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## Oceans and Coastal Resources: A Briefing Book

Oceans and Coastal Management Issues Team  
Congressional Research Service



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# OCEANS AND COASTAL RESOURCES: A BRIEFING BOOK

## SUMMARY

The United States and the international community have important interests in ocean and coastal resources involving such issues as pollution of the resource base, food from the sea, energy and mineral development, and marine transportation. Equally important, an understanding of oceanic processes and air-sea exchange is vital to scientific predictions of the timing and magnitude of projected global warming. A major concern is the impact increasing population, development, and other human activity will have on the oceans and coastal environment and what actions should be taken to better understand, define, and prevent unacceptable degradation.

The Congressional Research Service prepared the *Oceans and Coastal Resources Briefing Book* for use by a wide congressional audience with interests in oceans and coastal resources issues.

The briefing book contains short papers on selected oceans and coastal resource issues. Each paper contains an issue definition, background and analysis, status of the issue, questions, and references.

The papers are arranged under major subject headings:

- **Living Marine Resources,**
- **The Coastal Environment,**
- **Law of the Sea,**
- **Mineral and Energy Resources, and**
- **Antarctica.**

One appendix to this report contains the full text of Agenda 21, Chapter 17, of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in June 1992, outlining recommendations in 7 program areas dealing with the protection and sustainable development of the marine and coastal environment and its resources. Other appendices include a copy of the Oceans and Coastal Resources section of the *United States of America National Report* prepared by the executive branch for UNCED; and a selected listing of oceans and coastal resources statutes.

Because of the competing uses of oceans and coastal resources and the potential for increased degradation of the resource base, Congress and the public are likely to give increasing attention to these and other issues affecting these resources in the future.

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# OCEANS AND COASTAL RESOURCES: A BRIEFING BOOK

## INTRODUCTION\*

More than two-thirds of the Earth is covered with water, with oceans and inland seas accounting for almost 140 million square miles. The United States and its insular areas, such as Puerto Rico, Virgin Islands, American Samoa, Guam, have more than 13,000 miles of coastline, and the offshore U.S. Exclusive Economic Zone totals almost 3.4 million square miles.

The United States and the international community have important interests in ocean and coastal resources involving such issues as pollution of the resource base, food from the sea, energy and mineral development, and marine transportation. Equally important, an understanding of oceanic processes and air-sea exchange is vital to scientific predictions of the timing and magnitude of projected global warming. A major concern is the impact increasing population, development, and other human activity will have on the oceans and coastal environment and what actions should be taken to better understand, define, and prevent unacceptable degradation.

### Population Impact

In a joint statement on February 26, 1992, the U.S. National Academy of Sciences and Britain's Royal Society of London warned that actions are necessary to curb population growth and to modify human activities harming the environment to prevent "irreversible damage to the Earth's capacity to sustain life." The two academies further noted that "if current predictions of population growth prove accurate and patterns of human activity on the planet remain unchanged, science and technology may not be able to prevent irreversible degradation to the environment."

According to the Population Reference Bureau, Inc., world population is projected to double from 5.4 billion in 1991 to over 10 billion by the middle of the next century. World population increased from one to two billion from 1800 to 1930; but it took only 30 years to reach a population of three billion in 1960. Current population growth is estimated to increase by almost 100 million a year until the year 2020. In the United States, almost 50 percent of the population resides in coastal areas. From 1960 to 1990 the population of coastal areas increased from 80 to 110 million and is projected to reach 127 million by the year 2010. If these population trends continue, heavy demands will be placed on ocean and coastal resources, especially those resulting from population

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\*Prepared by Alfred R. Greenwood, Senior Analyst in Natural Resources Policy, Environment and Natural Resources Policy Division.

growth near the coasts, the need for food from the sea to satisfy world protein requirements, and the production of energy and minerals from offshore deposits.

### **Threats to Ocean and Coastal Resources**

Increasing evidence has been found of deterioration in ocean resources resulting from: sewage, chemical, and garbage disposal; runoff from agricultural and forested lands; exploitation of fishery resources; development of energy and mineral resources; and coastal infrastructure development.

In recent years, the United States has experienced a degradation of coastal water quality, a loss of wetlands, closure of beach and recreational areas, and pollution of fishery and shellfish resources that diminish the resource base, contaminate seafood, and endanger human health. It has been estimated that 70 percent of U.S. commercial and recreational fish and shellfish depend on estuaries and the coastal environment which is important to their life cycles. Toxic chemicals and sewage dumped into the Nation's coastal waters have contaminated harbors and waterways. A major source of pollution can be attributed to some 20,000 combined sewer overflows (CSOs), sewers that combine storm water and sanitary flows, which empty directly into rivers and coastal waters. Heavy rains and flooding in California in 1992 resulted in severe CSO overflows which forced the closing of 70 miles of beach along the coast adjacent to Los Angeles.

Increasing population concentration in coastal areas can be expected to result in even more intensive demands and impacts on ocean and coastal resources. Significant economic activity and growth has also occurred as coastal residential, commercial, and recreational development has accelerated in recent decades. For example, approximately 50 percent of annual U.S. residential construction during the previous two decades occurred in coastal areas. During the 1980's alone, 6.7 million housing units were constructed in coastal areas with Florida and California accounting for 45 percent of this growth.

Population growth and the attendant development of residential, industrial, commercial, and recreational facilities are likely to continue into the future and to continue to stress coastal ecosystems which are among the most productive on Earth. At the same time, this increasing concentration of development along the Nation's coasts poses a threat to life and property from major storms. For example, Hurricane Andrew, the most devastating natural disaster ever to strike the United States, roared across southern Florida and into the low lying coastal areas of Louisiana in August 1992, affecting the lives of more than 275,000 residents of these two States. Estimates of the enormous damage caused by the storm range from \$25 to \$30 billion. Hurricane Hugo, the 1989 storm that struck the U.S. Virgin Islands and Puerto Rico, and came ashore at Charleston, South Carolina, caused damage estimated at \$6 billion requiring approximately \$2.8 billion of Federal disaster assistance and insurance payments of \$400 million from the National Flood Insurance Program. If some scientists' predictions of global warming prove accurate, the attendant sea level rise severely would threaten many coastal communities. These predictions are likely

to stimulate significant debate at the local, State, and Federal level concerning the future development policies of the coastal zone.

### **Petroleum and Mineral Developments**

Against this background, there is renewed interest in the leasing and development of U.S. Outer Continental Shelf (OCS) oil and gas resources. At the same time, unless domestic energy production increases enough to keep up with energy demand, oil tanker traffic bringing foreign crude oil to the United States will continue to increase as will the potential for oil spills. In each case, the public is concerned with possible adverse environmental consequences.

While not a signatory to the United Nation's Convention on Law of the Sea, the United States has taken steps to align itself with some of its provisions by establishing a U.S. Exclusive Economic Zone (EEZ) extending 200 miles from the Nation's coasts and also extending the U.S. territorial sea from 3 to 12 miles. Under authority provided in the Deep Seabed Hard Mineral Resources Act of 1980 (P.L.96-283), the National Oceanic and Atmospheric Administration (NOAA) has issued exploration licenses to U.S. firms, although no commercial recovery has yet occurred. In this regard, legislation enacted in the 101st Congress (P.L.101-178) authorizes NOAA to develop regulations and environmental safeguards for ocean mining.

Many nations, including the United States, have been interested in Antarctica as a potential source of petroleum and other mineral resources. There has been disagreement about whether even regulated development should be permitted on this environmentally sensitive continent. The Protocol on Environmental Protection to the Antarctic Treaty would place a ban on the development of mineral resources in Antarctica and would preserve its environmental quality. Twenty-six consultative parties to the treaty currently are acting to ratify this measure. Thus far, Ecuador, France and Spain have taken such action.

### **United Nations Conference on Environment and Development**

Many of the issues discussed in this briefing book on Oceans and Coastal Resources have been addressed in the United States of America National Report published in preparation for the United Nations' Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in June 1992. The report concludes that the roles of economic development and environmental protection are inseparable and while much has been done to protect the environment, new environmental management strategies are needed. See Appendix B for the full text of the oceans and coastal resources section of the U.S. report.

At the conclusion of the UNCED on June 14, 1992, the Plenary session adopted Agenda 21, Chapter 17. Chapter 17 includes the protection of the oceans, all kinds of seas (including enclosed and semi-enclosed seas), and coastal areas and includes the protection, rational use, and development of their living resources. The session concluded that new approaches to marine and coastal

areas management and development at the national, subregional, regional, and global levels would be necessary over the next decade. Seven program areas were identified for international protection and sustainable development:

- integrated management and sustainable development of coastal areas, including exclusive economic zones;
- marine environmental protection;
- sustainable use and conservation of marine living resources of the high seas;
- sustainable use and conservation of marine living resources under national jurisdiction;
- critical uncertainties for the management of the marine environment and climate change;
- international and regional cooperation and coordination; and
- sustainable development of small islands.

Conference objectives were established for each program area. The conference secretariat made financing and cost estimates for 1993-2000. See Appendix A for the text of Agenda 21, Chapter 17, which is to be published by the United Nations this fall for use by the U.N. General Assembly.

Because of the competing uses of oceans and coastal resources and the potential for increased degradation of the resource base, Congress and the public are likely to give increasing attention to these and other issues affecting these resources in the future.

## SELECTED OCEAN AND COASTAL FACTS AND FIGURES

- **Oceans** and marginal seas account for nearly 71 percent of the Earth's surface.
- Almost 98 percent of the Earth's water is included in the oceans and sea ice. It is estimated that the oceans' current characteristics (i.e. salinity, density, etc) were formed more than 1.5 billion years ago.
- The average depth of the global ocean is more than 3,657 meters (12,000 feet).
- No sunlight penetrates below 1,000 meters (3,280 feet) of ocean depth.
- **World weather** and **long term climate change** are strongly linked to ocean behavior.
- The **ocean** is **an immense reservoir of heat**. To a depth of 2.5 meters (8 feet), the surface waters of the ocean hold as much heat as the entire atmosphere.
- **Continental shelves** account for approximately 8 percent of the entire oceanic area.
- Most of the major **fisheries** are located on the continental margins.
- The United Nations Food and Agriculture organization reported that 1989 **world commercial fishery landings** were a record 99.5 million metric tons.
- The U.S. commercial fishery catch totalled 4.4 million metric tons in 1990 and was valued at approximately \$3.6 billion. At the same time, the U.S. imported \$5.2 billion of fishery products.
- 56 percent of the U.S. fishery catch came from Alaskan waters.
- U.S. **seafood** consumption totalled approximately 15.5 pounds per person in 1990. Consumer expenditures totalled \$26.7 billion in 1990 (\$18.3 billion in food service establishments and \$8.2 billion at retail).
- U.S. **Aquaculture** production (catfish, trout, salmon, oysters, striped bass, etc.) totalled approximately \$700 million in 1988 and has been growing at an annual rate of 20 percent a year since 1980.
- In the United States almost 50 percent of the population resides in coastal areas.
- From 1960-1990, the population in U.S. coastal areas increased from 80 to 110 million and is projected to reach 127 million by the year 2010.

- Almost 27.4 million acres of *wetlands* are in the Nation's coastal areas accounting for 16 percent of coastal land areas.
- Coastal wetlands account for almost one-third of the Nation's total wetlands.
- Wetlands associated with estuaries provide food and habitat critical to 70 percent of U.S. marine commercial and sport fisheries.
- Approximately 50 percent of all coastal wetlands in the lower 48 States have been destroyed, averaging 40,000 acres of net loss per year.
- Billions of metric tons of silt, sewage, industrial waste, and chemical residues are discharged into the world's oceans. Rivers alone pour an estimated 9.3 billion metric tons of silt and other *wastes* into coastal waters each year.
- The major U.S. sources of *ocean pollutants* in 1986 included industrial (11 percent), municipal (56 percent) and nonpoint or runoff (34 percent).
- *Marine pollutants* include sewage (treated and untreated), marine litter, petroleum, synthetic organic compounds, metals, radioactive materials, etc.
- From the mid 1950s to the early 1980s world *offshore oil and gas production* went from negligible to approximately 14 million barrels per day (25 percent of world production).
- U.S. Outer Continental Shelf oil and gas production currently supplies 10 percent of the U.S. oil production and 25 percent of U.S. natural gas production.
- From 1970-1991, **royalty payments** from U.S. OCS oil and gas production to the U.S. Government totalled **\$88.9 billion**.
- Worldwide, sand and gravel are mined from numerous offshore locations for construction uses and beach replenishment. Millions of tons of sand are dredged annually off the U.S. coast for beach replenishment.
- *Mineral deposits*, such as manganese nodules, have been discovered in large concentrations in the north and south Pacific. Tracer deposits, which include chromite, platinum, titanium, and gold, can be found on the ocean floor within the U.S. EEZ, although no deep sea mineral mining currently is being undertaken within the EEZ.



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**SELECTED U.S. OCEAN AND COASTAL DATA**


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**COASTAL LAND AND WATER AREA****Exclusive Economic Zone (EEZ) area:**

Total EEZ: 3.36 million square nautical miles

**Estuarine Drainage Area:**

261,003 square miles (676,000 square kilometers)

**Coastal Wetlands:**

32,432 square miles (84,000 square kilometers), approximately 12 percent of total estuarine drainage area

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	Coastline (statute miles)	Exclusive Economic Zone (square nautical miles)
<b>Conterminous only:</b>	<b>4,993</b>	
Atlantic	2,069	253,800
Gulf	1,631	186,200
Pacific*	1,293	236,800
Alaska (total)	6,640	950,000
Hawaii	750	695,000
<b>Extra-territorial</b>		
Caribbean**	441	58,400
Pacific***	335	981,000
<b>Total</b>	<b>13,056</b>	<b>3,362,600</b>

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\* Excluding Hawaii, Alaska, American Samoa, Guam, and other U.S. insular areas.

\*\* Including Puerto Rico and the U.S. Virgin Islands.

\*\*\* Including only American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands.

**FISHERIES DATA****Commercial:**

- U.S. fisheries accounted for six percent of total world commercial fishery landings in 1989.
- 5.506 million tons (4.995 million metric tons) valued at \$3.89 billion were landed by U.S. commercial fishermen in 1990.
- 92,900 craft were used in commercial fishing activities in 1988.
- Approximately 274,000 men and women were engaged in commercial fishing full-time in 1988. An additional 90,000 persons were employed by 4,600 processors and wholesalers of fishery products.

**Recreational marine fisheries:** (data from Atlantic and Gulf of Mexico coasts only)

- Approximately 17 million U.S. marine recreational fishermen made 39.8 million fishing trips.
  - Approximately 231 million fish roughly 157,300 tons (143 million kilograms) were caught.
  - 86 percent of these fishing trips occurred within 10 miles (16 kilometers) of shore.
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**Source:** United Nations Conference on Environment and Development. *United States of America National Report, Oceans and Coastal Resources Section.* 1992. pp. 250-251.

## SELECTED U.S. OCEAN AND COASTAL DATA (continued)

## NON-LIVING RESOURCES

**Offshore Oil and Gas Production**

1.65 million square nautical miles of Outer Continental Shelf (OCS).\*

- In 1989, 50,952 square miles were under lease. Of that, 12,198 square miles were under exploration, development, or production for oil and gas.
- 8.5 billion barrels of oil and condensate were produced from Federal waters in the OCS between 1954 and 1989.
- 86.87 trillion cubic feet (2.46 trillion cubic meters) of natural gas were produced from Federal waters in the OCS between 1954 and 1989.

Year	Crude Oil (billion barrels)	Natural Gas (billion cubic feet)
1954	3.302	60.04
1972	411.856	3000.01
1989	305.169	4200.01

**Oil Spills Investigated by the U.S. Coast Guard in 1982, 1986, and 1989**

Year	Vessels** (barrels)	Non-vessels (barrels)	Total (barrels)
1982	90,466	157,126	247,592
1986	80,943	30,952	111,896
1989	***323,774	14,284	338,058

\* This is the Federal portion of the United States EEZ plus Continental Shelf Extensions by the Outer Continental Shelf Lands Act.

\*\* Includes tankships, tank barges and other vessels.

\*\*\* On March 24, 1989, the *Exxon Valdez* spilled 257,115 barrels of crude oil into Alaska's Prince William Sound.

**Source:** United Nations Conference on Environment and Development. *United States of America National Report*, Oceans and Coastal Resources Section. 1992. pp. 250-251.

## OCEAN RESEARCH FOR UNDERSTANDING GLOBAL CHANGE\*

### Issue Definition

The decade of the 1980s was one of significant oceanic discoveries and a new recognition of the importance of the world ocean in global environmental change. In fact, the last half of the decade was noteworthy in that a number of national and international programs and planning efforts were begun for new, cooperative, global studies that hold the promise of answering major questions about the world ocean and its role as a vital component of the Earth system. But will these new programs -- some planned, some underway -- actually take place as proposed?

### Background and Analysis

A more fundamental understanding of the structure and functioning of the Earth's natural systems and the forces that interconnect or change them is now widely regarded as essential to protecting global habitability. Recently, for example, a perceived need has emerged to study the climate system of the Earth, largely because of scientific findings that project future depletion of Earth's protective ozone layer or a possible warming of Earth's climate. A better understanding of the possible ramifications of such projections for human health and welfare and for the land and aquatic biospheres has led to an international consensus among scientists, who propose that the Earth's natural systems are best studied as one interacting whole. In such an "Earth systems science" approach, the biosphere is studied together with the atmosphere, the world ocean, the land surface, the polar regions, and the Sun. This approach, scientists explain, gives them the best chance of describing and understanding the interactive physical, chemical, and biological processes that regulate the total Earth system, the unique environment it provides for life, the changes occurring in this system, and the manner in which these changes are influenced by human actions.

Nowhere has the value of such an approach been more evident than in the conjugate study of atmosphere and ocean. The ocean has a profound influence on climate change, both because of its huge capacity to store heat and because it can moderate concentrations of atmospheric constituents believed to control average global temperatures.

World weather and long-term climatic change are strongly linked to oceanic behavior. Heat released by the ocean in a region remote from where it was absorbed interacts with the overlying atmosphere, moderating daily and seasonal cycles of temperature on the Earth's surface and helping to shape regional weather and climate. Furthermore, the scientific debate over excess concentrations of certain atmospheric trace gases and projected global warming

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\*Prepared by John Justus, Specialist in Earth and Ocean Sciences, Science Policy Research Division.

clearly would be incomplete, much less capable of resolution, without proper recognition of the major role played by the world ocean, both as a factor in climate maintenance and as a major actor in the variability and change of Earth's climate over decades to centuries to millennia. A better understanding of the interaction between the ocean and the atmosphere is necessary, if predictions of global change are to be based on sound scientific judgment and, particularly, if forecasts of monthly, seasonal, and interannual climatic variability are to be meaningful and accurate for the public and for policymakers.

With the beginning of the 1990s, there is a demonstrable interest and commitment among many countries and groups of countries around the world to contribute funds and in-kind support for ocean science. With this support, the international scientific community is mounting global scale initiatives to observe and understand the world ocean, employing new technology, instruments, and techniques for observing the state of the ocean and for measuring oceanic constituents, properties, and processes, both remotely and *in situ*. Coupled with vastly expanded capabilities in microelectronics and computer technology for sensing, transmitting, processing, analyzing, and disseminating the data, there is the prospect of major advances in describing and understanding oceanic behavior.

### **Status of the Issue**

Several ambitious field programs are being coordinated by such international organizations as the United Nations Environment Program (UNEP); the U.N. World Meteorological Organization (WMO); the U.N. Educational, Scientific, and Cultural Organization (UNESCO); and the International Council of Scientific Unions (ICSU). These programs include: the Global Ocean Observing System (GOOS); the World Climate Research Program (WCRP); Global Energy and Water Balance Experiment (GEWEX); International Satellite Cloud Climatology Project (ISCCP); World Ocean Circulation Experiment (WOCE); Tropical Ocean/Global Atmosphere Program (TOGA); International Global Atmospheric Chemistry Program (IGAC) and the Global Tropospheric Chemistry Program (GTCP); Joint Global Ocean Flux Study (JGOFS); Global Ocean Euphotic Zone Study (GOEZO); Land-Ocean Interactions in the Coastal Zone; Atlantic Climate Change Program; Arctic System Science Program (ARCSS); Greenland Sea Project; Marginal Ice Zone Experiment (MIZEX); Global Ocean Ecosystem Dynamics Program (GLOBEC); and International Geosphere-Biosphere Program (IGBP). These global programs employ space-borne observations for measuring oceanic wind stress, sea level variability, wave height, sea surface temperature and topography, ice sheet topography, oceanic circulation, gravity, and color of the sea surface for chemical information and biological productivity. Simultaneous collection of surface and subsurface data from research vessels and platforms is pursued in direct support of the oceanographic components of these programs and also for corroboration with the data received from the satellite leg of these missions.

U.S. national support for and participation in these projects is integrated under the Global Ocean Science Program (GOSP), an interagency effort coordinated under the auspices of the Federal Global Change Research Program and focused on five key areas: (1) global ocean structure and dynamics; (2) atmosphere-ocean interactions that drive global climate; (3) global ecosystems and productivity processes; (4) the global ocean lithosphere and geoprocesses; and (5) processes in the coastal margins and polar oceans. The GOSP is conducted under the cooperative leadership of the National Research Council and the Federal agencies with major ocean science interests and responsibilities: Department of Energy, Environmental Protection Agency, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, National Science Foundation, U.S. Geological Survey, and the U.S. Navy. Through a White House interagency coordinating body called the Committee on Earth and Environmental Sciences (CEES), these agencies in conjunction with the Office of Management and Budget have implemented a coherent program of focused global ocean science research. This program is comprised of enhancements of existing programs plus some new starts and is carried out in the scientific context of active national and international planning to support broader studies of global environmental change.

When space-borne data from these global-scale, international observing programs are complemented with data obtained from accompanying remote sensing technologies such as drifting buoy arrays, moored data buoy platforms, subsurface drifters, surface floats, and acoustic tomography networks, the potential exists for observing the ocean three-dimensionally on basin scales to near global scales. This, however, presents challenges in terms of cost, infrastructure requirements, and scale of operations.

### **Questions**

Global change programs are receiving high priority in the funding plans of many nations; however, there are likely to be more programs being planned than could be funded adequately by the mechanisms and arrangements used in the past.

1. Even if programs are stretched out and appropriately sequenced, are the physical resources and facilities adequate for, or national policy drives commensurate with, sustaining the research initiatives over time frames sufficient to yield clear scientific results, much less process and interpret the vast streams of data to yield meaningful information for policymakers and the public?
2. What are some of the improvements, if any, in the infrastructure that would be needed to sustain these scientific efforts or to conduct them in ways that are better, faster, and cheaper: e.g., global measurement systems already in place? New *in situ* measuring techniques and instruments, such as autonomous underwater vehicles and unmanned aircraft? New supercomputers, and new communications technologies and networks for

delivering data as needed to researchers and operational users? Newly developed and validated models to use the new global data sets?

3. Regarding present and future satellite instrumentation, what, for example, is the status of such key supporting missions as the NASA scatterometer (NSCAT), and the SeaWiFS ocean color sensor? Does the current design configuration for NASA's Earth Observing System (EOS) adequately address the research and instrumentation needs of the ocean science community, or might some of those needs and science requirements be addressed in a more timely and budget conscious fashion with small satellites dedicated to specific missions?
4. The joint French-U.S. satellite mission to measure ocean-surface "topography", TOPEX-Poseidon, was successfully launched in August 1992 and has been mapping global ocean circulation on a routine basis since September 1992. This project has been judged to have had a successful beginning and is well underway to observing global ocean circulation for 3 to 5 years. Given the promising results obtained by the TOPEX-Poseidon mission thus far and the need to maintain observations of ocean circulation and sea-level changes over decades to help understand climate change, how might a series of altimetric missions with the TOPEX-Poseidon level of accuracy, or better, be implemented? Cooperatively? Multinationally? Appropriate steps to design and implement such a program jointly among principals could serve as a timely contribution to the International Global Ocean Observing System (GOOS) currently being planned under the auspices of the U.N. World Meteorological Organization (WMO), the U.N. Intergovernmental Oceanographic Commission (IOC), the United Nations Environment Program (UNEP), and the International Council of Scientific Unions (ICSU) auspices.
5. What are the special needs, if any, of the Federal and academic fleet and laboratory centers and of special large facilities to support the U.S. GOSP? Moreover, how would any needed improvements be funded?
6. The long-term nature of the research portended makes it especially vulnerable to instability in support, and interruptions might lead to disbanding active research teams, in and out of Government, which might not easily be reassembled. Viewed against the backdrop of policies for fiscal restraint and deficit reduction, many programs supported with Federal funds, including the GOSP, seem likely to feel pressure in budget reduction exercises. What research strategies will best serve the national interest in a period of budgetary stress? What options have or could be examined for maintaining a functioning ocean research enterprise while reducing the deficit? Can support be assured for the future of the longer term programs?
7. To what extent might outside participation of a direct or in-kind nature be anticipated from private entities (e.g., labs, institutions, industry) as possible partners in sponsoring and funding portions of the U.S. GOSP?

- Should creating university-industry alliances and establishing Government-industry or Government-university cooperative institutes of partnerships be investigated?
8. Many policymakers are attracted to international collaboration because it is a way of saving U.S. dollars. Concerns arise, however, over the possibility that foreign partners might gain a "free ride" on U.S. technological expertise. In these collaborative ocean science projects, to what extent is the United States gaining access to foreign technical expertise or facilities, and are our international partners sharing equitably in the burden of funding and implementing projects?
  9. Concerns also may arise among potential international partners over the performance record of the U.S. Government in funding large, international science projects. To what extent might this discourage some nations from cooperative involvement with the United States in ocean science projects?
  10. What efforts have been made or what programs exist at the international level to facilitate involvement of developing country scientists productively and meaningfully in many of these ocean science programs?
  11. Another issue that speaks to continuity of program is that of manpower, education, and training. Who will do ocean science in the next century? Who is in the talent pool? The emerging field of global change research might suffer far reaching consequences if young talent is neither attracted nor retained. This issue bears further consideration and study in the executive, congressional, and academic sectors.
  12. Might the harmonizing process of "Europe 1992" and the associated sense of unity foster the creation of new organizations to facilitate cross frontier cooperation in oceanic research? Could such new organizations be considered as possible vehicles for developing new fiscal and material resources in oceanography that might be tapped by the ocean science community?

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## WHALE CONSERVATION\*

### Issue Definition

The United States is a member of the International Whaling Commission (IWC), within which strong U.S. advocacy for whale conservation often conflicts with other nations' desires to harvest whales commercially. Most recently, evaluation by IWC scientists indicates that several whale populations are of sufficient size that limited commercial harvest could be sustained. The United States has relied upon unilateral sanctions to encourage whaling nations to give greater consideration to whale conservation. Because of larger whale population estimates, however, the issue is how to craft U.S. whale conservation policy now that foreign demands for limited harvesting can no longer be countered purely by scientific arguments that harvesting will compromise whale population recovery. If the United States argues for continuing the moratorium on commercial whaling, it may have to rely increasingly on moral and ethical appeals. A second concern is whether, when other nations harvest whales contrary to IWC guidelines, the currently available options for United States' response are adequate.

### Background and Analysis

Under the auspices of the International Whaling Commission (IWC), the United States and other whaling nations cooperatively allocated whale harvesting quotas as provided for under the 1946 International Convention for the Regulation of Whaling. In 1972, the United States enacted the Marine Mammal Protection Act (MMPA) and prohibited commercial whaling by U.S. citizens. During the 1970s, U.S. efforts in international bodies shifted to advocacy for better whale conservation, and other non-whaling nations joined the IWC to support these conservation efforts. To encourage international fish and wildlife conservation, the United States enacted two measures providing for possible unilateral economic sanctions -- the 1971 Pelly Amendment (22 U.S.C. 1978) to the 1954 Fishermen's Protective Act, which allowed fish and wildlife product imports to be prohibited from nations acting to diminish the effectiveness of international fish and wildlife agreements; and the 1979 Packwood-Magnuson Amendment (16 U.S.C. 1821) to the Fishery Conservation and Management Act of 1976, which allowed the United States to reduce or suspend fishing privileges in U.S. waters for nations acting contrary to IWC guidelines.

Early U.S. whale conservation policy was based on scientific uncertainty concerning whale abundance, whose estimation depended on the rate at which whale populations might be recovering from earlier exploitation. Beginning in 1935 with bowhead, right, and gray whales, the predecessor to the IWC had started prohibiting the harvest of large whale species. By 1980, harvesting focused almost entirely on smaller species such as minke whales, which had

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heretofore not been extensively harvested. In addition, the Indian Ocean was proclaimed a whale sanctuary where all harvesting was prohibited.

Most recently, environmental interests have sought to broaden U.S. policy on whale conservation to include moral and ethical reasons for extending the current moratorium on commercial harvesting, and to more fully recognize the non-consumptive values (*i.e.*, non-lethal scientific research, tourism) of whales (57 *Federal Register* 4603, Feb. 6, 1992).

The number of IWC members supporting whale conservation increased steadily until 1982, when this organization proclaimed a moratorium on all commercial whaling, fully effective in 1986. The IWC was to review comprehensively the effects of the moratorium by 1990 and to consider whether to modify the moratorium and re-establish harvest quotas for some species or populations. Concurrently, new management procedures were to be developed which would guard against future over-exploitation. To continue whale research, which the IWC allowed during the moratorium, Japan and several other nations self-issued permits for scientific research involving the killing of minke, fin, and sei whales from several populations. However, the IWC repeatedly asked these nations to reconsider their research plans to minimize lethal takes, and conservationists attacked this research as a means of circumventing the intent of the moratorium. Since the IWC had no power to force nations to abide by its guidelines, the United States repeatedly initiated action under the authority of the Pelly Amendment threatening unilateral economic sanctions against nations which acted contrary to IWC guidelines. Although Pelly Amendment sanctions have never been imposed, the United States has obtained important concessions from offending nations to improve whale conservation.

Despite the moratorium on commercial whaling, several nations continue to kill whales for "scientific research". Japan continues a research program on minke whales in the Antarctic, killing about 300 whales annually. Although Norway announced in April 1991 that its harvesters would take no more whales, this nation resumed scientific research on whales in 1992, killing 93-95 northeast Atlantic minke whales, and continued this research program in 1993 with the intent of killing 136 minke whales.

Late in 1991, a General Agreement on Tariffs and Trade (GATT) dispute panel came to a decision that could diminish the future effectiveness of unilateral environmental sanctions imposed by the United States. The dispute panel determined that the United States had exceeded its authority under GATT by imposing sanctions on Mexico for excessive dolphin mortalities during tuna harvesting conducted outside U.S. jurisdiction. The dispute panel action made the use of the Pelly Amendment to encourage whale conservation problematic, since specific language in the Pelly Amendment limits its use to situations in which the import prohibitions contemplated would be acceptable under GATT.

Annual IWC meetings during the early 1990s focused on crafting acceptable new management procedures, as well as on status reviews of key populations on

which some nations sought to resume commercial harvesting. The 1992 IWC meeting was particularly contentious as the Commission took the first steps to end the six-year moratorium and permit a limited resumption of commercial whaling on biologically healthy whale stocks. Citing the IWC's slow action on resumption of commercial whaling, Iceland withdrew from IWC membership and Norway announced that it would begin commercial harvest of northeast Atlantic minke whales in 1993. Both Japan and Norway believe the IWC estimates of minke whale population abundance (760,000 in the Antarctic and 86,700 in the northeast Atlantic) indicate that these stocks can sustain a limited commercial harvest. Japanese officials cite the traditional importance of whale products in Japanese culture as reason for continued interest in resuming commercial whale harvesting.

### **Status of the Issue**

Meeting in May 1993 in Kyoto, Japan, IWC commissioners voted to deny a quota of 50 minke whales for coastal Japanese harvesters, to direct a working group to study a French-proposed Antarctic whale sanctuary which will be considered at the 1994 meeting in Puerto Vallarta, Mexico, and (by a margin of 18-6) to extend the moratorium on commercial whaling for another year. Norway reaffirmed its unilateral decision to resume commercial whaling, despite the IWC action. Subsequently, Norway announced a commercial quota of 160 minke whales for the 1993 season, to be taken in addition to its research harvest. At least one environmental group asked consumers to boycott Norwegian products. Some suggest that European public opinion against commercial whaling could complicate Norway's bid to enter the European Community on Jan. 1, 1995, and anti-whaling groups threaten a boycott of the 1994 Winter Olympics scheduled for Lillehammer, Norway.

In the 102nd Congress, §201 of P.L. 102-582 expanded Presidential authority under the Pelly Amendment to pursue sanctions against non-fisheries imports from nations acting contrary to IWC guidelines. In the 103rd Congress, H.Con.Res. 34 passed both the House and Senate. The resolution supported extending and strengthening the IWC's moratorium on commercial whaling.

### **Questions**

1. How do the Japanese and others interested in commercial whaling respond to the moral and ethical concerns for whale conservation?
2. Should the International Whaling Commission's decisions be based on good science, or should factors related to politics or moral and ethical appeals also be considered?
3. Should the United States press for whale conservation objectives based on moral and ethical grounds if this approach adversely affects relations with important allies?
4. In order to increase our scientific knowledge of whales, what types and levels of research should be allowed?

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## SHRIMP FISHERY CONCERNS\*

### Issue Definition

Sea turtles, most species of which have been declared threatened or endangered, may be inadvertently caught and drowned in trawl nets pulled by fishing vessels harvesting shrimp. The United States has reduced sea turtle mortality by requiring U.S. fishing vessels to use turtle excluder devices (TEDs) in their shrimp trawls to reduce the likelihood of turtles being caught and drowned, but turtle mortalities from foreign shrimp vessels may still be substantial. However, the use of TEDs reduces the efficiency of shrimp trawling, and some shrimpers say the economic impacts are severe.

### Background and Analysis

Sea turtle conservation became a concern in the late 1970s and early 1980s. All five sea turtle species inhabiting State and Federal waters are protected under the Endangered Species Act of 1973. Prior to current sea turtle conservation efforts, at least 11,000 sea turtles (and probably several times this estimate, according to the National Academy of Sciences) were killed each year by shrimp trawlers in U.S. waters. For the Kemp's ridley sea turtle, annual mortality was estimated to have exceeded the number of females which came ashore to lay eggs.

In 1990, after much litigation, TEDs became mandatory from March 1 through November 30 in the Gulf of Mexico, and from May 1 through August 31 in the South Atlantic (54 *Federal Register* 37812, Sept. 13, 1989). Some shrimpers claim that TEDs can reduce shrimp harvest 30 percent or more; the Federal Government says its tests indicate an average 10 percent reduction in harvest. Domestic shrimpers are heavily squeezed by low-cost imports, which provided more than 77 percent of the total U.S. shrimp supply in 1991. To assist both sea turtles and U.S. shrimpers, §610 of P.L. 101-162 prohibited imports of shrimp after May 1, 1991, from nations whose fishing practices adversely affect sea turtle conservation. The U.S. Government published standards for determining foreign compliance (56 *Federal Register* 1051, January 10, 1991; subsequently revised -- 58 *Federal Register* 9015, February 18, 1993), and action has been taken to ban some shrimp imports. However, environmental groups believe the U.S. Government has not acted expeditiously to sanction all harmful foreign shrimping practices, and have filed suit to force the imposition of additional sanctions. Although these sanctions have not been challenged under the General Agreement on Tariffs and Trade (GATT), some question their acceptability.

Reducing the incidental bycatch of fish in shrimp trawls may necessitate additional controls on shrimp harvesters. Harvesters criticize gear modification

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to address bycatch if the modified gear is less efficient in catching target species, as has been reported for TEDs. Managers, on the other hand, suggest that if harvesters learn to use modified gear properly, little loss in efficiency should occur. A 1990 amendment to the Magnuson Act, §110(c) of P.L. 101-627, authorized a three-year study of the affects of bycatch from Gulf and South Atlantic shrimp trawlers, and prohibited Federal regulations to reduce shrimp trawl bycatch prior to 1994. In October 1992, North Carolina became one of the first States to require shrimp trawlers to use a finfish excluding device (FED, also called a bycatch reduction device, or BRD) in each trawl fished in State waters, primarily to reduce pressure on grey trout stocks.

### **Status of the Issue**

On Dec. 4, 1992, the National Marine Fisheries Service (NMFS) published new TED regulations (57 *Federal Register* 57348) requiring all shrimp trawlers more than 25 feet in length in the Gulf and South Atlantic to use TEDs year-round in offshore waters. By Dec. 1, 1994, all inshore shrimpers must also begin using TEDs. These regulations will be phased-in over a period of 2 years; strict Coast Guard enforcement of the initial phase began almost immediately. Some shrimpers continue to insist that requiring TEDs constitutes a legislative taking, and that they are due compensation.

In response to U.S. efforts to encourage better turtle protection measures by nations exporting shrimp to the United States, 13 of the 14 foreign nations which harvest shrimp with trawls in the wider Caribbean supplied sufficient information concerning comparable programs for protecting turtles by the May 1, 1991 deadline. Thus, imports were prohibited only from Suriname, which exports little shrimp to the United States; Suriname was subsequently found to be in compliance. These certifications extend for one year and must be renewed annually. In 1992, French Guiana was not certified as in compliance. In 1993, French Guiana, Honduras, Trinidad and Tobago, and Suriname were not certified as in compliance (58 *Federal Register* 28428, May 13, 1993); Trinidad and Tobago subsequently supplied information to verify compliance. By May 1994, all fourteen nations must require TEDs if they wish to continue exporting shrimp to the United States. However, the Earth Island Institute filed suit early in 1992 against the U.S. Government seeking to force the immediate imposition of sanctions against all Caribbean and non-Caribbean shrimping nations which do not use TEDs.

In the 102nd Congress, P.L. 102-567, the NOAA Authorization Act of 1992, included §310 requiring NMFS to complete a comprehensive economic study and report to Congress on the Gulf and South Atlantic shrimp industry to guide future policy decisions related to this fishery. A total of \$1 million was authorized for FY1993. In addition, S. 47 and H.R. 1478 were introduced to moderate the impacts of TEDs use by shrimp harvesters by providing tax credits and authorizing funds for expanded efforts to artificially culture sea turtles. No action was taken on either of these measures.

Within the FY1993 appropriations for NMFS (P.L. 102-395), \$716,000 was provided specifically for conservation engineering/bycatch research. The Gulf and South Atlantic Fisheries Development Foundation used a \$600,000 Saltonstall-Kennedy grant, awarded in early summer 1991, to develop a plan to reduce finfish bycatch in the shrimp trawl fishery. In addition, incidental catch/bycatch research for shrimp trawl fisheries was identified as the priority issue for funding in the 1993 MARFIN (Marine Fisheries Initiative) Program for the Gulf of Mexico administered by NMFS.

### Questions

1. What are the short- and long-term potential impacts of TED regulations on employment and the local economies of Gulf coast communities and counties?
2. Will enforcement of the restrictions on shrimp imports potentially allow domestic shrimp harvesters to improve their economic situation? What will be the cost to consumers?
3. What is the extent of the economic disruption of the shrimp industry caused by TED regulations? To what extent have sea turtles benefitted from greater use of TEDs?
4. How effective are alternative means of enhancing sea turtle survival (*e.g.*, sea turtle hatcheries and headstarting programs)? Would these alternatives be less detrimental to the shrimp industry? What might be the costs for each turtle reared to adulthood by these alternative means?
5. How has the Department of State interpretation of the P.L. 101-162 import sanction provisions affected foreign acceptance of TEDs?

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## HIGH-SEAS DRIFTNETS\*

### Issue Definition

In the quest for an efficient harvest, fishing fleets around the world employ a variety of fishing technologies. Some vessels have deployed driftnets measuring many tens of miles in length to ensnare a portion of this harvest -- squid and pomfret were sought in the North Pacific. The United States and conservation interests worldwide became concerned with the incidental mortality of large volumes of non-target marine life (*e.g.*, sea birds, marine mammals, sea turtles, and non-commercial fish) in these nets. Mounting concern led to adoption of an international accord to prohibit the use of large-scale (*i.e.*, length exceeding 1½ miles) driftnets. Enforcing this international prohibition is a challenge.

### Background and Analysis

Driftnets hang like curtains of unattended netting from floats and may stretch tens of miles in length. This fishing gear can ensnare anything which blunders into its meshes. Fishing vessels leave these nets overnight, retrieve the entangled catch, and reset this gear for another harvest. The nonspecific nature of the harvest and the wasted bycatch spark intense criticism of this fishery.

Japan, Taiwan, and the Republic of Korea fished extensively with high seas driftnets in the Pacific. Under the Driftnet Impact Monitoring, Assessment, and Control Act of 1987 (Title IV, P.L. 100-220), the United States negotiated independent bilateral agreements with these three nations to better monitor driftnet fishing in the North Pacific Ocean. On November 24, 1989, 20 nations of the South Pacific adopted the Wellington Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific. On December 22, 1989, the U.N. General Assembly adopted by consensus a non-binding resolution (Number 44/225) calling for an end to driftnet fishing in the South Pacific by July 1, 1991, and a worldwide cessation on use of this gear one year later, unless effective conservation and management measures were taken to guide this gear's use.

The Driftnet Act Amendments of 1990 (§107, P.L. 101-627) implemented the U.N. moratorium, supported South Pacific efforts, and directed that work continue on negotiations to obtain a permanent ban on destructive fishing practices. Meanwhile, other nations began to use large driftnets in the Mediterranean Sea.

In response to continued concern for high-seas driftnetting and in the face of initial resistance by Japan and others, the U.N. General Assembly adopted a second resolution concerning high-seas driftnets. After negotiations, Japan

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indicated a willingness to end driftnet fishing, and on December 20, 1991, the U.N. General Assembly agreed to a U.S.-sponsored non-binding resolution (Number 46/215) which halved driftnet fishing by June 30, 1992, and unconditionally banned all high-seas driftnet fishing after December 31, 1992.

### **Status of the Issue**

Japan, Taiwan, and the Republic of Korea have ceased fishing with driftnets. However, continued driftnet fishing by Chinese vessels presents a continuing enforcement problem; several Chinese vessels were detected fishing with driftnets in the North Pacific in May 1993, and were intercepted by the U.S. Coast Guard.

To increase the effectiveness of U.N. resolutions prohibiting large-scale driftnet fishing, Congress enacted the High Seas Driftnet Fisheries Enforcement Act (P.L. 102-582). Measures to accomplish this intent included denial of U.S. port privileges to foreign driftnet vessels, mandatory sanctions on fish products from countries that continue driftnet fishing beyond the U.N. deadline, and expanded Presidential authority under the Pelly Amendment (22 U.S.C. 1978) to the 1954 Fishermen's Protective Act to pursue sanctions against non-fisheries imports. As of early June 1993, none of these provisions had been invoked.

### **Questions**

1. How much effort should be devoted to developing alternatives to driftnets for harvesting living marine resources on the high seas with minimized incidental non-target bycatch; and how should such a program be financed?
2. What is the status of research on quantifying and assessing the impacts of driftnet harvesting and in evaluating alternative solutions?
3. How does the magnitude of high-seas driftnet bycatch compare with bycatch rates in domestic fisheries, such as salmon gillnetting, groundfish trawling, and shrimp trawling?
4. What technologies from the Department of Defense and elsewhere can be used to improve enforcement of the worldwide prohibition of high seas driftnet fishing?

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## MINIMIZING OR USING FISHERIES WASTES\*

### Issue Definition

In the process of harvesting seafood, fish and other marine life which are not target species also may be caught. This bycatch often does not survive the rigors of harvesting and is discarded, providing no benefits. Success in addressing two waste and bycatch issues (dolphin mortality by the tuna industry and high seas driftnetting) has encouraged a growing constituency to seek to minimize, or productively use, this bycatch.

### Background and Analysis

Bottom trawls scour and damage bottom habitat; shrimp trawls can capture almost ten times as much bycatch as marketable shrimp; tens of thousands of juvenile halibut are killed by the Alaska pollock, flatfish, and cod trawl fisheries; Alaska pollock carcasses have been discarded as waste after roe is removed from females or when size is deemed too small for efficient processing; and many non-target species (including birds and marine mammals) die in gillnets. These and other instances of poor utilization are becoming increasingly scrutinized as circumstances in which environmental damage might be minimized, waste might be transformed into an economically profitable product, and the image of the commercial fishing industry could be enhanced. In fact, with many fishery stocks harvested at rates near or exceeding their maximum yields, waste utilization may represent one of the few remaining ways to increase the production of protein from marine resources during the 21st Century. However, inefficient and non-selective fishing gear encourages bycatch, while the minimal economic value of most bycatch impedes its beneficial use.

In response to increasing problems with Gulf of Mexico finfish populations, the 101st Congress enacted §110(c) of the Fishery Conservation Amendments of 1990 (P.L. 101-627). This provision focused on incidental harvest concerns with shrimp trawling, establishing a three-year program to assess incidental harvest by shrimp trawling and evaluating gear technology alternatives for reducing this incidental mortality. The Federal Government is prohibited from implementing certain measures to reduce incidental harvest in the shrimp trawl fishery prior to 1994.

### Status of the Issue

In the 102nd Congress, P.L. 102-582 dealt with enforcement of the worldwide prohibition on using high-seas driftnets, and incidental harvest was raised as a concern in H.R. 2588 dealing with declining weakfish populations. No action was taken on this second measure in the 102nd Congress, although

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interjurisdictional fisheries legislation encompassing these concerns was reintroduced as H.R. 2134 in the 103rd Congress.

Within the FY1993 appropriations (P.L. 102-395) for the National Marine Fisheries Service (NMFS), \$716,000 was provided specifically for conservation engineering/by-catch research. The Gulf and South Atlantic Fisheries Development Foundation used a \$600,000 Saltonstall-Kennedy grant, awarded in early summer 1991, to develop a plan to reduce finfish bycatch in the shrimp trawl fishery. In addition, incidental catch/bycatch research for shrimp and other fisheries was identified as the priority issue for funding in the 1993 MARFIN (Marine Fisheries Initiative) Program for the Gulf of Mexico administered by the NMFS.

### **Questions**

1. How much marine protein is wasted annually by the U.S. commercial fishing industry? How much of this might be productively recovered and utilized?
2. What incentives might encourage the fishing industry to pay more attention to waste minimization or use, or should penalties for excessive waste be invoked under certain circumstances or for certain segments of the fishing industry?
3. Might fisheries waste utilization programs be linked with national welfare or supplemental feeding programs to provide food to address dietary deficiencies?
4. What is the prospect that changing market or trade patterns, evolving consumer preferences, or product engineering breakthroughs might alter the demand and/or economic situation for bycatch?

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## DOLPHIN PROTECTION ISSUES\*

### Issue Definition

Since dolphins and related porpoises inhabit most U.S. marine waters, they are a very visible barometer of how effectively marine mammal protection laws are being implemented. Current issues involve interactions with seafood harvesters, swim-with-the-dolphin programs, dolphin feeding, military use of dolphins, epidemic mortalities of dolphins, and cooperative international management.

### Background and Analysis

At least 44 species of dolphins and porpoise are recognized by marine scientists. These warm-blooded, air-breathing mammals inhabit most marine environments from equatorial to sub-arctic waters, while a few Asian and Latin American species are restricted to freshwater drainages. Most common species along the U.S. coasts are bottlenose and Atlantic white-sided dolphin (Atlantic Ocean); bottlenose and spotted dolphins (Gulf of Mexico); bottlenose, Pacific white-sided, and common dolphins (Pacific Ocean); and Dall's porpoise, harbor porpoise, and killer whales (coastal Alaska). Three species of dolphin have been declared endangered under the provisions of the U.S. Endangered Species Act - the vaquita (Gulf of California harbor porpoise), the Chinese river dolphin, and the Indus River dolphin.

Public concern for better protection of dolphins and porpoises encouraged initial congressional attention to marine mammal legislation. The 1972 Marine Mammal Protection Act (MMPA, P.L. 92-522, 16 U.S.C. 1361 *et seq.*) proclaimed a moratorium on taking (defined to include harassment, hunting, capturing, or killing, or attempts to do any of these) of marine mammals. The Act provides that the moratorium on taking can be waived for specific purposes (excluding public display and scientific research, for which permits may be issued), if the taking will not harm the affected species or population. It provides that permits may be issued to take any marine mammal species, including endangered, threatened, and depleted species, for purposes of scientific research. These permits must specify numbers and species of animals to be taken as well as times, dates, places, and methods of taking. It also provides that permits may be issued to take non-depleted species in the course of commercial fishing operations and for public display.

The Act also provides that U.S. citizens who engage in certain activities (*e.g.*, offshore oil and gas exploration and development) may be exempted from the waiver and permit requirements to allow incidental, unintentional taking of small numbers of marine mammals after notice and opportunity for public comment. The National Marine Fisheries Service (NMFS) within the National

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Oceanic and Atmospheric Administration (U.S. Department of Commerce) is responsible for MMPA regulations affecting dolphins and porpoises.

In the eastern tropical Pacific (ETP) Ocean, large yellowfin tuna congregate beneath schools of dolphin, especially common, spotted, and spinner dolphins. In order to capture these tuna, harvesters encircle dolphins (and hopefully the tuna swimming beneath) with large purse seine nets. Initial use of this technique resulted in extensive dolphin entanglement and death in the nets; more than 500,000 may have been killed in 1960 alone. Under a series of MMPA permits granted the tuna seiners, fishing techniques were modified and dolphin mortality declined. In the late 1980s, the tuna seiners operated under an annual quota which permitted not more than 20,500 dolphin deaths. Although mortalities by U.S. vessels have decreased markedly, total dolphin mortalities increased with expanding foreign tuna seining under less stringent regulations. For 1990, incidental dolphin mortalities in the ETP totaled 5,083 by U.S. vessels and 47,448 by foreign vessels. In June 1992, the United States and other tuna harvesting nations formally adopted a multilateral program to reduce the international dolphin mortality in the ETP to less than 5,000 by 1999 through the establishment of annual mortality limits. However, this program could be superseded if the moratorium authorized by P.L. 102-523 (see following section) is concluded.

The U.S. Navy has captured and trained Atlantic bottlenose dolphins for use in sonar research and to act as mine hunters and "watchdogs" at naval facilities in Vietnam and the Persian Gulf, and possibly at U.S. nuclear submarine facilities. Annual capture of as many as 25 dolphins is authorized by Congress in §1354 of P.L. 99-661 (10 U.S.C. 7524) -- the National Defense Authorization Act for Fiscal Year 1987. This legislation has been criticized by animal rights interests because it allows the program to disregard provisions of the MMPA. More recently, P.L. 102-172 directed the Navy to, and appropriated funds for, release back into the wild of captive marine mammals no longer required.

### **Status of the Issue**

MMPA amendments in 1988 (P.L. 100-711) sought to reduce dolphin deaths attributed to foreign tuna seining by requiring nations exporting tuna to the United States to employ more stringent dolphin protection measures. Importation of Mexican tuna (as well as tuna from several other nations) was prohibited in October 1990 under this provision, after U.S. District Court action. However, Mexico protested this action as contrary to U.S. obligations under the General Agreement on Tariffs and Trade (GATT), and a dispute panel reported in August 1991 favoring Mexico. Under a subsequent court order early in 1992, U.S. tuna import sanctions were extended to a host of intermediary nations.

Late in 1992, Congress enacted P.L. 102-523 clarifying the definition of an intermediary nation to reduce the number of countries adversely affected, making it illegal to sell tuna which is not dolphin-safe after March 1, 1994, and authorizing negotiation of a moratorium on harvesting tuna by surrounding

dolphins; Venezuela and Mexico previously indicated that they would adhere to such a moratorium. If a moratorium agreement is reached, the U.S. tuna fleet's authorization to set nets around dolphins will expire on March 1, 1994. More importantly, the environmental community believes GATT concerns with MMPA tuna sanctions are made moot by this legislation.

On April 12, 1990, three major U.S. tuna canners announced that they no longer would accept and sell tuna harvested in association with dolphins. Legislation was introduced to mandate a labeling program for canned tuna to identify whether or not it was harvested in a "dolphin-safe" manner. Title IX of P.L. 101-627, the Dolphin Protection Consumer Information Act, established standards for labeling canned tuna as "dolphin-safe" and called for negotiations to eliminate tuna seining on dolphins. In response to this action, almost all U.S. tuna seiners have ceased fishing for tuna with seines in the ETP, and have emigrated to the Western Pacific where tuna do not congregate beneath schools of dolphins. The High Seas Driftnet Fisheries Enforcement Act, P.L. 102-582, prohibited the importation of tuna which is not dolphin-safe.

In 1985, NMFS permitted the first of four enterprises currently offering recreational swimming in controlled conditions with captive Atlantic bottlenose dolphins. Environmental groups argued this activity was unacceptable under the MMPA. NMFS evaluated these programs in 1990 (55 *Federal Register* 28081, July 9, 1990), and decided to continue the existing permits for further evaluation, but to withhold permits from new applicants. NMFS has initiated a dolphin behavioral study to further evaluate existing swim-with-the-dolphin programs, and expects this study to be completed by the end of 1993.

In 1988, concern developed over promotion of tourist cruises which feed dolphins for the sole purpose of encouraging human-dolphin encounters. NMFS prohibited this activity (56 *Federal Register* 11693, March 20, 1991) as an illegal taking under the MMPA which might disrupt normal dolphin behavior patterns. However, a Corpus Christi tour operator took legal action against NMFS (*Strong v. United States*), and on Sept. 30, 1992, the District Court judge prohibited NMFS from enforcing these regulations for dolphins. NMFS is interpreting this court ruling as applicable to all U.S. waters, while considering whether to appeal the decision.

As a result of numerous deaths, public concern has over the health of marine mammals and their ecosystems has increased. In 1987-88, more than 740 bottlenose dolphins died and were washed ashore on the Atlantic coast. In late 1988, Congress requested a study and held a hearing (House Merchant Marine, Serial No. 101-20). The study implicated toxic algal blooms as a possible causal factor in the mortalities. Other studies noted that some animals had very high levels of anthropogenic contaminants and argued that they may have been a causal factor. Since the 1987-88 die-off, a number of other deaths have further elevated public concern. In 1990, there was an increase in the number of stranded bottlenose dolphins in the Gulf of Mexico, and in early 1992, large numbers of bottlenose dolphins stranded in a two-county area in Texas. In 1990-91, a die-off of striped dolphins occurred in the Mediterranean.

**Questions**

1. Should the United States encourage the International Whaling Commission to give more attention to dolphin protection concerns, and if so, how?
2. To what extent do dolphins directly compete with humans for fishery resources? To what degree does this competition pose an economic problem for certain fisheries?
3. To what extent does public education and contact with dolphins increase or diminish our ability to protect dolphins?
4. To what extent should experimentation using dolphins to assist humans to accomplish otherwise difficult work in the marine environment be allowed?

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## MARINE MAMMAL - FISHERIES INTERACTIONS\*

### Issue Definition

Since marine mammals feed on living marine resources, human harvesting of fish and shellfish can result in the taking of marine mammals. Since any taking of marine mammals is regulated under the authority of the Marine Mammal Protection Act (MMPA), such fisheries interactions are carefully scrutinized. A primary objective of the MMPA is to reduce marine mammal mortalities and injuries from commercial fishing operations to insignificant levels approaching zero. Thus, how best to minimize marine mammal mortality caused by fishing is a controversial issue.

### Background and Analysis

In response to an incidental take permit for Dall's porpoise granted to the Japanese North Pacific high seas salmon gillnet fleet, a lawsuit was filed by environmental groups and Alaska fish harvesters (*Kokechik Fisherman's Association v. Secretary of Commerce*). In June 1987, a Federal court injunction halted the Japanese salmon fishery. This decision was upheld in subsequent appeals all the way to the U.S. Supreme Court, on the grounds that optimum sustainable population levels had not been determined for several marine mammal species that might be caught, and thus it could not be determined whether or not these marine mammal populations were depleted. This decision provided the basis for potentially successful challenges to MMPA incidental take permits for many domestic fisheries. Thus, MMPA amendments enacted in 1988 addressed this issue by providing a blanket incidental take exemption for domestic commercial fisheries through FY1993, while requiring that the National Marine Fisheries Service (NMFS) develop a new regime for regulating incidental marine mammal take in these fisheries after October 1, 1993.

To obtain necessary data on which to base this new regime, NMFS assigned all domestic commercial fisheries to one of three different categories, depending upon the likelihood of encountering and taking marine mammals. In fisheries assigned to Category I, in which encounters with marine mammals were believed most likely, fishing vessels were required to carry observers, if requested, to obtain data on the interactions. These data were to provide the basis for developing new regulatory regime.

### Status of the Issue

As required by the 1988 MMPA amendments, the Marine Mammal Commission (MMC) developed draft guidelines to govern the taking of marine mammals incidental to commercial fishing, received public comment on these guidelines, and delivered revised guidelines to the NMFS on July 12, 1990.

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After considering these guidelines, the NMFS published a proposed regulatory regime on May 24, 1991 (56 *Federal Register* 23958-23964), and solicited public comment. One of the most controversial elements of the NMFS proposal was the concept of allowable biological removal, in which a numerical maximum total annual removal from each marine mammal population would be specified, and these removals would be allocated among user groups. Responding to comment, the NMFS announced its revised proposal on November 20, 1991 (56 *Federal Register* 61231-61232), and changed its basic concept to focus on potential biological removal, which does not prejudice whether this may be allowable.

After additional modifications, the proposed regime was forwarded to Congress by NMFS on December 4, 1992. The proposed regime provides a system for working with all available information, incorporating new data from monitoring and assessment programs, and including substantive participation by scientific and public groups. The proposal consists of comprehensive stock assessment programs, potential biological removal (PBR) determinations and allocations among all known user groups, and monitoring and enforcement. The regime provides for: 1) the goal of maintaining marine mammal stocks at their optimum sustainable populations; 2) identifying fisheries that take depleted, endangered or threatened marine mammal stocks, or remove individuals from a stock whose current level of take, from all sources, exceeds its calculated PBR; 3) calculating PBRs from stock assessment data; 4) allocating PBRs among user groups; 5) authorizing and regulating takes from endangered, threatened, and depleted stocks through a small-take application process; 6) monitoring of marine mammal takes during fishing operations; 7) permitting takes through a registration-application system; 8) enforcing allocations; and 9) retaining the zero mortality goal.

A counter-proposal, concluded by representatives of seven conservation organizations and more than 30 commercial fishing industry groups on June 10, 1993, offered an alternative to the NMFS approach. The counter-proposal would not require fishing vessel registration, would not classify individual fisheries, would place the burden of proof on the Federal Government to prove that marine mammal stock would be harmed by commercial fishing activities, and would establish conservation teams for marine mammal species requiring special management. However, a coalition of about 20 other conservation groups expressed concerns that the counter-proposal would set a dangerous precedent by providing a means whereby threatened and endangered marine mammals could be killed during commercial fishing, and by allowing the killing of "nuisance" marine mammals. NMFS faulted the counter-proposal for authorizing the incidental taking of marine mammals unless the Secretary of Commerce demonstrates that such taking would be detrimental to marine mammal populations. Congress responded with the introduction of H.R. 2760 providing for a new regime incorporating elements of both the NMFS proposal and the fishing industry-conservation group alternative. However with time running out as the October 1, 1993 deadline approached, H.R. 3049 was introduced to extend the Interim Exemption through April 1, 1994 and to allow more time for Congress to craft an acceptable new regime.

**Questions**

1. How stringently should the United States seek zero mortality and injury to marine mammals, given increasing economic costs?
2. Should the United States increase funding for research on the degree to which some human activities indirectly harm marine mammals by altering ecosystems (e.g., large commercial harvests of fish upon which marine mammals feed)?
3. What funding will be necessary to implement the new regime to regulate incidental taking of marine mammals during commercial fishing?

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## OCEAN FISHERIES AND THE MAGNUSON ACT: IMPLEMENTATION AND REAUTHORIZATION CONCERNS\*

### Issue Definition

In 1991, U.S. commercial fish harvesters landed more than 10.1 billion pounds of fish and shellfish. Of this total, almost 5.8 billion pounds was taken from Federal waters beyond State jurisdiction. The Magnuson Fishery Conservation and Management Act (MFCMA) of 1976, as amended, governs Federal management of fisheries outside coastal State waters to 200 miles offshore. Legislation to reauthorize this Act is under consideration during the 103d Congress, potentially including an extensive package of amendments to the parent law.

### Background and Analysis

The enactment of the Fishery Conservation and Management Act (FCMA) of 1976 (later renamed the Magnuson Fishery Conservation and Management Act (MFCMA) for the late Senator Warren G. Magnuson) ushered in a new era of marine fisheries management for the United States. The MFCMA was signed into law on April 13, 1976, after several years of debate on extending fisheries jurisdiction. On March 1, 1977, fisheries resources within 200 miles of all U.S. coasts came under Federal jurisdiction, and an entirely new multifaceted regional management system began allocating harvesting rights, with priority given to domestic enterprises. Exclusive Federal management authority was vested in the National Marine Fisheries Service (NMFS) within the National Oceanic and Atmospheric Administration of the Department of Commerce. The 200-mile fisheries conservation zone was superseded by an Exclusive Economic Zone (EEZ), proclaimed by President Reagan on March 10, 1983 (Presidential Proclamation 5030).

Under provisions of the MFCMA, eight Regional Fishery Management Councils were established for the New England, Mid-Atlantic, South Atlantic, Caribbean, Gulf of Mexico, Pacific, Western Pacific, and North Pacific regions. The eight Councils prepare fishery management plans (FMPs) for those fisheries, both commercial and recreational, which they determine to require active Federal management. An environmental assessment or environmental impact statement is prepared for every FMP submitted. After public hearings on these plans, revised FMPs are submitted to the Secretary of Commerce for approval. Implementing regulations are published in the *Federal Register*. Completed plans may be amended and revised through similar procedures. Together these Councils have implemented 35 FMPs for various fish and shellfish resources, with 6 additional plans being developed. Some plans are created for individual or a few closely related species (e.g., FMPs for northern anchovy by the Pacific Council and for shrimp by the Gulf of Mexico Council).

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Others are developed for unrelated species in similar habitats (e.g., FMPs for Gulf of Alaska groundfish by the North Pacific Council and for reef fish by the Gulf of Mexico Council). Many of the implemented plans have undergone subsequent amendment (one has been amended 25 times), and four plans have been developed and implemented jointly by two or more Councils.

Initially under MFCMA authority, a substantial portion of fishery resources in offshore waters under Federal jurisdiction was allocated for foreign harvest. However, foreign allocations have been reduced as domestic fish harvesting and processing industries have expanded. Under the MFCMA, foreign harvests from the U.S. EEZ declined from about 3.8 billion pounds in 1977, to only about 12 million pounds in 1991. Commensurate with the decline of foreign harvest, domestic offshore catch increased from about 1.56 billion pounds (1977) to more than 5.79 billion pounds (1991). Thus, the percent of fish harvested by foreign nations from the U.S. EEZ declined from 71 percent in 1977 to about 0.2 percent in 1991.

Since 1977, total offshore fisheries harvest from the U.S. EEZ increased about 24 percent to a peak of 6.65 billion pounds annually in 1986-1988, but has subsequently declined 13 percent to 5.79 billion pounds in 1991. Currently, the largest offshore fishery, in terms of volume landed, is Alaska pollock, with more than 2.8 billion pounds harvested in 1991. By value, Gulf of Mexico shrimp (more than \$270 million) and Alaska pollock (more than \$238 million) were the leading fisheries in 1991. Of 153 species groups of U.S. fish assessed by NMFS, 65 (42%) are overutilized, and another 57 groups (37%) are considered to be fully utilized.

### **Status of the Issue**

Legislation introduced during the 102nd Congress dealt primarily with localized issues. P.L. 102-130 contained a section which deleted a MFCMA provision requiring that a fishery management plan (FMP) be prepared for Atlantic striped bass in the EEZ. Title III of P.L. 102-251 provided for fisheries management in the isolated pocket of international waters (the "donut hole") in the Bering Sea between waters under U.S. and Russian jurisdiction. P.L. 102-567 mandated several fisheries studies, established a shellfish research program, authorized funding for NMFS fisheries programs (Title III), implemented an international treaty on salmon management in the North Pacific (Title VIII), and enhanced enforcement and provided for underutilized species development off New England (Title IX). P.L. 102-582 provided for fisheries enforcement for U.S. vessels operating outside U.S. jurisdiction in the Central Bering Sea (Title III), and repealed the user fee on recreational boats (Title V). P.L. 102-587 approved a fisheries agreement with Estonia (Title I) and implemented an international treaty on salmon management in the North Pacific (Title VIII).

Early in the 103rd Congress, H.R. 780 was introduced, providing for reauthorization of MFCMA appropriations without additional amendments to the Act. During MFCMA reauthorization, however, many issues are likely to be debated in a regional, rather than national, context. Some of the more

controversial issues include: 1) increasing attention to conservation of fish stocks and restoration of overharvested populations; 2) assuring that Regional Council representation and decisions are fair and balanced; 3) clarifying when and how fisheries overcapitalization should be addressed through limiting access; and 4) removing the restriction on fee collection to permit user fees and other charges which could be directed to fund conservation and management activities. Other prominent issues may include increasing emphasis on preservation of ecosystem health and long-term resource productivity, modifying FMP criteria, directing more attention to bycatch concerns, enhancing data collection, and providing more effective enforcement. Some of these issues have arisen repeatedly, and the MFCMA has been amended previously in attempts to resolve them.

### **Questions**

1. What modifications, if any, are needed to revise the MFCMA to meet the demands of a totally domestic fishery in the EEZ?
2. What lessons were learned from legislating on specific FMPs in previous reauthorizations of the MFCMA? Does congressional involvement in intimate Council management issues indicate a need for modification of Council authority?
3. Does the MFCMA adequately balance the competing demands for conservation and development of marine living resources? If not, what modifications of the Act would help achieve this balance?
4. Does the current system of membership on Regional Fishery Management Councils facilitate or hamper rational management decisionmaking for EEZ fishery resources?

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## SEAFOOD SAFETY AND INSPECTION\*

### Issue Definition

Unlike meat and poultry, seafood is not subject to mandatory, continuous Government inspection for safety and wholesomeness. While recent research has tied consumption to some health benefits, seafood also has been associated with a number of illnesses caused by chemical or biological contaminants. Some consumer advocates have argued that many types of fish and shellfish pose a significant public health risk and that a new, more aggressive inspection program should be enacted to deal with the problem. Others have countered that most seafood is safe to eat and that current programs are adequate or simply could be operated more effectively. At issue are the need for such an effort, whether new legislation should mandate it, and the appropriate type of program and administering agency, among other things.

### Background and Analysis

Several consumer groups have argued that fish and shellfish pose a major health risk because, unlike meat and poultry products, they are not required to undergo rigorous Federal inspection. Opponents of major changes believe that more inspection would be too expensive and impractical for seafood, which is harvested in the wild rather than raised on farms, and involves a far more diverse industry than meat and poultry. At any rate, opponents argue that more government inspection would not necessarily mean a safer product.

Seafood already is subject to Federal inspection, but under a system markedly different from that for meat and poultry. The Federal Meat Inspection Act and the Poultry Products Inspection Act require U.S. Department of Agriculture (USDA) inspectors to be in plants at all times of operation to conduct "continuous" inspection; that is, to examine virtually every head of cattle, sheep, swine and goat, and every chicken, turkey, goose, and duck at slaughter, and to visit daily all plants that further process them into edible products.

Although seafood is not subject to mandatory continuous inspection, several Federal and State agencies have responsibilities to assure its quality and safety under a number of existing laws. The Department of Health and Human Services' Food and Drug Administration (FDA) has a broad mandate under the Federal Food, Drug, and Cosmetic Act to assure the safety of all foods in interstate commerce, including seafood. FDA also works cooperatively with States and industry in a voluntary shellfish sanitation program. The Commerce Department's National Marine Fisheries Service (NMFS) offers, for a fee, voluntary seafood inspection, mainly as a marketing and quality rather than safety program. The Environmental Protection Agency (EPA) has primary

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responsibility for reducing water pollution, a source of many seafood-borne contaminants.

What is the risk of eating seafood? The National Academy of Sciences (NAS) in early 1991 released a study concluding that most seafoods available to consumers are wholesome and unlikely to cause illness. A study of Federal health data found that, from 1978 to 1987, for all foodborne illnesses, seafood-borne illnesses constituted 10.5 percent of all *outbreaks* (incidents involving two or more sick persons) but 3.6 percent of all *cases* (single ill persons). This compares with beef at 4 percent of all cases, turkey at 3.7 percent, pork at 2.7 percent, and chicken at 2.6 percent.

However, if all shellfish were excluded from the data, fish-related illnesses would have represented just 1.2 percent of all foodborne illness cases during the period. NAS reported that the overwhelming majority of seafood illness is related to the consumption of raw or undercooked molluscan shellfish (clams, oysters, mussels), which pick up pathogenic bacteria and viruses (often but not always from sewage) in the water. Most other seafood-related illnesses are due to naturally-occurring toxins in finfish--ciguatera that certain reef-dwelling fish acquire in the water, and scombroid poisoning that occurs through mishandling of some species after harvest. Chemical contamination of fish is more difficult to document because its effects are longer-term. One of NAS's general conclusions is that most seafood health hazards are tied to conditions in the environment (as opposed to, for example, processing).

### **Status of the Issue**

Advocates of seafood inspection legislation were unable to win enactment of seafood inspection legislation in the 101st or 102nd Congress, despite intensive deliberations and relatively widespread agreement among consumer and industry groups, and many lawmakers, that a more aggressive program would be desirable. Among other obstacles were disagreements over: which department (Health and Human Services, Commerce, or USDA) should have the lead; how stringent and comprehensive a new program should be; whether standards could and should be set for chemical and microbiological contaminants; and the cost of such a program, including who should pay for it.

Although interest in such legislation has extended into the 103rd Congress, prospects for passage of a bill are uncertain at best. As of early June, only one seafood safety bill (H.R. 1412, establishing a National Shellfish Safety Program) had been introduced into either the House or Senate.

Meanwhile, FDA has been using existing legislative authority to strengthen its current fish and shellfish safety programs. Early in 1993, the agency announced that it soon would publish regulations requiring much of the industry to adopt so-called "Hazard Analysis Critical Control Point" (HACCP) procedures. These procedures analyze health and safety risks, determine where risks can be controlled in production and handling, and concentrate oversight resources on those points. The agency received an increased appropriation to

create a new Office of Seafood in 1991 and, in 1992, had completed a round of special safety inspections of the roughly 4,000 U.S. seafood plants. The agency gave 95 percent of the plants a "clean bill of health" and found "readily correctable" problems at the remaining plants.

### Questions

1. What is the most appropriate type (and level) of seafood inspection, particularly in light of the NAS findings on hazards and risks? Is the current array of programs, including the new regulatory initiative by FDA and NMFS, adequate to address these hazards and risks? If not, should legislation be enacted to close current gaps in the system?
2. If legislation is considered, should it be aimed at modifying existing programs, or is an overhaul warranted?
3. Would an enhanced effort of any type actually provide consumers with a safer supply of seafood than currently?
4. Which agency or agencies should be responsible for seafood inspection, whether in its present or some modified form? If inspection changes are relatively minor, could the current roles of NMFS, FDA, and USDA remain basically the same? If major changes are deemed appropriate, who should be given the new duties -- USDA, which already inspects other flesh foods? FDA, which monitors the safety of all other foods; NMFS, which already works with the seafood industry on a voluntary basis; or a combination of all three?
5. Given that NAS's chief findings pinpoint environmental reasons for the most important health hazards, should Government oversight focus on environmental controls, including monitoring waters and those who harvest from them? What role should EPA play, if any?
6. Since molluscan shellfish are the source of the preponderance of seafood-borne illnesses, should any new program be focused on that source? Might improvements in the existing Federal-State-industry shellfish program suffice?
7. What would be the practical aspects of implementing a new program? Because the seafood industry is far more diverse than meat and poultry, with hundreds of fish species already on the market, would it be difficult to establish standards for all the potential chemical and microbiological contaminants? Can methods be developed now to rapidly test for all such contaminants?
8. How much might the design of a more aggressive program be governed by cost factors? How would it be funded? Do current Federal budget constraints limit the extent of any new effort funded by taxpayers? What about user fees?

9. How would new inspection requirements affect the structure and performance of the industry itself? Is it likely that any new industry compliance costs would be passed through the marketing chain to consumers? What would be seafood's competitive position relative to other flesh foods like meat and poultry?
10. There is a consensus that imports (accounting for more than half of all U.S. seafood consumption) should be subject to the same standards as U.S. products, but how can these imports be monitored without violating international trade rules?

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## COASTAL DEMOGRAPHICS AND DEVELOPMENT PATTERNS\*

### Issue Definition

Population in the United States continues to concentrate along the coasts, with a declining portion remaining in the heartland. Over the next 20 years, population in coastal counties is projected to increase from 80 million to 127 million. As the population grows and retires, coastal locations are increasingly attractive destinations. These retirees, as well as others who prefer coastal locations, in turn, attract supporting businesses and industry.

At issue is how to deal with the environmental impacts of this growth. Many coastal areas that attract development are also very fragile, and development can disrupt coastal ecosystems and destroy economic and ecologic values. The result is that many of the very qualities that attract more people to the coast are being reduced or destroyed. There is interest in examining innovative ways to protect these environments and resources so that the attracting qualities will remain for future generations.

### Background and Analysis

The National Oceanic and Atmospheric Administration reviewed population trends along the coasts from 1960 to 2010 in a 1990 report. This analysis examined coastal county and coastal state population trends using Bureau of Census data up to 1988 and projections into the future. The results are striking.

When examining the 451 coastal counties of the country (there are more than 3000 counties or their equivalents in all), the analysts found that a growing portion of the population has been and continues to concentrate in coastal areas. At the State level, among the leaders in growth in absolute numbers between 1960 and 2010 are California (19.2 million), Texas (11.6 million), and Florida (11.2 million). The leaders in percentage change over the same time period will include Florida (226 percent) and Alaska (208 percent). The study predicts that while overall growth will slow over the next 20 years, it will remain slightly greater in coastal areas than in non-coastal areas. It concludes that 17 of the 20 States with the greatest population growth for this 50-year period will be coastal states.

Coastal growth is not equally distributed. While coastal Oregon and Washington counties, for example, are likely to grow relatively slowly, coastal areas in the South are likely to grow rapidly. In terms of absolute increases in population between now and 2010, eight coastal counties in Florida and California are projected to be among the ten most rapidly growing ones in the entire country. The result of past and future patterns of growth is that

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population density in most coastal States and many coastal counties is much higher than the national and State averages, respectively. The most densely populated coastal areas include the northeastern States between Massachusetts and Pennsylvania, Florida, California, and Ohio and Illinois along the Great Lakes.

The pattern of growth has changed in recent decades, and in ways that threaten more coastal resources. Until the 1960s, growth was concentrated in urban areas and their suburbs; obvious examples include New York City, Miami, Los Angeles, and Chicago. While these urban concentrations greatly stressed coastal systems, they encompassed only a relatively small portion of the total coast. Starting in the 1950s, for a variety of reasons, coastal development rapidly spread to more rural coastal areas. Reasons for this dispersal include an increase in general affluence and demand for second homes and vacation destinations, improved transportation systems (especially the interstate road network) and a growing number of retirees seeking amenity areas. This growth has been explosive in some areas; Cape Cod, Massachusetts and Hilton Head, South Carolina are but two of many possible examples of this change.

Another important characteristic of this change is that, while much of the earlier growth had taken place along protected and semi-protected areas, especially harbors and ports, much of the new development has taken place along the open coast. This newer development can disrupt dynamic beach systems, and has put rapidly-expanding private and related public investment at risk from coastal storms and changing coastal profiles. Florida's experience in 1992 with Hurricane Andrew could be a precursor of the magnitude of coastal problems that could be caused by future hurricanes. The direct effects on public and private investment, and residual costs such as the availability of insurance for coastal property in southern Florida, indicate the high cost that can accompany coastal development.

### **Status of the Issue**

As the average age of the population continues to increase, along with the overall population, there is every reason to anticipate that demand for development in coastal areas will continue to grow. Congressional interest will center not on the demographics, *per se*, but on the possible effects of more people in coastal areas. Congress has already addressed aspects of these concerns through programs such as the Coastal Zone Management Act, National Flood Insurance Program, and various infrastructure and environmental protection programs. Recent amendments show how these concerns have changed since these programs were first enacted. Two conclusions are apparent when one examines the current array of Federal programs. First, some may work at cross purposes; some encourage development (in the broadest sense), while others discourage it. Second, there is no coherent approach to recognizing and responding to current demographic trends in national policy discussions. But efforts to define a coherent and consistent national approach likely will increase as more people choose to move to coastal areas.

**Questions**

1. Should Congress use demographic trends as a basis for developing more consistent Federal policies toward development in coastal areas?
2. Can Federal policies be used to encourage a sounder and safer pattern of future development in coastal areas?
3. Should Congress be more concerned with demographic predictions in setting policy? If so, how can Congress more effectively integrate this information into the policy process?

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## COASTAL WETLANDS\*

### Issue Definition

Wetlands, areas where upland and water environments overlap, are concentrated in some coastal areas, especially along the south Atlantic and Gulf coasts. The various values that are unique to these areas have been increasingly appreciated in recent years, but at the same time, a portion of the remaining acreage is being destroyed or damaged by development and other activities. The particulars of the issue vary from place to place, but the forces at work are generally the same. At issue is the effectiveness of various Federal (and State) wetlands protection efforts. Some activities are regulated through a permit program administered by the U.S. Army Corps of Engineers under §404 of the Clean Water Act, but this provision deals only with disposal of dredge or fill material. Protection advocates are seeking a broader wetlands statute. Both protection advocates and development interests also debate whether coastal wetlands deserve specific recognition, both as an important subset of all wetlands, because of their different hydrologic and biologic properties and because of concentrated modification pressures.

### Background and Analysis

Coastal wetlands occur in a wide variety of forms, but they all have distinctive plant assemblages because of the wetness of the soil. Many coastal wetlands are flooded daily as the tide rises and falls. The value of coastal wetlands depends on location, size, and relationships with adjacent land and water areas. Wetland values can include:

- habitat for aquatic birds and other animals;
- habitat for rare or endangered species;
- production of fish and shellfish;
- water storage, including limiting the effects of floods;
- water purification;
- recreation;
- timber production;
- food production;
- education and research; and
- open space and aesthetic values.

Usually wetlands provide a mix of these values; no single wetland provides all of them at the same time. Many of these values decline when wetlands are altered. In addition, alterations at some distance can affect wetlands because they are part of larger water systems. For example, in coastal areas, conversion of wetlands to urban uses can increase the cost of flood damage because wetland areas typically provide natural storage and slow the release of flood waters.

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Wetlands have been disappearing at a rapid rate through most of this country's history. The U.S. Fish and Wildlife Service estimates that only 104 million acres remain of the 220 million that were here when the country was first settled. More recently, the Service has estimated that the current rate of loss (between the mid-1970s and the mid-1980s) is about 290,000 acres per year. This is a significant decline from an earlier survey, from the mid-1950s to the mid-1970s, when the loss rate averaged nearly 500,000 acres per year.

Coastal wetlands are probably disappearing less rapidly than all wetlands for two reasons. First, many of the conversions have been to drain these lands for agriculture; coastal wetlands, especially in salt water environments, are not attractive sites for agricultural production. Second, efforts to protect wetlands in this country focused on coastal areas initially; there is a relatively strong and lengthy tradition of Federal and State efforts to protect coastal wetland areas. In a study of wetlands loss in the Mid Atlantic States between the 1950s and 1970s, the U.S. Fish and Wildlife Service concluded that coastal wetland losses were much smaller than the inland wetland losses. The major causes of coastal wetland loss were identified as urban development and encroachment by coastal waters caused by impoundments, dredging projects, and rising sea level. (By contrast, the major causes of freshwater wetlands loss were other development, agriculture, and ponds.)

Expansion of coastal waters at the expense of wetlands is a problem in many areas. The most notable, because of the sheer magnitude of both the amount of loss and the reservoir of remaining wetlands that could be lost, is Louisiana. Estimates of annual wetland loss range up to about 60 square miles (38,000 acres). High loss rates are partially attributed to natural phenomena, including sea level rise and settling of the land. But in the case of Louisiana, it is also attributed to several human factors, including dredging channels through the wetlands that have disrupted water flows, and impediments upstream on the Mississippi River and its tributaries that have halted the flow of sediments and altered the rates and patterns of fresh water flows around its delta.

### **Status of the Issue**

Wetlands are currently a major national issue as the 103rd Congress debates alternative proposals to amend the Federal permit program under §404 of the Clean Water Act and as the National Academy of Sciences studies wetland delineation issues. Controversy over wetlands protection was pronounced under the Bush Administration, which attempted to implement a general policy of no net loss while trying still to satisfy environmental development constituencies.

The wetlands issue temporarily abated until the Clinton Administration announced its positions on possible revisions to §404 in August 1993, and until the National Academy of Sciences completes its delineation study. Many interests, however, believe that the status quo is temporary, and that program and policy changes must occur. There has been no indication that the Clinton Administration will give wetlands high visibility as the Bush Administration did,



lending to much of the subsequent debate. While there were more than 24 days of wetlands hearings in the 102nd Congress, the 103rd Congress has given little attention to wetlands to date.

### **Questions**

1. Is a new and more encompassing Federal wetlands statute needed to replace the §404 program?
2. Should coastal wetlands receive special attention within Federal wetland protection efforts because of the extreme pressures they are under and because of their unique biological and hydrological characteristics?
3. Can the full diversity of coastal wetlands be recognized through a single Federal program?
4. Should wetlands protection efforts recognize classes of wetlands based on functions and values?
5. Should State and Federal wetlands protection efforts be better integrated?

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## MARINE SANCTUARIES PROGRAM\*

### Issue Definition

The national marine sanctuaries program, authorized in 1972 through Title III of the Marine Protection, Research, and Sanctuaries Act (MPRSA), allows for the designation of protected areas in Federal and State coastal and ocean waters for multiple purpose use. At issue for Congress is reauthorization of the program and possible amendments that address perceived program problems. Specific issues of concern are whether or how to regulate activities outside a marine sanctuary that may adversely affect the protected values within, streamlining the designation process, new designations, whether to broaden designation criteria, funding, and whether to allow oil and gas leasing as a permissible activity within a designated sanctuary.

### Background and Analysis

The national marine sanctuaries program is administered by the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). As of 1992, NOAA had designated 13 sanctuaries (11 exist now because of subsequent combining of sanctuaries in Florida). NOAA is considering other sites for designation.

Congress enacted the 1972 legislation because of public concern over oil spills and increased dumping of waste materials into coastal waters. The sanctuaries program offers a unique Federal mechanism to provide comprehensive regulation, planning, and management of defined marine areas to assure long-term preservation of the specified resource values.

Other Federal laws may provide protection for single purposes within the same area, but do not provide the comprehensive protection that accompanies sanctuary designation. Examples of other interactive Federal laws are the Outer Continental Shelf Lands Act, as amended, Comprehensive Oilspill Liability Act of 1990, Marine Mammal Protection Act, Endangered Species Act, Clean Water Act, Title I of the MPRSA (Ocean Dumping Act), Coastal Zone Management Act, and Federal historic preservation laws.

Congress amended Title III of the MPRSA in 1980, 1984, 1988, and 1992. The 1980 amendments (P.L. 96-332) gave veto authority to the adjacent States and Congress for a designation or any of its terms. The amendments also required that the terms of designation include the characteristics of the area that give it conservation, recreational, ecological, or aesthetic value. The 1984 amendments (P.L. 98-498) changed the procedures by which sanctuaries were selected and designated -- requiring the consideration of specific factors (historical, research, or educational were added to the four existing values),

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wider consultation, environmental studies, and compatible multiple use. The 1988 amendments (P.L. 100-627, Title II) contained provisions for compensation for destruction or loss of, or injury to, sanctuary resources. Of specific interest were the vessel liability provisions, which could be applied to oil spills or other actions that damage marine sanctuary resources.

The 1992 amendments (P.L. 102-587, Title II) prohibited activities outside a marine sanctuary that adversely may harm the protected values within, prohibited offshore oil and gas leasing within specified designated sanctuaries, improved the timeliness of sanctuary designation (which many claimed had been too slow and inefficient), designated three new sanctuaries, broadened designation criteria, and authorized funding for FY 1993 through FY 1996.

### **Status of the Issue**

The next reauthorization of Title III of the MPRSA is expected in 1996. Until that time, the House Merchant Marine and Fisheries Committee and the Senate Commerce Committee are likely to hold oversight hearings. At this time, there are no significant issues that the next reauthorization needs to resolve.

### **Questions**

1. Should the designation process be further streamlined? Critics point out that Congress designates land-based parallels--such as national wildlife refuges, parks, and wilderness areas--and suggest that Congress should designate marine sanctuaries and allow NOAA only to manage them. Pressure to allow Congress to designate marine sanctuaries is propelled, in part, by criticism that the current process includes excessive delay and duplication of effort, and in part because some of the affected parties believe that their concerns do not receive adequate attention. Previous changes to improve the site selection and designation process to require more consultation, opportunities for public input, environmental analysis, and resource assessment may better accommodate affected interests, but inadvertently have resulted in a longer designation process. Additionally, Congress, through the authority of provisions in the 1980 amendments, may veto a designation or any of its terms if both Houses adopt a concurrent resolution disapproving the unacceptable items. When Congress has taken advantage of this provision, as it did in the Cordell Bank NMS designation, it lengthens the process further.
2. Should new designations be made? If new designations are made, will there be adequate funding available for the existing as well as new designations? Sanctuary designation largely was placed on hold during the 1980s, due to a combination of bureaucratic problems in the sanctuary designation process which delayed the designation of candidate sites and Reagan Administration opposition to the program.
3. Should the sanctuary designation criteria be broadened? The various amendments to the sanctuary program have broadened the factors that

could be considered in site selection or designation; the House reauthorization would have broadened these factors to include cultural qualities, international significance, and research.

4. Is the funding for the program adequate? When enacted in 1972, Congress authorized \$10 million per year. Congress has never appropriated this amount of money for the program, and currently the program is funded at half this amount. Environmentalists (and a NOAA-commissioned study) have recommended that an adequate level of funding for the current program would be \$30 million per year. If new sanctuaries are designated, however, additional funds may be required. Reauthorization legislation would increase funding, although not to \$30 million, and would provide authority for donations to be used in sanctuary management.

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**ESTUARINE RESEARCH RESERVE SYSTEM\*****Issue Definition**

The Estuarine Research Reserve System, created as an element of the Federal Coastal Zone Management Program, encourages States to set aside examples of the Nation's coastal biogeographical regions for research and education. This program has proven popular; 21 sanctuaries have been designated, and 5 additional proposals are being considered. At issue is whether these sites are being used for the purposes that Congress intended, and, if not, how can Congress help resolve these shortcomings. The designated sanctuaries are listed below.

Padilla Bay (WA)	Hudson River (NY)
South Slough (OR)	Chesapeake Bay (MD)
Elkhorn Slough (CA)	Chesapeake Bay (VA)
Tijuana River (CA)	Sapelo Island (GA)
Waimanu Valley (HI)	Jabos Bay (PR)
Old Woman Creek (OH)	Rookery Bay (FL)
Wells (ME)	Appalchicola Bay (FL)
Great Bay (NH)	Weeks Bay (AL)
Waquoit Bay (MA)	North Inlet, Winyah Bay (SC)
Narragansett Bay (RI)	Ashepoe/Combahee/
North Carolina (NC)	Edisto Basin (SC)

**Background and Analysis**

The National Estuarine Research Reserve System, known earlier as the National Estuarine Sanctuary Program, was initially authorized in the Coastal Zone Management Act of 1972. The system was envisioned as an integral component to the overall success of coastal zone management efforts. It was to provide natural laboratories in all the major coastal biogeographical regions that could be used for long-term research projects and education programs in support of State and Federal coastal zone management efforts. This system also was intended to protect habitats that are representative of the characteristics of the country's coastal regions.

The System was renamed in 1985 amendments to the Coastal Zone Management Act. These amendments were designed to strengthen and improve coordination among the sanctuary sites, and to clarify relations between research efforts and sanctuary management. They articulated the important contribution that sanctuaries were expected to make to the coastal management effort, and added further definition to the Federal role in supporting the development of the reserve system.

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Each sanctuary operates education and research programs. These differ from site to site, depending on the characteristics of the sanctuary, the interests of the State program and the sanctuary manager, and other similar factors. Many sanctuaries have built facilities on site to present education programs and provide logistical support to researchers. All sanctuaries have either permanent staff or designated contacts within State government. Some of the reserve staff members at the older sites have been with their programs for a decade or more, providing continuity to their local effort, and also to the national program. The reserve managers convene national meetings periodically to discuss mutual problems and opportunities. These meetings provide a learning and exchange opportunity for both the managers and the Federal program staff.

### **Status of the Issue**

The sanctuary program has proven popular with coastal States. Federal funds have been used to acquire lands and construct sanctuary facilities. However, several potential and real problems remain. One is funding. The Federal Coastal Zone Management program primarily sets the sites up, then the sites must seek money for their programs and facilities from other sources. These funds are needed to attract and support long-term research, and to develop and reach out with education programs that address the value and importance of protecting estuarine areas.

While most of the sanctuaries have developed their own research programs, often with local universities, there is still only limited coordinated research that ties the sites together. This program will come closer to meeting its mandates if all of the biophysical regions are represented, and after NOAA implements an integrated national research program that takes advantage of the diversity of natural conditions and human modifications that are represented in the system.

### **Questions**

1. Are Federal and State efforts to coordinate research and information among sites adequate? How can they be improved? What is the most effective Federal role in coordination?
2. Does the system now represent all the basic biogeographical regions of the United States; if not, should priority be given to designations in the remaining unrepresented regions?
3. What actions can be taken to make the system more valuable, as a system in the future? How does the system or NOAA help facilitate planning for the system's future? What are some of the major impediments to this planning, and how can they be overcome?

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## COASTAL BARRIER PROTECTION\*

### Issue Definition

Coastal barriers, lying along the water's edge, are very popular and valuable development sites but are also among the most dangerous because of exposure to and changes caused by flooding and winds. Legislation was enacted in 1981 and 1982 prohibiting most forms of Federal development assistance within 186 designated undeveloped barriers in the Coastal Barrier Resources System (CBRS). The 101st Congress amended the CBRA to increase the size of the CBRS from approximately 450,000 acres to 1,272,000 acres of undeveloped coastal barrier ("fastland") and associated aquatic habitat.

The Federal Government continues to pay ever increasing costs for damage and disaster assistance in these areas. Congress may consider whether additional controls are needed, both in developed and undeveloped coastal barriers, to control this development, and thus limit Federal damage and disaster assistance costs in the future.

### Background and Analysis

Most coastal barriers are elongated landforms that shift frequently and rapidly in response to storms, winds, and tides. These landforms provide important habitat for certain species and protect inland areas, wetlands, and estuaries from the brunt of ocean storms. Coastal barriers are also among the most valuable real estate in the country; the value is highest when the parcel is adjacent to the shoreline. Development has been rapid on many coastal barriers in recent decades, increasing the magnitude of the threat to life and property when major storms strike.

In the early 1980s, legislation was enacted that removed most Federal subsidies that encourage development from designated coastal barriers along the Gulf and Atlantic coasts. Initial legislative action in 1981 removed the availability of Federal flood insurance for new construction on certain barrier islands identified by the Department of the Interior (DOI). A more encompassing enactment, the Coastal Barrier Resources Act of 1982 (CBRA), established the Coastal Barrier Resources System (CBRS), included the 186 coastal barriers in the CBRS, and removed a variety of forms of Federal assistance, including grants for new water, sewage, and transportation systems.

CBRA required DOI to report to Congress with any suggested modifications to the CBRS, including additions and deletions. The report, completed in 1988, recommended the inclusion of additional units along the Atlantic and Gulf coasts. For the first time, DOI recommended units for New Jersey, Maryland, the Florida Keys, Virgin Islands, and Puerto Rico. Congressional approval of

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these units would have increased the CBRS from 186 to 461 units, 666 to 1,089 shoreline miles, and 0.45 to 1.2 million acres. Much of the increased acreage, however, would have come from adding associated aquatic habitat, such as adjacent wetlands, rather than from expanding the fastland area where development is most likely to occur.

In 1988, Congress enacted the Great Lakes Barrier Act, which required DOI to identify additional units for the CBRS in the Great Lakes. The DOI identified, and recommended for inclusion in the CBRS, 112 Great Lakes units.

In the 101st Congress, legislation (enacted as P.L. 101-591) carried out many of the recommendations in the DOI report, including expanding the CBRS from approximately 452,000 acres to 1,272,000 acres of undeveloped coastal barrier ("fastland") and associated aquatic habitat. The 1990 additions to the CBRS included, for the first time, acreage in the Great Lakes (31,450 acres), the Florida Keys (66,500 acres), Puerto Rico (20,334 acres), and the Virgin Islands (3,775 acres). The enactment also required the DOI to prepare maps of undeveloped coastal barrier units on the Pacific Coast (except Alaska) and established processes for including Federal excess property and "otherwise protected areas" in the CBRS. Finally, the enactment required Federal agency self-certification of compliance with the CBRA, authorized a 2-year interagency task force for addressing additional options for the CBRS, and authorized appropriations of \$1 million for each of fiscal years 1990 through 1993.

### **Status of the Issue**

Despite the enactment of the CBRA and associated legislation, development in high-risk coastal areas continues. There are a variety of reasons for the continuing development. One is that DOI may not have designated and Congress approved as many units as they might have for the CBRS. Another is that coastal development, even on designated coastal barriers, might still be occurring to the extent that developers can find non-federal support for flood insurance as well as infrastructure.

This continued coastal development--both on developed and undeveloped coastal barriers--raises the economic question of whether the Federal Government should in any way subsidize this development, or continue to pay (along with State/local governments and the private sector) for the increasing storm/flood damage and disaster assistance. An important and controversial consideration in this debate may be sea level rise.

The impact of the 1990 CBRS additions on undeveloped coastal barriers is not known at this time: equally plausible, development may cease or decline on these designated units, or development may continue if private funding for infrastructure development and flood insurance is found.

A question that remains for Congress is whether additional controls are needed to stem further development of "developed" as well as "undeveloped" coastal barriers.

To this end, the 1990 CBRA Amendments established an interagency Task Force to conduct a 2-year study of additional options for the CBRS, including whether new Federal policies are needed to protect all coastal barriers, developed and undeveloped. The Task Force does not expect to begin deliberations until October 1993 and will do so only if there is a specific appropriation for it.

### **Questions**

1. Should the Federal Government in any way subsidize further coastal development either on developed or undeveloped coastal barriers?
2. To what extent will the possibility of sea level rise affect the debate on federally subsidized development of coastal barriers?
3. To what extent will private funding for infrastructure development and flood insurance substitute for withdrawn Federal funding/subsidy?
4. Should Congress make a specific appropriation to initiate the 2-year interagency Task Force study. If initiated and completed, how will the findings relate to the above questions?

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## COASTAL FLOODING, EROSION, AND SEA LEVEL RISE\*

### Issue Definition

Changing water elevations and storms modify the coastal environment; the larger the change or the storm, the greater the modification. These physical processes make the coast highly dynamic, and efforts to stabilize it at one location often exacerbate problems at adjoining locations. Stabilization efforts are substantial because property values are very high along the immediate coast and because owners seek to stabilize the shoreline and protect their investments. Trying to stabilize the coast is very expensive and usually provides an illusory and temporary solution. At issue is the appropriate role of the Federal Government, given both the high cost of stabilization efforts and the high likelihood for continued change, which will grow with any rise in sea level.

### Background and Analysis

Hurricanes and other coastal storms have periodically caused billions of dollars in damages, especially along the southeastern coast of the United States. These storms strike periodically and randomly. As more development is concentrated along the coast, smaller or less intense storms cause more damage. Also, if sea level rise occurs, then smaller and less intense storms will cause more damage because they will be starting from a higher water elevation. A main cause of damage is coastal flooding, and one of the most serious forms of damage is coast erosion.

Coastal flooding is addressed through the National Flood Insurance Program. This program makes flood insurance available in return for local government taking actions through building codes and planning that are intended to reduce future costs, in lives and property damage, of major storm events. The flood insurance program has been less than fully successful, often because local governments have not vigorously enforced the development controls needed to make it succeed. The 102d Congress considered amending the program to deal with some coastal issues, especially coastal erosion.

While the flood insurance program was supposed to address coastal erosion, participants have never agreed on methodology that would allow them to predict the future rates and patterns precisely enough for insurance purposes. Past erosion rates do not necessarily continue, and patterns change with the configuration and profile of beaches. Rates of change are highest during rare severe storm events. Therefore, over the useful life of a structure, say a house, there might be only a couple of severe erosion events.

The Federal Government addresses coastal flooding, coastal erosion, and sea level rise on designated undeveloped coastal sites through the Coastal Barrier

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Resources Act of 1982. But this law only applies to sites where there is limited pressure to protect the shoreline as it exists today.

Potential sea level rise, unlike erosion and flooding, is not addressed in Federal programs. Many experts predict that the sea level will rise significantly over the next century, although the rate and total amount of change are subject to considerable debate. Changes will vary from place to place, depending on the current pattern of development and the profile of the shoreline. For example, a recent study of coastal Massachusetts, using predictions that sea level could rise by between .45 feet and 1.57 feet by the year 2025, concluded that the State would lose between 3,000 and 10,000 acres with losses in property value of between \$3 and \$10 billion. Political leaders find it hard to address a problem when its impacts are in the distant future, and when the technical experts can not agree on how to characterize the problem.

Low, flat jurisdictions will be subject to the greatest risks, and no area is considered to be more at risk than coastal Louisiana. Louisiana is losing an estimated 60 square miles of coastal wetlands a year, and if the current pattern continues, much of three parishes largely could disappear in the next century. The problems in Louisiana are attributed to a combination of changing natural conditions and human actions that would be exacerbated by any sea level rise. Some of the man-induced causes are being addressed, most notably the dredging of channels through the marshes to provide oil drilling rigs with access to drilling sites. But other factors, such as the loss of sediment caught behind dams upstream on the Mississippi River and its tributaries, are more difficult to address. In addition, much of the Mississippi delta, which is unconsolidated sediment, is sinking under its own weight.

Solutions to these hazards fall into three categories. One is to retreat from the beach, moving future development inland to a point where it is not threatened by anticipated water elevations. Some coastal geologists and environmentalists support this approach because it would spare today's coast from more development, allow natural processes to continue, and reduce the loss of property and lives when a storm strikes. The second and third are to barricade the beach and to build up the land. These are favored by many in the development and engineering businesses. But the barricade-the-beach approach can only work if an entire beach system is included, and building up the land may only work so long as the ocean does not go around it. There is much debate not only on the relative feasibility of these options, but also on costs of each in both the short and long terms. Congressional debate comparing and contrasting these approaches has been increasingly visible in recent years, and is likely to increase so long as sea level rise can be anticipated as a problem.

### **Status of the Issue**

There is a great deal of uncertainty surrounding some aspects of this issue, and some very specific and immediate needs in other aspects. Consequently, Congress has addressed some of the specifics, such as loss of wetlands in Louisiana, but it has not addressed the full issue. At the same time, several

States, through coastal management and other programs, are starting to examine these problems as well.

One issue that Congress is facing is how much should be done now, when there is still considerable controversy and uncertainty among scientists about what might happen in the future regarding the rate and pattern of sea level rise. A second issue is the related debate over whether some solutions to erosion that are currently used, most notably beach nourishment projects, are cost effective over the longer run.

Congress may have to decide in the future and at a general level, whether to attempt to stabilize the coast or to retreat. Solutions likely will be a mixture of both, and the costs of the solution, whatever the mix, will be high.

### **Questions**

1. What options, structural and non-structural, are available to the Federal Government to protect life and property in coastal areas from flooding, erosion, and sea level rise? What are the limitations and opportunities associated with each option?
2. How does the tight Federal budget situation limit these options?
3. Recognizing that sea level rise may have an impact at some time in the future, what could the Federal Government do now to anticipate the kinds of problems that would accompany sea level rise?

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## COASTAL DEVELOPMENT AND THE NATIONAL FLOOD INSURANCE PROGRAM\*

### Issue Definition

Coastal development is influenced in part by incentives the Federal Government provides. Congress may wish to review the National Flood Insurance Program (NFIP) to evaluate whether it is helping to control coastal development as intended, and cost effectively, and if not, modify it accordingly. A key concern is the ever-increasing Federal (and non-federal) expenditures for disaster assistance to coastal communities.

### Background and Analysis

The desirability of coastal living has produced a migration to the coasts, construction of primary and vacation homes, and attendant commercial and recreational development. Although Federal programs such as the NFIP have imposed stiffer and more expensive requirements for new construction in coastal areas, coastal population and development continue to increase. Even in the ecologically important undeveloped coastal barrier areas protected through the Coastal Barriers Resources Act, some development continues, although the benefits from the NFIP and other Federal Government subsidies are unavailable.

Development is still occurring in coastal areas for a variety of reasons. One is that not all eligible communities have chosen to participate in the NFIP; yet, while these communities may not receive NFIP coverage, they may still receive conventional loans from federally insured or regulated private lending institutions. Also, in participating eligible communities, residents who have not taken out a policy under the NFIP, but do so at the time of flood damage, may apply for and receive disaster assistance. However, if subsequent flood damage occurs and the resident has not maintained that policy, then no further disaster assistance is available.

A second reason is that developers may sometimes find non-federal support for flood insurance as well as infrastructure such as roads, bridges, and sewage treatment. A third is that the Interior Department may not have designated, and Congress approved, as many units as they might have for the Coastal Barrier Resources System (CBRS). Once in the CBRS, new construction normally declines because Federal flood insurance is not available for new or substantially improved construction, and Federal subsidies are not available for most new and/or improved infrastructure. A fourth is that the Federal Government may not have legislated strong enough disincentives/prohibitions; some believe that additional legislation such as national minimum erosion setback requirements is needed.

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Continued coastal development has resulted in increasing damage and higher Federal, as well as non-federal, relief costs in the aftermath of hurricanes and storms. More to the point, many of these losses are repetitive: a 1988 General Accounting Office (GAO) report indicated that repetitive losses accounted for 43 percent of total federally insured losses and 53 percent of these repetitive losses were for properties in coastal communities.

### ***NFIP Actuarial Soundness***

The NFIP is now actuarially sound, with premiums just covering damage claims, for the average loss year over its 25-year history. However, since no *major* loss year has occurred for the program during the past twenty-four years, the *average* loss year for the period of record may be unrealistically low. The NFIP, therefore, may not be actuarially sound for the future if major losses occur. Furthermore, if predictions of some scientists are correct, global warming may increase sea level, increasing coastal erosion and the probability of higher damage claims even if coastal development were stopped today.

The issue of future actuarial soundness relates to a variety of factors. The principal factor is the occurrence of a major loss-year, which the GAO believes has not occurred in the history of the program. Another factor is whether property owners in coastal communities, in particular those whose structures have been damaged repetitively, are paying the appropriate premium for the risk involved. A third factor is whether additional requirements should be imposed in especially hazardous coastal areas either to deter further new development or at least to provide more protection from storm and hurricane damage. A final factor is that the mandatory purchase requirement for the NFIP is not being enforced. Many property owners obtain flood insurance for the first year of their mortgage, but thereafter let it lapse, especially if their property has not recently experienced a major flood event. The likely result is lower participation and participation skewed towards the "adversely selected" (those at higher risk), with higher premiums for those that do participate.

### ***Removing Structures from High-Risk Coastal Areas***

Some States, and more recently the Federal Government, have started to view erosion setback requirements as an important tool for cost management of insurance and relief costs, as well as controlling coastal development for environmental reasons. The concept is actuarially as well as environmentally sound -- structures built (or moved) landward of certain high-risk coastal zones are less likely to be damaged by coastal storms and erosion, and these structure-free erosion zones also will preserve the coastal environment.

As originally enacted in 1968, the NFIP provided for the demolition or relocation of *damaged* structures. In 1987 Congress passed the Jones/Upton Amendment (P.L. 100-242, §544) to the program, which provides incentives for either relocating *erosion-threatened* structures landward of specified erosion setbacks or demolishing them. While there are some problems associated with the approach taken in 1987 (property owners taking advantage of the more



expensive demolition option), its notable result was the beginning of Federal use of erosion setbacks as a tool for cost-effective management of the NFIP and coastal development.

While the use of setback requirements through the Jones/Upton approach is accomplished through financial incentives, the use of *mandatory* setback requirements is also being used, at least at the State level (*e.g.*, North Carolina and South Carolina), but with mixed success: property-owner resistance often has resulted in multiple lawsuits claiming the taking of property without just compensation. States have responded that a healthy beach/dune system is the first and most important line of defense for cost-effective protection of life and property in high-risk coastal zones, and that setbacks are essential for this approach. These States view other approaches, such as beach nourishment or armoring, as costly and less effective.

### **Status of the Issue**

Congress may consider whether the NFIP should be evaluated for its long-term actuarial soundness. A subsidiary issue is whether owners of coastal structures suffering repetitive losses should pay higher premiums, or whether the financial incentives to owners of these structures should be changed to induce more of the less-costly option of relocation landward of erosion setbacks and less of the more-costly option of demolition. Another related issue is the enforcement of the mandatory purchase requirements. A final related issue is national minimum erosion setback requirements. If the predictions of some scientists that global warming could lead to increased erosion are correct, these issues may become increasingly important, from both the environmental and actuarial viewpoints.

The House addressed these issues in H.R. 62 in the 102nd Congress. Legislation in the Senate is expected to be introduced in August 1993.

### **Questions**

1. Is the NFIP actuarially sound for the long-term?
2. Should coastal (and other) structures suffering repetitive losses pay higher premiums, and/or should other incentives be provided to remove such structures from high-risk zones?
3. Should erosion setback zones be used as a tool in removing structures from the highest risk coastal zones?
4. How can the mandatory purchase requirements of the NFIP be enforced more effectively?
5. How will predictions of sea level rise, if they prove correct, affect the NFIP, in particular the questions posed above?

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## MANAGING COASTAL AREAS\*

### Issue Definition

The 1972 Coastal Zone Management Act (CZMA) created Federal incentives for coastal States and territories to plan and manage their coastal resources under several broad guidelines. The National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce administers the programs authorized by the CZMA. The 101st Congress amended the CZMA, reauthorizing most existing programs and their funding for the for the next five years and created a new initiative--the Coastal Nonpoint Pollution Control Program--to improve coastal water quality through land use management tools available through CZMA authority. At issue for Congress is oversight of existing programs and the new initiative, which must be coordinated with the Environmental Protection Agency (EPA) standards setting authority.

### Background and Analysis

Increasing population concentration on the coasts of the United States has resulted in greater coastal use for residential, commercial, industrial, and recreational purposes. This greater coastal use has resulted in degradation of coastal water quality, a decline in coastal wildlife, adverse changes to coastal ecosystems, decreasing open space for public use, and shoreline erosion.

The Coastal Zone Management Act of 1972 (CZMA; P.L. 92-583) established a role for the Federal Government in the management of coastal resources. Other Federal programs related to coastal management, and discussed in other sections of this briefing book, are coastal barrier protection, Federal flood insurance, wetlands policy, water quality, and fisheries management.

The CZMA has provided financial incentives for the development of State coastal zone management (CZM) plans, which the Federal Government must approve. Now, 29 of 35 eligible coastal States and territories have federally approved CZM plans. Once approved, coastal States and territories then have a mechanism for managing coastal development and become eligible for additional financial benefits through State administrative grants, the Estuarine Research Reserves Program, and interstate grants. One important mechanism for managing some types of coastal development is the requirement that Federal activities be "consistent" with approved CZM plans.

The 101st Congress amended the CZMA (§6202 - §6217, P.L. 101-508), reauthorizing its programs for another 5 years (FY1991 through FY1995); providing incentives for States and territories without approved CZM plans to complete the CZM plan approval process; and requiring that States with approved CZM plans develop Coastal Nonpoint Pollution Control Programs.

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Also, the legislation established a Coastal Zone Management (CZM) Fund to finance a new Coastal Zone Enhancement Grants program for regional and interstate projects, demonstration projects, emergency assistance, awards, and program development grants. Financing for the CZM Fund will come from the repayment by States and territories of \$87.5 million in outstanding loans transferred to the Fund from the repealed Coastal Energy Impact Program. The legislation also established a new "Technical Assistance" program to provide Federal technical and management-oriented research necessary to support the Enhancement Grants program. Finally, the amendments required that Federal OCS oil and gas lease sales would have to be consistent with approved State CZM plans (thus overturning a 1984 Supreme Court ruling).

### ***Coastal Water Quality***

Water quality is now controlled primarily through regulatory programs administered by the EPA under the Clean Water Act (CWA). These programs have focused primarily on point sources. Many proponents of a program for improved coastal water quality maintain that control of nonpoint sources of pollution is vital and that the CZMA is an important adjunct to programs under the CWA for controlling nonpoint pollution sources.

The development of a coastal water quality control program was a dilemma for the 101st Congress because of the perceived necessity of invoking authorities contained in the CWA as well as the CZMA; yet the CZMA was up for reauthorization in the 101st Congress, and the Clean Water Act was not (the CWA is up for reauthorization in the 103rd Congress). The 101st Congress passed legislation (enacted as §6217, P.L. 101-508) that required each State with an approved CZM program to develop a Coastal Nonpoint Pollution Control (CNPC) program through its existing §306 authority. States were given 4 years to complete the program, which must be implemented through authorities contained in both the CWA and CZMA, and submitted for review and approval to both the EPA and NOAA. States not submitting an approvable program in the designated time could lose some of their State management §306) as well as CWA §319 funding on a graduated basis. Significantly, the Congress required coastal States to implement the CNPC program using guidance to be developed by EPA; and to provide the necessary mechanisms to enforce nonpoint pollution management measures.

### ***Managing Land Uses***

State CZM programs were already employing a wide variety of tools to manage land uses within their coastal zones. The 101st Congress required additional use of land use management tools, as seen in the requirements for the CNPC program:

- identification of land uses;
- identification of critical areas;
- development of coastal land use management measures;
- provision of technical assistance;

- identification/designation of outstanding coastal resource waters;
- administrative coordination among State agencies and between State and local officials; and
- modification of State coastal zone boundaries.

Additionally, the legislation created a Coastal Zone Enhancement Grants program ("Section 309" program) that also may have implications for the management of coastal land uses. This new effort would require the Administrator of NOAA to implement a program in each coastal State to encourage improvements in its management program in one or more of the following eight areas of specified national interest: such as coastal wetlands management and protection; natural hazards management; public access; marine debris reduction; cumulative and secondary impacts; special management of important coastal areas; management of ocean resources; and coastal energy development. Finally, Congress created a new Technical Assistance program (with authorized appropriations of \$10 million per year) to provide the technical assistance and management-oriented research necessary to support the Enhancement Grants program.

### ***Consistency Provision***

The CZMA contains provisions that require various activities affecting the coastal zone to be "consistent ... to the maximum extent practicable" with a State's CZM plan. While almost all consistency determinations have been reached with little controversy, the consistency provision as it applies to Federal OCS oil and gas leasing activities has created considerable debate.

Coastal State interests had been concerned that their input into the Federal OCS leasing process was inadequately considered and that requiring a lease sale to be "consistent" with a State's coastal zone management (CZM) plan, through an amendment to the Coastal Zone Management Act (CZMA), would assure protection of their interests. The Interior Department and the oil industry, on the other hand, argued that a lease sale should not be subject to CZMA consistency requirements because it does not directly affect the coastal zone; only exploration and development/production activities of the post-lease phase do. In 1984, the Supreme Court ruled in favor of the Interior Department/oil industry position. In the 101st Congress, §6208 of the FY1991 budget reconciliation legislation contained a provision that reversed the 1984 U.S. Supreme Court ruling that supported the Interior Department/industry view, thus requiring that OCS lease sales be consistent with State CZM plans.

While Congress addressed its consistency amendment principally to the Federal OCS oil and gas leasing program, other consistency issues, such as ocean dumping, were also affected. This amendment established a generally applicable rule that *any* Federal agency activity may be subject to the CZMA consistency requirement. The conferees dropped earlier provisions identifying specific Federal activities (such as ocean dumping) subject to consistency, because they did not want to imply that other specific activities not listed would be exempt.

## Status of the Issue

The 1990 CZMA Amendments reauthorized existing programs, established a new coastal water quality program, and required consistency of all Federal activities affecting the coastal zone. Congress at this time may wish to conduct oversight hearings on how the new programs created by the 1990 amendments are working. Additionally, Congress may wish to observe the coordination of the coastal water quality program between NOAA and the EPA and to consider how possible amendments to the Clean Water Act will affect this coordination.

## Questions

1. How are the newly created enhancement grants (\$309) and Technical Assistance programs working? How do they relate to the existing 306 State grants program?
2. Will any of the remaining six States which currently do not have an approved CZM program proceed to develop one, particularly in light of the new program development incentives provided in the 1990 CZMA reauthorization?
3. Are the States proceeding in the development of the new required Coastal Nonpoint Pollution Control Programs (CNPCs)? Will Congress pass amendments to the Clean Water Act (CWA) to carry out the CNPCs? How well are the NOAA and EPA coastal water quality programs coordinated?

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## U.S. NONPARTICIPATION IN THE LAW OF THE SEA PREPARATORY COMMISSION\*

### Issue Definition

The United States actively participated for more than nine years in the Third United Nations Law of the Sea Conference but, in 1982, voted against adoption of the Convention on the Law of the Sea drafted by the Conference. The United States did not sign the Convention but did sign the Final Act of the Conference, a step that made it eligible to participate as an observer in the work of the Preparatory Commission, often referred to as the *PrepCom*. The United States, however, does not participate in the Commission and also withholds that portion of its assessed contribution to the U.N. regular budget that would fund PrepCom meetings. At issue is whether U.S. nonparticipation in the Preparatory Commission is in the best interests for U.S. policy.

### Background and Analysis

Resolution I of the Law of the Sea Conference provided for the establishment of a Preparatory Commission that would meet after 50 states had signed the Convention. Those states that had signed or acceded to the Convention could participate fully in the work of the Commission and those states that had signed only the Final Act could take part in the deliberations as observers but not participate in the taking of decisions. The first session of the PrepCom convened in Jamaica in April 1983. Since that time, the Commission has met twice a year, either in Jamaica or in New York. Most of the functions of the Preparatory Commission relate to the seabed mining portions of the Law of the Sea Convention and consist of drafting rules, regulations, and procedures under which the institutions established by the Convention will operate.

The United States opposed and remains opposed to acceptance of the Convention as it is presently formulated because of seabed mining provisions in Part XI and Annexes III and IV of the Convention. The executive branch took two actions in 1982 to symbolize this opposition:

- 1) Refused to participate in the work of the PrepCom: The U.S. executive branch maintains that the PrepCom "has no authority to change the damaging provisions and precedents" in the Convention and "for that reason, the United States is not participating in the Commission." (Statement by Ronald Reagan, Public Papers of the President, 1982, Book II, p. 1652)

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- 2) Withheld the U.S. share of its U.N. regular budget contribution that would finance the PrepCom: U.S. officials maintain that the expenses of the PrepCom are not expenses of the United Nations and thus to finance them through the U.N. regular budget is "an improper assessment...that is not legally binding, and adverse to the interests of the United States." (White House Fact Sheet on UN Assessments for the Seabed Authority and Law of the Sea Preparatory Commission, December 30, 1982, p. 2)

U.S. attitudes and policies toward the United Nations have changed significantly since 1982. In addition, the current fashioning of a "new world order" in a post-Cold War and post-Persian Gulf era implies a redefining of aims and goals for U.S. policy that may alter or reverse past policy positions. A strategy that encourages greater use of the United Nations might find the option of participation in the PrepCom to be more acceptable.

Associated with U.S. participation in the work of the Preparatory Commission would be a change in the U.S. policy of withholding its *pro rata* share of funding the work of the PrepCom. Current estimates on the amount being withheld by the United States for this purpose follow:

Fiscal Year 1990 (Calendar Year 1989):	\$900,000
FY 1991 (CY 1990):	\$357,000
FY 1992 (CY 1991):	\$193,000

### **Status of the Issue**

The Preparatory Commission concluded its resumed tenth session in New York between August 10-21, 1992. Discussions during the final plenary meeting addressed the failure of the PrepCom to facilitate "universal participation" in the Convention and the wisdom of further efforts by the PrepCom in the absence of wider acceptance of the Convention. The eleventh session of the Commission took place in Kingston, Jamaica, March 22-April 2, 1993.

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**THE UNITED STATES AND THE 1982 CONVENTION\*****Issue Definition**

The United States actively participated in the negotiation of the United Nations Convention on the Law of the Sea but, in 1982, voted against its adoption and decided not to sign it. The United States is currently participating in U.N.-sponsored consultations aimed at increasing participation in the Convention. The issue for the United States is whether changes can be devised for the seabed mining provisions of the Convention that would allow for successful U.S. accession to the treaty.

**Background and Analysis**

While the Bush Administration viewed the Convention "as a major accomplishment in the development of international law of the oceans," it believed that the deep seabed mining portions of the Convention are "seriously flawed" (statement by Ambassador Thomas R. Pickering to the U.N. General Assembly, Nov. 20, 1989).

U.S. officials cite problems with Part XI and Annexes III and IV of the Convention, arguing that it would:

- lack guaranteed assured access for qualified future miners;
- create a system of privileges for the Enterprise that would discriminate against private and national miners;
- fail to give a proportionate voice to those countries most affected by decisions in the deep seabed regime;
- allow for amendments to come into force without the specific consent of individual states, a provision that is incompatible with U.S. constitutional procedures for incurring treaty obligations; and
- create inappropriate precedents in its provisions on mandatory transfer of technology and potential distribution of benefits to national liberation movements.

Since 1982, the executive branch has taken steps that might be viewed as bringing its maritime claims into line with certain other provisions of the Convention. The Administration maintains that these U.S. steps, as well as those provisions of the Convention, are "reflective of customary international law." For example:

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- on March 10, 1983, President Reagan established a U.S. Exclusive Economic Zone extending 200 nautical miles beyond the coasts;
- on December 27, 1988, the President extended the U.S. territorial sea from 3 to 12 nautical miles; and
- on September 23, 1989, the United States and the Soviet Union issued a Joint Statement to accompany their interpretation of the rules of international law governing innocent passage. The two nations agreed that they were "guided" by the provisions of the 1982 Convention, "which, with respect to traditional uses of the oceans, generally constitute international law and practice and balance fairly the interests of all States." (Joint Statement, in International Legal Materials, November 1989: 1444-1447.)

### **Status of the Issue**

Today, current U.S. policy toward the Convention is confronted by a number of challenges, brought about by: 1) an increase in pressures for universality of participation in the Convention, 2) an improvement in the international political climate; and 3) a slow but steady increase in the number of ratifications or accessions to the Convention that brings it closer to entry into force.

In 1990, then-U.N. Secretary-General Javier Perez de Cuellar initiated a series of informal consultations among an estimated 30 U.N. member representatives aimed at achieving universal participation in the Convention. Then-U.S. Permanent Representative to the United Nations Thomas Pickering attended these meetings for the United States. The sixth informal meeting, the last one under Perez de Cuellar, was held in December 1991. Secretary-General Boutros Boutros-Ghali continued the initiative in 1992, holding the seventh informal consultation in June 1992, with representatives from 72 countries present. An eighth meeting was held in August 1992.

These consultations are not negotiations but informal meetings for the presentation of views, aimed at producing a better understanding of the issues. Many officials have been promoting negotiations aimed at changing either the text or the application of provisions in the seabed mining portions of the Convention. The United States, however, has not participated in any negotiations toward that goal.

The changes in the international situation, including both the end of the Cold War and the growing maturity of many nonaligned nations in the multilateral arena, and the search by the Bush Administration for a "new world order," may provide an opportunity for renewed consideration of the Law of the Sea Convention. For example, the American Bar Association's February 1990 House of Delegates meeting recommended the establishment by the President, in consultation with Congress, of a "special high-level working group within the United States government" to determine what changes and clarifications in the

deep seabed provisions of the Convention would make those sections acceptable to the U.S.; what steps should be taken to make any such changes acceptable to other countries; and to determine by what procedures such changes "can best be introduced into or attached to the Convention." (Statement by James R. Silkenat to the Senate Committee on Foreign Relations on May 1, 1990, p. 5; hearings not printed.)

As of March 1, 1992, 49 countries had ratified the Convention and two countries had acceded to it, for a total of 51 ratifications and accessions. Entry into force takes place one year after the receipt by the U.N. Secretary-General of 60 ratifications or accessions.

The Convention has been ratified by: Angola, Antigua and Barbuda, Bahamas, Bahrain, Belize, Botswana, Brazil, Cameroon, Cape Verde, Cote d'Ivoire, Cuba, Cyprus, Djibouti, Dominica, Egypt, Fiji, Gambia, Ghana, Grenada, Guinea, Guinea-Bissau, Iceland, Indonesia, Iraq, Jamaica, Kenya, Kuwait, Mali, Mexico, Namibia, Nigeria, Oman, Paraguay, Philippines, Saint Lucia, Sao Tome and Principe, Senegal, Seychelles, Somalia, Sudan, Togo, Trinidad and Tobago, Tunisia, Uganda, United Republic of Tanzania, Yemen (Democratic Yemen and Yemen have since merged to form the Republic of Yemen), Yugoslavia, Zaire, and Zambia. The Convention has been acceded to by: Federated States of Micronesia and the Marshall Islands.

## SEABED HARD MINERALS\*

### Issue Definition

The decision by the Reagan Administration not to sign the Law of the Sea (LOS) Convention because of provisions that were "inimical" to the interests of the United States with regard to mining the seabed beyond the limits of national jurisdiction still raises concern in some communities. In view of the apparent near demise of the nascent deep seabed mining industry, the question is raised whether the United States should review its position regarding the LOS Convention. Aside from seabed mining, the United States supports most of the provisions of the Convention. On the other hand, would this revive interest in the seabed mining industry? Would it be in the national interest, as an alternative source of copper, nickel, cobalt, manganese, and other metals, to provide some form of incentives or assistance? Prototype technology has been developed to recover ferromanganese nodules containing cobalt, copper, and nickel, and other metals from the deep ocean floor, although economic feasibility has not been demonstrated.

### Background and Analysis

With passage of the Deep Seabed Hard Mineral Resources Act (DSHMRA) of 1980 (P.L. 96-283), Congress established the framework for what was then thought to be an interim domestic regime to regulate the activities of U.S. nationals and firms who wished to engage in deep seabed nodule mining activities in international waters, pending the entry into force for the United States of the Law of the Sea (LOS) Convention. Subsequently, in 1982, President Reagan announced that the United States would not sign the LOS Convention, basing U.S. objections largely upon the seabed mining provisions that it contained. Consequently, four seabed mining consortia involving U.S. firms applied to NOAA, the lead agency under DSHMRA, for exploration licenses. While the licenses have been granted, and sustained through required activities and expenditures, the consortia have yet to proceed to the next step of applying for commercial recovery permits.

By not being a signatory to the LOS Convention, the United States was precluded from a participatory role in the Preparatory Commission, whose purpose was to draft rules of procedures to implement the seabed mining regime established by the Convention. Some argued that U.S. interests would have been better served by participation in the Preparatory Commission. Others argued that the seabed mining provisions of the LOS Convention are basically inimical to the interests of the United States and that U.S. interests are better served by legislation such as DSHMRA and agreements such as the Provisional

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Understanding on Deep Seabed Matters, which the United States has with seven other nations who have developed seabed mining technology.

In March 1993, the Preparatory Commission completed its "provisional final report". In the meantime, the UN Secretary-General has held a series of informal consultations on concerns with the seabed mining provisions of the LOS Convention, and on April 28, 1993, submitted an Information Note outlining results to date and suggesting options for putting into effect the results of the consultations. On April 27, 1993, the U.S. Ambassador to the United Nations announced that the United States would participate in the current (10th) round of informal consultations. Currently, 56 countries have ratified or acceded to the LOS Convention of the 60 required for entry into force.

### **Questions**

1. Should the United States reconsider ratifying the Law of the Sea Convention and seek to move the international community toward more acceptable provisions for deep seabed mining?
2. Is it in the national interest as an alternative source of copper, nickel, cobalt, manganese, and other metals to provide some form of support or incentives for a domestic seabed mining industry?

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## MARINE MINING WITHIN THE U.S. EEZ\*

### Issue Definition

From gravel to gold, hard minerals on the ocean floor are attracting commercial interest. For the United States, the marine minerals with potential for development include placer deposits of heavy minerals (e.g. gold, platinum, chromite, and titanium minerals), sand and gravel, and phosphorite deposits. Mining of gold off Nome, Alaska began in 1987, and sand and gravel have been dredged from the entrance to New York Harbor as a needed source of construction aggregate for the New York market. In addition, prototype technology has been developed to recover ferromanganese nodules containing cobalt, copper, and nickel, and other metals from the deep ocean floor, although economic feasibility is still in the future.

### Background and Analysis

By proclamation of the President on March 10, 1983, the United States claimed sovereign rights and jurisdiction within an Exclusive Economic Zone (EEZ) extending 200 nautical miles seaward from the coast of the United States and U.S. territories. In joining the majority of coastal nations in declaring a 200-mile EEZ, the United States is left with the question of establishing a minerals management regime for the area. The Department of the Interior (DOI) has asserted that the Outer Continental Shelf (OCS) Lands Act is a suitable mechanism. Legislation was introduced in the 99th, 100th and 101st Congresses that would establish a much different regime.

The declaration of an Exclusive Economic Zone has given the United States a vast new frontier, larger than its onshore territory. The EEZ contains important natural resources, but because most of the EEZ has not been explored, its resources and their potential are largely undefined. Recently, deposits of polymetallic sulfides have been discovered in spreading centers such as the Gorda Ridge off Oregon and cobalt-manganese nodules and crusts have been found on the flanks and tops of seamounts in the Central Pacific. While these are years away from being commercially recoverable, they could become a major future source of strategic and other minerals important to the U.S. economy.

Legislative authority for managing mineral resources within the EEZ is somewhat unclear. Two laws could be brought to apply: the OCS Lands Act under which the Department of the Interior has jurisdiction over the leasing of minerals on the continental shelf, and the Deep Seabed Hard Mineral Resources Act under which the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce has jurisdiction over the development of

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ferromanganese nodule resources by U.S. citizens operating in international waters. While either of these two Acts could be amended to accommodate development of mineral resources within the EEZ, each serves best its specific purpose. The Department of the Interior holds the view that the OCS Lands Act is an adequate vehicle for management of the mineral resources of the EEZ, but others point out that many of its provisions, such as competitive bidding, were designed for petroleum development by a mature offshore oil industry, and are not appropriate for the innovation of deep ocean hard mineral recovery. Consequently, legislation has been introduced in previous Congresses to address such questions as revenue sharing, State/Federal relationships, appropriate managerial procedures and safeguards, and the roles of the Federal agencies, particularly the DOI and NOAA.

### **Questions**

1. Would management of the seabed mineral resources of the Exclusive Economic Zone be better organized under the Department of the Interior or the Department of Commerce?
2. If a new Federal regime for management of resources within the Exclusive Economic Zone were created, should coastal States have greater participation in development decisions and receive a portion of any royalties?

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## OCS LEASING MORATORIA\*

### Issue Definition

In recent years Congress has imposed various one-year leasing moratoria for defined areas within certain Outer Continental Shelf leasing regions. The imposition of moratoria has occurred because many coastal States and environmental groups have convinced Congress that their input into the planning process has not been adequately considered in the drive for increased offshore oil and gas production, and that leasing tracts in environmentally sensitive areas might lead to activities that could cause irreversible damage. President Bush issued a 1990 statement on the OCS leasing program, in which he indicated that many of the leasing areas that Congress had placed in moratoria should be off bounds to leasing until the year 2000. At issue for Congress is whether to make the sequential one-year moratoria legislation of the past 10 years (which have effectively precluded leasing in all OCS areas except the Central and Western Gulf of Mexico) multi-year or permanent moratoria.

### Background and Analysis

Congress has enacted moratoria through provisions in the Interior Department appropriations enactments for the fiscal years 1982 through 1993. The specific areas covered by the moratoria have varied from year to year: New England (FY84 through FY93), California (FY82 through FY85, FY89 through FY93), Eastern Gulf (FY84, FY89 through FY93), Mid-Atlantic (FY83, FY90 through FY93), South Atlantic (FY93), Alaska's North Aleutian Basin (FY90 through FY93), and the Pacific Northwest (FY91 through FY93). Generally, however, the total acreage placed off bounds to leasing has increased every subsequent year: from 736,000 acres in four Northern California basins in FY82, to 468.6 million acres off California, the Pacific Northwest, the Atlantic Coast, Florida's Gulf Coast, and Alaska's North Aleutian Basin in FY93.

As reflected in President Clinton's FY1994 budget proposal, the Administration's position on OCS leasing is both to continue leasing in areas where leasing was occurring previously -- that is, in the Central and Western Gulf of Mexico, and some Alaskan Basins -- and to continue the OCS moratoria contained in the FY1993 appropriations legislation.

The most recent annual moratoria, enacted as part of the FY1993 Interior Department appropriations legislation (P.L. 102-381), incorporated President Bush's recommendations for California, southwestern Florida, the Georges Bank, and Washington/Oregon. Additionally, the legislation included moratoria in the North Aleutian Basin, a 50-mile wide stretch along the entire Atlantic Coast, and the Eastern Gulf OCS off northwestern Florida. The total acreage

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in the FY1993 moratoria was 468.6 million acres. Multiyear moratoria were considered in the comprehensive energy legislation of the previous Congress but were dropped in conference.

### **Status of the Issue**

The FY1993 Interior Department appropriations legislation (P.L. 102-381) enacted OCS moratoria off California, the Eastern Gulf of Mexico, the entire Atlantic Coast, Alaska's North Aleutian Basin, and Washington/Oregon. The FY1994 Interior Department appropriations legislation (H.R. 2520), as reported by the House, would continue the FY1993 moratoria for another year.

In previous years, congressional OCS moratoria have been enacted through annual Department of the Interior appropriations legislation. With the President's recommended policy of continuing for FY1994 the OCS annual moratoria in the FY1993 Interior Department appropriations enactment, it is unclear to what extent Congress may pursue enactment of annual or multiyear moratoria. In the 102nd Congress, the Senate passed (S. 2166) multiyear moratoria (until the year 2000) for OCS areas off California, the North Atlantic, New Jersey, Washington/Oregon, and southwest Florida, as well as directed the buyback of existing leases off southwest Florida; on the House side, H.R. 776 would have established multiyear moratoria (until the year 2002) in areas currently under annual moratoria, and provided for buyback of leases off North Carolina, southwest Florida, and Alaska's North Aleutian Basin after October 1, 1995.

### **Questions**

1. How much acreage Congress may place under moratoria, and will it exceed the current 468.6 million acres in the FY1993 legislation?
2. Will Congress enact multiyear moratoria?
3. How would enactment of moratoria relate to enactment of OCS coastal impact assistance?
4. How would enactment of moratoria relate to national energy strategy legislation and the President's interest in development of domestic natural gas?

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## OCS COASTAL IMPACT ASSISTANCE\*

### Issue Definition

The Federal Government receives substantial revenues from offshore oil and gas development. The principal participants in the debate before Congress (environmentalists, industry, coastal communities, States, and the Administration) all seem to agree to the desirability of enacting OCS coastal impact assistance legislation, although their rationales for such a program, as well as how such a program would be structured, still may differ.

Most coastal States, except those in the central and western Gulf of Mexico, have opposed OCS activities off their coasts, mostly because of environmental concerns, but also because they do not share the OCS revenues produced (except in the case of shared revenues from so-called "8g" tracts). Coastal impact assistance was passed by the House and Senate in their respective comprehensive energy bills in the 102nd Congress, but was dropped in conference before enactment.

### Background and Analysis

The Federal Government receives bonuses, rents and royalties from the Outer Continental Shelf (OCS) oil and gas leasing program. For most sales, prospective lessees make bids -- called bonus bids -- on a tract (approximately 9 square miles). The winning bidder is entitled to explore and develop the tract. Once acquired, the lessee pays rent on the tract, until the lease expires or is relinquished, or development of oil and gas occurs. If oil, gas, or sulphur production occurs, the lessee pays royalties on that production.

OCS revenues are substantial. Table 1 shows these revenues from 1970 through 1990. OCS revenues were the second largest source of revenue for the Federal Government before progressively increasing congressionally mandated OCS moratoria, together with declining oil prices, limited OCS leasing and development activities. The high year for total OCS receipts was calendar year 1981, when the Federal Government received \$9.966 billion in bonuses, rents, and royalties. In calendar year 1991, the Federal Government received \$2.794 billion.

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**TABLE 1. Revenues from the Federal OCS Leasing Program,  
Calendar Year 1970 through 1992  
(\$ in billions)**

Year	Bonus	Royalty	Rent	Total
1970	0.945	0.285	0.009	1.239
1971	0.096	0.352	0.008	0.456
1972	2.251	0.366	0.008	2.625
1973	3.082	0.404	0.009	3.495
1974	5.023	0.562	0.014	5.599
1975	1.088	0.618	0.018	1.723
1976	2.243	0.702	0.023	2.968
1977	1.568	0.921	0.020	2.510
1978	1.767	1.152	0.022	2.941
1979	5.079	1.517	0.020	6.616
1980	4.205	2.139	0.019	6.363
1981	6.653	3.291	0.022	9.966
1982	3.987	3.817	0.020	7.825
1983	5.749	3.459	0.032	9.240
1984	3.929	3.968	0.036	7.932
1985	1.558	3.643	0.062	5.262
1986	0.187	2.565	0.053	2.805
1987	0.497	2.372	0.075	2.944
1988	1.259	2.095	0.063	3.418
1989	0.646	2.190	0.079	2.915
1990	0.584	2.704	0.079	3.367
1991	0.339	2.376	0.079	2.794
1992	0.085	2.561	0.060	2.706

**Source:** U.S. Department of the Interior, Minerals Management Service, "Federal Offshore Statistics: 1992" (1993). See Table 46.

The principal participants in the debate before Congress (environmentalists, industry, coastal communities, States, and the Administration) have held varying opinions on coastal impact assistance, or at least as to how it should be structured. These opinions were most clearly expressed during the debates in the 98th Congress. In contrast to the Reagan Administration, the Bush Administration supported coastal impact assistance.

The Bush Administration's favorable view towards revenue sharing, expressed in the President's June 1990 statement on Federal OCS leasing program, was clearly intended to be an inducement to new OCS leasing and development activities. Under the Bush Administration-proposed legislation in the 102nd Congress (H.R.4128/S.2175), coastal States and communities would receive some royalty revenue--based on a sliding scale beginning at 12.5%--from

new development, and would have no restrictions placed on their use of these revenues.

### **Status of the Issue**

A principal consideration regarding OCS coastal impact assistance is how it may relate to congressional intent as to OCS moratoria, which have increased acreage unavailable for leasing every year since FY1982. To the extent that coastal impact assistance is based on new OCS activities offshore individual States, more acreage under moratoria would mean less potential revenue to share. It is unclear if, or to what extent, States now opposing OCS development through support of moratoria would drop that support if offered a share of the revenues. To a large extent, such a change would likely be conditioned on a State's careful evaluation (or reevaluation) of both the potential spill risk and the interaction between petroleum and other coastal industries; and to a lesser extent, it would likely be conditioned by a State's current fiscal situation.

A second consideration is congressional intent as to a national energy strategy, and the extent that such a strategy would target the OCS as a source for additional domestic oil and gas production, and the extent to which coastal impact assistance would be viewed as an incentive for this production.

So far in the 103rd Congress, no OCS coastal impact assistance legislation has been introduced. In the 102nd Congress, the comprehensive energy legislation (S. 2166) passed by the Senate contained provisions for two coastal impact assistance funds: non-federal revenues in the first were based on a sliding scale beginning at 12.5% of new royalties; non-federal revenues for the second were based on 4% of the previous year's royalty revenue. On the House side, H.R. 776 would have established a coastal impact assistance fund comprised of 4% of the average annual OCS revenues from the previous three fiscal years and provided for an annual 5% increase of revenues deposited into the fund.

### **Questions**

1. How does OCS coastal impact assistance relate to congressional intent on OCS moratoria. Would States now opposing OCS development through their support of moratoria drop that support if offered a share of the revenues?
2. To what extent would a State's support of OCS coastal impact assistance be related to perception of the potential spill risk and the interaction between petroleum and other coastal industries?
3. To what extent would a State's support of OCS coastal impact assistance be related to that State's current fiscal situation?



4. How is OCS coastal impact assistance related to future national energy strategy legislation? Would such legislation target the OCS as a source for additional domestic oil and gas production, and to what extent would coastal impact assistance would be viewed as an incentive for this production?

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## OCS 5-YEAR LEASING PROGRAM\*

### Issue Definition

The five-year OCS leasing plan for the years mid-1992 through mid-1997 has fewer sales than the previous plan, and avoids leasing in most, but not all, areas where Congress has imposed moratoria. It is unclear how the proposed plan will relate to congressional consideration of OCS development as an element of a national energy strategy, or OCS coastal impact assistance as an incentive for OCS development. In looking at these variables, the issue for Congress is how to balance development of OCS oil and gas resources with environmental protection.

### Background and Analysis

The principal authority for OCS oil and gas development is the OCS Lands Act of 1953, as amended. Important amendments in 1978 provided for balancing between expedited exploration and development and protection of the human, marine, and coastal environments. A provision (§18) was included to authorize the Department of the Interior to conduct a 5-year lease sale planning process. Interior's Minerals Management Service (MMS) has responsibility for the Federal OCS leasing process and prepares a 5-year plan for the upcoming sales in the subregions of the four major leasing regions (Atlantic, Gulf, Pacific, and Alaskan).

The entire process for developing the current five-year plan took three years. The process began in July 1989 when the MMS issued a *Federal Register* notice soliciting information from the States, local governments, industry, and the public. The MMS developed its proposed final plan from the information received through the notice.

The MMS released its first draft of the proposed five-year leasing plan in February 1991. After a 60-day comment period, the MMS reviewed the comments and modified the proposed plan. The MMS released the second draft plan and its draft EIS on July 31, 1991 for a 90-day comment period. After reviewing these comments and modifying the second draft plan, the MMS released the draft final plan on May 1, 1992. There followed a 60-day congressional notification period, after which the Interior Department approved the plan July 1, 1992.

The new plan has fewer sales (18) than the previous one (originally 37). Except in the Central and Western Gulf of Mexico, the proposed plan does not employ the "areawide approach;" rather, the plan would target leasing to smaller areas within planning regions, while deferring certain environmentally sensitive

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areas. Many sales would be limited to a fixed number of tracts: 250 in the only mid- and South Atlantic sale in 1996, 200 in the Eastern Gulf of Mexico (north of 26 degrees North Latitude) sale in 1995, and 250 in the Cook Inlet sale in 1994.

The development of the next 5-year plan (mid-1997 through mid-2002) will begin in 1994. The current 5-year plan is being reviewed.

### **Status of the Issue**

The only areas of the proposed plan that do not coincide with congressional intent as reflected in the FY1991 moratoria, are the Mid- and South Atlantic region, and the Eastern Gulf of Mexico off northwest Florida. In these areas, the plan proposes leasing.

Congress may wish to conduct oversight hearings on the development of the next plan, to evaluate issues such as the plan's relationship to congressional intent on moratoria, national energy strategy, and OCS coastal impact assistance. Moratoria provisions of one year's duration were contained in the FY1993 Interior Department appropriations legislation. Multiyear moratoria and coastal impact assistance provisions were contained in the comprehensive energy legislation (S. 2166 and H.R. 776) of the 102nd Congress.

### **Questions**

1. How does current five-year plan relate to current congressional moratoria? How will it address such moratoria?
2. How does the current five-year plan relate to OCS proposals for coastal impact assistance?
3. What changes will be necessary for the next five-year plan, for the years mid-1997 through mid-2002?

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## EVALUATION OF OCS ENVIRONMENTAL RISK\*

### Issue Definition

One of the key congressional concerns over OCS leasing is environmental risk. This concern is largely responsible for the increasing acreage under congressional moratoria. In FY1993, 468.6 million acres were under moratoria. While Congress has imposed OCS moratoria, it was also responding to the Bush Administration's position that development of domestic gas would be an important part of its energy and environmental strategy. Any congressional resolution of these conflicting developments most likely will involve a determination of environmental risk.

### Background and Analysis

The risk of an oil spill from domestic OCS oil exploration and development activities has declined dramatically since 1970, although it still remains. The reasons for this improved environmental record are probably both the success of new drilling and production technologies and more stringent environmental controls. An example of successful technology is improved blowout preventers. Examples of more stringent environmental controls include requirements for burial of pipelines, worker training programs, inspection programs, and oil spill contingency plans.

It is widely recognized that the spill risk from domestically produced OCS oil, piped to a shore facility, is far less than that for tankered oil both from abroad and from domestic onshore sources (the *Exxon Valdez* spill was Prudhoe Bay onshore-produced oil). The volume of oil spilled into U.S. waters is more likely to increase the more tankered imported oil is substituted for OCS production.

The spill risk from development of OCS gas is much less than the risk for OCS oil development. Many undeveloped OCS areas, such as the Baltimore Canyon in the Mid-Atlantic OCS, the Georges Bank in the North Atlantic OCS, and the Pacific Northwest OCS, are thought to be gas-prone and the risk of spills to be minor.

Public perceptions of OCS-related spill damage do not reflect the improved environmental record, possibly because the oil industry in general is blamed for oil spill damage whether or not related to a particular activity. The public does not appear to distinguish between the oil spill risk from OCS oil development - where it is very low relative to tankered oil -- and OCS gas development -- where the risk is almost nonexistent.

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Environmentalists and other critics of OCS production, particularly with regard to pristine areas with few people, maintain that large scale coastal infrastructure development (such as refining and attendant industries, and transportation) would accompany OCS development and that oil rigs on the horizon would ruin ocean views. Proponents of development indicate that, to some extent, pipeline technology may make possible the "export" of infrastructure development to other areas more amenable to it. To a lesser extent, rigs can be made less obtrusive, and, through subsea horizontal drilling, provide an extended extraction network that can ultimately require fewer rigs.

Oil spill and other environmental risk is sometimes difficult to evaluate. Equally difficult to determine is whether adequate environmental information exists for making leasing decisions. Important sources of environmental information are EISs. Other major sources are the studies produced through the Department of the Interior's Environmental Studies Program established under §20 of the OCSLAA. Still other sources are information from the processes under OCSLAA §18 (5-year OCS plan) and §19 (State consultation).

It is sometimes difficult for an interested party, such as an affected State, to review all the sources of OCS environmental information, to review this information as a comprehensive whole, and to determine its adequacy for making leasing decisions. Review and adequacy determinations are often done by an independent agency such as the National Academy of Sciences (NAS); it has undertaken such reviews for OCS areas off California, south Florida, and the Georges Bank; and is currently conducting reviews of three Alaskan OCS areas (Chukchi Sea, Beaufort Sea, and Navarin Basin). Congress may request the NAS to perform such a review; the most recent reviews have taken at least a year to complete.

### **Status of the Issue**

Underlying the congressional imposition of moratoria is the public concern over oil spill risk. Before the possibility of increased OCS production may be addressed, it is likely that the public will press for re-examination of the relative risk potential of OCS development compared to other hydrocarbon supply options. The outcome of such an evaluation could be an important factor in congressional consideration of OCS moratoria and the President's interest in the development of natural gas.

Specific questions the 103d Congress may wish to evaluate include the different oil spill risks posed by tankered and OCS-produced oil, and how (and when) the new oil spill liability law (P.L. 101-380) will affect these different risks. Additionally, the Congress may decide to involve the National Academy of Sciences in additional independent analyses to determine the adequacy of area-specific environmental information on which to base leasing decisions.

**Questions**

1. To what extent is perception or determination of environmental risk related to enactment of moratoria?
2. To what extent is perception or determination of environmental risk related to the development of natural gas?
3. What are the different oil-spill risks of OCS-produced oil versus tankered oil? Will the new oil spill liability law affect these differential risks?
4. Are there more potential leasing areas where Congress may want the National Academy of Sciences, or some other independent organization or process, to determine the adequacy of area-specific environmental information on which to base leasing decisions?

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## ANTARCTIC ENVIRONMENTAL PROTECTION AND MINERAL RESOURCES\*

### **Issue Definition**

Antarctica, home to penguins, seals, and whales, and long of interest to explorers and scientists, has also attracted controversy as a potential source of petroleum and other mineral resources, although no recoverable deposits have yet been discovered. After seven years of negotiation, on June 2, 1988, in Wellington, New Zealand, the Convention on the Regulation of Antarctic Mineral Resource Activities (also known as CRAMRA or the "Wellington Convention") was adopted by consensus of the nations that were Consultative Parties (20 at that time) to the Antarctic Treaty. The convention, negotiated under the provisions of the Antarctic Treaty, would have established an environmentally based regulatory framework for possible future development of mineral resources in Antarctica. Almost immediately, however, it came under attack by those who feared that any development of mineral resources in Antarctica would adversely affect the pristine nature of the continent. Consequently, the negotiators representing the Antarctic Treaty Consultative Parties (those countries with significant established research interests in Antarctica, of which there are now 26) negotiated a new measure that would place a ban on mineral resource development in Antarctica and preserve its environmental quality. This measure is known as the Protocol on Environmental Protection to the Antarctic Treaty, with Annexes. It was submitted to the Senate for its advice and consent for ratification and was approved on October 7, 1992 (Treaty Doc. 102-22).

### **Background and Analysis**

The primary purpose of the Antarctic Treaty is to ensure that "Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord." The treaty provides for freedom of scientific research in Antarctica and promotes international cooperation toward that end. Through Consultative Meetings and other provisions of the treaty, a growing complex of arrangements for regulating activities of nations in the Antarctic has evolved. This complex of arrangements is known as the Antarctic Treaty System (ATS), the center of which is the treaty itself. Other aspects of the ATS include recommendations adopted at Consultative Meetings and separate agreements and conventions adopted at Special Consultative Meetings. Among the separate agreements and conventions that have been adopted are the Agreed Measures for the Conservation of Antarctic Fauna and Flora, the Convention for the Conservation of Antarctic Seals, and the Convention on the Conservation of Antarctic Marine Living Resources. CRAMRA was intended to complement these other agreements and create a more comprehensive management regime for Antarctica.

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Even though CRAMRA was intended to establish an environmentally sound management regime for mineral resource activities, considerable pressure was brought forth by those who opposed any future minerals development. Consequently, on October 4, 1991, the Consultative Parties concluded the Protocol on Environmental Protection to the Antarctic Treaty which specifically prohibits all activities relating to Antarctic mineral resources, except scientific research, with the proviso that this prohibition cannot be amended by less than unanimous agreement of the Antarctic Treaty Consultative Parties for at least 50 years after entry into force of the Protocol. Detailed mandatory **rules** for environmental protection pursuant to the provisions of the Protocol are contained in a series of annexes forming an integral part of the Protocol. Any modification of the minerals ban would require unanimous consent of the Consultative Parties and that an acceptable binding legal regime on Antarctic mineral resource activities be in place before the ban could be lifted.

The Protocol on Environmental Protection to the Antarctic Treaty designates Antarctica as a natural reserve, devoted to peace and science and commits the contracting parties to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems. The protocol establishes a Committee for Environmental Protection to provide advice and formulate recommendations to the Consultative Parties. The protocol is currently accompanied by five annexes (four were adopted with the Protocol and the fifth two weeks later) dealing with environmental impact assessment, conservation of Antarctic fauna and flora, waste disposal and management, prevention of marine pollution, and area protection and management. Additional annexes may be adopted and become effective in accordance with provisions of the Antarctic Treaty.

### **Questions**

1. Although 50 years seems like a long time, there are still many who would not wish to have any future minerals development occur in Antarctica. These concerns are often embodied in terms of establishing Antarctica as a world park. In such an event, how would the contentious question of territorial claims be resolved?
2. While the issue of mineral development activities in Antarctica is resolved for the present, the question of negotiating an acceptable minerals management regime for possible future use still remains. Is CRAMRA still viable in the future or if not, how might it be improved?

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## THE ANTARCTIC TREATY SYSTEM AND THE IMPACT OF UNITED NATIONS DEBATES\*

### Issue Definition

This fall, the United Nations General Assembly will discuss the possibility of establishing a U.N.-sponsored station in the Antarctic. The 1991 debate marks the ninth year that the Assembly has considered the "Question of Antarctica." Since debate began, in 1983, the number of states parties to the Antarctic Treaty has increased from 28 to 40. During the same time, the Consultative Parties have admitted 10 countries to their number. Since 1984, the overall direction of the Assembly's considerations seems to be replacement of the regime established in the 1959 Antarctic Treaty with a new structure negotiated under U.N. auspices. This chapter discusses the background of U.N. debate on the issue and the extent to which U.N. considerations have had an impact on the decisions of the Antarctic Consultative Parties.

### Background and Analysis

The Antarctic Treaty, which entered into force on June 23, 1961, serves as the backbone of a system of treaty organizations often referred to as the Antarctic Treaty System (ATS). The Treaty establishes a meeting of consultations among the "Consultative Parties" to it [the original 12 states party to the Treaty plus those invited, by virtue of establishing scientific research programs in Antarctica, to participate as consultative parties]. The Antarctic Consultative Parties meet every other year to discuss common problems associated with their activities in the Antarctic. They have adopted, for governmental approval, a total of 199 recommendations, 123 (62 percent) of which have entered into force.

Other components of the ATS include the other treaties negotiated and adopted by the Antarctic Consultative Parties. They include the Convention for the Conservation of Antarctic Seals and the Convention on the Conservation of Antarctic Marine Living Resources. In 1988, the Antarctic Consultative Parties negotiated and opened for signature a Convention on the Regulation of Antarctic Mineral Resource Activities. This treaty did not enter into force and was suspended. A Protocol on Environmental Protection to the Antarctic Treaty was adopted and opened for signature on October 4, 1991 (until October 3, 1992). Lastly, the Scientific Committee on Antarctic Research is an active participant in the ATS, providing scientific information and reports to the Antarctic Consultative Meetings on a wide variety of issues before the Meetings.

By the early 1980s, the ATS was being criticized by some as "an exclusive club," with participation in the consultative meetings excluding both treaty parties who were not consultative parties and international organizations that

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have some expertise on issues discussed at the meetings. Moreover, consultative meetings were closed to the public and some reports submitted for discussion at the meetings were never released as public documents. These circumstances fostered suspicions among those outside the system over the actions of consultative parties and raised questions over the accountability of the ATS to the larger international community.

### ***United Nations Considerations***

The U.N. debates began in 1983, at the request of Antigua and Barbuda and Malaysia. Spurred by Antarctic Consultative Party negotiations on a mineral resource regime, these two countries argued for assurances that activities in Antarctica be carried out for the benefit of mankind as a whole. Australia, speaking on behalf of the Consultative Parties, maintained that the Antarctic Treaty was open to all nations and had averted international strife and territorial disputes over Antarctica. The Assembly called on the U.N. Secretariat to prepare a study of all aspects of Antarctica. The resolutions of the Assembly in 1983 and 1984 [the resolution took note of the study] were adopted by a consensus that included the Antarctic Consultative Parties.

Since that time, however, the Consultative Parties have not participated in the Assembly votes on Antarctica because they were not prepared to accept the efforts of those U.N. members who are pressing for fundamental changes in the ATS. One Assembly resolution adopted in 1985 would have labelled any "benefits" from Antarctic activities as the "common heritage of mankind." In later resolutions, the Assembly urged the Consultative Parties to invite the U.N. Secretary-General or his representative to their Consultative meetings and expressed regret that this had not been done. Also, in 1985, Assembly members adopted, for the first time, a resolution that called on Consultative Parties to exclude "the racist apartheid regime of South Africa" from their meetings. This resolution has been repeated each year.

The major points of the Assembly's 1991 resolution (A/RES/46/41) included the following:

- renewal of the Assembly's request that the Consultative Parties deposit information and documents covering all aspects of Antarctica with the U.N. Secretary-General;
- disappointment that the Madrid Protocol on Environmental Protection was not negotiated with the full participation of the international community;
- support for a permanent ban on prospecting and mining in Antarctica; and
- request that the Secretary-General report annually on the state of the environment in Antarctica.

### ***Consultative Party Response***

A number of decisions have been taken by the Consultative Parties starting with their September 1983 meeting to expand participation in the ATS process, make information more accessible, and increase the regulatory basis for protection of the Antarctic region. They include the following:

- granting the non-consultative treaty parties observer status at the consultative meetings. They do not participate in the decisionmaking but receive documentation and, by their presence, might influence the decisions;
- providing the U.N. Secretary-General with a copy of the consultative meeting final reports;
- expanding the substantive comments in the final reports of the meetings to include the content of the discussions, not just the texts of the adopted recommendations;
- establishing in each Consultative State Party a national contact point charged with information functions;
- implementing a review procedure for conference and information documents of the consultative meetings for the first 12 and future meetings and making most documents publicly available;
- agreeing to a set of guidelines for environmental impact assessments related to man's impact on the Antarctic environment; and
- negotiating the text of a document of comprehensive measures for the protection of the Antarctic environment.

### **Status of the Issue**

United Nations debate contributed to an opening up of the Antarctic Treaty system, with the Consultative Parties responding to criticisms made during the first years of discussion. The Consultative Parties have, however, firmly maintained that they will not agree to a U.N.-imposed system and have refused to participate in any Assembly resolutions that set any constraints on the decisions they might take.

The 17th Antarctic Consultative Meeting took place in Venice, Italy, November 9-20, 1992. Twenty-six Consultative Parties currently are acting to ratify the Protocol on Environmental Protection and to provide for its implementation. Ecuador, France, and Spain have taken such action thus far.

**Question**

What is an appropriate relationship between the United Nations/U.N. system and the Antarctic Treaty Consultative Parties/Antarctic Treaty system?

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APPENDIX A

**AGENDA 21:**

Programme of Action for  
Sustainable Development

**RIO DECLARATION**

on Environment and Development

Statement of

**FOREST PRINCIPLES**

The final text of agreements  
negotiated by Governments  
at the United Nations Conference on  
Environment and Development (UNCED),  
3-14 June 1992, Rio de Janeiro, Brazil



## 17

## Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources

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### INTRODUCTION

17.1 The marine environment — including the oceans and all seas and adjacent coastal areas — forms an integrated whole that is an essential component of the global life-support system and a positive asset that presents opportunities for sustainable development. International law, as reflected in the provisions of the United Nations Convention on the Law of the Sea<sup>1,2</sup> referred to in this chapter of Agenda 21, sets forth rights and obligations of States and provides the international basis upon which to pursue the protection and sustainable development of the marine and coastal environment and its resources. This requires new approaches to marine and coastal area management and development, at the national, subregional, regional and global levels, approaches that are integrated in content and are precautionary and anticipatory in ambit, as reflected in the following programme areas:<sup>3</sup>

- (a) Integrated management and sustainable development of coastal areas, including exclusive economic zones;
- (b) Marine environmental protection;
- (c) Sustainable use and conservation of marine living resources of the high seas;
- (d) Sustainable use and conservation of marine living resources under national jurisdiction;
- (e) Addressing critical uncertainties for the management of the marine environment and climate change;
- (f) Strengthening international, including regional, co-operation and coordination;
- (g) Sustainable development of small islands.

17.2 The implementation by developing countries of the activities set forth below shall be commensurate with their individual technological and financial capacities and priorities in allocating resources for development

needs and ultimately depends on the technology transfer and financial resources required and made available to them.

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### PROGRAMME AREAS

#### A) INTEGRATED MANAGEMENT AND SUSTAINABLE DEVELOPMENT OF COASTAL AND MARINE AREAS, INCLUDING EXCLUSIVE ECONOMIC ZONES

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##### BASIS FOR ACTION

17.3 The coastal area contains diverse and productive habitats important for human settlements, development and local subsistence. More than half the world's population lives within 60 km of the shoreline, and this could rise to three quarters by the year 2020. Many of the world's poor are crowded in coastal areas. Coastal resources are vital for many local communities and indigenous people. The exclusive economic zone (EEZ) is also an important marine area where the States manage the development and conservation of natural resources for the benefit of their people. For small island States or countries, these are the areas most available for development activities.

17.4 Despite national, subregional, regional and global efforts, current approaches to the management of marine and coastal resources have not always proved capable of achieving sustainable development, and coastal resources and the coastal environment are being rapidly degraded and eroded in many parts of the world.

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##### OBJECTIVES

17.5 Coastal States commit themselves to integrated



management and sustainable development of coastal areas and the marine environment under their national jurisdiction. To this end, it is necessary to, *inter alia*:

- (a) Provide for an integrated policy and decision-making process, including all involved sectors, to promote compatibility and a balance of uses;
- (b) Identify existing and projected uses of coastal areas and their interactions;
- (c) Concentrate on well-defined issues concerning coastal management;
- (d) Apply preventive and precautionary approaches in project planning and implementation, including prior assessment and systematic observation of the impacts of major projects;
- (e) Promote the development and application of methods, such as national resource and environmental accounting, that reflect changes in value resulting from uses of coastal and marine areas, including pollution, marine erosion, loss of resources and habitat destruction;
- (f) Provide access, as far as possible, for concerned individuals, groups and organizations to relevant information and opportunities for consultation and participation in planning and decision-making at appropriate levels.

#### ACTIVITIES

##### A) MANAGEMENT-RELATED ACTIVITIES

17.6 Each coastal State should consider establishing, or where necessary strengthening, appropriate coordinating mechanisms (such as a high-level policy planning body) for integrated management and sustainable development of coastal and marine areas and their resources, at both the local and national levels. Such mechanisms should include consultation, as appropriate, with the academic and private sectors, non-governmental organizations, local communities, resource user groups, and indigenous people. Such national coordinating mechanisms could provide, *inter alia*, for:

- (a) Preparation and implementation of land and water use and siting policies;
- (b) Implementation of integrated coastal and marine management and sustainable development plans and programmes at appropriate levels;
- (c) Preparation of coastal profiles identifying critical areas, including eroded zones, physical processes, development patterns, user conflicts and specific priorities for management;
- (d) Prior environmental impact assessment, systematic observation and follow-up of major projects, including the systematic incorporation of results in decision-making;
- (e) Contingency plans for human induced and natural

disasters, including likely effects of potential climate change and sea-level rise, as well as contingency plans for degradation and pollution of anthropogenic origin, including spills of oil and other materials;

- (f) Improvement of coastal human settlements, especially in housing, drinking water and treatment and disposal of sewage, solid wastes and industrial effluents;
- (g) Periodic assessment of the impacts of external factors and phenomena to ensure that the objectives of integrated management and sustainable development of coastal areas and the marine environment are met;
- (h) Conservation and restoration of altered critical habitats;
- (i) Integration of sectoral programmes on sustainable development for settlements, agriculture, tourism, fishing, ports and industries affecting the coastal area;
- (j) Infrastructure adaptation and alternative employment;
- (k) Human resource development and training;
- (l) Public education, awareness and information programmes;
- (m) Promoting environmentally sound technology and sustainable practices;
- (n) Development and simultaneous implementation of environmental quality criteria.

17.7 Coastal States, with the support of international organizations, upon request, should undertake measures to maintain biological diversity and productivity of marine species and habitats under national jurisdiction. *Inter alia*, these measures might include: surveys of marine biodiversity, inventories of endangered species and critical coastal and marine habitats; establishment and management of protected areas; and support of scientific research and dissemination of its results.

##### B) DATA AND INFORMATION

17.8 Coastal States, where necessary, should improve their capacity to collect, analyse, assess and use information for sustainable use of resources, including environmental impacts of activities affecting the coastal and marine areas. Information for management purposes should receive priority support in view of the intensity and magnitude of the changes occurring in the coastal and marine areas. To this end, it is necessary to, *inter alia*:

- (a) Develop and maintain databases for assessment and management of coastal areas and all seas and their resources;
- (b) Develop socio-economic and environmental indicators;
- (c) Conduct regular environmental assessment of the state of the environment of coastal and marine areas;

(d) Prepare and maintain profiles of coastal area resources, activities, uses, habitats and protected areas based on the criteria of sustainable development;

(e) Exchange information and data.

17.9 Cooperation with developing countries, and, where applicable, subregional and regional mechanisms, should be strengthened to improve their capacities to achieve the above.

### C) INTERNATIONAL AND REGIONAL COOPERATION AND COORDINATION

17.10 The role of international cooperation and coordination on a bilateral basis and, where applicable, within a subregional, interregional, regional or global framework, is to support and supplement national efforts of coastal States to promote integrated management and sustainable development of coastal and marine areas.

17.11 States should cooperate, as appropriate, in the preparation of national guidelines for integrated coastal zone management and development, drawing on existing experience. A global conference to exchange experience in the field could be held before 1994.

### MEANS OF IMPLEMENTATION

#### A) FINANCING AND COST EVALUATION

17.12 The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about \$6 billion including about \$50 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, *inter alia*, the specific strategies and programmes Governments decide upon for implementation.

#### B) SCIENTIFIC AND TECHNOLOGICAL MEANS

17.13 States should cooperate in the development of necessary coastal systematic observation, research and information management systems. They should provide access to and transfer environmentally safe technologies and methodologies for sustainable development of coastal and marine areas to developing countries. They should also develop technologies and endogenous scientific and technological capacities.

17.14 International organizations, whether subregional, regional or global, as appropriate, should support coastal

States, upon request, in these efforts, as indicated above, devoting special attention to developing countries.

#### C) HUMAN RESOURCE DEVELOPMENT

17.15 Coastal States should promote and facilitate the organization of education and training in integrated coastal and marine management and sustainable development for scientists, technologists, managers (including community-based managers) and users, leaders, indigenous peoples, fisherfolk, women and youth, among others. Management and development, as well as environmental protection concerns and local planning issues, should be incorporated in educational curricula and public awareness campaigns, with due regard to traditional ecological knowledge and socio-cultural values.

17.16 International organizations, whether subregional, regional or global, as appropriate, should support coastal States, upon request, in the areas indicated above, devoting special attention to developing countries.

#### D) CAPACITY-BUILDING

17.17 Full cooperation should be extended, upon request, to coastal States in their capacity-building efforts and, where appropriate, capacity-building should be included in bilateral and multilateral development cooperation. Coastal States may consider, *inter alia*:

- (a) Ensuring capacity-building at the local level;
- (b) Consulting on coastal and marine issues with local administrations, the business community, the academic sector, resource user groups and the general public;
- (c) Coordinating sectoral programmes while building capacity;
- (d) Identifying existing and potential capabilities, facilities and needs for human resources development and scientific and technological infrastructure;
- (e) Developing scientific and technological means and research;
- (f) Promoting and facilitating human resource development and education;
- (g) Supporting "centres of excellence" in integrated coastal and marine resource management;
- (h) Supporting pilot demonstration programmes and projects in integrated coastal and marine management.

#### B) MARINE ENVIRONMENTAL PROTECTION

### BASIS FOR ACTION

17.18 Degradation of the marine environment can result

from a wide range of sources. Land-based sources contribute 70 per cent of marine pollution, while maritime transport and dumping-at-sea activities contribute 10 per cent each. The contaminants that pose the greatest threat to the marine environment are, in variable order of importance and depending on differing national or regional situations, sewage, nutrients, synthetic organic compounds, sediments, litter and plastics, metals, radionuclides, oil/hydrocarbons and polycyclic aromatic hydrocarbons (PAHs). Many of the polluting substances originating from land-based sources are of particular concern to the marine environment since they exhibit at the same time toxicity, persistence and bioaccumulation in the food chain. There is currently no global scheme to address marine pollution from land-based sources.

17.19 Degradation of the marine environment can also result from a wide range of activities on land. Human settlements, land use, construction of coastal infrastructure, agriculture, forestry, urban development, tourism and industry can affect the marine environment. Coastal erosion and siltation are of particular concern.

17.20 Marine pollution is also caused by shipping and sea-based activities. Approximately 600,000 tons of oil enter the oceans each year as a result of normal shipping operations, accidents and illegal discharges. With respect to offshore oil and gas activities, currently machinery space discharges are regulated internationally and six regional conventions to control platform discharges have been under consideration. The nature and extent of environmental impacts from offshore oil exploration and production activities generally account for a very small proportion of marine pollution.

17.21 A precautionary and anticipatory rather than a reactive approach is necessary to prevent the degradation of the marine environment. This requires, *inter alia*, the adoption of precautionary measures, environmental impact assessments, clean production techniques, recycling, waste audits and minimization, construction and/or improvement of sewage treatment facilities, quality management criteria for the proper handling of hazardous substances, and a comprehensive approach to damaging impacts from air, land and water. Any management framework must include the improvement of coastal human settlements and the integrated management and development of coastal areas.

#### OBJECTIVES

17.22 States, in accordance with the provisions of the United Nations Convention on the Law of the Sea on protection and preservation of the marine environment, commit themselves, in accordance with their policies, priorities and resources, to prevent, reduce and control

degradation of the marine environment so as to maintain and improve its life-support and productive capacities. To this end, it is necessary to:

- (a) Apply preventive, precautionary and anticipatory approaches so as to avoid degradation of the marine environment, as well as to reduce the risk of long-term or irreversible adverse effects upon it;
- (b) Ensure prior assessment of activities that may have significant adverse impacts upon the marine environment;
- (c) Integrate protection of the marine environment into relevant general environmental, social and economic development policies;
- (d) Develop economic incentives, where appropriate, to apply clean technologies and other means consistent with the internalization of environmental costs, such as the polluter pays principle, so as to avoid degradation of the marine environment;
- (e) Improve the living standards of coastal populations, particularly in developing countries, so as to contribute to reducing the degradation of the coastal and marine environment.

17.23 States agree that provision of additional financial resources, through appropriate international mechanisms, as well as access to cleaner technologies and relevant research, would be necessary to support action by developing countries to implement this commitment.

#### ACTIVITIES

##### A) MANAGEMENT-RELATED ACTIVITIES

##### ► *Prevention, reduction and control of degradation of the marine environment from land-based activities*

17.24 In carrying out their commitment to deal with degradation of the marine environment from land-based activities, States should take action at the national level and, where appropriate, at the regional and subregional levels, in concert with action to implement programme area A, and should take account of the Montreal Guidelines for the Protection of the Marine Environment from Land-Based Sources.

17.25 To this end, States, with the support of the relevant international environmental, scientific, technical and financial organizations, should cooperate, *inter alia*, to:

- (a) Consider updating, strengthening and extending the Montreal Guidelines, as appropriate;
- (b) Assess the effectiveness of existing regional agreements and action plans, where appropriate, with a view to identifying means of strengthening action, where necessary, to prevent, reduce and control marine degradation caused by land-based activities;
- (c) Initiate and promote the development of new regional agreements, where appropriate;

(d) Develop means of providing guidance on technologies to deal with the major types of pollution of the marine environment from land-based sources, according to the best scientific evidence;

(e) Develop policy guidance for relevant global funding mechanisms;

(f) Identify additional steps requiring international cooperation.

17.26 The UNEP Governing Council is invited to convene, as soon as practicable, an intergovernmental meeting on protection of the marine environment from land-based activities.

17.27 As concerns sewage, priority actions to be considered by States may include:

(a) Incorporating sewage concerns when formulating or reviewing coastal development plans, including human settlement plans;

(b) Building and maintaining sewage treatment facilities in accordance with national policies and capacities and international cooperation available;

(c) Locating coastal outfalls so as to maintain an acceptable level of environmental quality and to avoid exposing shell fisheries, water intakes and bathing areas to pathogens;

(d) Promoting environmentally sound co-treatments of domestic and compatible industrial effluents, with the introduction, where practicable, of controls on the entry of effluents that are not compatible with the system;

(e) Promoting primary treatment of municipal sewage discharged to rivers, estuaries and the sea, or other solutions appropriate to specific sites;

(f) Establishing and improving local, national, sub-regional and regional, as necessary, regulatory and monitoring programmes to control effluent discharge, using minimum sewage effluent guidelines and water quality criteria and giving due consideration to the characteristics of receiving bodies and the volume and type of pollutants.

17.28 As concerns other sources of pollution, priority actions to be considered by States may include:

(a) Establishing or improving, as necessary, regulatory and monitoring programmes to control effluent discharges and emissions, including the development and application of control and recycling technologies;

(b) Promoting risk and environmental impact assessments to help ensure an acceptable level of environmental quality;

(c) Promoting assessment and cooperation at the regional level, where appropriate, with respect to the input of point source pollutants from new installations;

(d) Eliminating the emission or discharge of organohalogen compounds that threaten to accumulate to dangerous levels in the marine environment;

(e) Reducing the emission or discharge of other synthetic organic compounds that threaten to accumulate to dangerous levels in the marine environment;

(f) Promoting controls over anthropogenic inputs of nitrogen and phosphorus that enter coastal waters where such problems as eutrophication threaten the marine environment or its resources;

(g) Cooperating with developing countries, through financial and technological support, to maximize the best practicable control and reduction of substances and wastes that are toxic, persistent or liable to bio-accumulate and to establish environmentally sound land-based waste disposal alternatives to sea dumping;

(h) Cooperating in the development and implementation of environmentally sound land-use techniques and practices to reduce run-off to water-courses and estuaries which would cause pollution or degradation of the marine environment;

(i) Promoting the use of environmentally less harmful pesticides and fertilizers and alternative methods for pest control, and considering the prohibition of those found to be environmentally unsound;

(j) Adopting new initiatives at national, subregional and regional levels for controlling the input of non-point source pollutants, which require broad changes in sewage and waste management, agricultural practices, mining, construction and transportation.

17.29 As concerns physical destruction of coastal and marine areas causing degradation of the marine environment, priority actions should include control and prevention of coastal erosion and siltation due to anthropogenic factors related to, *inter alia*, land-use and construction techniques and practices. Watershed management practices should be promoted so as to prevent, control and reduce degradation of the marine environment.

► *Prevention, reduction and control of degradation of the marine environment from sea-based activities*

17.30 States, acting individually, bilaterally, regionally or multilaterally and within the framework of IMO and other relevant international organizations, whether sub-regional, regional or global, as appropriate, should assess the need for additional measures to address degradation of the marine environment:

A) FROM SHIPPING, BY:

(i) Supporting wider ratification and implementation of relevant shipping conventions and protocols;

(ii) Facilitating the processes in (i), providing support to individual States upon request to help them overcome the obstacles identified by them;

- (iii) Cooperating in monitoring marine pollution from ships, especially from illegal discharges (e.g., aerial surveillance), and enforcing MARPOL discharge provisions more rigorously;
- (iv) Assessing the state of pollution caused by ships in particularly sensitive areas identified by IMO and taking action to implement applicable measures, where necessary, within such areas to ensure compliance with generally accepted international regulations;
- (v) Taking action to ensure respect of areas designated by coastal States, within their exclusive economic zones, consistent with international law, in order to protect and preserve rare or fragile ecosystems, such as coral reefs and mangroves;
- (vi) Considering the adoption of appropriate rules on ballast water discharge to prevent the spread of non-indigenous organisms;
- (vii) Promoting navigational safety by adequate charting of coasts and ship-routing, as appropriate;
- (viii) Assessing the need for stricter international regulations to further reduce the risk of accidents and pollution from cargo ships (including bulk carriers);
- (ix) Encouraging IMO and IAEA to work together to complete consideration of a code on the carriage of irradiated nuclear fuel in flasks on board ships;
- (x) Revising and updating the IMO Code of Safety for Nuclear Merchant Ships and considering how best to implement a revised code;
- (xi) Supporting the ongoing activity within IMO regarding development of appropriate measures for reducing air pollution from ships;
- (xii) Supporting the ongoing activity within IMO regarding the development of an international regime governing the transportation of hazardous and noxious substances carried by ships and further considering whether the compensation funds similar to the ones established under the Fund Convention would be appropriate in respect of pollution damage caused by substances other than oil;

#### B) FROM DUMPING, BY:

- (i) Supporting wider ratification, implementation and participation in relevant Conventions on dumping at sea, including early conclusion of a future strategy for the London Dumping Convention;
- (ii) Encouraging the London Dumping Convention parties to take appropriate steps to stop ocean dumping and incineration of hazardous substances;

#### C) FROM OFFSHORE OIL AND GAS PLATFORMS, BY:

- (i) Assessing existing regulatory measures to address discharges, emissions and safety and assessing the need for additional measures;

#### D) FROM PORTS, BY:

- (i) Facilitating establishment of port reception facilities for the collection of oily and chemical residues and garbage from ships, especially in MARPOL special areas, and promoting the establishment of smaller scale facilities in marinas and fishing harbours.
- 17.31 IMO and as appropriate, other competent United Nations organizations, when requested by the States concerned, should assess, where appropriate, the state of marine pollution in areas of congested shipping, such as heavily used international straits, with a view to ensuring compliance with generally accepted international regulations, particularly those related to illegal discharges from ships, in accordance with the provisions of Part III of the United Nations Convention on the Law of the Sea.
- 17.32 States should take measures to reduce water pollution caused by organotin compounds used in anti-fouling paints.
- 17.33 States should consider ratifying the Convention on Oil Pollution Preparedness, Response and Cooperation, which addresses, *inter alia*, the development of contingency plans on the national and international level, as appropriate, including provision of oil-spill response material and training of personnel, including its possible extension to chemical spill response.
- 17.34 States should intensify international cooperation to strengthen or establish, where necessary, regional oil/chemical-spill response centres and/or, as appropriate, mechanisms in cooperation with relevant subregional, regional or global intergovernmental organizations and, where appropriate, industry-based organizations.

#### B) DATA AND INFORMATION

- 17.35 States should, as appropriate, and in accordance with the means at their disposal and with due regard for their technical and scientific capacity and resources, make systematic observations on the state of the marine environment. To this end, States should, as appropriate, consider:
- (a) Establishing systematic observation systems to measure marine environmental quality, including causes and effects of marine degradation, as a basis for management;
  - (b) Regularly exchanging information on marine degradation caused by land-based and sea-based activities and on actions to prevent, control and reduce such degradation;
  - (c) Supporting and expanding international programmes for systematic observations such as the mussel watch programme, building on existing facilities with special attention to developing countries;

- (d) Establishing a clearing-house on marine pollution control information, including processes and technologies to address marine pollution control and to support their transfer to developing countries and other countries with demonstrated needs;
- (e) Establishing a global profile and database providing information on the sources, types, amounts and effects of pollutants reaching the marine environment from land-based activities in coastal areas and sea-based sources;
- (f) Allocating adequate funding for capacity-building and training programmes to ensure the full participation of developing countries, in particular, in any international scheme under the organs and organizations of the United Nations system for the collection, analysis and use of data and information.

#### MEANS OF IMPLEMENTATION

##### A) FINANCING AND COST EVALUATION

17.36 The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about \$200 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, *inter alia*, the specific strategies and programmes Governments decide upon for implementation.

##### B) SCIENTIFIC AND TECHNOLOGICAL MEANS

17.37 National, subregional and regional action programmes will, where appropriate, require technology transfer, in conformity with chapter 34, and financial resources, particularly where developing countries are concerned, including:

- (a) Assistance to industries in identifying and adopting clean production or cost-effective pollution control technologies;
- (b) Planning development and application of low-cost and low-maintenance sewage installation and treatment technologies for developing countries;
- (c) Equipment of laboratories to observe systematically human and other impacts on the marine environment;
- (d) Identification of appropriate oil- and chemical-spill control materials, including low-cost locally available materials and techniques, suitable for pollution emergencies in developing countries;
- (e) Study of the use of persistent organohalogenes that are liable to accumulate in the marine environment to

identify those that cannot be adequately controlled and to provide a basis for a decision on a time schedule for phasing them out as soon as practicable;

- (f) Establishment of a clearing-house for information on marine pollution control, including processes and technologies to address marine pollution control, and support for their transfer to developing and other countries with demonstrated needs.

##### C) HUMAN RESOURCE DEVELOPMENT

17.38 States individually or in cooperation with each other and with the support of international organizations, whether subregional, regional or global, as appropriate, should:

- (a) Provide training for critical personnel required for the adequate protection of the marine environment as identified by training needs' surveys at the national, regional or subregional levels;
- (b) Promote the introduction of marine environmental protection topics into the curriculum of marine studies programmes;
- (c) Establish training courses for oil- and chemical-spill response personnel, in cooperation, where appropriate, with the oil and chemical industries;
- (d) Conduct workshops on environmental aspects of port operations and development;
- (e) Strengthen and provide secure financing for new and existing specialized international centres of professional maritime education;
- (f) Through bilateral and multilateral cooperation, support and supplement the national efforts of developing countries as regards human resource development in relation to prevention and reduction of degradation of the marine environment.

##### D) CAPACITY-BUILDING

17.39 National planning and coordinating bodies should be given the capacity and authority to review all land-based activities and sources of pollution for their impacts on the marine environment and to propose appropriate control measures.

17.40 Research facilities should be strengthened or, where appropriate, developed in developing countries for systematic observation of marine pollution, environmental impact assessment and development of control recommendations and should be managed and staffed by local experts.

17.41 Special arrangements will be needed to provide adequate financial and technical resources to assist de-

veloping countries in preventing and solving problems associated with activities that threaten the marine environment.

17.42 An international funding mechanism should be created for the application of appropriate sewage treatment technologies and building sewage treatment facilities, including grants or concessional loans from international agencies and appropriate regional funds, replenished at least in part on a revolving basis by user fees.

17.43 In carrying out these programme activities, particular attention needs to be given to the problems of developing countries that would bear an unequal burden because of their lack of facilities, expertise or technical capacities.

### C) SUSTAINABLE USE AND CONSERVATION OF MARINE LIVING RESOURCES OF THE HIGH SEAS

#### BASIS FOR ACTION

17.44 Over the last decade, fisheries on the high seas have considerably expanded and currently represent approximately 5 per cent of total world landings. The provisions of the United Nations Convention on the Law of the Sea on the marine living resources of the high seas sets forth rights and obligations of States with respect to conservation and utilization of those resources.

17.45 However, management of high seas fisheries, including the adoption, monitoring and enforcement of effective conservation measures, is inadequate in many areas and some resources are overutilized. There are problems of unregulated fishing, overcapitalization, excessive fleet size, vessel reflagging to escape controls, insufficiently selective gear, unreliable databases and lack of sufficient cooperation between States. Action by States whose nationals and vessels fish on the high seas, as well as cooperation at the bilateral, sub-regional, regional and global levels, is essential particularly for highly migratory species and straddling stocks. Such action and cooperation should address inadequacies in fishing practices, as well as in biological knowledge, fisheries statistics and improvement of systems for handling data. Emphasis should also be on multi-species management and other approaches that take into account the relationships among species, especially in addressing depleted species, but also in identifying the potential of underutilized or unutilized populations.

#### OBJECTIVES

17.46 States commit themselves to the conservation and sustainable use of marine living resources on the high seas. To this end, it is necessary to:

- (a) Develop and increase the potential of marine living resources to meet human nutritional needs, as well as social, economic and development goals;
- (b) Maintain or restore populations of marine species at levels that can produce the maximum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species;
- (c) Promote the development and use of selective fishing gear and practices that minimize waste in the catch of target species and minimize by-catch of non-target species;
- (d) Ensure effective monitoring and enforcement with respect to fishing activities;
- (e) Protect and restore endangered marine species;
- (f) Preserve habitats and other ecologically sensitive areas;
- (g) Promote scientific research with respect to the marine living resources in the high seas.

17.47 Nothing in paragraph 17.46 above restricts the right of a State or the competence of an international organization, as appropriate, to prohibit, limit or regulate the exploitation of marine mammals on the high seas more strictly than provided for in that paragraph. States shall cooperate with a view to the conservation of marine mammals and, in the case of cetaceans, shall in particular work through the appropriate international organizations for their conservation, management and study.

17.48 The ability of developing countries to fulfil the above objectives is dependent upon their capabilities, including the financial, scientific and technological means at their disposal. Adequate financial, scientific and technological cooperation should be provided to support action by them to implement these objectives.

#### ACTIVITIES

##### A) MANAGEMENT-RELATED ACTIVITIES

17.49 States should take effective action, including bilateral and multilateral cooperation, where appropriate at the subregional, regional and global levels, to ensure that high seas fisheries are managed in accordance with the provisions of the United Nations Convention on the Law of the Sea. In particular, they should:

- (a) Give full effect to these provisions with regard to fisheries populations whose ranges lie both within and beyond exclusive economic zones (straddling stocks);

(b) Give full effect to these provisions with regard to highly migratory species;

(c) Negotiate, where appropriate, international agreements for the effective management and conservation of fishery stocks;

(d) Define and identify appropriate management units;

17.50 States should convene, as soon as possible, an intergovernmental conference under United Nations auspices, taking into account relevant activities at the sub-regional, regional and global levels, with a view to promoting effective implementation of the provisions of the United Nations Convention on the Law of the Sea on straddling fish stocks and highly migratory fish stocks.

The conference, drawing, *inter alia*, on scientific and technical studies by FAO, should identify and assess existing problems related to the conservation and management of such fish stocks, and consider means of improving cooperation on fisheries among States, and formulate appropriate recommendations. The work and the results of the conference should be fully consistent with the provisions of the United Nations Convention on the Law of the Sea, in particular the rights and obligations of coastal States and States fishing on the high seas.

17.51 States should ensure that fishing activities by vessels flying their flags on the high seas take place in a manner so as to minimize incidental catches.

17.52 States should take effective action consistent with international law to monitor and control fishing activities by vessels flying their flags on the high seas to ensure compliance with applicable conservation and management rules, including full, detailed, accurate and timely reporting of catches and effort.

17.53 States should take effective action, consistent with international law, to deter reflagging of vessels by their nationals as a means of avoiding compliance with applicable conservation and management rules for fishing activities on the high seas.

17.54 States should prohibit dynamiting, poisoning and other comparable destructive fishing practices.

17.55 States should fully implement General Assembly resolution 46/215 on large-scale pelagic drift-net fishing.

17.56 States should take measures to increase the availability of marine living resources as human food by reducing wastage, post-harvest losses and discards, and improving techniques of processing, distribution and transportation.

## B) DATA AND INFORMATION

17.57 States, with the support of international organizations, whether subregional, regional or global, as appropriate, should cooperate to:

(a) Promote enhanced collection of data necessary for

the conservation and sustainable use of the marine living resources of the high seas;

(b) Exchange on a regular basis up-to-date data and information adequate for fisheries assessment;

(c) Develop and share analytical and predictive tools, such as stock assessment and bioeconomic models;

(d) Establish or expand appropriate monitoring and assessment programmes.

## C) INTERNATIONAL AND REGIONAL COOPERATION AND COORDINATION

17.58 States, through bilateral and multilateral cooperation and within the framework of subregional and regional fisheries bodies, as appropriate, and with the support of other international intergovernmental agencies, should assess high seas resource potentials and develop profiles of all stocks (target and non-target).

17.59 States should, where and as appropriate, ensure adequate coordination and cooperation in enclosed and semi-enclosed seas and between subregional, regional and global intergovernmental fisheries bodies.

17.60 Effective cooperation within existing subregional, regional or global fisheries bodies should be encouraged. Where such organizations do not exist, States should, as appropriate, cooperate to establish such organizations.

17.61 States with an interest in a high seas fishery regulated by an existing subregional and/or regional high seas fisheries organization of which they are not members should be encouraged to join that organization, where appropriate.

17.62 States recognize:

(a) The responsibility of the International Whaling Commission for the conservation and management of whale stocks and the regulation of whaling pursuant to the 1946 International Convention for the Regulation of Whaling;

(b) The work of the International Whaling Commission Scientific Committee in carrying out studies of large whales in particular, as well as of other cetaceans;

(c) The work of other organizations, such as the Inter-American Tropical Tuna Commission and the Agreement on Small Cetaceans in the Baltic and North Sea under the Bonn Convention, in the conservation, management and study of cetaceans and other marine mammals.

17.63 States should cooperate for the conservation, management and study of cetaceans.

## MEANS OF IMPLEMENTATION

### A) FINANCING AND COST EVALUATION

17.64 The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the



activities of this programme to be about \$12 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, *inter alia*, the specific strategies and programmes Governments decide upon for implementation.

#### B) SCIENTIFIC AND TECHNOLOGICAL MEANS

17.65 States, with the support of relevant international organizations, where necessary, should develop collaborative technical and research programmes to improve understanding of the life cycles and migrations of species found on the high seas, including identifying critical areas and life stages.

17.66 States, with the support of relevant international organizations, whether subregional, regional or global, as appropriate, should:

- (a) Develop databases on the high seas marine living resources and fisheries;
- (b) Collect and correlate marine environmental data with high seas marine living resources data, including the impacts of regional and global changes brought about by natural causes and by human activities;
- (c) Cooperate in coordinating research programmes to provide the knowledge necessary to manage high seas resources.

#### C) HUMAN RESOURCE DEVELOPMENT

17.67 Human resource development at the national level should be targeted at both development and management of high seas resources, including training in high seas fishing techniques and in high seas resource assessment, strengthening cadres of personnel to deal with high seas resource management and conservation and related environmental issues, and training observers and inspectors to be placed on fishing vessels.

#### D) CAPACITY-BUILDING

17.68 States, with the support, where appropriate, of relevant international organizations, whether subregional, regional or global, should cooperate to develop or upgrade systems and institutional structures for monitoring, control and surveillance, as well as the research capacity for assessment of marine living resource populations.

17.69 Special support, including cooperation among States, will be needed to enhance the capacities of developing countries in the areas of data and information, scientific and technological means, and human resource development in order to participate effectively in the conservation and sustainable utilization of high seas marine living resources.

#### D) SUSTAINABLE USE AND CONSERVATION OF MARINE LIVING RESOURCES UNDER NATIONAL JURISDICTION

##### BASIS FOR ACTION

17.70 Marine fisheries yield 80 to 90 million tons of fish and shellfish per/year, 95 per cent of which is taken from waters under national jurisdiction. Yields have increased nearly fivefold over the past four decades. The provisions of the United Nations Convention on the Law of the Sea on marine living resources of the exclusive economic zone and other areas under national jurisdiction set forth rights and obligations of States with respect to conservation and utilization of those resources.

17.71 Marine living resources provide an important source of protein in many countries and their use is often of major importance to local communities and indigenous people. Such resources provide food and livelihoods to millions of people and, if sustainably utilized, offer increased potential to meet nutritional and social needs, particularly in developing countries. To realize this potential requires improved knowledge and identification of marine living resource stocks, particularly of underutilized and unutilized stocks and species, use of new technologies, better handling and processing facilities to avoid wastage, and improved quality and training of skilled personnel to manage and conserve effectively the marine living resources of the exclusive economic zone and other areas under national jurisdiction. Emphasis should also be on multi-species management and other approaches that take into account the relationships among species.

17.72 Fisheries in many areas under national jurisdiction face mounting problems, including local overfishing, unauthorized incursions by foreign fleets, ecosystem degradation, overcapitalization and excessive fleet sizes, underevaluation of catch, insufficiently selective gear, unreliable databases, and increasing competition between artisanal and large-scale fishing, and between fishing and other types of activities.

17.73 Problems extend beyond fisheries. Coral reefs and other marine and coastal habitats, such as mangroves and estuaries, are among the most highly diverse, integrated

and productive of the Earth's ecosystems. They often serve important ecological functions, provide coastal protection, and are critical resources for food, energy, tourism and economic development. In many parts of the world, such marine and coastal systems are under stress or are threatened from a variety of sources, both human and natural.

#### OBJECTIVES

17.74 Coastal States, particularly developing countries and States whose economies are overwhelmingly dependent on the exploitation of the marine living resources of their exclusive economic zones, should obtain the full social and economic benefits from sustainable utilization of marine living resources within their exclusive economic zones and other areas under national jurisdiction.

17.75 States commit themselves to the conservation and sustainable use of marine living resources under national jurisdiction. To this end, it is necessary to:

- (a) Develop and increase the potential of marine living resources to meet human nutritional needs, as well as social, economic and development goals;
- (b) Take into account traditional knowledge and interests of local communities, small-scale artisanal fisheries and indigenous people in development and management programmes;
- (c) Maintain or restore populations of marine species at levels that can produce the maximum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species;
- (d) Promote the development and use of selective fishing gear and practices that minimize waste in the catch of target species and minimize by-catch of non-target species;
- (e) Protect and restore endangered marine species;
- (f) Preserve rare or fragile ecosystems, as well as habitats and other ecologically sensitive areas.

17.76 Nothing in paragraph 17.75 above restricts the right of a coastal State or the competence of an international organization, as appropriate, to prohibit, limit or regulate the exploitation of marine mammals more strictly than provided for in that paragraph. States shall cooperate with a view to the conservation of marine mammals and in the case of cetaceans shall in particular work through the appropriate international organizations for their conservation, management and study.

17.77 The ability of developing countries to fulfil the above objectives is dependent upon their capabilities, including the financial, scientific and technological means at their disposal. Adequate financial, scientific and technological cooperation should be provided to support action by them to implement these objectives.

#### ACTIVITIES

##### A) MANAGEMENT-RELATED ACTIVITIES

17.78 States should ensure that marine living resources of the exclusive economic zone and other areas under national jurisdiction are conserved and managed in accordance with the provisions of the United Nations Convention on the Law of the Sea.

17.79 States, in implementing the provisions of the United Nations Convention on the Law of the Sea, should address the issues of straddling stocks and highly migratory species, and, taking fully into account the objective set out in paragraph 17.74, access to the surplus of allowable catches.

17.80 Coastal States, individually or through bilateral and/or multilateral cooperation and with the support, as appropriate of international organizations, whether sub-regional, regional or global, should *inter alia*:

- (a) Assess the potential of marine living resources, including underutilized or unutilized stocks and species, by developing inventories, where necessary, for their conservation and sustainable use;
  - (b) Implement strategies for the sustainable use of marine living resources, taking into account the special needs and interests of small-scale artisanal fisheries, local communities and indigenous people to meet human nutritional and other development needs;
  - (c) Implement, in particular in developing countries, mechanisms to develop mariculture, aquaculture and small-scale, deep-sea and oceanic fisheries within areas under national jurisdiction where assessments show that marine living resources are potentially available;
  - (d) Strengthen their legal and regulatory frameworks, where appropriate, including management, enforcement and surveillance capabilities, to regulate activities related to the above strategies;
  - (e) Take measures to increase the availability of marine living resources as human food by reducing wastage, post-harvest losses and discards, and improving techniques of processing, distribution and transportation;
  - (f) Develop and promote the use of environmentally sound technology under criteria compatible with the sustainable use of marine living resources, including assessment of the environmental impact of major new fishery practices;
  - (g) Enhance the productivity and utilization of their marine living resources for food and income.
- 17.81 Coastal States should explore the scope for expanding recreational and tourist activities based on marine living resources, including those for providing alternative sources of income. Such activities should be compatible with conservation and sustainable development policies and plans.

17.82 Coastal States should support the sustainability of small-scale artisanal fisheries. To this end, they should, as appropriate:

- (a) Integrate small-scale artisanal fisheries development in marine and coastal planning, taking into account the interests and, where appropriate, encouraging representation of fishermen, small-scale fishworkers, women, local communities and indigenous people;
- (b) Recognize the rights of small-scale fishworkers and the special situation of indigenous people and local communities, including their rights to utilization and protection of their habitats on a sustainable basis;
- (c) Develop systems for the acquisition and recording of traditional knowledge concerning marine living resources and environment and promote the incorporation of such knowledge into management systems.

17.83 Coastal States should ensure that, in the negotiation and implementation of international agreements on the development or conservation of marine living resources, the interests of local communities and indigenous people are taken into account, in particular their right to subsistence.

17.84 Coastal States, with the support, as appropriate, of international organizations should conduct analyses of the potential for aquaculture in marine and coastal areas under national jurisdiction and apply appropriate safeguards as to the introduction of new species.

17.85 States should prohibit dynamiting, poisoning and other comparable destructive fishing practices.

17.86 States should identify marine ecosystems exhibiting high levels of biodiversity and productivity and other critical habitat areas and should provide necessary limitations on use in these areas, through, *inter alia*, designation of protected areas. Priority should be accorded, as appropriate, to:

- (a) Coral reef ecosystems;
- (b) Estuaries;
- (c) Temperate and tropical wetlands, including mangroves;
- (d) Seagrass beds;
- (e) Other spawning and nursery areas.

## B) DATA AND INFORMATION

17.87 States, individually or through bilateral and multilateral cooperation and with the support, as appropriate, of international organizations, whether subregional, regional or global, should:

- (a) Promote enhanced collection and exchange of data necessary for the conservation and sustainable use of the marine living resources under national jurisdiction;
- (b) Exchange on a regular basis up-to-date data and information necessary for fisheries assessment;

- (c) Develop and share analytical and predictive tools, such as stock assessment and bioeconomic models;
- (d) Establish or expand appropriate monitoring and assessment programmes;
- (e) Complete or update marine biodiversity, marine living resource and critical habitat profiles of exclusive economic zones and other areas under national jurisdiction, taking account of changes in the environment brought about by natural causes and human activities.

## C) INTERNATIONAL AND REGIONAL COOPERATION AND COORDINATION

17.88 States, through bilateral and multilateral cooperation, and with the support of relevant United Nations and other international organizations, should cooperate to:

- (a) Develop financial and technical cooperation to enhance the capacities of developing countries in small-scale and oceanic fisheries, as well as in coastal aquaculture and mariculture;
- (b) Promote the contribution of marine living resources to eliminate malnutrition and to achieve food self-sufficiency in developing countries, *inter alia*, by minimizing post-harvest losses and managing stocks for guaranteed sustainable yields;
- (c) Develop agreed criteria for the use of selective fishing gear and practices to minimize waste in the catch of target species and minimize by-catch of non-target species;
- (d) Promote seafood quality, including through national quality assurance systems for seafood, in order to promote access to markets, improve consumer confidence and maximize economic returns.

17.89 States should, where and as appropriate, ensure adequate coordination and cooperation in enclosed and semi-enclosed seas and between subregional, regional and global intergovernmental fisheries bodies.

17.90 States recognize:

- (a) The responsibility of the International Whaling Commission for the conservation and management of whale stocks and the regulation of whaling pursuant to the 1946 International Convention for the Regulation of Whaling;
- (b) The work of the International Whaling Commission Scientific Committee in carrying out studies of large whales in particular, as well as of other cetaceans;
- (c) The work of other organizations, such as the Inter-American Tropical Tuna Commission and the Agreement on Small Cetaceans in the Baltic and North Sea under the Bonn Convention, in the conservation, management and study of cetaceans and other marine mammals.

17.91 States should cooperate for the conservation, management and study of cetaceans.

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#### MEANS OF IMPLEMENTATION

##### A) FINANCING AND COST EVALUATION

17.92 The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about \$6 billion, including about \$60 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs will depend upon, *inter alia*, the specific strategies and programmes Governments decide upon for implementation.

##### B) SCIENTIFIC AND TECHNOLOGICAL MEANS

17.93 States, with the support of relevant intergovernmental organizations, as appropriate, should:

- (a) Provide for the transfer of environmentally sound technologies to develop fisheries, aquaculture and mariculture, particularly to developing countries;
- (b) Accord special attention to mechanisms for transferring resource information and improved fishing and aquaculture technologies to fishing communities at the local level;
- (c) Promote the study, scientific assessment and use of appropriate traditional management systems;
- (d) Consider observing, as appropriate, the FAO/ICES Code of Practice for Consideration of Transfer and Introduction of Marine and Freshwater Organisms;
- (e) Promote scientific research on marine areas of particular importance for marine living resources, such as areas of high diversity, endemism and productivity and migratory stopover points.

##### C) HUMAN RESOURCE DEVELOPMENT

17.94 States individually, or through bilateral and multi-lateral cooperation and with the support of relevant international organizations, whether subregional, regional or global, as appropriate, should encourage and provide support for developing countries, *inter alia*, to:

- (a) Expand multidisciplinary education, training and research on marine living resources, particularly in the social and economic sciences;
- (b) Create training opportunities at national and regional levels to support artisanal (including subsistence) fisheries, to develop small-scale use of marine living

resources and to encourage equitable participation of local communities, small-scale fish workers, women and indigenous people;

- (c) Introduce topics relating to the importance of marine living resources in educational curricula at all levels.

##### D) CAPACITY-BUILDING

17.95 Coastal States, with the support of relevant sub-regional, regional and global agencies, where appropriate, should:

- (a) Develop research capacities for assessment of marine living resource populations and monitoring;
- (b) Provide support to local fishing communities, in particular those that rely on fishing for subsistence, indigenous people and women, including, as appropriate, the technical and financial assistance to organize, maintain, exchange and improve traditional knowledge of marine living resources and fishing techniques, and upgrade knowledge on marine ecosystems;
- (c) Establish sustainable aquaculture development strategies, including environmental management in support of rural fish-farming communities;
- (d) Develop and strengthen, where the need may arise, institutions capable of implementing the objectives and activities related to the conservation and management of marine living resources.

17.96 Special support, including cooperation among States, will be needed to enhance the capacities of developing countries in the areas of data and information, scientific and technological means and human resource development in order to enable them to participate effectively in the conservation and sustainable use of marine living resources under national jurisdiction.

##### E) ADDRESSING CRITICAL UNCERTAINTIES FOR THE MANAGEMENT OF THE MARINE ENVIRONMENT AND CLIMATE CHANGE

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#### BASIS FOR ACTION

17.97 The marine environment is vulnerable and sensitive to climate and atmospheric changes. Rational use and development of coastal areas, all seas and marine resources, as well as conservation of the marine environment, requires the ability to determine the present state of these systems and to predict future conditions. The high degree of uncertainty in present information inhibits effective management and limits the ability to make predictions and assess environmental change. Systematic

collection of data on marine environmental parameters will be needed to apply integrated management approaches and to predict effects of global climate change and of atmospheric phenomena, such as ozone depletion, on living marine resources and the marine environment. In order to determine the role of the oceans and all seas in driving global systems and to predict natural and human-induced changes in marine and coastal environments, the mechanisms to collect, synthesize and disseminate information from research and systematic observation activities need to be restructured and reinforced considerably.

17.98 There are many uncertainties about climate change and particularly about sealevel rise. Small increases in sealevel have the potential of causing significant damage to small islands and low-lying coasts. Response strategies should be based on sound data. A long-term cooperative research commitment is needed to provide the data required for global climate models and to reduce uncertainty. Meanwhile, precautionary measures should be undertaken to diminish the risks and effects, particularly on small islands and on low-lying and coastal areas of the world.

17.99 Increased ultraviolet radiation derived from ozone depletion has been reported in some areas of the world. An assessment of its effects in the marine environment is needed to reduce uncertainty and to provide a basis for action.

#### OBJECTIVES

17.100 States, in accordance with provisions of the United Nations Convention on the Law of the Sea on marine scientific research, commit themselves to improve the understanding of the marine environment and its role on global processes. To this end, it is necessary to:

- (a) Promote scientific research on and systematic observation of the marine environment within the limits of national jurisdiction and high seas, including interactions with atmospheric phenomena, such as ozone depletion;
- (b) Promote exchange of data and information resulting from scientific research and systematic observation and from traditional ecological knowledge and ensure its availability to policy makers and the public at the national level;
- (c) Cooperate with a view to the development of standard inter-calibrated procedures, measuring techniques, data storage and management capabilities for scientific research on and systematic observation of the marine environment.

#### ACTIVITIES

##### A) MANAGEMENT-RELATED ACTIVITIES

17.101 States should consider, *inter alia*:

- (a) Coordinating national and regional observation programmes for coastal and near-shore phenomena related to climate change and for research parameters essential for marine and coastal management in all regions;
- (b) Providing improved forecasts of marine conditions for the safety of inhabitants of coastal areas and for the efficiency of maritime operations;
- (c) Cooperating with a view to adopting special measures to cope with and adapt to potential climate change and sealevel rise, including the development of globally accepted methodologies for coastal vulnerability assessment, modelling and response strategies particularly for priority areas, such as small islands and low-lying and critical coastal areas;
- (d) Identifying ongoing and planned programmes of systematic observation of the marine environment, with a view to integrating activities and establishing priorities to address critical uncertainties for oceans and all seas;
- (e) Initiating a programme of research to determine the marine biological effects of increased levels of ultraviolet rays due to the depletion of the stratospheric ozone layer and to evaluate the possible effects.

17.102 Recognizing the important role that oceans and all seas play in attenuating potential climate change, IOC and other relevant competent United Nations bodies, with the support of countries having the resources and expertise, should carry out analysis, assessments and systematic observation of the role of oceans as a carbon sink.

##### B) DATA AND INFORMATION

17.103 States should consider, *inter alia*:

- (a) Increasing international cooperation particularly with a view to strengthening national scientific and technological capabilities for analysing, assessing and predicting global climate and environmental change;
- (b) Supporting the role of the IOC in cooperation with WMO, UNEP and other international organizations in the collection, analysis and distribution of data and information from the oceans and all seas, including as appropriate, through the Global Ocean Observing System, giving special attention to the need for IOC to develop fully the strategy for providing training and technical assistance for developing countries through its Training, Education and Mutual Assistance (TEMA) programme;

- (c) Creating national multisectoral information bases, covering the results of research and systematic observation programmes;
- (d) Linking these databases to existing data and information services and mechanisms, such as World Weather Watch and Earthwatch;
- (e) Cooperating with a view to the exchange of data and information and its storage and archiving through the world and regional data centres;
- (f) Cooperating to ensure full participation of developing countries, in particular, in any international scheme under the organs and organizations of the United Nations system for the collection, analysis and use of data and information.

### C) INTERNATIONAL AND REGIONAL COOPERATION AND COORDINATION

17.104 States should consider bilaterally and multilaterally and in cooperation with international organizations, whether subregional, regional, interregional or global, where appropriate:

- (a) Providing technical cooperation in developing the capacity of coastal and island States for marine research and systematic observation and for using its results;
- (b) Strengthening existing national institutions and creating, where necessary, international analysis and prediction mechanisms in order to prepare and exchange regional and global oceanographic analyses and forecasts and to provide facilities for international research and training at national, subregional and regional levels, where applicable.

17.105 In recognition of the value of Antarctica as an area for the conduct of scientific research, in particular research essential to understanding the global environment, States carrying out such research activities in Antarctica should, as provided for in Article III of the Antarctic Treaty, continue to:

- (a) Ensure that data and information resulting from such research are freely available to the international community;
- (b) Enhance access of the international scientific community and specialized agencies of the United Nations to such data and information, including the encouragement of periodic seminars and symposia.

17.106 States should strengthen high-level inter-agency, subregional, regional and global coordination, as appropriate, and review mechanisms to develop and integrate systematic observation networks. This would include:

- (a) Review of existing regional and global databases;
- (b) Mechanisms to develop comparable and compatible techniques, validate methodologies and measurements,

organize regular scientific reviews, develop options for corrective measures, agree on formats for presentation and storage, and communicate the information gathered to potential users;

- (c) Systematic observation of coastal habitats and sealevel changes, inventories of marine pollution sources and reviews of fisheries statistics;
- (d) Organization of periodic assessments of ocean and all seas and coastal area status and trends.

17.107 International cooperation, through relevant organizations within the United Nations system, should support countries to develop and integrate regional systematic long-term observation programmes, when applicable, into the Regional Seas Programmes in a coordinated fashion to implement, where appropriate, subregional, regional and global observing systems based on the principle of exchange of data. One aim should be the predicting of the effects of climate-related emergencies on existing coastal physical and socioeconomic infrastructure.

17.108 Based on the results of research on the effects of the additional ultraviolet radiation reaching the Earth's surface, in the fields of human health, agriculture and marine environment, States and international organizations should consider taking appropriate remedial measures.

### MEANS OF IMPLEMENTATION

#### A) FINANCING AND COST EVALUATION

17.109 The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about \$750 million, including about \$480 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, *inter alia*, the specific strategies and programmes Governments decide upon for implementation.

17.110 Developed countries should provide the financing for the further development and implementation of the Global Ocean Observing System.

#### B) SCIENTIFIC AND TECHNOLOGICAL MEANS

17.111 To address critical uncertainties through systematic coastal and marine observations and research, coastal States should cooperate in the development of procedures that allow for comparable analysis and soundness of data. They should also cooperate on a subregional and regional

basis, through existing programmes where applicable, share infrastructure and expensive and sophisticated equipment, develop quality assurance procedures and develop human resources jointly. Special attention should be given to transfer of scientific and technological knowledge and means to support States, particularly developing countries, in the development of endogenous capabilities.

17.112 International organizations should support, when requested, coastal countries in implementing research projects on the effects of additional ultraviolet radiation.

#### C) HUMAN RESOURCE DEVELOPMENT

17.113 States, individually or through bilateral and multilateral cooperation and with the support, as appropriate, of international organizations whether subregional, regional or global, should develop and implement comprehensive programmes, particularly in developing countries, for a broad and coherent approach to meeting their core human resource needs in the marine sciences.

#### D) CAPACITY-BUILDING

17.114 States should strengthen or establish as necessary, national scientific and technological oceanographic commissions or equivalent bodies to develop, support and coordinate marine science activities and work closely with international organizations.

17.115 States should use existing subregional and regional mechanisms, where applicable, to develop knowledge of the marine environment, exchange information, organize systematic observations and assessments, and make the most effective use of scientists, facilities and equipment. They should also cooperate in the promotion of endogenous research capabilities in developing countries.

#### F) STRENGTHENING INTERNATIONAL, INCLUDING REGIONAL, COOPERATION AND COORDINATION

##### BASIS FOR ACTION

17.116 It is recognized that the role of international cooperation is to support and supplement national efforts. Implementation of strategies and activities under the programme areas relative to marine and coastal areas and seas requires effective institutional arrangements at national, subregional, regional and global levels, as appropriate. There are numerous national and international,

including regional, institutions, both within and outside the United Nations system, with competence in marine issues, and there is a need to improve coordination and strengthen links among them. It is also important to ensure that an integrated and multisectoral approach to marine issues is pursued at all levels.

##### OBJECTIVES

17.117 States commit themselves, in accordance with their policies, priorities and resources, to promote institutional arrangements necessary to support the implementation of the programme areas in this chapter. To this end, it is necessary, as appropriate, to:

- (a) Integrate relevant sectoral activities addressing environment and development in marine and coastal areas at national, subregional, regional and global levels, as appropriate;
- (b) Promote effective information exchange and, where appropriate, institutional linkages between bilateral and multilateral national, regional, subregional and interregional institutions dealing with environment and development in marine and coastal areas;
- (c) Promote within the United Nations system, regular intergovernmental review and consideration of environment and development issues with respect to marine and coastal areas;
- (d) Promote the effective operation of coordinating mechanisms for the components of the United Nations system dealing with issues of environment and development in marine and coastal areas, as well as links with relevant international development bodies.

##### ACTIVITIES

#### A) MANAGEMENT-RELATED ACTIVITIES

##### GLOBAL

17.118 The General Assembly should provide for regular consideration, within the United Nations system, at the intergovernmental level of general marine and coastal issues, including environment and development matters, and should request the Secretary-General and executive heads of United Nations agencies and organizations to:

- (a) Strengthen coordination and develop improved arrangements among the relevant United Nations organizations with major marine and coastal responsibilities, including their subregional and regional components;
- (b) Strengthen coordination between those organizations and other United Nations organizations, institutions and specialized agencies dealing with development, trade and other related economic issues, as appropriate;

(c) Improve representation of United Nations agencies dealing with the marine environment in United Nations system-wide coordination efforts;

(d) Promote, where necessary, greater collaboration between the United Nations agencies and subregional and regional coastal and marine programmes;

(e) Develop a centralized system to provide for information on legislation and advice on implementation of legal agreements on marine environmental and development issues.

17.119 States recognize that environmental policies should deal with the root causes of environmental degradation, thus preventing environmental measures from resulting in unnecessary restrictions to trade. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing international environmental problems should, as far as possible, be based on an international consensus. Domestic measures targeted to achieve certain environmental objectives may need trade measures to render them effective. Should trade policy measures be found necessary for the enforcement of environmental policies, certain principles and rules should apply. These could include, *inter alia*, the principle of non-discrimination; the principle that the trade measure chosen should be the least trade-restrictive necessary to achieve the objectives; an obligation to ensure transparency in the use of trade measures related to the environment and to provide adequate notification of national regulations; and the need to give consideration to the special conditions and development requirements of developing countries as they move towards internationally agreed environmental objectives.

#### SUBREGIONAL AND REGIONAL

17.120 States should consider, as appropriate:

(a) Strengthening, and extending where necessary, intergovernmental regional cooperation, the Regional Seas Programmes of UNEP, regional and subregional fisheries organizations and regional commissions;

(b) Introduce, where necessary, coordination among relevant United Nations and other multilateral organizations at the subregional and regional levels, including consideration of co-location of their staff;

(c) Arrange for periodic intraregional consultations;

(d) Facilitate access to and use of expertise and technology through relevant national bodies to subregional and regional centres and networks, such as the Regional Centres for Marine Technology.

#### B) DATA AND INFORMATION

17.121 States should, where appropriate:

(a) Promote exchange of information on marine and coastal issues;

(b) Strengthen the capacity of international organizations to handle information and support the development of national, subregional and regional data and information systems, where appropriate. This could also include networks linking countries with comparable environmental problems;

(c) Further develop existing international mechanisms such as Earthwatch and GESAMP.

#### MEANS OF IMPLEMENTATION

##### A) FINANCING AND COST EVALUATION

17.122 The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about \$50 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, *inter alia*, the specific strategies and programmes Governments decide upon for implementation.

##### B) SCIENTIFIC AND TECHNOLOGICAL MEANS, HUMAN RESOURCE DEVELOPMENT AND CAPACITY-BUILDING

17.123 The means of implementation outlined in the other programme areas on marine and coastal issues, under the sections on scientific and technological means, human resource development and capacity-building are entirely relevant for this programme area as well. Additionally, States should, through international cooperation, develop a comprehensive programme for meeting the core human resource needs in marine sciences at all levels.

##### G) SUSTAINABLE DEVELOPMENT OF SMALL ISLANDS

#### BASIS FOR ACTION

17.124 Small island developing States, and islands supporting small communities are a special case both for environment and development. They are ecologically fragile and vulnerable. Their small size, limited resources, geographic dispersion and isolation from markets, place them at a disadvantage economically and



prevent economies of scale. For small island developing States the ocean and coastal environment is of strategic importance and constitutes a valuable development resource.

17.125 Their geographic isolation has resulted in their habitation by a comparatively large number of unique species of flora and fauna, giving them a very high share of global biodiversity. They also have rich and diverse cultures with special adaptations to island environments and knowledge of the sound management of island resources.

17.126 Small island developing States have all the environmental problems and challenges of the coastal zone concentrated in a limited land area. They are considered extremely vulnerable to global warming and sea level rise, with certain small low-lying islands facing the increasing threat of the loss of their entire national territories. Most tropical islands are also now experiencing the more immediate impacts of increasing frequency of cyclones, storms and hurricanes associated with climate change. These are causing major set-backs to their socio-economic development.

17.127 Because small island development options are limited, there are special challenges to planning for and implementing sustainable development. Small island developing States will be constrained in meeting these challenges without the cooperation and assistance of the international community.

#### OBJECTIVES

17.128 States commit themselves to addressing the problems of sustainable development of small island developing States. To this end, it is necessary:

- (a) To adopt and implement plans and programmes to support the sustainable development and utilization of their marine and coastal resources, including meeting essential human needs, maintaining biodiversity and improving the quality of life for island people;
- (b) To adopt measures which will enable small island developing States to cope effectively, creatively and sustainably with environmental change and to mitigate impacts and reduce the threats posed to marine and coastal resources.

#### ACTIVITIES

##### **A) MANAGEMENT-RELATED ACTIVITIES**

17.129 Small island developing States, with the assistance as appropriate of the international community and on the basis of existing work of national and international organizations, should:

- (a) Study the special environmental and developmental characteristics of small islands, producing an environmental profile and inventory of their natural resources, critical marine habitats and biodiversity;
- (b) Develop techniques for determining and monitoring the carrying capacity of small islands under different development assumptions and resource constraints;
- (c) Prepare medium- and long-term plans for sustainable development that emphasize multiple use of resources, integrate environmental considerations with economic and sectoral planning and policies, define measures for maintaining cultural and biological diversity and conserve endangered species and critical marine habitats;
- (d) Adapt coastal area management techniques, such as planning, siting and environmental impact assessments, using Geographical Information Systems (GIS), suitable to the special characteristics of small islands, taking into account the traditional and cultural values of indigenous people of island countries;
- (e) Review the existing institutional arrangements and identify and undertake appropriate institutional reforms essential to the effective implementation of sustainable development plans, including intersectoral coordination and community participation in the planning process;
- (f) Implement sustainable development plans, including the review and modification of existing unsustainable policies and practices;
- (g) Based on precautionary and anticipatory approaches, design and implement rational response strategies to address the environmental, social and economic impacts of climate change and sea level rise, and prepare appropriate contingency plans;
- (h) Promote environmentally sound technology for sustainable development within small island developing States and identify technologies that should be excluded because of their threats to essential island ecosystems.

##### **B) DATA AND INFORMATION**

17.130 Additional information on the geographic, environmental, cultural and socio-economic characteristics of islands should be compiled and assessed to assist in the planning process. Existing island databases should be expanded and geographic information systems developed and adapted to suit the special characteristics of islands.

##### **C) INTERNATIONAL AND REGIONAL COOPERATION AND COORDINATION**

17.131 Small island developing States, with the support, as appropriate, of international organizations, whether

subregional, regional or global, should develop and strengthen inter-island, regional and interregional co-operation and information exchange, including periodic regional and global meetings on sustainable development of small island developing States with the first global conference on the sustainable development of small island developing States, to be held in 1993.

17.132 International organizations, whether subregional, regional or global, must recognize the special development requirements of small island developing States and give adequate priority in the provision of assistance, particularly with respect to the development and implementation of sustainable development plans.

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#### MEANS OF IMPLEMENTATION

##### A) FINANCING AND COST EVALUATION

17.133 The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about \$130 million, including about \$50 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, *inter alia*, the specific strategies and programmes Governments decide upon for implementation.

##### B) SCIENTIFIC AND TECHNICAL MEANS

17.134 Centres for the development and diffusion of scientific information and advice on technical means and technologies appropriate to small island developing States, especially with reference to the management of the coastal zone, the exclusive economic zone and marine resources, should be established or strengthened, as appropriate, on a regional basis.

##### C) HUMAN RESOURCE DEVELOPMENT

17.135 Since populations of small island developing States cannot maintain all necessary specializations, training for integrated coastal management and development should aim to produce cadres of managers or scientists, engineers and coastal planners able to integrate the many factors that need to be considered in integrated coastal management. Resource users should be prepared to execute both management and protection functions and to apply the polluter pays principle and support the training of their personnel. Educational systems should

be modified to meet these needs and special training programmes developed in integrated island management and development. Local planning should be integrated in educational curricula of all levels and public awareness campaigns developed with the assistance of non-governmental organizations and indigenous coastal populations.

##### D) CAPACITY-BUILDING

17.136 The total capacity of small island developing States will always be limited. Existing capacity must therefore be restructured to meet efficiently the immediate needs for sustainable development and integrated management. At the same time, adequate and appropriate assistance from the international community must be directed at strengthening the full range of human resources needed on a continuous basis to implement sustainable development plans.

17.137 New technologies that can increase the output and range of capability of the limited human resources should be employed to increase the capacity of very small populations to meet their needs. The development and application of traditional knowledge to improve the capacity of countries to implement sustainable development should be fostered.

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<sup>1</sup>References to the United Nations Convention on the Law of the Sea in this chapter of Agenda 21 do not prejudice the position of any State with respect to signature, ratification of or accession to the Convention.

<sup>2</sup>References to the United Nations Convention on the Law of the Sea in this chapter of Agenda 21 do not prejudice the position of States which view the Convention as having a unified character.

<sup>3</sup>Nothing in the programme areas of this chapter should be interpreted as prejudicing the rights of the States involved in a dispute of sovereignty or in the delimitation of the maritime areas concerned.

APPENDIX B

UNITED NATIONS  
CONFERENCE ON  
ENVIRONMENT & DEVELOPMENT

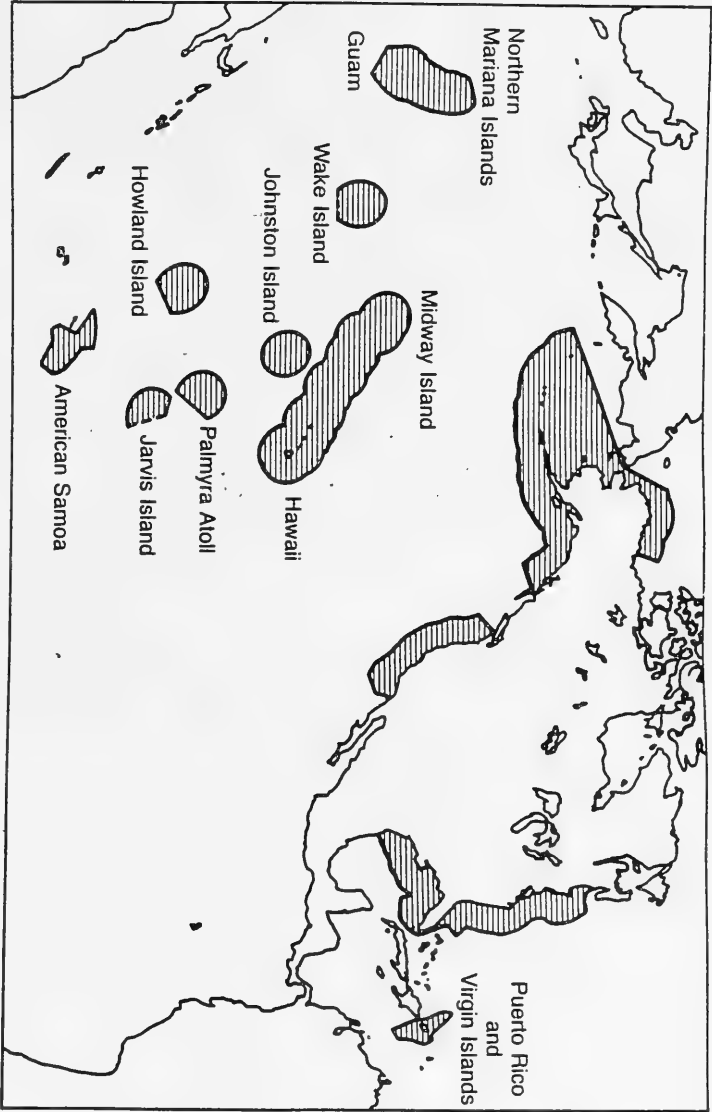
United  
States  
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America  
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Report

1992

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# Oceans and Coastal Resources





**The Exclusive Economic Zone**  
(Baker Island, Kingman Reef and Nevasa Island are not shown.)

By proclamation of the President on March 10, 1983, the United States claimed sovereign rights and jurisdiction within an Exclusive Economic Zone (EEZ). The United States is responsible for wisely developing, managing and protecting the EEZ's environment and marine resources within an area of over three million square nautical miles.

**Exhibit 6A.1**

## Overview

**T**he states and insular areas of the United States have a total of over 20,000 kilometers of coastline. The United States exercises sovereignty over the estuarine and near-coastal waters of its adjacent territorial seas. In accordance with international law, the United States also exercises rights and responsibilities for resource conservation and management and environmental protection in its Exclusive Economic Zone (EEZ).<sup>1</sup> Coastal and ocean ecosystems often extend beyond U.S. maritime zones into areas where similar rights and responsibilities are exercised by Canada, the former Soviet Union, Mexico and several nations of the Caribbean and Pacific. Exhibit 6d.2 summarizes selected ocean and coastal resource facts.

The Exclusive Economic Zone of the United States, an area of 3.36 million square nautical miles (1.14 thousand-million hectares), contains approximately one-fifth of the world's harvestable fish and shellfish. Exhibit 6d.1 illustrates the extent of the U.S. EEZ. In 1990 commercial landings by U.S. fishing vessels were valued at \$3.9 thousand-million dollars. The value-added contribution of commercial marine fishery products added approximately \$16.6 thousand-million to the U.S. gross national product. Consumers spent \$26.6 thousand-million on seafood products.<sup>2</sup> A substantial portion of oceanborne trade occurs in territorial waters and the EEZ.

Coastal and estuarine areas include some of the richest, most diverse and most productive ecosystems on Earth. Important coastal habitats include: estuaries, salt and fresh marshes, tidal flats, coastal wetlands, sandy beaches, barrier islands, seagrass beds, mangrove forests, coral reef ecosystems, and deltas and dunes. It is difficult to quantify the economic benefits of some of these habitats and ecosystems. However, coastal waters sustain complex food webs that support important spawning, nursery and feeding grounds for commercially, recreationally and ecologically important fish and shellfish species.<sup>3</sup> Almost 70 percent of commercially and recreationally important species of fish and shellfish rely on estuaries for part of their life cycle.

At least 30 percent of North American waterfowl winter in estuarine areas. Many other migratory birds depend on coastal or estuarine areas for breeding or migration. Shallow water estuaries and wetland areas provide important refuges or "staging points" for migratory birds during their annual flight patterns. A number of marine mammals and endangered species spend part or all of their lives in coastal areas and specially protected areas of the United States. Coastal wetland vegetation filters pollutants, retains sediments, buffers coastal lands against erosion and flooding, and maintains integrity of groundwater quality and supply. However, these coastal areas and habitats are susceptible to degradation from human activities as well as natural events.

Coastal areas are highly desired locations for people seeking either permanent or "second home" residences. In 1990, approximately 110 million people in the United States (40 percent of the total population) lived within 80 kilometers of a coastline. By 2010, the population of the United States' coastal counties is expected to rise to 127 million people. The nation's most densely populated coastal region stretches along the U.S. northeast coast from Boston, Massachusetts, to Washington, D.C., and accounts for one-third of the nation's coastal population. The Southeast's coastal population is expected to increase 200 percent by 2010 with development of "retirement-oriented" communities.<sup>4</sup> In addition to the 50 states, over 3.6 million citizens and U.S. nationals live in eight inhabited insular areas that are under U.S. sovereignty in the Pacific and Atlantic oceans. The population is also increasing rapidly in these areas. (See Exhibit 1.5 in Chapter 1.)

## SELECTED OCEAN AND COASTAL DATA

COASTAL LAND  
AND WATER AREA**Exclusive Economic Zone (EEZ) area:**

Total EEZ: 3.36 million square nautical miles (1.14 thousand-million hectares)

**Estuarine Drainage Area:**

676,000 square kilometers

**Coastal Wetlands:**

84,000 square kilometers (11 million hectares), approximately 12 percent of total estuarine drainage area

	Coastline (statute miles)	Exclusive Economic Zone (square nautical miles)
<b>Contiguous only:</b>	<b>4,993</b>	
Atlantic	2,069	253,800
Gulf	1,631	186,200
Pacific	1,293	236,800
Alaska (total)	6,640	950,000
Hawaii	750	695,000
<b>Extra-territorial:</b>		
Caribbean	441	58,400
Pacific	335	981,000
<b>Total:</b>	<b>13,056</b>	<b>3,362,600</b>

\* excluding Hawaii, Alaska, American Samoa and Guam, and other U.S. insular areas

\*\* including Puerto Rico and the U.S. Virgin Islands

\*\*\* including only American Samoa, Guam and the Commonwealth of the Northern Mariana Islands

## FISHERIES DATA

**Commercial:**

- U.S. fisheries accounted for six percent of total world commercial fishery landings in 1989.
- 5 thousand-million kilos (4.995 million metric tons), valued at \$3.89 thousand-million were landed by U.S. commercial fishermen in 1990.
- 92,900 craft were used in commercial fishing activities in 1988.
- Approximately 274,000 men and women were engaged in commercial fishing full-time in 1988. An additional 90,000 persons were employed by 4,600 processors and wholesalers of fishery products.

**Recreational marine fisheries:** (data from Atlantic and Gulf of Mexico coasts only)

- Approximately 17 million U.S. marine recreational fishermen made 39.8 million fishing trips.
- Approximately 231 million fish (roughly 143 million kilos) were caught.
- 86 percent of these fishing trips occurred within 16 kilometers of shore.

NON-LIVING  
RESOURCES**Off-Shore Oil and Gas Production**

1.65 million square nautical miles (560 thousand-million hectares) of Outer Continental Shelf (OCS).\*

- In 1989, 13.2 million hectares were under lease. Of that, 3.16 million hectares were under exploration, development and production for oil and gas.
- 8.5 billion barrels of oil and condensate were produced from federal waters in the OCS between 1954 and 1989.
- 2.46 million-million cubic meters of natural gas were produced from federal waters in the OCS between 1954 and 1989.

Year	Crude oil (thousand-million cubic meters)	Natural gas (thousand-million cubic meters)
1954	0.525	1.70
1972	65.480	84.95
1989	48.518	118.93

OIL SPILLS INVESTIGATED BY THE U.S. COAST GUARD IN 1982, 1986 AND 1989	Year	Vessels** (cubic meters)	Non-vessels (cubic meters)	TOTAL (cubic meters)
	1982	14,383	24,981	39,364
	1986	12,869	4,921	17,790
	1989	51,476***	2,271	53,747

\* This is the federal portion of the United States EEZ plus Continental Shelf Extensions covered by the Outer Continental Shelf Lands Act.

\*\* Includes tankships, tank barges and other vessels.

\*\*\* On March 24, 1989, the *Exxon Valdez* spilled 40,878 cubic meters of crude oil into Alaska's Prince William Sound.

## SOURCES:

**Coastal Land and Water Area**

- U.S. Department of Commerce. National Oceanic and Atmospheric Administration. National Ocean Survey. Coast and Geodetic Survey. Chief Geographer.
- U.S. Department of Commerce. National Oceanic and Atmospheric Administration. National Ocean Service. Strategic Assessments Branch. *Estuaries of the United States: Vital Statistics of a National Resource Base*. Rockville, MD: October 1990: 79pp.
- U.S. Department of Commerce. National Oceanic and Atmospheric Administration. National Ocean Service. Rockville, MD: Ocean Assessments Division, in cooperation with Department of Interior. National Wetlands Inventory. Fish and Wildlife Service. Washington, D.C.; and the National Wetlands Research Center. Fish and Wildlife Service. Sidell, Louisiana. *Coastal Wetlands of the United States. An Accounting of A Valuable National Resource*. February 1991: 59pp.
- U.S. Department of Commerce. National Oceanic and Atmospheric Administration. *The Coastline of the United States*. Washington, D.C.: U.S. Government Printing Office: 1975.

**Fisheries Data**

- U.S. Department of Commerce. National Oceanic and Atmospheric Administration. National Marine Fisheries Service. *Fisheries of the United States, 1989. Current Fishery Statistics no. 8900*. 111pp., and *Fisheries of the United States, 1990. Current Fishery Statistics, no. 9000*. 111pp. Silver Spring, MD.: May 1990; May 1991.

**Non-Living Resources**

- U.S. Department of the Interior. Minerals Management Service. *Federal Offshore Statistics: 1989: Leasing, Exploration and Revenues*. OCS Report MMS 90-0072: 1990: 104pp.

**Oil Spills**

- U.S. Department of Transportation. U.S. Coast Guard. GMEP Office. Washington, D.C.



Increasing population and development are stressing U.S. coastal systems. Demand for prime coastal property for residential and industrial purposes has created intense competition and controversy over appropriate uses of these lands. Constructing harbors, industrial facilities and services for tourists and others leads to filling and draining wetlands, modifying shorelines to protect investments and increases in pollution loads.

Development in many coastal areas has "sprawled" across the landscape. Residential and industrial developments have replaced farms, forests, wetlands, woodlands, and fish and wildlife habitats. Between 43 and 51 percent of annual U.S. residential construction between 1970 and 1989 was in coastal areas. Some 6.7 million housing units were constructed in the nation's coastal areas during the 1980s. The most dramatic growth occurred in Florida and California, where almost 45 percent of the nation's coastal housing was built. Florida and California have lost 46 percent and 91 percent, respectively, of their original wetlands.

Natural coastal ecosystems have been disrupted by poorly planned or inefficient development patterns. Commercial fishing and industrial activities are especially vulnerable to rising property values along waterways.

Condominiums and second- or vacation-home developers purchase dock space, particularly fish docks, and develop waterfront condominiums and marinas, displacing fishermen from this area. Development of recreational facilities in some undeveloped areas has created pollution from "point" and "non-point" sources, and destroyed fish and wildlife habitat. Coastal erosion and public access to beaches remain problems in many areas with high property values.

Additional leisure time has increased the demand for parks, recreational facilities and fishery resources. Excluding Hawaii, Alaska and the U.S. insular areas, over 27,000 recreation sites covering 114,400 square kilometers, under public ownership and/or management by local, state and federal governments, are in U.S. coastal areas. Local governments own the majority of these. Almost 4,000 of these sites are adjacent to tidally influenced waters, and about 1,500 are adjacent to the open ocean. Over 200 million hectares of federal lands are managed by the National Park Service and the Fish and Wildlife Service in Hawaii. In Alaska, over 51.6 million hectares are managed by the National Park Service and Fish and Wildlife Service. These areas are protected for public enjoyment.

Coastal areas support major population and transportation centers, commercial and recreational fishing industries, agricultural activities and industrial facilities. Traders, guides and equipment suppliers in coastal areas contribute thousands of millions of dollars to the national economy. Scenic and recreational appeal of coastal and marine areas greatly enhance many local economies. The economic base of many coastal communities centers on providing visitors with opportunities to enjoy beaches and related recreational activities such as swimming, surfing, fishing and boating. Tourism and related activities generate thousands of millions of dollars each year in coastal U.S. communities.

The offshore oil and gas industry in the coastal states (located primarily in the Gulf of Mexico, off southern California, and in the Arctic Ocean) is of national strategic and economic importance. Approximately 11 percent of the nation's oil production and 23 percent of the nation's natural gas production were produced from these areas in 1989.<sup>5</sup> (See Box 6d.1.) Thousands of millions of dollars of economically recoverable resources remain in the Gulf of Mexico and other outer continental shelf (OCS) areas; only about five percent of the total number of designated OCS tracts have been leased for energy exploration and development.<sup>6</sup> Coastal areas are also a potentially important source of non-energy mineral resources, including sand

### U.S. COASTAL AREAS: ENVIRONMENTAL PROBLEMS

Over the past several decades, the United States has made substantial progress in correcting poor resource management practices. This includes curbing the loss and modification of some types of coastal habitats, and reducing environmental loadings of some types of contaminants such as nutrients, certain pesticides and toxic industrial chemicals. However, many of our coastal areas continue to suffer from over-utilization, continuing losses of important habitat and damage from pollution. For example:

- Striped bass have shown a steady decline over the past 15 years in almost every estuary on the Atlantic and Gulf coasts. Salmonid populations continue to drop in San Francisco and Willapa Bays, and the Columbia River. Other interjurisdictional and estuarine species, such as sturgeon, shad, redfish, oysters and dungeones crab are also declining in at least part of their ranges. Maryland's oyster harvest has declined more than 90 percent from levels of a century ago.
- Waterfowl are declining in all coastal areas. Black duck, canvasback, redhead, pintail, blue wing teal, scaup and cackling Canada goose populations are showing significant declines.
- Coastal wetlands, which support many fish and wildlife species, are still being lost in many areas. In Louisiana alone, there is an estimated loss of 12,800 hectares of coastal wetlands annually.
- Submerged aquatic vegetation, which is a source of food and essential habitat for many aquatic species, has decreased drastically in several estuaries in recent times, including the Chesapeake, Tampa, Mobile, Galveston, San Francisco and Willapa bays, and the Laguna Madre. At least 65 percent of the submerged aquatic vegetation present in the Chesapeake Bay in 1960 had been lost by 1988.
- In 1990, of the 6.88 million hectares of estuarine waters that were classified for harvest, 37 percent are harvest-limited. In Louisiana in 1985, harvest from 24 percent of the state's classified estuarine waters was prohibited. In 1990, this had risen to 35 percent.
- Restrictions or health advisories for the consumption of certain types of fish and shellfish are in effect in many coastal areas.
- Beach closures due to bacterial contamination or presence of debris, including medical wastes, remain a problem in some areas.

and gravel, phosphorite, manganese nodules, cobalt-ferromanganese crusts and polymetallic sulfides.

The United States has many federal, state and local programs to manage and protect marine areas and resources subject to its jurisdiction. These include the Coastal Zone Management Act (CZMA), Marine Protection, Research and Sanctuaries Act, the Clean Water Act (CWA), the Magnuson Fishery Conservation and Management Act (MFCMA), the Outer Continental Shelf Lands Act (OCSLA), the Oil Pollution Act of 1990, among others. A description of these environmental laws is presented in Chapter 5. State and federal coastal-zone management programs are intended to balance development and use of coastal resources with environmental and social

considerations. These programs encourage multiple use and long-term protection of U.S. coastal areas.

More than half of the U.S. population resides in coastal areas. These coastal areas account for less than 10 percent of the nation's land. A number of approaches have been taken to manage the effect of population growth on the coastal environment. The Coastal Zone Management Act of 1972, for example, established a national framework for coastal resources management to assist states and insular areas in developing the capability to manage their coastal resources. The federal government provides financial and technical assistance and policy guidance to states and territorial governments to prepare and implement programs. State and local governments must balance the use and conservation of coastal and ocean resources. The federal government has invested over \$600 million in these state programs. Twenty-nine coastal states and insular areas covering 94 percent of the U.S. coastline now have federally approved coastal zone management programs. In 1990, the act added a requirement for states and insular areas with approved CZM programs to develop coastal non-point pollution control programs. State programs must contain enforceable policies and mechanisms to reduce non-point sources of pollution and protect coastal waters.

Individual U.S. states take the lead role in other programs such as the National Estuary Program. This program, created under the Clean Water Act, identifies significant estuaries, and establishes a process for improving and protecting water quality and enhancing coastal resources in the estuarine ecosystem. An estuary is nominated by a state governor and approved by the federal government. A Comprehensive Conservation Management Plan (CCMP) for managing the estuarine watershed is developed cooperatively with the participation of all interested parties. These include the appropriate government agencies, elected officials, academic institutions, interest groups and the public. The CCMP identifies the specific actions needed to restore and maintain the estuary and establishes a schedule for implementation. The program currently includes 17 estuaries.

## Characterization of the U.S. Coastal Areas and Resources<sup>7</sup>

### Northeast Atlantic

**A**long the Northeast Atlantic coast, rocky tidal shorelines and islands are the dominant geologic feature. Estuaries are generally small. Boston, Massachusetts is the only major urban area. Forested areas predominate in this region. Harvesting is allowed in 83 percent of the shellfish growing areas (approximately 3,120 square kilometers). Over 325,000 metric tons of seafood valued at over \$542 million were landed in the region in 1990. Lobsters, scallops and cod are the commercially important species. The Northeast Atlantic region has the fewest point sources of pollution and the lowest rate of pesticide application of all the regions.

### Middle Atlantic

The Middle Atlantic is the most densely populated coastal region of the United States. It contains the greatest percentage of urban land, and includes New York City and Washington, D.C. Nevertheless, forest and agricultural land uses dominate in this region. Sixty percent of the wetlands in this region are found around the Chesapeake and Delaware bays. Approximately 84 percent of the 19,500 square kilometers of classified shellfish growing areas are approved for harvesting. About 550,000 metric tons of seafood worth approximately \$310 million were landed in this region in 1990. Major fisheries of the region include the sea scallop and estuarine-dependant blue crab. Estuaries in this area provide important habitat for striped bass and bluefish.

- Southeast Atlantic** The Southeast Atlantic coast is characterized by two shorelines: lagoons fronted by barrier islands and low-lying marshy shoreline formations. The population density varies significantly from sparsely populated areas of North and South Carolina to high densities in Florida. Extensive forests cover the landscape adjoining several estuaries, such as the Albemarle/Pamlico Sounds. Agriculture is also a major land use. This region contains the second highest amount of wetlands of all the regions. Harvesting is allowed in over 75 percent of the classified shellfish waters. Over 131,000 metric tons of seafood valued at \$169 million were landed in the region in 1990. Estuarine-dependant species, including shrimp, crabs and menhaden accounted for over half of the harvest. Municipal wastewater treatment plants and pesticides applied to agricultural lands are the major sources of coastal pollution.
- Gulf of Mexico** Large shallow estuaries dominate the Gulf of Mexico coast. They provide important habitats for many estuarine-dependant living resources. Abundant wetlands are found in this area. Significant wetland losses are occurring due to natural erosion, accelerated erosion caused by river diversions, damming and channelization, and pollution. Conversion to agriculture has been a major cause of loss of wetlands in the Mississippi delta and Florida Everglades. Agricultural and forestry activities are the most prevalent land uses. Although only five percent of the region is considered urban, the Gulf of Mexico region is the second fastest growing coastal area. Most of the region's population is concentrated in Florida and Texas. Approximately 42 percent of classified shellfish-growing waters are open for harvesting. In 1990, the Gulf of Mexico region landed almost 800 metric tons of seafood valued at \$640 million. Shrimp landings are second to menhaden in volume, but accounted for more than half of the value of all landings. The Gulf of Mexico has more point sources of pollution than any other region. Over half of these point sources are associated with the petrochemical industry. Farmers in the Gulf of Mexico apply more pesticides to their crops than in any other coastal region.
- Pacific** The Pacific region has the second highest percentage of urban land. Forests are the major land use along the coast and estuaries north of San Francisco Bay. Next to the Northeast Atlantic coast, the Pacific has the fewest point sources of pollution and the lowest amount of pesticide application of coastal regions. The Pacific region contains the least amount of coastal wetlands. Harvesting is limited in more than 70 percent of the approved shellfish-growing waters. This region landed 310,000-metric tons of seafood valued at \$315 million in 1990 in this region. Over half of the total value is from anadromous salmon fisheries.
- Alaska** Alaska has two distinct types of coastlines: deep glacial fjords and wide dendritic fluvial plains. Coastal bays and rivers provide important habitats for major runs of anadromous fish, marine mammals and commercially sought species. Millions of seabirds nest and marine mammals haul out on numerous islands around the coast. Pacific cod, pollock and other trawl-caught species dominate fish landings in Alaska. In 1990, the fishing industry landed approximately 2.7 million metric tons of seafood products valued at over \$1.5 thousand-million in Alaskan ports.
- Hawaii** The Hawaiian islands, a chain of volcanic islands, rise from the seafloor in the tropical Pacific. Forested land dominates in Hawaii, and much of the coastline is undeveloped. The population is concentrated on Oahu, one of the eight major islands. Tourism is a major part of the economic base of the state. In 1990, over 6 million visitors generated over \$9 thousand-million in the

tourist industry. In 1990, 1,300 metric tons of seafood valued at \$6.5 million were landed in Hawaii.

### Insular Areas of the Pacific and Caribbean

Insular areas under U.S. sovereignty or administration range from coralline-fringed volcanic seamounts of American Samoa, Guam, Palau and the Commonwealth of the Northern Mariana islands in the Pacific, to the U.S. Virgin Islands and Puerto Rico in the Caribbean. Approximately 30 percent of the U.S. EEZ lies in the insular areas. Fishing for tuna and nearshore reef species and tourism are important components of the economies of many Pacific islands. Tourism, light industry and petroleum refining are integral to the economic base of the U.S. Virgin Islands and Puerto Rico. Chapter 3 on indigenous peoples gives a more detailed description of these insular areas.

## Ocean Resources

### Living Marine Resources

Over 20,000 species of fish and shellfish inhabit marine, estuarine and freshwater ecosystems in the waters of the United States. Of these, approximately 300 species are fished for commercial and recreational purposes. Many species are enjoyed in their environment for their aesthetic value.

*Commercial Fisheries.* During the 1960s and 1970s, foreign distant water fleets exploited highly productive waters off the United States such as the Georges Bank region. Foreign factory freezer trawlers revolutionized deepwater commercial fishing. In 1976, Congress enacted the Magnuson Fishery Conservation and Management Act. Through eight regional fishery management councils, fisheries resources within the EEZ are managed for their maximum sustained and optimum yield. States regulate the nearshore fisheries within their coastal waters.

Since 1976, the United States harvesting capacity has increased allowing a higher proportion of the maximum sustainable and optimum yield within the U.S. EEZ to be harvested the U.S. fishing fleet. For certain fisheries, however, the average catch per unit effort has declined. Reasons for these declines vary. Over-exploitation of target and non-target species, coastal habitat alteration, and point and non-point source pollution discharges have had major impacts on fishery resources.

Total landings and their value have increased substantially since 1970. Exhibit 6d.3 illustrates the trends in total landings and their value from 1970 to 1989. Almost 5 million metric tons of edible fish and shellfish and industrial fishery products were landed by U.S. commercial fishing operators in 1990. The total value of this harvest was worth \$3.89 thousand-million. This compares with landings of 2.2 million metric tons of fish and shellfish valued at \$602 million in 1970. In 1970, Americans consumed approximately 5.13 kilos of edible seafood per person. By 1990, consumption had increased to 7.2 kilos per person.

Marine species comprise 85 percent of the commercial, non-aquaculture catch of seafood in the United States. In 1990, 1.44 million metric tons of pollock were landed from the Bering Sea and Gulf of Alaska. This catch alone accounted for approximately 30 percent of the total commercial landings and was valued at \$272 million. The other important fisheries landings were: 900,000 metric tons of menhaden valued at \$94 million from the South Atlantic and Gulf of Mexico; 330,000 metric tons of salmon from the Pacific Northwest and Alaska valued at \$612 million; and 157,000 metric tons of shrimp from the Gulf of Mexico valued at \$491 million.<sup>6</sup>

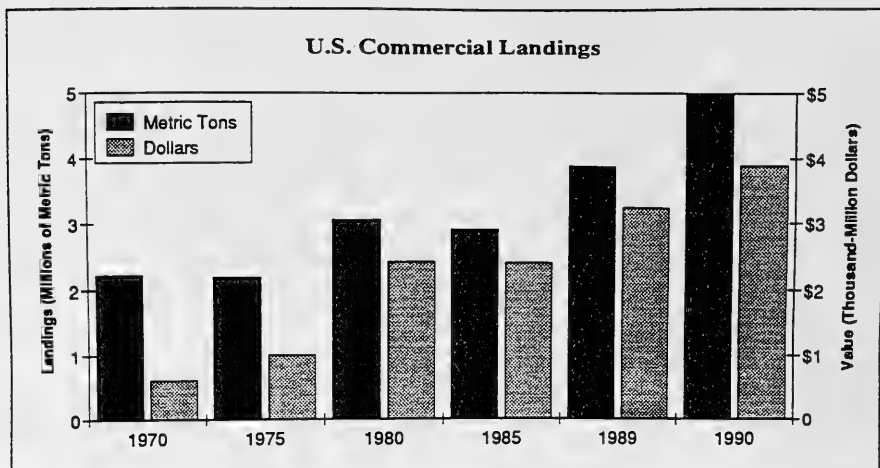


Exhibit 6d.3

A 1989 survey of commercial fisheries resources of the United States concluded that of 81 commercially harvested stocks (i.e., species or species groups),<sup>9</sup>

- 14 are over-exploited and another 36 are fully exploited;
- 10 of 14 over-exploited stocks would require five to 20 years to recover if fishing stopped altogether, but commercial fishing continues in eight of these 10 fisheries;
- Nearly 30 percent of all species and stocks studied have experienced population declines since 1977;
- Insufficient information exists on the status of 29 percent of U.S. fisheries.

**Aquaculture.** Although the U.S. aquaculture industry is relatively new, it is expanding rapidly. Aquaculture of some species is especially important in certain U.S. regions. Catfish, trout and salmon are among the most valuable species cultured in the United States. In 1989, 373.5 million kilos, worth \$740 million of aquacultured species were produced by the U.S. aquaculture industry.<sup>10</sup>

**Marine Recreational Fisheries.** Fishing is one of the most popular recreational activities in the United States. In 1990, approximately 143 million kilos of marine fish were caught during an estimated 39.8 million fishing trips. Popular marine sportfish include bluefish, mahi mahi, spotted seatrout, sea bass, marlin, striped bass, red drum, weakfish, summer and winter flounder, sharks and Atlantic croaker in the Atlantic and Gulf of Mexico regions. Mackerel, smelt, striped bass, rockfish and flounder are species caught on the Pacific coast. Most recreational fishing occurs within 16 kilometers of the shore. Although the number of marine recreational fishing trips has remained relatively constant, as Exhibit 6d.4 illustrates, the total annual catch has declined substantially since 1980.<sup>11</sup>

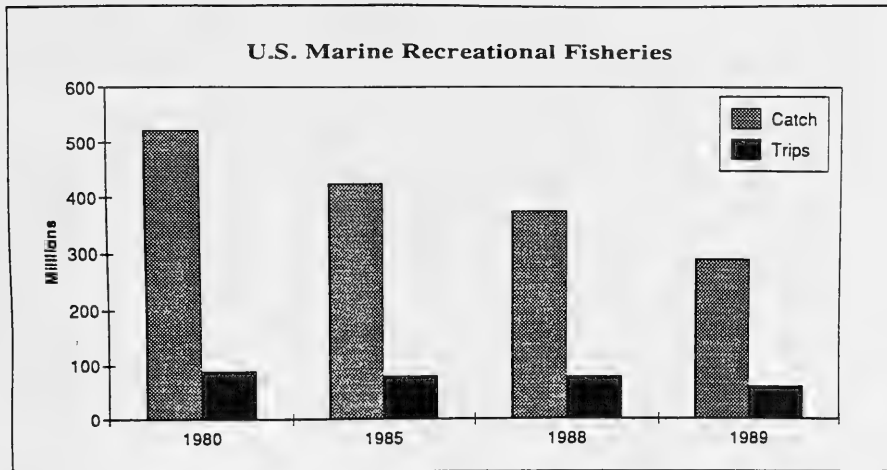


Exhibit 6d.4

*Marine Mammals.* All marine mammals found in the waters of the United States are protected by the Marine Mammal Protection Act (MMPA). Ten species of large whales, 34 species of small cetaceans (porpoises and dolphins), 13 species of pinnipeds (seals, sea lions and walrus), and five other species (sea otters, polar bear, manatee and dugong) of marine mammals spend part or all of their time in waters of the United States and its insular areas. Population levels of manatees, Hawaiian monk seals, northern right whales, humpback whales, California sea otters, Stellar sea lions and the Gulf of California harbor porpoises are much lower than historical levels and have been designated as endangered or threatened.<sup>12</sup> The MMPA, enacted in 1972, was the first national law to prohibit taking (defined as actual or attempted killing, hunting, capturing, harming or harassing) of marine mammals. The MMPA allows taking by permit for scientific research, public education, enhancing the survival or recovery of a species or stock, and by Alaska Natives for subsistence and handicraft purposes. Small numbers of marine mammals may also be taken incidental to commercial fishing activities and specified activities other than commercial fishing, if the federal government determines that such taking will have a negligible impact on the marine mammal species. Concerns that led Congress to enact the MMPA included: declining populations, particularly of large whales; calls for a global moratorium on commercial whaling; and the incidental capture of marine mammals by commercial tuna fishermen, particularly in the eastern tropical Pacific.<sup>13</sup> The box on the next page highlights advances in the protection of marine mammal populations since enactment of the MMPA.

*Marine Turtles.* The five species of sea turtles which are listed by the Endangered Species Act (ESA) as endangered or threatened are green, hawksbill, Kemp's ridley, leatherback and loggerhead. Despite protection under the ESA, incidental capture in commercial shrimp trawls, loss of nesting habitat and marine pollution have prevented turtle populations from recovering. Scientists have identified incidental capture of sea turtles in commercial shrimp trawls as the single most serious threat to population

### **Marine Mammal Protection Act**

Several significant changes have occurred since the United States Congress passed the Marine Mammal Protection Act (MMPA) in 1972:

#### **Eastern Pacific population of gray whales recovers.**

Population estimates indicate that the eastern Pacific population of gray whales numbered 15,000 to 20,000 prior to the initiation of commercial exploitation in 1846. By the turn of the century, the population was severely depleted. All commercial whaling on the species ceased in 1946. The population has recovered to the pre-exploitation levels, which is currently estimated at 21,000 animals. Between 1967 and 1988, the population grew at an annual rate of 3.2 percent (Breiwick and Braham, 1984).

#### **Dolphin captures by U.S. tuna fishermen reduced over 90 percent.**

In 1972, American tuna fishermen killed 423,678 dolphins in purse-seine fishery in the eastern tropical Pacific. By using new gear, United States fishermen reduced incidental capture to less than 20,000 per year in the 1980s. In 1990, three U.S. canneries—suppliers of nearly 75 percent of canned tuna consumed nationwide—terminated purchase of tuna caught in dolphin-threatening operations. In 1990, the observed kill of dolphins by U.S. fishing boats was 5,083 (Hall and Boyer, 1990).

#### **Commercial fur seal harvests ended.**

A commercial harvest of Northern fur seal for their pelts was conducted under the supervision of the U.S. government in the Pribilof Islands from 1916 to 1984 under the North Pacific Fur Seal Convention. The meat from these animals was also used for subsistence by the Pribilof islanders. Beginning in 1985, the harvest has been for subsistence use only and the kill was limited to 3,713. The kill since then has been less than 2,000 per year. The population has been declining for many years and is considered depleted. The current population of fur seals in the entire eastern Bering Sea is thought to be 871,000 (U.S. Fish and Wildlife Service, 1990).

#### **Sea otter populations in Alaska are thriving.**

Between 1742 and 1911, commercial fur hunters reduced sea otters in Alaska to extremely low population levels. Since sea otters are now protected under the MMPA, their numbers and distribution in Alaska continue to increase. Between 1965 and 1969, 402 sea otters were translocated to six sites in southeastern Alaska. Nearly 4,000 sea otters were counted in the same areas between 1987 to 1988. Most recent population estimates put the number of Alaska sea otters at between 100,000 and 150,000 (U.S. Fish and Wildlife Service, 1990).

#### **Florida manatee populations currently number between 1,200 to 2,000.**

The most recent survey counted 1,465 manatees. Species decline has been linked to killing or injury of animals by vessels in Florida waterways, degradation of habitat by extensive coastal development, and episodes of intense cold weather beyond the animals' ability to survive. Recovery programs by local, state, federal government, and non-profit organizations have targeted increased scientific research and public education as tools to halt species decline. In spite of these efforts, known annual mortality from all causes has been increasing (Marine Mammal Commission, 1991).

recovery of loggerhead and Kemp's ridley turtles. In 1987, the federal government required commercial shrimp trawlers to use Turtle Excluder Devices (TEDs) to minimize the then-estimated annual loss of 50,000 sea turtles drowned when taken incidentally in shrimp nets. Since implementation of these regulations, the number of dead sea turtles washing ashore on beaches during shrimping season has dropped dramatically.<sup>14</sup>

### **Specially Protected Areas**

The section on plants, animals and biodiversity addresses specially protected aquatic and terrestrial areas. Areas within U.S. maritime zones which are



representative of various ecosystems have been set aside for the conservation of plant and animal species.

*National Marine Sanctuaries.*<sup>15</sup> National Marine Sanctuaries range in size from less than 1 to over 2,600 square nautical miles (over 883,000 hectares). These sanctuaries harbor a diverse array of marine plants and animals, from huge whales to tiny brightly colored sea snails. In many cases, these protected waters provide a secure habitat for marine species close to extinction. The nine national marine sanctuaries represent distinct marine environments in temperate and tropical areas, such as nearshore, open water and benthic (or ocean floor) ecosystems. They are: Gulf of the Farallones (northern California); Channel Islands (southern California); Cordell Bank (northern California); Gray's Reef (Georgia coast); the MONITOR (North Carolina); Fagatele Bay (American Samoa); Florida Keys including Looe Key and Key Largo. Additional locations are in the process of being designated.

*National Estuarine Research Reserves.*<sup>16</sup> Currently, there are 19 National Estuarine Research Reserves (NERR) preserving approximately 120,000 hectares of estuarine waters and salt and freshwater wetlands. These areas are protected for support of long-term research. NERR sites are selected which represent biogeographical and typological ecosystems of U.S. mainland and trust territories. Four NERR's are located in the Gulf of Mexico and the Caribbean, eight on the Atlantic coast, one in the Great Lakes, and five in the Pacific. The most recent addition, the Chesapeake Bay National Estuarine Research Reserve in Virginia, was designated in June 1991. It protects nearly 1,200 hectares of wetland and upland habitat. Additional sites are currently being developed.<sup>17</sup>

*National Park Service.* The National Park System has many holdings in coastal areas in the United States and its territories. These coastal areas not only provide spectacular scenery, but allow for conservation, protection and research of wildlife, plants, and natural and cultural resources. Coastal and riparian parks include: the Everglades (Florida), Channel Islands (southern California), Acadia National Park (Maine); Big Cypress National Preserve (Florida); Pu'uohonua o Honaunau (Hawaii); Buck Island Reef (Virgin Islands), and Fort Jefferson (Dry Tortugas, Florida) National Monuments; USS Arizona Memorial (Hawaii); Sitka National Historical Park (Alaska); Assateague Island (Virginia) and Point Reyes (California) National Seashores.<sup>18</sup>

*National Wildlife Refuges.* The National Wildlife Refuge System is a unique and highly diverse network of over 36 million hectares of lands and waters in the United States. Over 470 national wildlife refuges are managed to conserve and enhance populations of fish and wildlife and their habitats. There are over 150 coastal refuges that provide nursery areas for anadromous, estuarine and marine fish, habitat for nesting and wintering migratory waterfowl and seabirds, and the necessary environment for the enhancement of endangered or threatened species such as manatees. Some of these coastal refuges include: Yukon Delta (Alaska), San Juan Islands (Washington), Howland Island (U.S. Pacific insular area), Arkansas (Texas), Key West (Florida) and Chincoteague (Virginia).

### **Challenges: Ongoing and in the Future**

Federal and state regulatory agencies are facing many challenges regarding the management and conservation of the nation's living marine resources and their habitats. Many are currently being addressed through various federal programs. These include: addressing the competition for resources among

commercial, recreational and indigenous fishermen; improving the effectiveness of international fisheries relationships with foreign fishermen; reducing bycatch/incidental catch; improving predictability of stock assessments; improving compliance with fisheries management regulations; resolving conflicts between Marine Mammal Protection Act, Endangered Species Act and fisheries; rebuilding overfished marine fisheries; protecting living marine resource habitat; assessing the effects of climate change on living marine resources and their habitats; and improving the safety of seafood for human consumption.<sup>19</sup>

### **Non-Living Marine Resources**

The continental shelves off the Atlantic, northwestern and southwestern Pacific (Alaska and California), and Gulf of Mexico coasts contain significant mineral and energy resources. The United States manages the minerals, natural gas and oil resources of the outer continental shelf (OCS) under the Outer Continental Shelf Lands Act (OCSLA). The OCSLA authorizes leasing publicly owned offshore areas to private companies for environmentally sound extraction of sub-seabed mineral resources. Exploration and development may occur only after analysis of potential environmental impacts, compliance with federal environmental laws and compliance with state coastal-zone management plans. From 1973 to 1988, the federal government spent over \$500 million dollars on studies relating to the effects of OCS development on the marine, coastal and human environments.<sup>20</sup>

*Oil and Gas Deposits.* The federal OCS encompasses approximately 560 million hectares. Of this total, 13.2 million hectares were under lease to oil and gas exploration, development and production companies during 1989. In 1989, the OCS oil and gas program generated more than \$2.9 thousand-million in production royalties and lease-related revenues for the federal government. Approximately 1.35 thousand-million cubic meters of oil and 2.46 million-million cubic meters of natural gas have been produced from the OCS between 1954 to 1989. An additional 651.8 million cubic meters were produced from the states' waters during this period for a U.S. EEZ total of about 2 thousand-million cubic meters. Between 1971 and 1988, oil production from OCS wells averaged almost one million barrels per day. In 1972, the OCS supplied almost 14 percent of the U.S. production of natural gas and 12 percent of the oil produced. By 1989, the OCS supplied almost 24 percent of all natural gas produced in the U.S and more than 10 percent of the nation's oil production.<sup>21</sup>

Balancing development of oil and gas resources on the outer continental shelf with protecting the coastal and marine environments and their living resources has been controversial. In response to public concern over adverse environmental effects of OCS oil and gas activities, and in light of some uncertainties in the scientific analysis of potential ecological and social impacts of offshore development, in June 1990, President George Bush announced a delay on OCS leasing until after the year 2000 in many areas off California, Florida, the Pacific Northwest and the North Atlantic. The Oil Pollution Act of 1990 initiated a comprehensive federal oil spill liability, compensation, prevention and response program. This act established a \$1 thousand-million trust fund to improve prevention and cleanup of oil spills. The act includes monies for cleanup activities, improving the safety of marine transportation of oil and research. It also imposed a moratorium on oil and gas leasing off the North Carolina coast.

*Mineral Deposits.* Blanket deposits of sand and gravel, placer deposits containing gold, platinum, chromite and titanium, polymetallic sulfides containing copper, lead, zinc and other minerals, ferromanganese crusts and

nodules, and thick beds of phosphorite occur on the ocean floor in the U.S. EEZ. At present, there are no mining operations in the U.S. EEZ; however, sand and gravel are dredged from the entrance to New York Harbor and sold for commercial use. Gold was mined in Alaskan state waters near the city of Nome from 1986 to 1990. Sand is also dredged periodically from state coastal waters for beach nourishment.

## Coastal and Marine Pollution

**I**n the 1970s, municipal sewage and contaminants in industrial wastewater were the primary sources of pollution. The construction of sewage treatment plants in coastal cities and installation of wastewater treatment plants at industrial facilities during the past two decades has curtailed many of the problems caused by these sources. Additional efforts currently underway should address remaining sewage treatment problems.<sup>22</sup> Non-point sources, stormwater, and combined storm and sanitary sewers, remain the largest challenges to fully addressing coastal pollution.

### Coastal Pollution

Growing coastal populations are generating an increasing amount of municipal sewage, urban runoff, and marine debris. Industrial manufacturing and processing plants, landfills, dock and marina structures, agricultural runoff and littering by the general population also contribute to marine pollution problems. The United States has initiated a number of measures to combat coastal pollution problems. The status of some of these programs is discussed below. In addition, special programs have been established for the Chesapeake Bay and Gulf of Mexico.

*Sewage Treatment.* In the past, one of the most severe sources of coastal pollution was municipal sewage. In some areas, coastal waters subject to limited tidal flushing action received sewage treated by only very basic, or primary, treatment procedures, and some received entirely untreated sewage either all the time or when rainfall overloaded combined storm and sanitary sewer systems. More municipal sewage is now treated prior to discharge into coastal as well as fresh waters. The U.S. population served by sewage treatment facilities providing secondary treatment or better has increased from 85 million in 1972 to 144 million in 1988 and the population served by raw discharge facilities has dropped from five million to one million during the same period.<sup>23</sup> Significant improvements in coastal water quality have been achieved for many of the nation's coastal cities since implementation of secondary, and in a few cases tertiary, or advanced, wastewater treatment. However, in a few of the nation's largest and oldest cities, such as the Boston, Massachusetts metropolitan area, antiquated treatment plants have not yet been fully upgraded; improvements have been undertaken in the past several years. Rebuilding sewer systems to separate combined sanitary and storm sewers also presents formidable problems due to the high cost and logistic difficulties of rebuilding old sewer systems in extremely dense population centers such as the New York and Boston metropolitan areas.

*Non-point and Other Diffuse Sources.* Non-point source runoff from agricultural and urban areas has been more difficult to control. The United States continues to use focused geographic approaches designed to protect particularly fragile or threatened coastal areas from non-point and other diffuse sources. Model urban runoff/stormwater programs are in place for Puget Sound in the state of Washington and in several other cities; these programs have demonstrated reductions in toxic and other pollutant loadings.

Agricultural management practices are being implemented through voluntary programs specifically aimed at coastal protection in the Chesapeake Bay, the North Carolina sounds and other coastal areas. Some states also limit suburban development and other construction in buffer zones along their estuarine coastlines. However, continuing development and incomplete protection against non-point source impacts continue to threaten water quality in many coastal areas. The United States is trying a new approach under the 1990 amendments of the Coastal Zone Management Act. The act combines water quality and coastal zone management activities into Coastal Non-point Pollution Control Programs, which coastal states are required to develop by the end of 1994.

One area currently receiving increased recognition and remaining to be addressed is the contribution of airborne sources of nutrient and toxic pollutants. Airborne sources of pollutants deposited into coastal water bodies are now estimated, in some cases, to contribute from 10 to 46 percent of nitrogen loads and significant portions of phosphorus loads to some major northeast estuaries.<sup>24</sup>

*Direct and Indirect Industrial Discharges.* Direct discharges into coastal waters from industrial point sources have been markedly controlled in the past 20 years. Large proportions of previously released toxic and conventional pollutants have been removed from the waste streams of many large industrial and manufacturing facilities. This has resulted in improved coastal water quality in the immediate vicinity of the plants. Development of regulations for some additional industrial categories which are not yet covered, as well as revisions to existing regulations, are expected to bring about additional reductions in the discharge of toxic and conventional water pollutants.

Additional efforts are needed to adequately control toxic water pollutants from industrial and commercial facilities that discharge waste to municipal sewage treatment plants. The program for controlling these industrial releases, called the pretreatment program, requires each municipality to regulate these "indirect" dischargers. Most sewage treatment plants have not been designed to treat toxic pollutants. These pollutants can kill microbes that are part of the treatment process at the sewage treatment plant. Therefore, most industrial facilities must "pretreat" their effluent before discharging to the municipal sewer system. Pretreatment programs are now in place in almost all large municipalities. However, compliance monitoring difficulties combined with municipal budget constraints have made this a difficult program for some cities to conduct with full success.

*Cumulative "Minor" Point Source Effects.* Toxic and conventional pollution of the coastal environment from a myriad of small commercial, industrial or resource extraction facilities has not yet been adequately addressed. These facilities have sometimes not been thoroughly controlled because a higher regulatory priority has been placed on large dischargers to achieve the largest individual pollutant load reductions. However, in some areas it appears that concentrations of many "minor" facilities are causing serious coastal water quality impairments.

*Floatables, Non-Biodegradables and Other Trash.* Floatable trash is an aesthetic problem and poses serious ecological risks. Several states and municipalities have begun major trash cleanup programs, often mobilizing

### CASE STUDY THE CHESAPEAKE BAY PROGRAM

The Chesapeake Bay, with a surface area of 5,720 square kilometers, is the largest estuary in the United States. It is fed by 150 tributary rivers and streams, and supports 2,500 species of plants and animals and 13 million people.

In recent decades, the bay suffered serious declines in quality and productivity. In 1975, elevated public concerns led to a \$27 million, Environmental Protection Agency-directed study of the causes of the decline. Overabundance of phosphorus and nitrogen was seen as the dominant cause of explosive algal growth that blocked out sunlight which bay grasses needed to survive, and depleted dissolved oxygen levels essential to all bay life. These conditions triggered a downward spiral of plants and animals competing for the depleted oxygen. The main sources of the excess nutrient loads include agricultural lands, specifically fertilizers and animal wastes, as well as urban and suburban waste discharges and runoff, and atmospheric deposition.

Though numerous federal and state pollution control and resource restoration programs were in operation, they were fragmented and unfocused. The EPA study recommendations provided a framework for coordinated, goal-driven actions by the three bay-bordering states (Maryland, Pennsylvania and Virginia), the District of Columbia, the Chesapeake Bay Commission (an interstate body for legislative coordination) and the federal government. To reduce algal growth and its impacts on submerged aquatic vegetation and dissolved oxygen levels, a 40-percent reduction in nitrogen and phosphorus loadings to the bay became a dominant goal of the 1987 Chesapeake Bay Agreement.

The Chesapeake Bay restoration has proceeded on many fronts. These include improved sewage treatment, phosphate detergent bans, better compliance with environmental requirements by federal facilities, reduced fertilizer use and improved animal waste management, better erosion control, a moratorium on striped-bass fishing, and construction of a fish passage facility at Conowingo Dam on the Susquehanna River. Plans are underway or already being implemented to restrict shoreline development, further improve controls on urban and farm runoff, protect wetlands, reduce pollutant discharges from recreational boats, improve fisheries management and limit discharges of toxic chemicals.

Bay water quality improvements reported in 1991 included a 20-percent reduction in total phosphorus since 1985, even though wastewater flows from municipal sources continued to grow. This progress is attributed primarily to reductions of phosphorus loadings from point source discharges. But non-point source control efforts on farm lands and a ban on phosphate detergents also contributed to reductions. Submerged aquatic vegetation, the most sensitive indicator of overall water quality improvement in the bay, increased its coverage in the mid-bay by 57 percent since 1984. Striped bass are increasing, again allowing sport and commercial fishing for this popular fish.

Nitrogen levels, however, have continued to rise due mostly to continuing population growth and related increases in wastewater flows without removal of their nitrate content. A major reduction is expected from the 30-percent cut in nitrogen fertilizer use. But this result will take some time to show up because nitrogen travels from fields to the bay predominantly through groundwater, a process that takes several years. Another concern is nitrogen deposition from the air (primarily from power plants and vehicle emissions), which may constitute nearly 40 percent of the loadings to the bay from human sources.

The parties to the 1987 Chesapeake Bay Agreement are currently reevaluating their commitment to a 40-percent reduction of phosphorus and nitrogen entering the bay by the year 2000. This evaluation is expected to provide a refined bay-wide nutrient reduction commitment, including basin-specific nutrient reduction targets and revised strategies to achieve the water quality and living resources goals.

citizen volunteers and instituting public education campaigns. In 1990, 109,000 volunteers nation-wide cleared 5,850 kilometers of coastline and collected more than 1,320 tons of trash.<sup>25</sup> New York City has been re-examining the management of its enormous solid waste stream in an effort to minimize contributions to the sea via storm sewers, spills from trash barges and other sources. The United States is working toward better control of storm sewers and combined sewer overflow and expects these controls to reduce the release of floatables from these sources.

### **Open Ocean Pollution**

Since the early 1970s, major progress has been made by the United States in controlling pollution in the open ocean. Ocean waters within the U.S. EEZ are relatively unpolluted compared to near-shore coastal waters. This is in part because pollutants disperse in the open ocean, but also because the United States has significantly reduced most direct ocean releases of pollutants. Material being disposed of in open ocean areas along the U.S. outer continental shelf now consists primarily of oil and gas drill rig discharges (mainly from drill cuttings with some drilling mud), sediments from dredging operations and ship discharges. Strict regulations limit materials that can legally be disposed of in the open ocean. Federal agencies have taken steps to discourage the use of some kinds of fishing gear and other shipboard equipment that increase the amount of trash in marine waters.

*Ocean Dumping of Sewage Sludge.* Dumping of sewage sludge increased from 4.8 million tons in 1973 to 8.7 million tons in 1989. Until 1986, sludge from nine New York and New Jersey sewage authorities was dumped at a site 19 kilometers offshore. In 1986, this dumping was moved to another site 170 kilometers offshore. Six of these nine sludge dumpers terminated their operation in March 1991. Two more will cease dumping in December 1991, and the last remaining offender is scheduled to cease dumping in June 1992. In order to end their ocean dumping, these sewerage authorities either have switched or will soon switch to beneficial re-use (recycling) of sludge or more costly sludge disposal methods, such as land disposal at permitted facilities or incineration, as a result of the Ocean Dumping Ban Act of 1988.

*Cessation of Industrial Ocean Dumping.* Between 1973 and 1987, the amount of U.S. industrial waste dumped in the ocean annually declined steadily from about six million tons to well under one million tons. Permitted ocean dumping of industrial wastes ceased in September 1988. Pollution traces from old sites can still be found in some areas, but the current impacts are considered minor or negligible. There are also prohibitions on disposal of high-level radioactive waste in ocean waters.

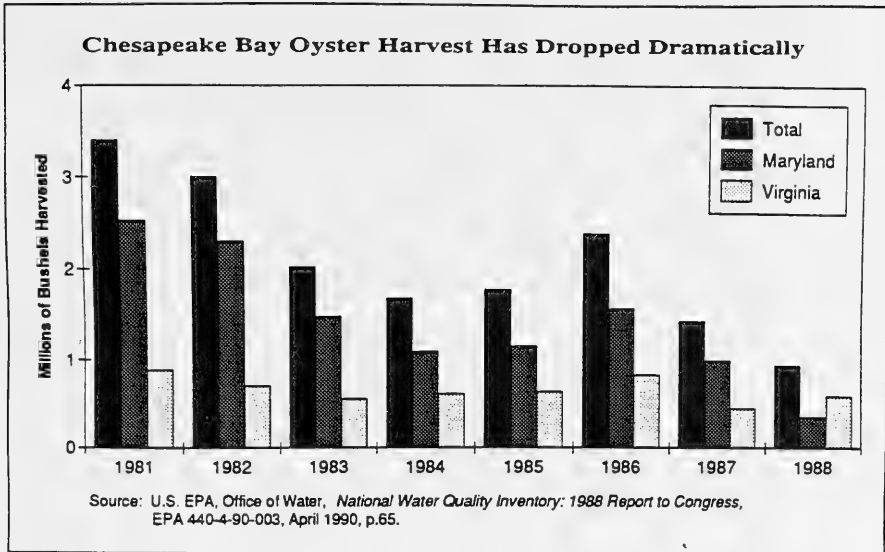


Exhibit 6d.5

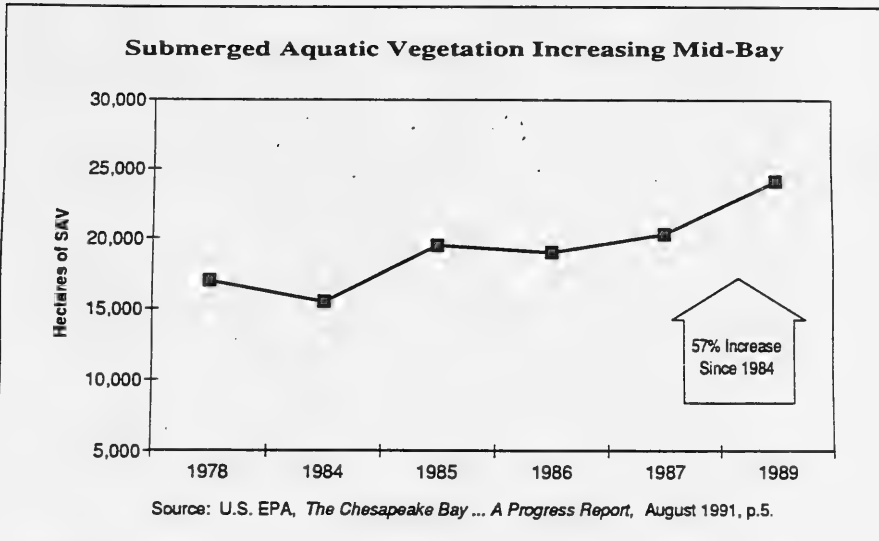


Exhibit 6d.6

**Endnotes:**

1. The Magnuson Fishery Conservation and Management Act (MFCMA) defines the Exclusive Economic Zone (EEZ) as that region that extends 200 nautical miles seaward from the baseline from which the territorial sea is measured. The United States is responsible for wisely developing, managing and protecting the EEZ's environment and its living and non-living marine resources contained within.
  2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. *Fisheries of the United States, 1990. Current Fishery Statistics, no. 9000* (Silver Spring, MD.: May 1991), 11pp.
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  12. Marine Mammal Commission, *Annual Report of the Marine Mammal Commission, Calendar Year 1990, A Report to Congress* (January 1991), 270pp.
  13. *Ibid.*
  14. National Academy of Science, National Research Council, *Decline of the Sea Turtles. Causes and Prevention* (National Academy Press: 1990), 259pp.
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  16. The Coastal Zone Management Act of 1972 established the National Estuarine Research Reserves program which designates an area that is a representative estuarine ecosystem that is suitable for long-term research and designation. The designation of the area will serve to enhance public awareness and understanding of estuarine factors. Additional areas may be designated in the future.
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## APPENDIX C. SELECTED OCEANS AND COASTAL RESOURCES STATUTES\*

### Marine and Coastal Resources

- ***Anadromous Fish Conservation Act (1965)***  
Authorizes programs to conserve, develop and enhance federal anadromous fisheries resources.
- ***Atlantic Striped Bass Conservation Act (1984)***  
Authorizes programs for the conservation and management of Atlantic striped bass.
- ***Coastal Barrier Resources Act***  
Prohibits development of barrier islands within the Coastal Barrier Resource System to conserve fish, wildlife and other natural resources in those areas.
- ***The Coastal Barrier Improvement Act of 1990***  
Amends the Coastal Barrier Resources Act of 1986, which established the Coastal Barrier Resources System consisting of undeveloped coastal barriers and other areas located on the coasts of the United States.
- ***The Coastal Zone Management Act of 1972***  
Makes federal funds available to encourage states to develop comprehensive management programs in an effort to increase the effective management, beneficial use, protection and development of the coastal zone.
- ***Driftnet Impact Monitoring, Assessment and Control Act of 1987***  
Directs the government to assess and minimize the adverse effects of driftnets in the North Pacific ocean on marine resources.
- ***Fish and Wildlife Act (1956)***  
Establishes a comprehensive national fish and wildlife policy to develop measures for maximum sustainable yield to insure stability of domestic fisheries.  
Provides for agency consultation with the Fish and Wildlife Service (FWS) whenever the "waters of any stream or other body of water are to be impounded, directed or otherwise controlled".

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\*Source: United Nations Conference on Environment and Development. *United States of America National Report*. pp.407-409.

- ***Fish and Wildlife Conservation Act ("Non-game Act")***  
Requires the Fish and Wildlife Service to monitor and assess non-game migratory birds and to identify those likely to be candidates for listing as endangered species.
- ***Fish and Wildlife Coordination Act (1934)***  
Authorizes FWS and National Marine Fisheries Service to assist federal, state and other agencies in developing, protecting, rearing and stocking fish and wildlife on federal lands.
- ***Fisherman's Protective Act ("Pelly Amendment") of 1967***  
Ensures that foreign fishing activities are in accordance with international fishery conservation program, and activities do not affect endangered/threatened species.
- ***Fur Seal Act Amendments of 1983***  
Prohibits taking of fur seals, with exception of subsistence harvest by Alaska Natives.
- ***Lacey Act Amendments of 1981***  
Prohibits commerce of fish and wildlife in violation of federal, state and international laws.
- ***Magnuson Fishery Conservation and Management Act (1976)***  
Conserves and manages fishery resources within the U.S. Exclusive Economic Zone (EEZ) for maximum sustainable yield.  
Creates eight regional fishery management councils to prepare fishery management plans for their respective regions.
- ***Marine Mammal Protection Act of 1972, and Amendments of 1988***  
Provides for long-term management, research, conservation and recovery programs for marine mammals.  
Establishes a moratorium on the taking and importing of marine mammals and marine mammal products.
- ***Shore Protection Act of 1988***  
Requires vessels to protect coastal areas from disposal of solid waste.
- ***Outer Continental Shelf Lands Act (1953) and Amendments of 1978 and 1985***  
Regulates offshore oil, gas and mineral leasing.  
Requires compliance with natural resource protection programs from damages associated with oil, gas and mineral development activities.
- ***Saltonstall-Kennedy Act (1939)***  
Establishes fisheries research and development fund.

- ***South Pacific Tuna Act of 1988***  
Regulates tuna harvest by U.S. flag vessels within the Exclusive Economic Zones of Pacific Island Parties.

### **Marine Pollution Control**

- ***National Ocean Pollution Planning Act, 1978***  
Establishes a comprehensive five-year plan for federal ocean pollution research and development and monitoring programs, and coordinates research of the Great Lakes and estuaries of national importance. Develops an information base for use in conservation, equitable distribution and development of ocean and coastal resources.
- ***The Act to Prevent Pollution from Ships (1980)***  
Implements international agreement "Convention for the Prevention of Pollution by Ships" (MARPOL Annexes I-V). Prevents pollution from ships by the discharge of harmful substances or effluent.
- ***Oil Pollution Act of 1990***  
Increases and extends civil and criminal liability limits for the cleanup of oil spilled from vessels. Requires better planning and preparedness and measures to increase navigation safety, new standards for vessel construction, crew licensing and manning of vessels.
- ***Marine Pollution and Research and Control Act, 1989***  
Implements the provisions of MARPOL Annex V. Prohibits the disposal of plastics at sea by any vessel within the U.S. EEZ.
- ***Ocean Dumping Ban Act (ODBA) of 1988***  
Prohibits issuance of new permits for dumping of sewage sludge or industrial wastes into ocean waters; existing sewage sludge or industrial waste dumping (existing permittees) under compliance schedules/enforcement agreements to phase out dumping activities. Statutory deadline December 31, 1991.
- ***Columbia River Basin Fishery Development Program ("The Mitchell Act") (1938)***  
Establishes cultural stations and funds programs to facilitate conservation of Columbia River fishery resources.
- ***Marine Protection, Research and Sanctuaries Act (Title I, II, and III)***  
Prohibits ocean dumping of wastes generated on land. Authorizes designation of marine sanctuaries. (Eight National Marine Sanctuaries currently are designated; seven more are proposed).

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