Turning to the Sea: America's Ocean Future

President Clinton and Vice President Gore exploring tidepools in Monterey Bay National Marine Sanctuary with sanctuary staff. Official White House photography

We must continue the critical dialogue that has begun and build together across party, regional, economic, and other interests a comprehensive oceans agenda for the 21st century. . . . We have to make this an American issue that transcends party and other philosophical differences, that is at the core of our own humanity and our obligation to our children and our grandchildren.

President William Jefferson Clinton

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"Hope, creativity, and imagination will be required to meet the challenges that we face with our oceans. But they are, after all, the traits that first enabled and inspired explorers to take to the sea. They are traits that allowed us to look at our inextricable ties to our environment and invent new ways to protect our natural wonders. . . . In the 21st century, these traits must lead us to preserve our living oceans as a sacred legacy for all time."

— President William Jefferson Clinton

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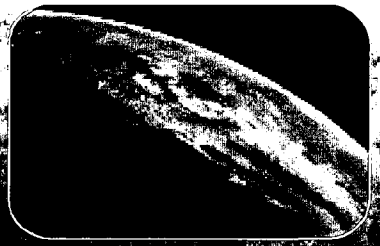

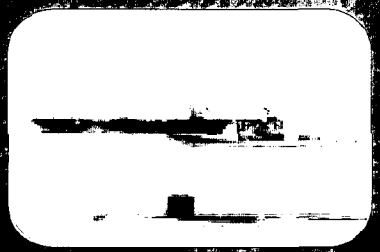

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A Look to the Future

September 2, 1999

To The President:

n June of last year, you and Vice President Gore presided over the National Ocean Conference in Monterey, which drew together for the first time the full array of ocean interests – from government to industry, science to conservation. Among the many initiatives you and the Vice President launched at that historic gathering were new steps to restore coastal reefs, rebuild marine fisheries, preserve freedom of the seas, provide public access to military data and technology, enhance the competitiveness of America's ports, and protect our national marine sanctuaries from oil drilling.

Our report reflects a broad national consensus on the vital importance of the oceans to our nation's future.

In your address to the Conference, you also directed your Cabinet to report back to you with additional recommendations for a coordinated, disciplined, long-term federal ocean policy. Today, on behalf of the Cabinet and independent agencies with responsibility for ocean affairs, we are pleased to submit this report with our recommendations for a comprehensive policy to guide federal efforts into the 21st century.

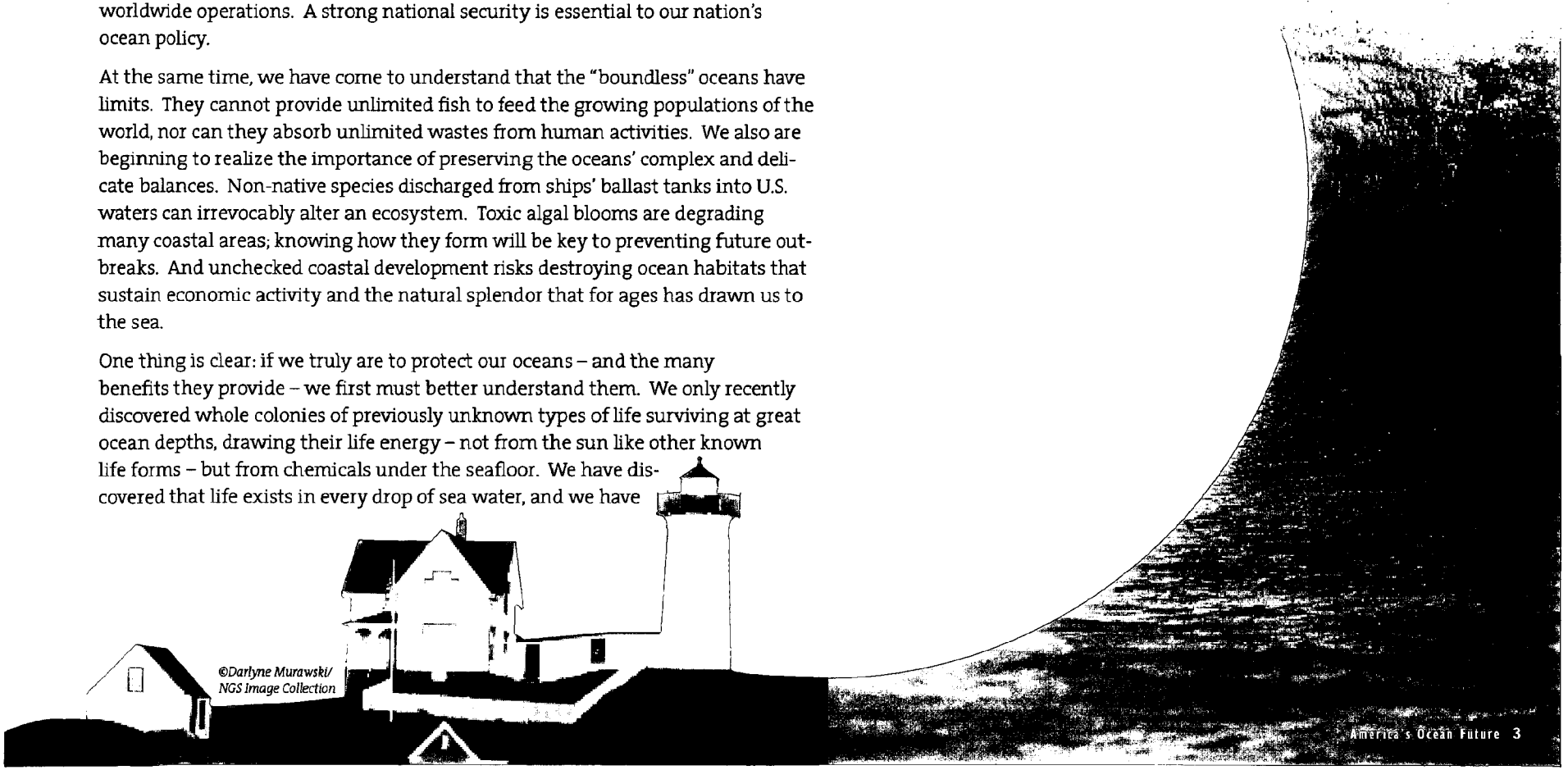
The national dialogue begun in Monterey reflects the diverse, sometimes competing values inherent in our oceans. The seas are not only a source of economic benefit and a major avenue of world trade, but they are also a vital component of our national defense, a natural treasure to be preserved, and a fascinating frontier with secrets yet to be discovered. Our recommendations build on the broad consensus among Conference participants on the vital importance of the oceans to our nation's future – our economy, our security, our health and well-being – and the challenges we face in ensuring that all the oceans' many resources are protected and sustained.

There is growing awareness among Americans of the many ways the oceans

influence our daily lives. Farmers in the nation's heartland depend on weather systems driven by the interaction of the oceans and atmosphere to nourish their crops. Citizens who have never seen an ocean may benefit from energy and food from the waters off our coasts. Marine organisms provide the cure for many diseases and the promise of many more cures. Ocean-going vessels carry the bulk of our world trade, linking us to the global marketplace and keeping our economy strong. Our naval forces, which preserve the international freedoms of navigation so crucial to maritime commerce and global stability, use ocean data daily in their worldwide operations. A strong national security is essential to our nation's ocean policy.

At the same time, we have come to understand that the "boundless" oceans have limits. They cannot provide unlimited fish to feed the growing populations of the world, nor can they absorb unlimited wastes from human activities. We also are beginning to realize the importance of preserving the oceans' complex and delicate balances. Non-native species discharged from ships' ballast tanks into U.S. waters can irrevocably alter an ecosystem. Toxic algal blooms are degrading many coastal areas; knowing how they form will be key to preventing future outbreaks. And unchecked coastal development risks destroying ocean habitats that sustain economic activity and the natural splendor that for ages has drawn us to the sea.

One thing is clear: if we truly are to protect our oceans – and the many benefits they provide – we first must better understand them. We only recently discovered whole colonies of previously unknown types of life surviving at great ocean depths, drawing their life energy – not from the sun like other known life forms – but from chemicals under the seafloor. We have discovered that life exists in every drop of sea water, and we have



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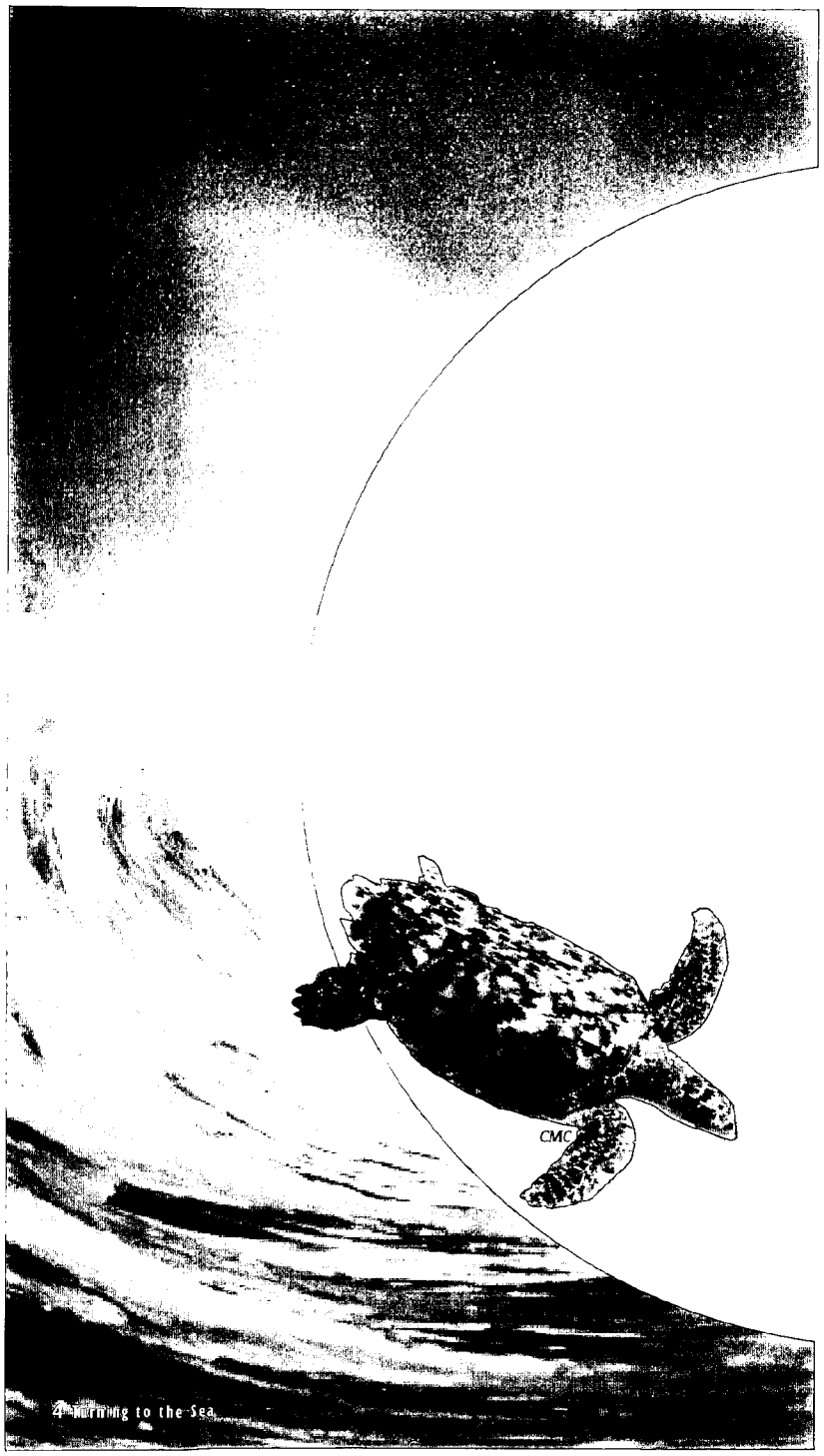


refined our understanding of the way the oceans drive climatic patterns like El Niño, which shape the weather across the globe. Yet, despite such advances, the seas remain largely unexplored. More ocean data and research are critical for identifying new resources and economic opportunities, maintaining our military readiness, and ensuring healthy oceans for future generations.

In developing the recommendations contained in this report, we have been guided by the following core principles:

SUSTAINING THE ECONOMIC BENEFITS OF THE OCEANS – Future generations deserve to inherit healthy, bountiful oceans.

STRENGTHENING GLOBAL SECURITY – Freedom of the seas is integral to the strength and security of our nation.

PROTECTING MARINE RESOURCES – Strong protection of our ocean and coastal environment, using a precautionary approach and sound management, is no longer a choice, but a necessity.

DISCOVERING THE OCEANS – Exploring and understanding the oceans is critical to our well-being and survival.

In the pages that follow, we offer specific recommendations in twenty-five subject areas. For example:

To sustain economic benefits, we recommend working with coastal communities on plans for sustainable development; creating new incentives to reduce overfishing and develop guidelines for environmentally sound aquaculture; and increasing support for identifying and harvesting marine resources with pharmaceutical benefits.

To strengthen global security, we recommend working with the U.S. Senate to ensure early ratification of the Law of the Sea Convention; improving our ability to detect and deter maritime threats before they reach our shores; expanding efforts to maintain and exercise traditional freedoms of navigation and overflight around the world; and extending to 24 nautical miles the "contiguous zone" for enhanced federal law enforcement purposes.

To protect marine resources, we recommend coordinating federal efforts with state and local "smart growth" initiatives in the coastal zone; taking new steps to reduce urban and agricultural runoff; strengthening efforts to protect and restore essential fish habitat; and exploring the concept of marine wilderness areas.

To better understand and use the oceans, we recommend expanding coastal, open-ocean, and seafloor observations; integrating satellite, buoy, and other observing networks; advancing basic and applied research to increase our knowledge of ocean and coastal areas; supporting exploration in underwater areas; and establishing a coordinated effort to promote ocean science education.

To ensure a coordinated, focused, federal effort to implement this report, we recommend establishment of a high-level task force composed of undersecretaries of relevant agencies and departments to be chaired by the Deputy National Security Advisor and the Chair of the Council on Environmental Quality.

Today, we offer recommendations for a comprehensive federal policy to explore, protect, and sustain our oceans in the new millennium.

We believe this report makes an important contribution to the national dialogue begun last year in Monterey. We look forward to working with you in developing and implementing a comprehensive federal policy to explore, protect, and sustain our oceans in the new millennium.

Sincerely,

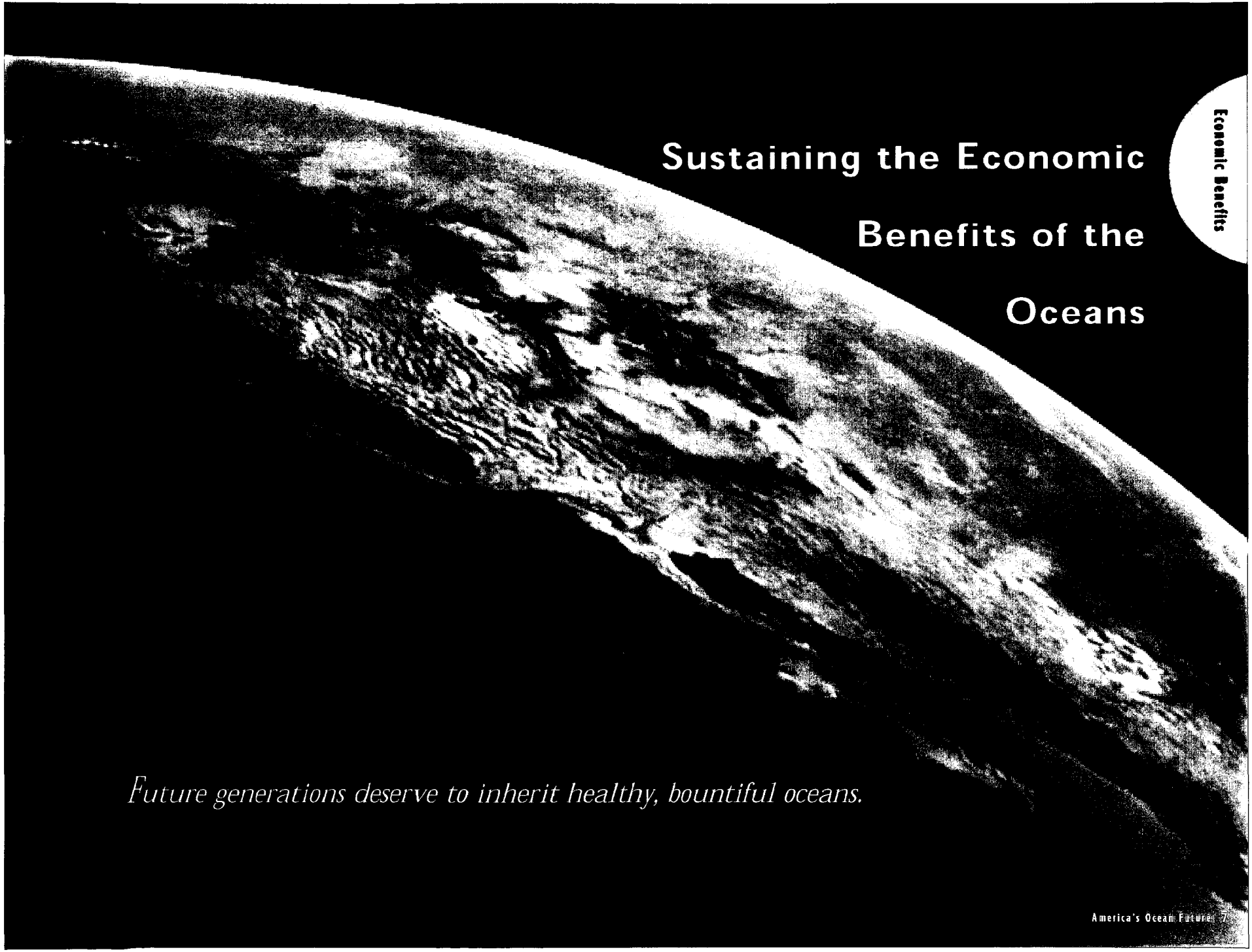
Richard Danzig
Secretary of the Navy

William M. Daley
Secretary of Commerce

"Seventy-one percent of our planet is ocean, and seventy-one percent of our body is salt water. . . . There is this extraordinary connection between who we are as human beings and what happens in this magnificent body of water."

First Lady Hillary Rodham Clinton

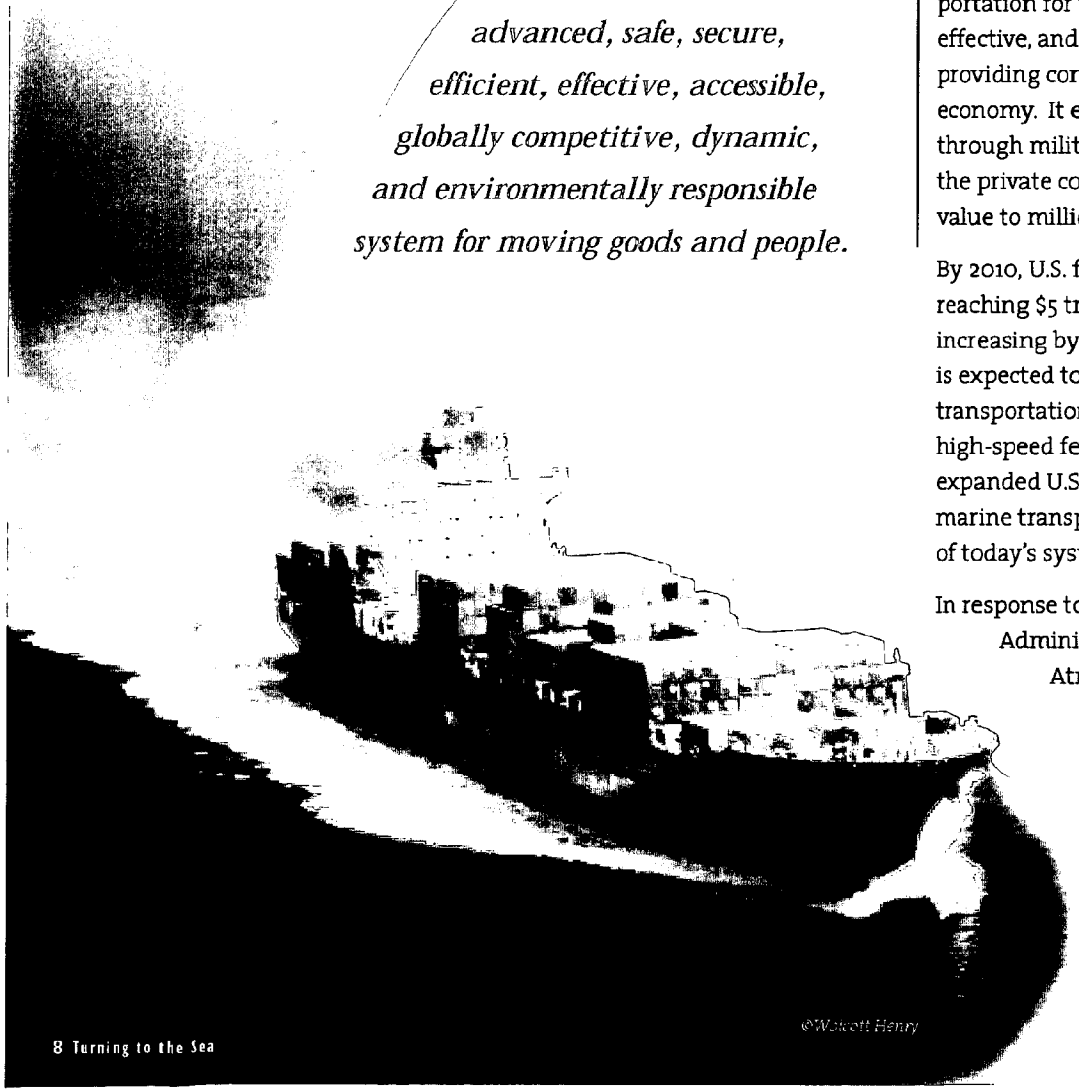
Sustaining the Economic Benefits of the Oceans



Future generations deserve to inherit healthy, bountiful oceans.

Marine Transportation

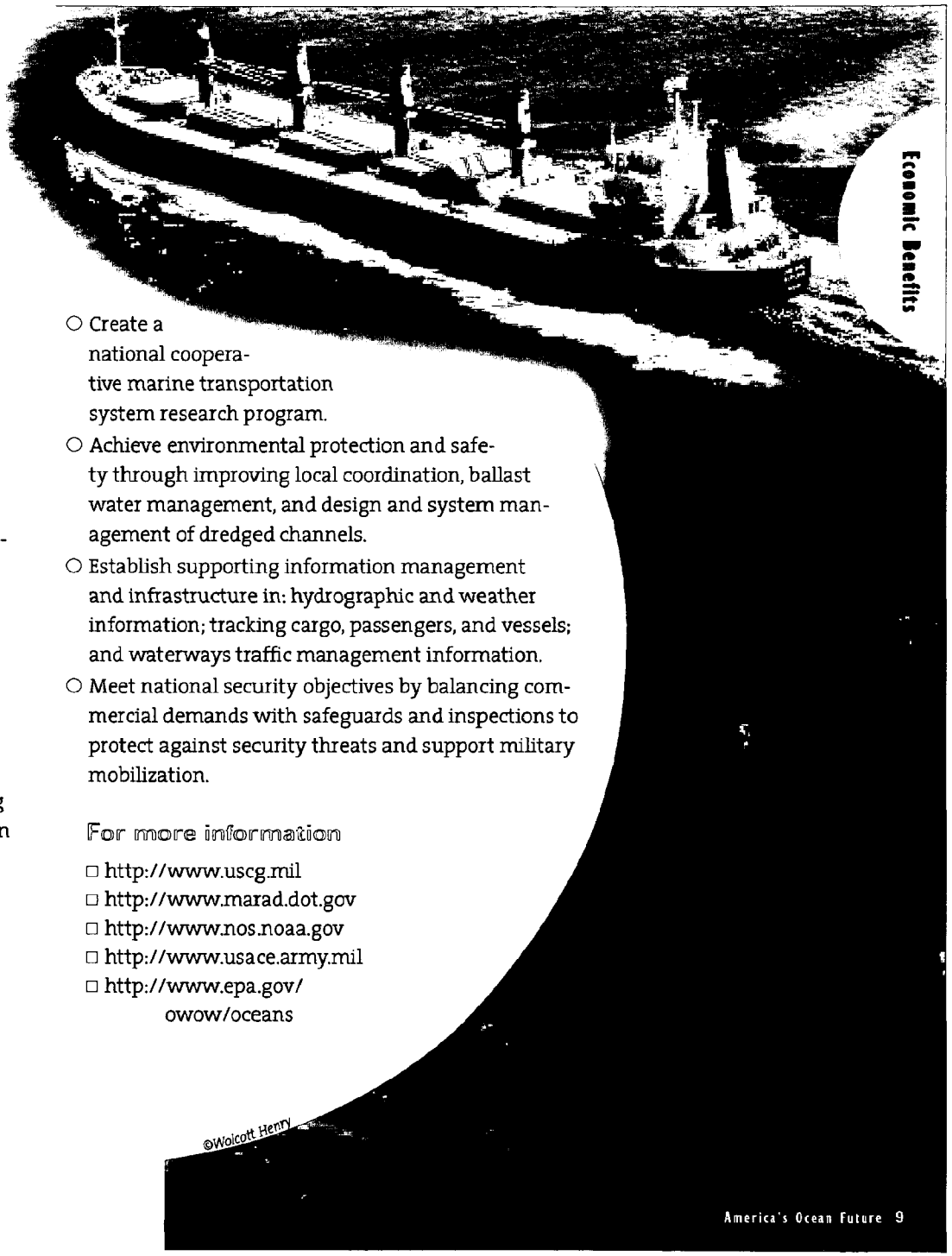
Build the world's most technologically advanced, safe, secure, efficient, effective, accessible, globally competitive, dynamic, and environmentally responsible system for moving goods and people.



Our marine transportation system – which consists of waterways, ports and their intermodal connections, vessels, vehicles, and system users – supports our economy and national security through dependable all-weather transportation for the movement of goods and people. It is the most flexible, most cost-effective, and safest mode of domestic and international freight transportation, providing competitive access to suppliers and markets in an increasingly global economy. It enables the swift mobilization and supply of America's military, both through military assets and through the sealift and logistical support provided by the private commercial U.S. flag merchant fleet. And it also provides recreational value to millions of boaters, fishermen, and cruise passengers.

By 2010, U.S. foreign trade in goods is projected to more than double today's value, reaching $5 trillion in constant dollars, with the volume of foreign trade cargo increasing by more than 30% to 1.7 billion metric tons. This rise in marine trade is expected to fuel demand for increasingly flexible and less expensive marine transportation services. This demand, as well as increases in recreational use, high-speed ferry transportation, cruise ship traffic, commercial fishing, and expanded U.S. military needs for force projection and supply, will strain the marine transportation system's services and infrastructure. However, the ability of today's system to handle tomorrow's emerging needs is severely challenged.

In response to a Congressional mandate, the Coast Guard, the Maritime Administration, the Army Corps of Engineers, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, and nine other federal agencies collaborated with stakeholders to assess the marine transportation system and present their findings in a report to Congress. The report of the Marine Transportation System Task Force addresses several concerns and recommendations to be implemented by the combined efforts of the private, local, state, and federal sectors. Highlights of the report are presented here.



Ongoing Concerns

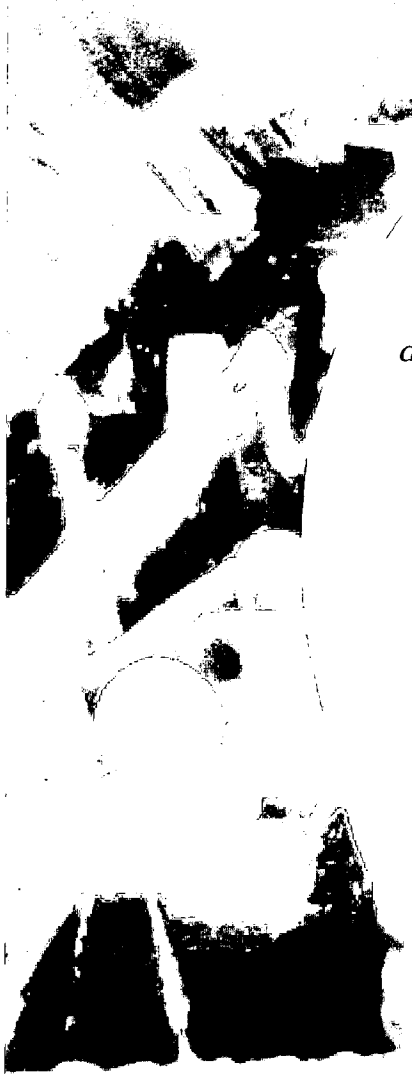
- Many federal agencies, state and local governments, port authorities, private industries, and labor groups share responsibilities for managing safety, security, and environmental protection, making coordinated responses to challenges and opportunities very difficult to achieve.
- Innovative U.S. financing, regulatory changes, and tax mechanisms may be needed over the long run to spur the substantial public and private capital investments needed to meet growing demands.
- The marine transportation system infrastructure and supportive information systems may be stretched to their limits to cope with projected increases in both the system's users and the size, speed, and diversity of vessels.
- Growth in vessel traffic will increase risks to sensitive ocean, coastal, and inland environments.

Recommendations

- Facilitate coordination among all stakeholders by establishing a federal Interagency Committee for the Marine Transportation System, a nonfederal Marine Transportation System National Advisory Council, as well as regional and local committees.
- Explore funding strategies that coordinate public funding processes and maximize the effectiveness of public and private investments.
- Improve competitiveness and safety by establishing infrastructure and information systems that streamline vessel inspection, reporting and port clearance procedures, and that improve the marine transportation system traffic forecasts.
- Create a national cooperative marine transportation system research program.
- Achieve environmental protection and safety through improving local coordination, ballast water management, and design and system management of dredged channels.
- Establish supporting information management and infrastructure in: hydrographic and weather information; tracking cargo, passengers, and vessels; and waterways traffic management information.
- Meet national security objectives by balancing commercial demands with safeguards and inspections to protect against security threats and support military mobilization.

For more information

- http://www.uscg.mil
- http://www.marad.dot.gov
- http://www.nos.noaa.gov
- http://www.usace.army.mil
- http://www.epa.gov/owow/oceans



Safe Navigation

Provide tools for safe navigation to eliminate deaths, injuries, and environmental and property damage.

The recent rapid expansion of trade, wealth, and recreational opportunities has led to a corresponding growth in vessel traffic and in the potential for accidents. About 3,500 ships are involved annually in accidents on our nation's waterways, and 50% of waterborne cargo contains hazardous materials. Human error is the cause of approximately 80% of those accidents. Educating mariners, pilots, crew, and rescuers about navigational concerns and maintaining a continuing dialogue among marine user groups will facilitate the creation of a safer operating environment.

To reduce the risk of accidents and spills, U.S. mariners and harbor pilots need information derived from new integrated electronic technologies, such as seafloor mapping, detailed large-scale digital vector charts, precise positioning systems, and real-time and predicted oceanographic and meteorological data. Expanded overseas charting services are also needed to support U.S. military and commercial navigation in foreign waters.

Because most of the nation's harbors and channels are not naturally deep enough to accommodate modern vessels, the U.S. dredges an average of 275 million cubic yards of sediment a year to maintain and improve the 299 deep-draft (greater than 14 feet) and 626 shallow-draft navigation projects. However, routine dredging can be environmentally destructive, and many of America's greatest seaports have contaminated sediment that cannot be dredged without harm to the environment. The nation's need for safe, efficient marine transportation must be balanced with the priority of healthy coastal waters.

Premised on mutual respect and shared commitment by government, industry, and labor, the Coast Guard's **Prevention Through People** program promotes marine safety and environmental protection by addressing the human element – the root cause of approximately 80% of marine accidents. Through this program, the Coast Guard works with mariners to develop innovative, non-regulatory solutions to human element issues, such as publishing advisory risk management guidelines and other "lessons learned" documents.

http:www.uscg.mil/hq/g-m/nmc/ptp/

Ongoing Concerns

- The rapid advance in the technological capabilities of navigational aids has outpaced the government's ability to provide the quality-controlled, standardized data streams needed to "fuel" new navigation products and systems.

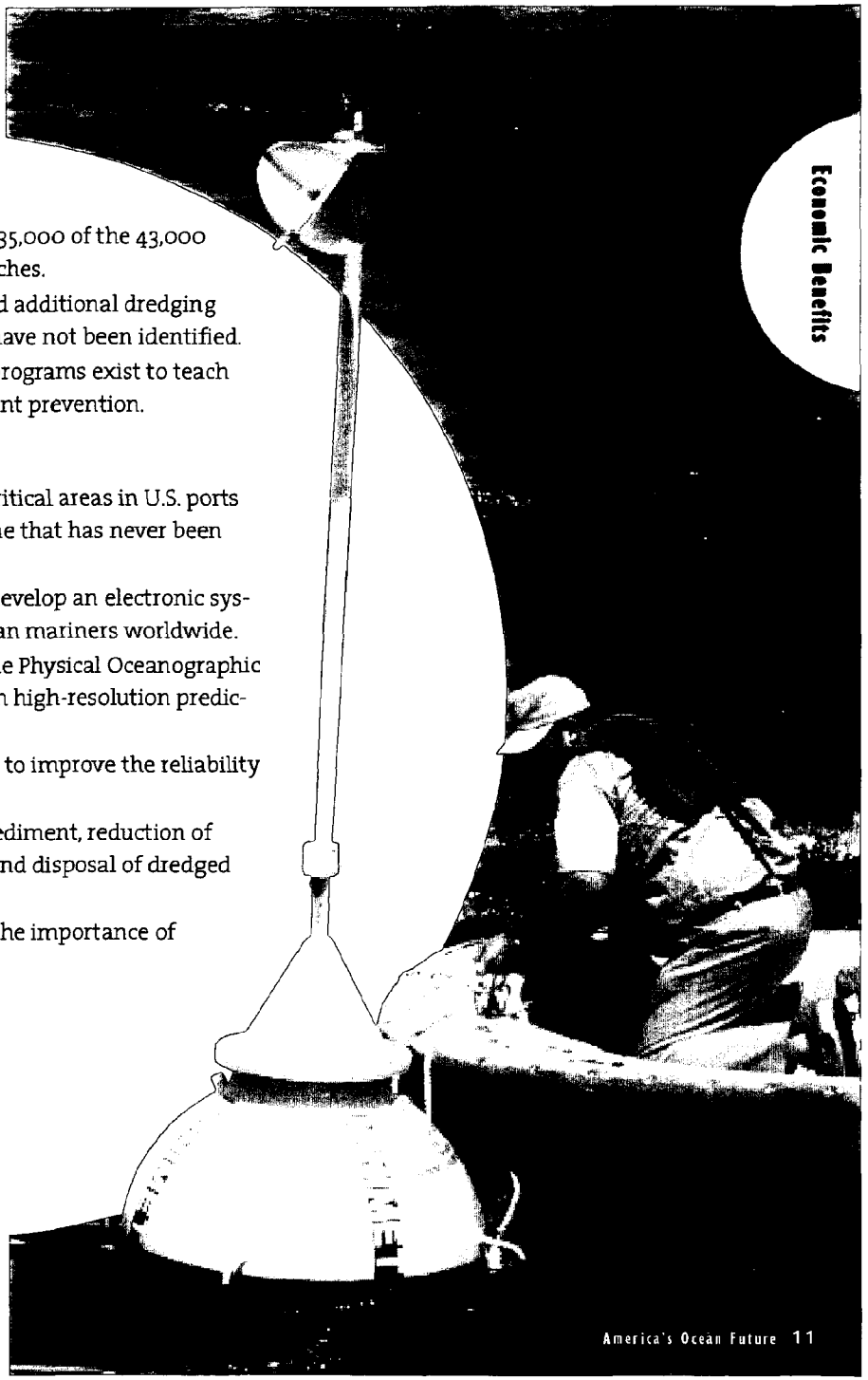
- Many areas of U.S. coastal waters have not been mapped in 50 years, including 35,000 of the 43,000 square nautical miles identified in 1993 as critical to U.S. ports and their approaches.
- Although increased maintenance dredging for existing navigation channels and additional dredging requirements for port improvements are required, better dredging techniques have not been identified.
- The greatest threat to safe navigation is human error. Yet, too few educational programs exist to teach commercial and recreational mariners the importance of human error in accident prevention.

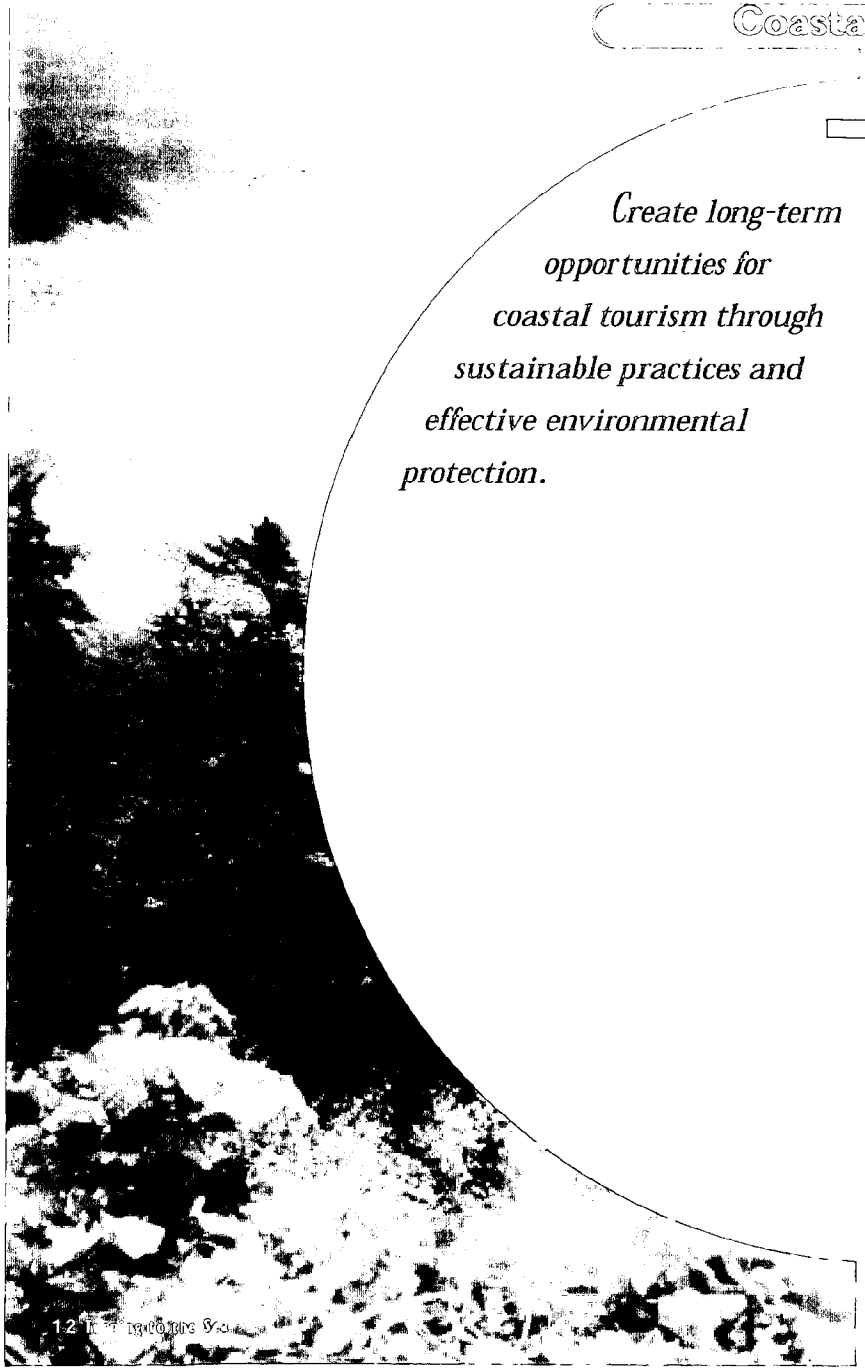
Recommendations

- Eliminate the hydrographic survey backlog of 35,000 square nautical miles of critical areas in U.S. ports and their approaches, and map the one-third of the 95,000 miles of U.S. coastline that has never been mapped using photogrammetric methods.
- Complete the production of electronic charts for U.S. and overseas waters, and develop an electronic system for disseminating timely updates and corrections to U.S. military and civilian mariners worldwide.
- Deploy real-time environmental observation and prediction systems, such as the Physical Oceanographic Real-Time System (PORTS), in U.S. high-traffic areas, and complement them with high-resolution predictions of all navigationally significant weather and oceanographic conditions.
- Expedite the development of technologies for maintaining navigation channels to improve the reliability and safety of federal navigation projects.
- Conduct research on effective and environmentally sensitive management of sediment, reduction of the flow of sediment into waterways, remediation of contaminated sediment, and disposal of dredged spoil in an environmentally sound manner.
- Develop educational programs to teach commercial and recreational mariners the importance of avoiding human error in accident prevention.

For more information

- http://chartmaker.ncd.noaa.gov
- http://www.usace.army.mil
- http://www.opsd.nos.noaa.gov/d_ports.html
- http://www.uscg.mil/
- http://marine.er.usgs.gov
- http://www.epa.gov/owow/oceans/dmmp





Coastal Tourism

Create long-term opportunities for coastal tourism through sustainable practices and effective environmental protection.

The travel and tourism industry is the nation's largest employer and second-largest contributor to the U.S. gross domestic product, generating over $700 billion annually. Coastal tourism and recreation comprise the largest and fastest-growing sector of the U.S. service industry, accounting for 85% of all tourism-related revenues.

Many coastal communities depend on healthy coastal ecosystems and clean coastal waters for their survival. Yet rapidly growing coastal populations, increasing numbers of visitors (180 million annually), and unsustainable coastal development are degrading the water quality and destroying the habitats that are the main attractions of coastal areas. Although tourism and recreation-related development are major factors shaping the use and management of U.S. ocean and coastal resources, this sector has not been regarded as requiring policy, management, planning, and resources. The federal government can help tribes and states, which have key roles in managing coastal tourism, achieve their goals of protecting vital coastal ecosystems while promoting economic growth and economic stability.

Ongoing Concerns

- Federal efforts to help tribal, state, and local partners promote and implement sustainable practices for coastal recreation and tourism are fragmented or limited.
- There is no systematic data collection on the magnitude, value, and impacts of coastal tourism and recreation, which should be the foundation of sound planning and sustainable management.
- Federal efforts to educate tourists and recreational users about safe and sustainable use of coastal resources are expanding, but the lack of coordination and resources significantly limits progress, and key opportunities are missed.
- Current financial and technical resources available to federal, tribal, state, and local entities are inadequate to effectively manage and safeguard many of the

coastal and marine protected areas and other tourism and recreation resources (e.g., national marine sanctuaries, national and state parks, city beaches) that are the foundation of coastal tourism and recreation.

- ○ There are too few areas for marine tourism use.

Recommendations

- ○ Collect and provide access to information on the magnitude, value, and impacts of ocean and coastal recreation and tourism, including information on a coastal-county basis and studies on the dynamics of tourism in coastal and marine areas.
- ○ Build on existing groups to coordinate relevant federal, tribal, state, and other programs dealing with ocean and coastal resource management to foster a sustainable tourism industry.
- ○ Mobilize public/private partnerships to develop coordinated and effective policies and public outreach programs related to coastal recreation and tourism.
- ○ Provide guidance and technical assistance to tribal, state, community, and private-sector partners to help them sustainably manage coastal recreation and tourism.
- ○ Evaluate current federal, tribal, state, and local programs related to recreation and tourism, and develop best management practices as part of general guidelines for managing sustainable recreation and tourism industries in the nation's coastal zones.
- ○ Working with tribal, state, and local governments, create new areas for sustainable marine tourism, and provide access to these areas.

In South Florida, the environment is the economy. A recent study found that over 2.3 million visitors spent $1.6 billion in 1997 on recreation and tourism in the Florida Keys. The total economic impact of the visitors was $2.9 billion in output/sales, $1.7 billion in income, and almost 28,000 jobs. Ninety-four percent of all recreating visitors were concerned about protecting the environment of the Florida Keys.

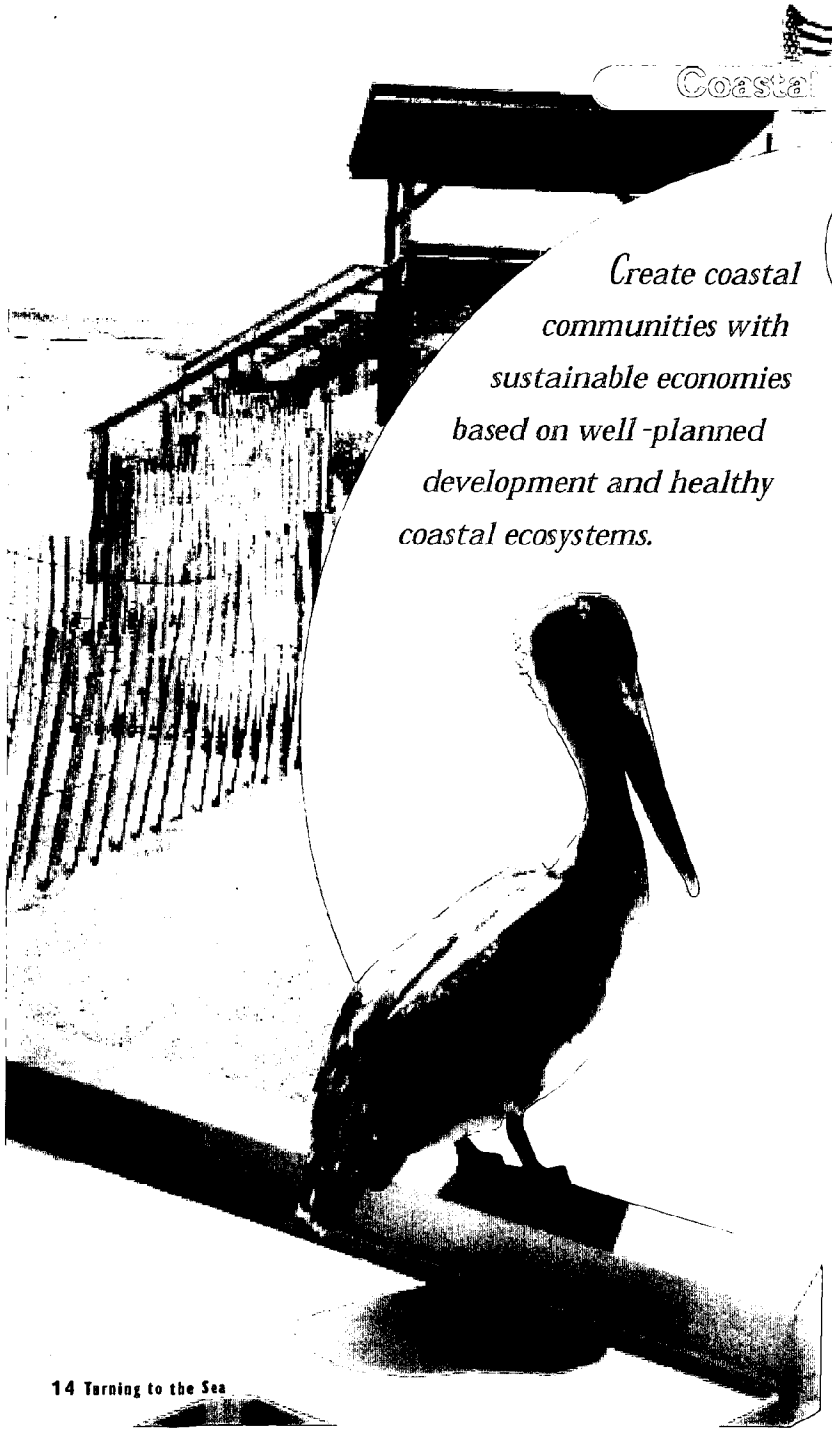
http://www-orca.nos.noaa.gov/projects/econkeys/econkeys.html

For more information

- □ http://state-of-coast.noaa.gov/
- □ http://www.epa.gov/surf2
- □ http://www.mms.gov/intermar/marineac.htm
- □ http://www.whitehouse.gov/PCSD/

CMC ©Don Kincade

Coastal Communities



Create coastal communities with sustainable economies based on well-planned development and healthy coastal ecosystems.

Our coastal communities are the most densely populated and fastest growing areas in the U.S.: 14 of the nation's 20 largest cities are coastal, over 40% of new commercial and residential development is along the coast, and approximately 3,600 people move to the coast every day. Over 50% of the U.S. population lives by the coast today; by 2025, this figure is expected to reach 75%.

Coastal communities contain some of the nation's most productive and diverse natural resources, including valuable habitats, fisheries, recreational areas, and natural treasures. However, growing demands for access to the coast have resulted in habitat loss, water pollution, increased polluted runoff, and sprawl. Helping communities reduce damage from natural disasters, address contamination sites (e.g., brownfields), and revitalize waterfronts will make better use of existing developed areas and reduce unwise new development.

In addition, some portions of the U.S. coastline are severely eroding, threatening the property and livelihoods of coastal communities. Federal offshore sand resources, which are used for beach nourishment projects, are needed to address erosion problems. However, there are concerns about environmental harm from sand collection and replenishment activities, as well as potential conflicts with other users of the coastal ocean, such as fisheries.

Ongoing Concerns

- Many coastal communities lack the tools, resources, and information to strategically and sustainably address the impacts of rapidly growing coastal populations, including increased runoff from developed areas.
- Some federal and state development policies and practices have unintentionally encouraged suburban sprawl and disinvestment in urban cores, or building in disaster-prone areas.
- Some policies have allowed for public and private investment in coastal areas prone to natural disasters, increasing the risks of loss of life and property and damage to natural habitats.

- No overall management framework exists to ensure that federal offshore sand resources are used in a timely, cost-effective, and environmentally sound manner.

Recommendations

- Promote comprehensive management by helping tribal, state, and local governments adopt and implement sustainable development management plans for coastal zones.
- Examine and revise policies and programs, such as flood insurance subsidies, that promote unsustainable or hazardous development.
- Increase support for tribal, state, and local efforts to plan for and mitigate the impacts of natural hazards on communities and natural resources; to redevelop brownfields appropriately and revitalize waterfronts in coastal communities; and to reduce the flow of polluted runoff into coastal watersheds, bays, and estuaries.
- Work with tribes, communities, states, nongovernmental organizations, and across federal agencies to produce useful indices of sustainable development to measure and track progress at local, regional, and national levels.
- Work with tribes, communities, states, nongovernmental organizations, and across federal agencies to create a coordinated "digital coast" electronic information system for coastal decision makers that provides easy access to comprehensive data on such topics as community vulnerability to natural hazards, impacts of land-use changes, and maps and descriptions of coastal habitats.
- Form closely coordinated partnerships among the federal government, tribes, coastal states, and communities to develop regional sand management initiatives; analyze the potential impacts associated with the use of federal sand resources; and identify possible mitigation measures to offset these impacts.

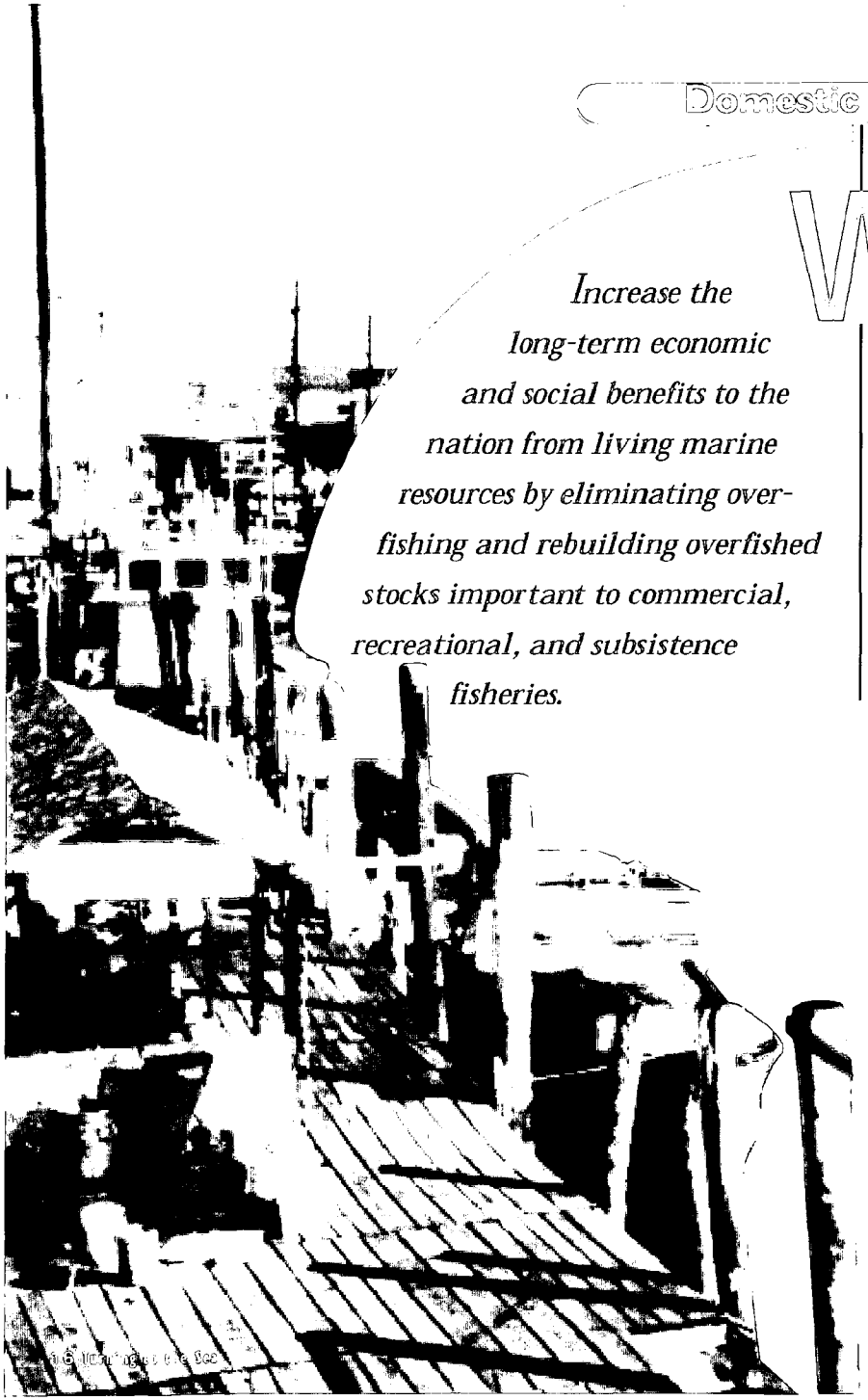
Thirty-three of the thirty-five U.S. coastal states and territories now have coastal zone management plans to help coastal communities improve long-term planning and sustainable use of their natural resources. This state-federal partnership helps communities implement pollution controls, land-use planning, waterfront revitalization, education and other efforts to address growing coastal populations and to reduce habitat destruction, harmful algal blooms, runoff pollution, and vulnerability to storms and other hazards. For example, in Florida, coastal management is helping revitalize waterfront areas, and plan and implement the South Florida Ecosystem Restoration Initiative, the largest coastal restoration project in history.

http://www.nos.noaa.gov/Programs/ocrm.html

For more information

- http://state-of-coast.noaa.gov/
- http://www.mms.gov/intermar/marineac.htm
- http://www.epa.gov/win
- http://www.epa.gov/surf2/
- http://marine.er.usgs.gov
- http://www.whitehouse.gov/PCSD/
- http://www.livablecommunities.gov

Domestic Fisheries



Increase the long-term economic and social benefits to the nation from living marine resources by eliminating overfishing and rebuilding overfished stocks important to commercial, recreational, and subsistence fisheries.

Waters under U.S. jurisdiction contain more than one-fifth of the world's most productive marine areas. However, fisheries resources in these waters, the ecosystems that support them, and the communities that depend on them are under increasing pressure to meet a growing demand from consumers, who spend about $46 billion a year on fish products.

In the past, U.S. government subsidies fostered increases in capacity in the fisheries sector, and until recently, many fisheries in the U.S. had unrestricted access. As a result, too many boats were chasing too few fish. Several other factors have exacerbated the problems facing domestic fisheries. Bycatch (the incidental capture of nontarget species) has significantly harmed many species of fish and endangered sea turtles, marine mammals, and birds. In addition, much of the bycatch is discarded because it is less valuable than the target species. Other human stressors, such as coastal development, pollution, anchoring on coral reefs, and some types of fishing gear, have substantially degraded habitat essential for fish productivity.

With strong management in recent years, such as the federal implementation of programs controlling access to fisheries, many stocks are beginning to recover. Several fisheries have also begun to address the bycatch issue by requiring turtle- and fish-excluder devices, and the regional Fishery Management Councils are involving broader communities in the management of the nation's fisheries. But even with current efforts, 33% of federally managed fish stocks are overfished, and it will take ten years or more before some fisheries fully recover and become commercially viable and sustainable. New fisheries management practices will require a more broad-based ecosystem approach.

Ongoing Concerns

- Fishing overcapacity continues to exist in many U.S. fisheries.
- Bycatch of nontarget species, although declining, continues to threaten marine biodiversity and reduce economic opportunities in other fisheries.
- Current harvest restrictions may have to be even more stringent to

eliminate overfishing and rebuild stocks to achieve sustainable economic benefits.

- ○ The status of 65% of federal marine fisheries stocks is unknown, hampering our ability to manage fisheries sustainably.
- ○ There are major data gaps on bycatch levels in many fisheries and on the impacts of fishing activities on most essential fish habitats.
- ○ The short-term effects of much-needed marine conservation measures may severely strain the economies of local communities.
- ○ Consumers are unaware of how their consumption drives fishing pressure, and are unable to distinguish between sustainably and nonsustainably harvested fisheries products.

Recommendations

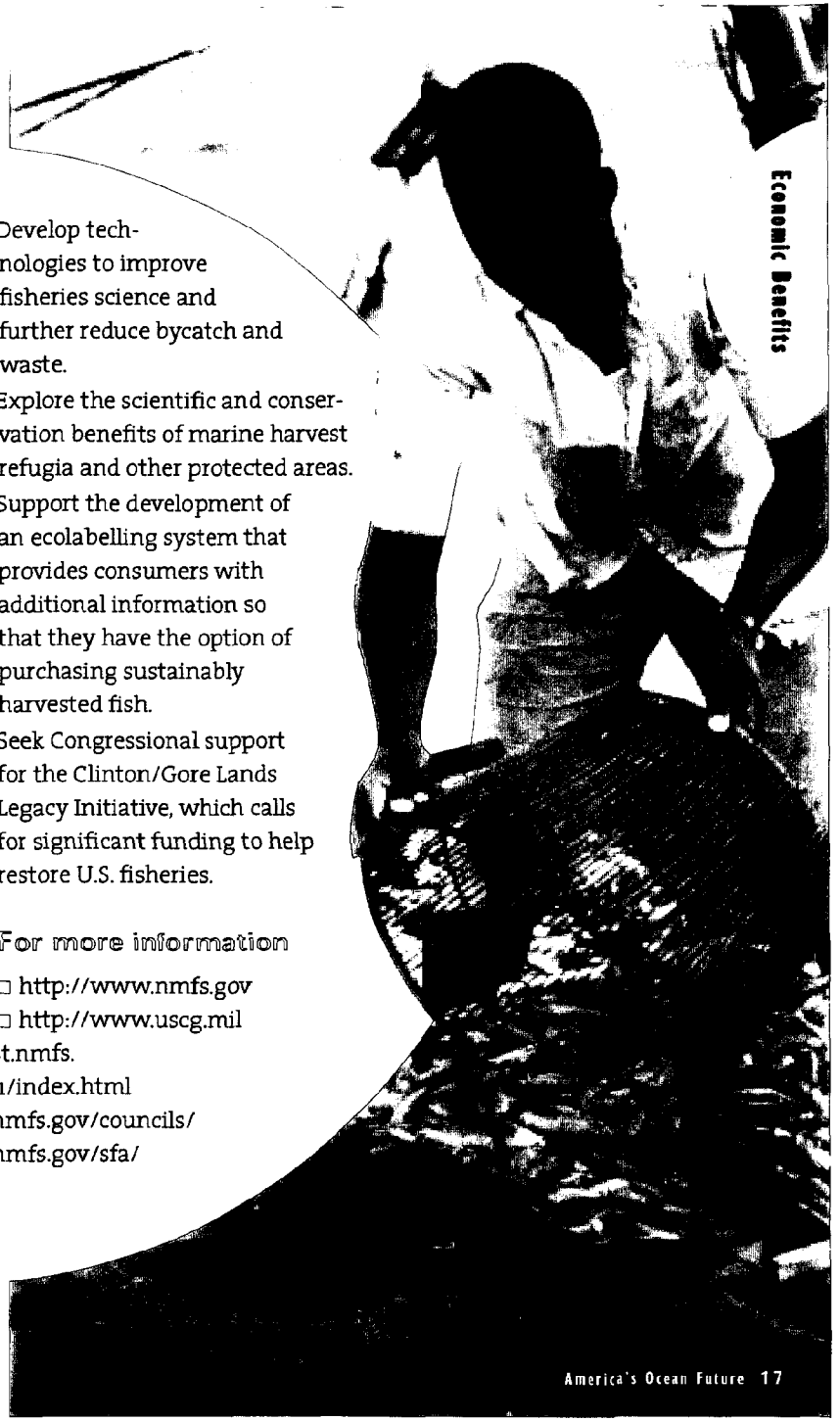
- ○ Evaluate and apply creative measures to reduce fishing overcapacity, including leveraged buy-outs and rights-based fishing.
- ○ Create short- and long-term opportunities to decrease the economic burden on fishing communities by redirecting fishing effort into supporting activities, such as fishery research.
- ○ Provide fisheries managers with the best available technology to survey and properly assess fish stock levels, enabling them to better set appropriate fishing limits.
- ○ Create incentives to reduce adverse effects on nontarget species and marine habitat.

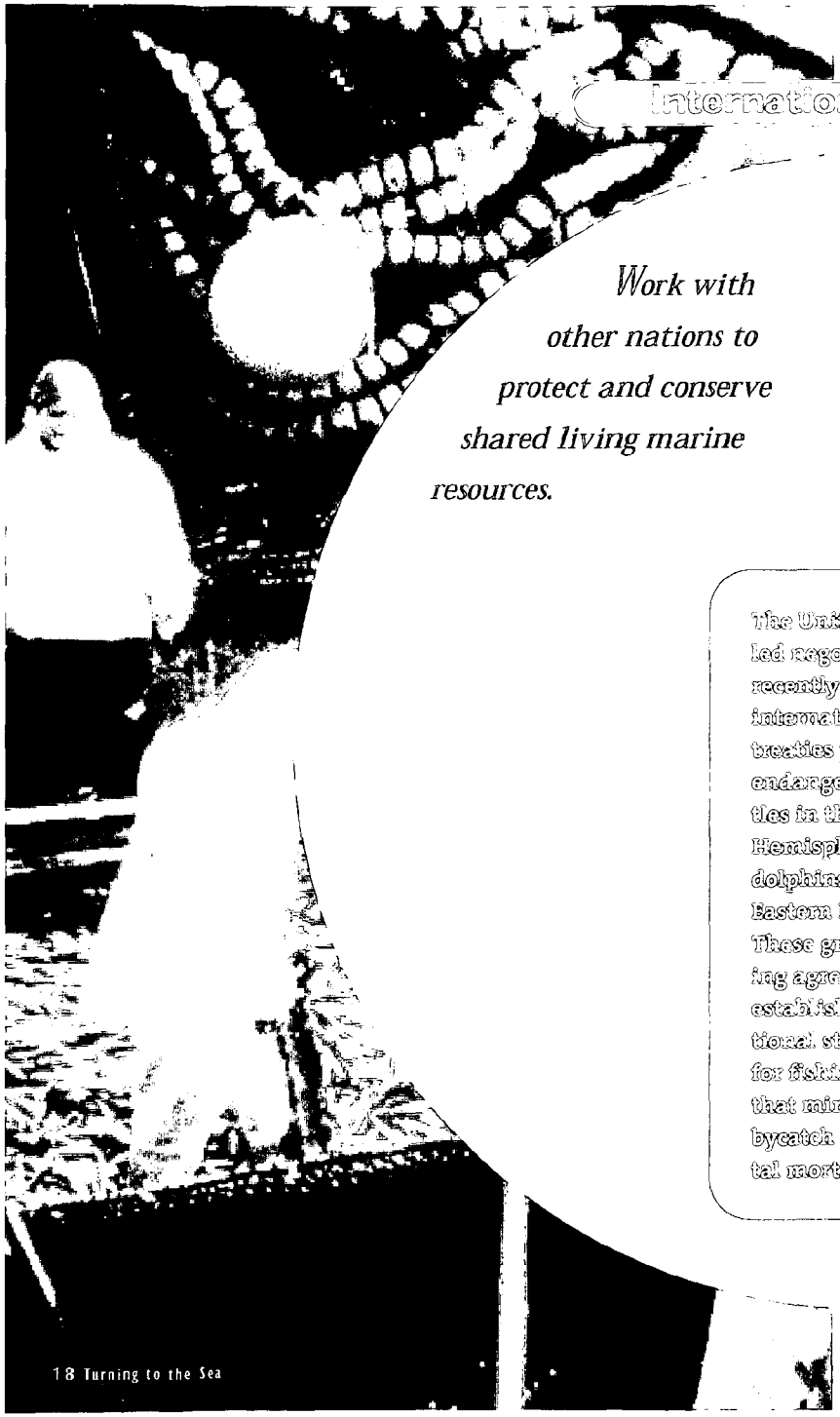
Georges Bank, one of the richest fishing grounds in the world, was overfished first by foreign fleets, then by the build-up of the U.S. domestic fleet. Today, as a result of strong management actions, haddock, cod, and flounder populations and the fishing yields from these stocks are once again increasing. The scallop fishery has recently reopened in a portion of Georges Bank under a pilot project that supports the fishing industry and promotes sustainable harvesting.

- ○ Develop technologies to improve fisheries science and further reduce bycatch and waste.
- ○ Explore the scientific and conservation benefits of marine harvest refugia and other protected areas.
- ○ Support the development of an ecolabelling system that provides consumers with additional information so that they have the option of purchasing sustainably harvested fish.
- ○ Seek Congressional support for the Clinton/Gore Lands Legacy Initiative, which calls for significant funding to help restore U.S. fisheries.

For more information

- □ http://www.nmfs.gov
- □ http://www.uscg.mil
- □ http://www.st.nmfs.gov/sti/index.html
- □ http://www.nmfs.gov/councils/
- □ http://www.nmfs.gov/sfa/





International Fisheries

Work with other nations to protect and conserve shared living marine resources.

Increasing world population and wealth have led to higher demand for edible fish and excess capacity of fishing boats. The United Nations (UN) Food and Agriculture Organization (FAO) forecasts that by 2010, worldwide demand for seafood will top 110 million tons, but catches will fall short by 40 million tons. Nearly 70% of the world's marine fish stocks are overfished, fully exploited, or rebuilding only under protective management regulation. Pressure to increase production already has the industry fishing farther down the food chain, causing potential imbalances in the ecosystem. The race for fish also leads to high rates of bycatch – of nontarget fish species and vulnerable marine mammals, turtles, and seabirds alike – and wasted discards.

The United States led negotiations that recently established international treaties protecting endangered sea turtles in the Western Hemisphere and dolphins in the Eastern Pacific. These ground-breaking agreements establish international standards for fishing practices that minimize bycatch and accidental mortality.

Though a growing number of regional organizations are charged with managing specific fish stocks, the future of the world's fishery resources is uncertain. At the 1992 Earth Summit in Rio de Janeiro, all nations joined in the call for new international agreements and mechanisms to achieve sustainable marine fisheries. The U.S., as one of the world's leading fishing nations, plays a key role in expanding international cooperation to manage and conserve global fishery resources. For example, the U.S. has successfully used trade measures – or the threat of trade measures – to convince exporting nations to end wasteful and destructive fishing methods. Focused effort can be especially effective because only ten countries, including the U.S., account for 70% of total global production.

Ongoing Concerns

- The two key tools for international fisheries management – the 1995 UN Straddling and Highly Migratory Fish Stocks Agreement (Straddling Stocks Agreement) and the FAO Agreement on High-Seas Fishing Vessel Compliance (FAO Compliance Agreement) – have yet to enter into force. Also, the FAO Code of Conduct for Responsible Fisheries (Code) is not yet widely implemented by

fishing nations.

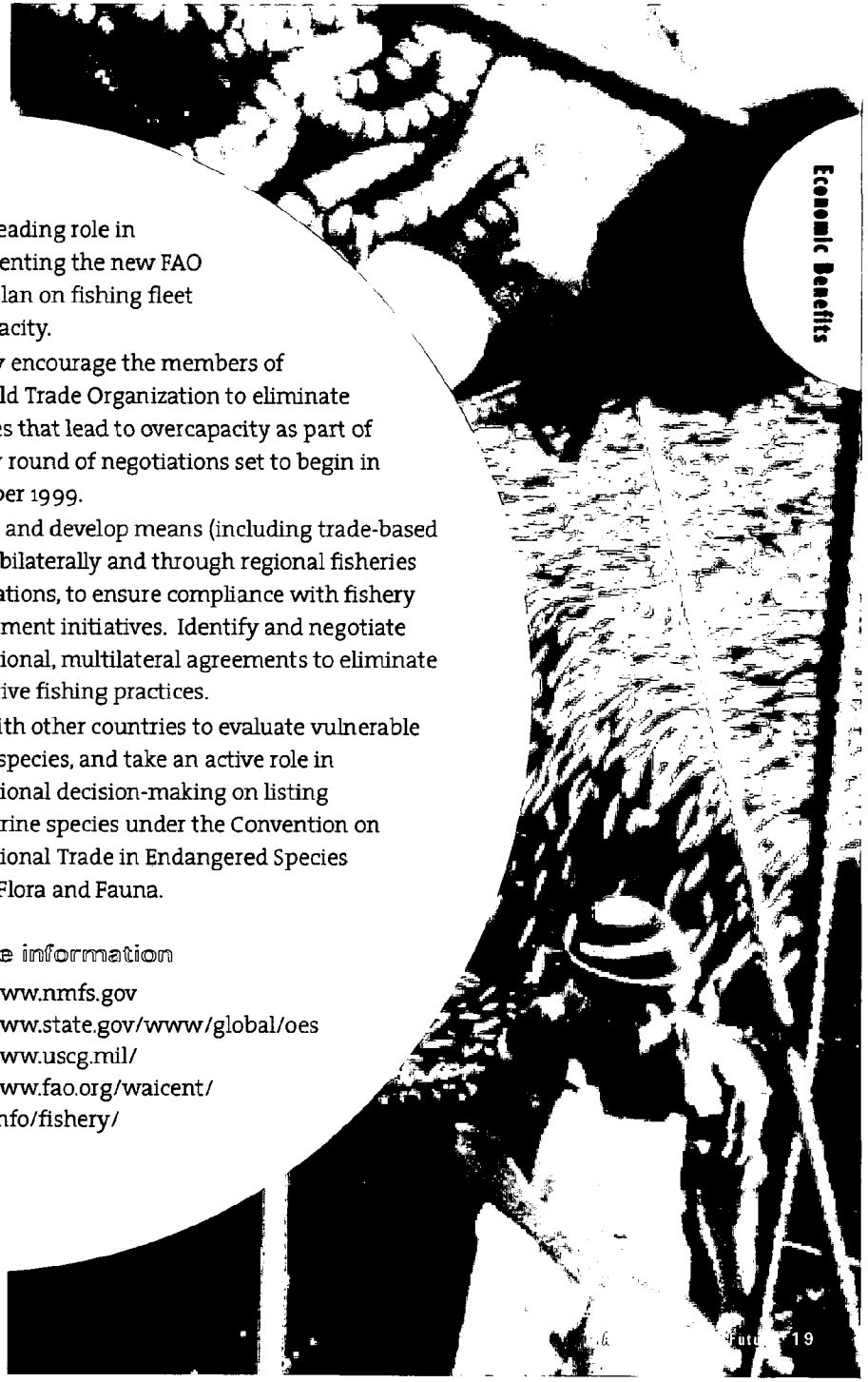
- Nations continue to subsidize their fishing industries, leading to overcapitalization of fishing fleets and increasing pressure to maximize harvest.
- Conservation and management schemes are undermined by illegal, unregulated, and unreported fishing. A number of nations also offer "flag of convenience" registry to fishing vessels with no accompanying oversight of their fishing practices.
- Conservation and management schemes have not always been successful in averting overfishing or allowing for the rebuilding of depleted stocks.
- Parties to international agreements and regional fishery management organizations often exceed agreed-upon quotas or are out of compliance with those organizations' conservation and management regimes.

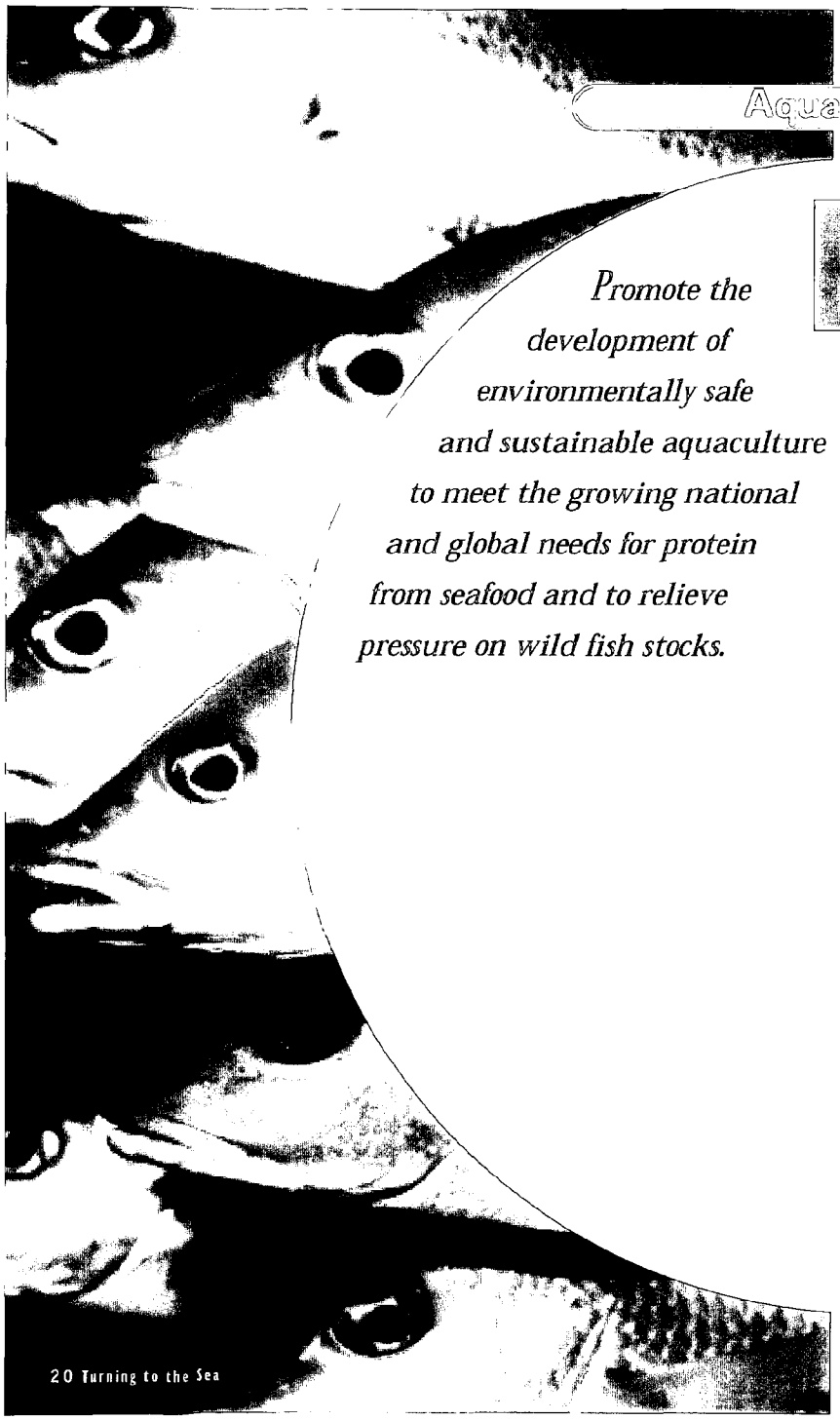
Recommendations

- Promote ratification by signatory nations of the Straddling Stocks Agreement and the FAO Compliance Agreement, and implementation of the FAO Code at all appropriate bilateral meetings.
- Develop proposals to implement key provisions of the above agreements, such as a precautionary approach and transparency (openness in the decision-making process), through regional fishery organizations and arrangements.
- Increase bilateral pressure to foster agreements to rebuild overfished species and to deter illegal, unregulated, and unreported fishing. Participate actively in FAO initiatives to develop an international plan of action to address such fishing practices.
- Take a leading role in implementing the new FAO action plan on fishing fleet overcapacity.
- Strongly encourage the members of the World Trade Organization to eliminate subsidies that lead to overcapacity as part of the new round of negotiations set to begin in November 1999.
- Support and develop means (including trade-based means) bilaterally and through regional fisheries organizations, to ensure compliance with fishery management initiatives. Identify and negotiate new regional, multilateral agreements to eliminate destructive fishing practices.
- Work with other countries to evaluate vulnerable marine species, and take an active role in international decision-making on listing new marine species under the Convention on International Trade in Endangered Species of Wild Flora and Fauna.

For more information

- http://www.nmfs.gov
- http://www.state.gov/www/global/oes
- http://www.uscg.mil/
- http://www.fao.org/waicent/faoinfo/fishery/





Aquaculture

Promote the development of environmentally safe and sustainable aquaculture to meet the growing national and global needs for protein from seafood and to relieve pressure on wild fish stocks.

Expected increases in world population are projected to intensify the global demand for edible seafood. The aquaculture industry, which propagates and rears aquatic plants and animals, can provide consumers with high-quality, safe, and affordable seafood and other important fish products, and thereby reduce pressure on wild stocks and help their recovery.

The global aquaculture industry, whose production is valued at nearly $1 billion in the U.S. and $40 billion worldwide, currently supplies less than 10% of the nation's seafood demands. Improving U.S. aquaculture production can simultaneously provide more seafood to domestic markets and help offset the U.S. trade deficit in edible seafood products, which has increased by 139% since 1992 and now stands at $6 billion annually – the largest for any agricultural commodity. Aquaculture can also make major contributions to U.S. local, regional, and national economies by creating business opportunities both here and abroad and by providing employment in a new and diverse industry.

The U.S. has the opportunity to lead the world in developing sustainable aquaculture technologies based on renewable resources and advancing international guidelines for the industry, which provides 25% of the world's fish supplies. However, the continued growth of aquaculture in land-based systems and coastal environments and any expansion of aquaculture into the U.S. Exclusive Economic Zone must be conducted in an environmentally sound manner. Although coastal environments are primarily under state control, the federal government can play a significant role in assisting tribal and state aquaculture efforts through research and the regulatory process.

Ongoing Concerns

- U.S. aquaculture development is restricted by a lack of species ready for commercial culture, sophisticated engineering requirements, sparse information on diseases and ways to treat them, and marketing and distribution concerns.
- Concern exists about the potential environmental impacts of some aquaculture

operations, especially genetic and disease consequences for wild stocks, introduction of nonindigenous species, coastal habitat alteration, effluent effects on habitat, and interactions with marine mammals and endangered species.

- ○ No comprehensive regulatory framework exists for permitting aquaculture operations.
- ○ Although aquaculture has proven to be a valuable tool to increase salmon populations, its effectiveness remains unknown for other fish and shellfish stocks.

Recommendations

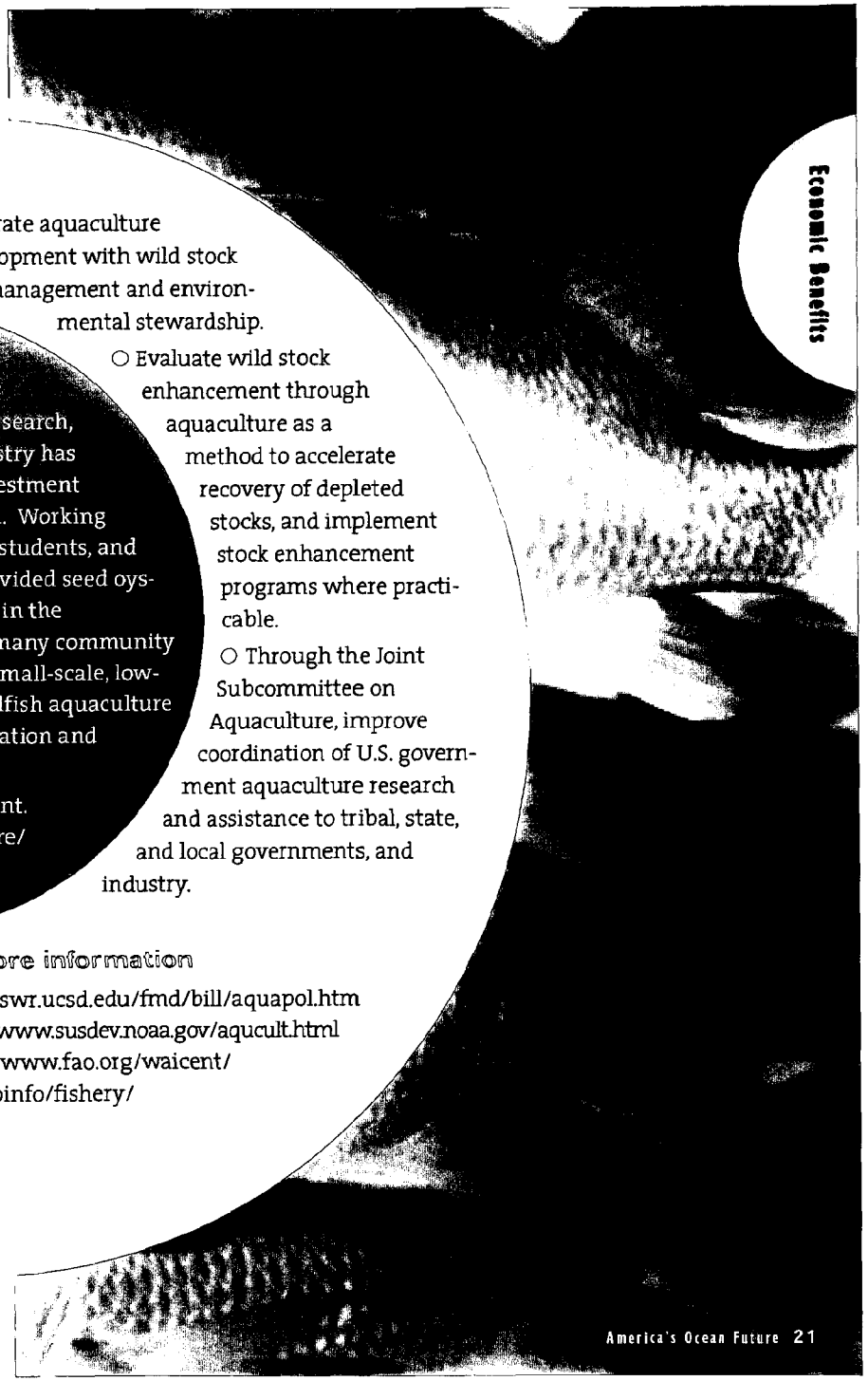
- ○ Support research and develop pilot projects for hatchery and nursery development, closed-system production techniques, processing, and marketing.
- ○ Work with stakeholders to develop guidelines for environmentally sound and sustainable aquaculture by the end of the year 2000, and promote domestic and international compliance with them.
- ○ Work with stakeholders to create an integrated regulatory framework for coastal or inland aquaculture.
- ○ Develop a comprehensive federal permitting and certification process for the open-ocean aquaculture industry in the U.S. Exclusive Economic Zone, consistent with the U.S. policy on nonindigenous species.
- ○ Integrate aquaculture development with wild stock management and environmental stewardship.
- ○ Evaluate wild stock enhancement through aquaculture as a method to accelerate recovery of depleted stocks, and implement stock enhancement programs where practicable.
- ○ Through the Joint Subcommittee on Aquaculture, improve coordination of U.S. government aquaculture research and assistance to tribal, state, and local governments, and industry.

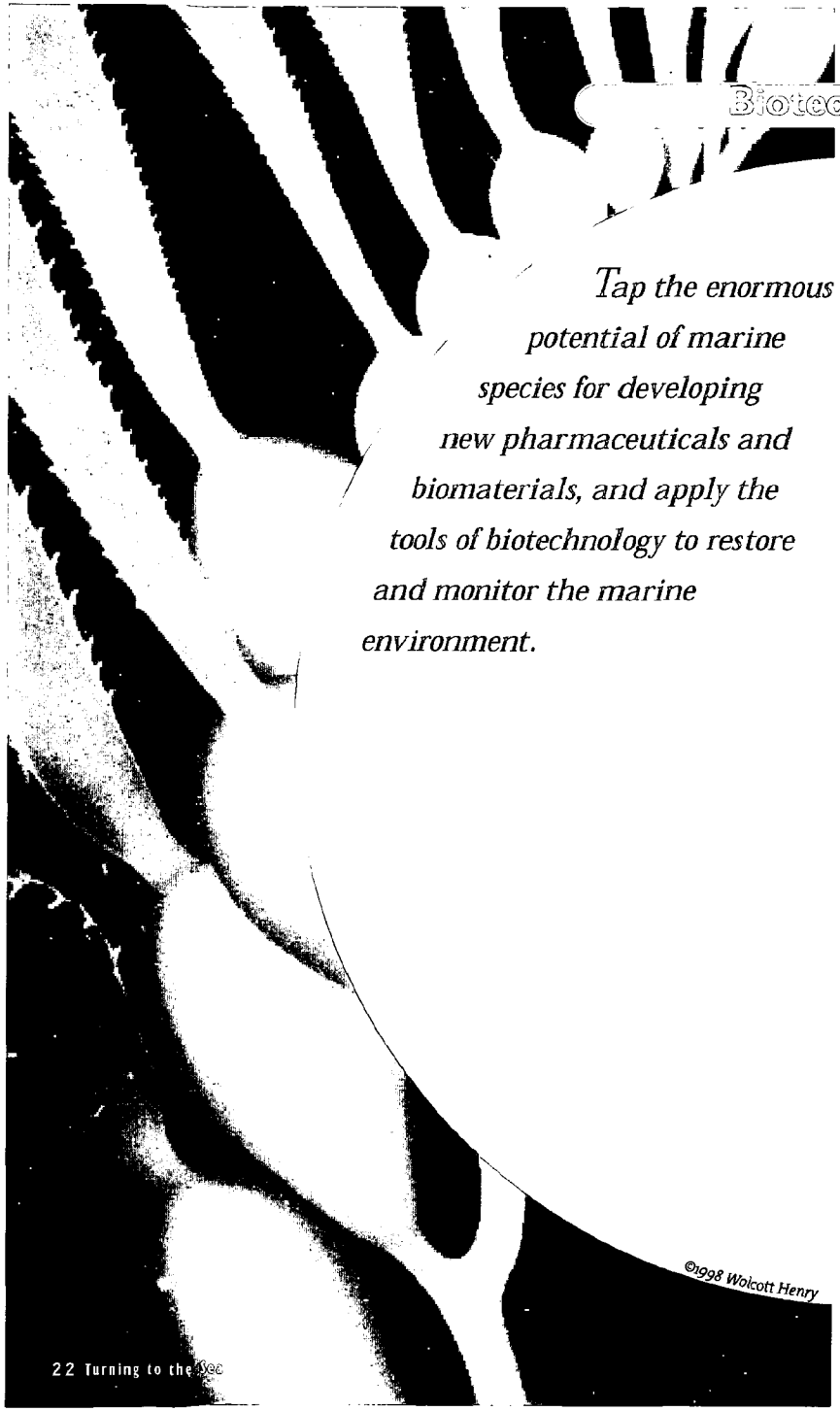
Aquaculture research continues to pay off. As a result of Sea Grant research, a small, local soft-shell crab industry has grown to a multi-million-dollar investment extending from New Jersey to Florida. Working with the fishing industry, researchers, students, and others, aquaculture specialists have provided seed oysters and expertise to rebuild oyster bars in the Chesapeake Bay. And in New England, many community partnerships are underway to develop small-scale, low-impact economic opportunities in shellfish aquaculture for local fishermen using new information and technologies.

http://www.nsgo.seagrant.org/research/aquaculture/index.html

For more information

- □ http://swr.ucsd.edu/fmd/bill/aquapol.htm
- □ http://www.susdev.noaa.gov/aqucult.html
- □ http://www.fao.org/waicent/faoinfo/fishery/





Tap the enormous potential of marine species for developing new pharmaceuticals and biomaterials, and apply the tools of biotechnology to restore and monitor the marine environment.

Biotechnology

In 1990, leading scientists predicted that the application of the modern tools of biotechnology and molecular and cellular biology to marine organisms and ecosystems would create a revolution in the ocean sciences that would be fundamental in nature, exponential in pace, and unprecedented in its scientific and economic impacts. In the decade that has followed this prediction, stunning results have been reported as the tools of marine biotechnology have been applied to solve problems in the areas of public health and human disease, seafood safety and supply, new materials and processes, and marine ecosystem restoration and remediation.

Many classes of marine organisms demonstrate a wide variety of compounds with unique structural features that suggest medicinal, agricultural, and industrial applications. However, even though 80% of all life forms on Earth are present only in the oceans, their enormous potential as the basis for new products remains largely unexplored. The U.S. government has traditionally invested less than 1% of its total biotechnology research and development budget in marine biotechnology. Productive new avenues for the commercial development of marine-derived compounds will enhance the use of aquatic resources and contribute to the global economy.

Ongoing Concerns

- There may exist potential risks related to the release of genetically altered species within the marine environment.
- Current technology is inadequate both to access remote marine biotechnology sites and to commercially develop marine biotechnology products.
- A lack of information about baseline conditions of the marine environment makes it difficult to assess the environmental impacts of biotechnology.
- There is no mechanism currently in place to ensure that profits derived from publicly owned resources will be shared with the public and used appropriately.

Recommendations

- ○ Increase support for sustainable harvesting and testing of marine compounds by both government agencies and commercial pharmaceutical companies as possible treatments for AIDS, inflammatory or infectious diseases, and cancers.
- ○ Assess the potential risks of genetically modified marine organisms to human health, marine diversity, and the environment, and communicate any concerns to the public.
- ○ Develop investment incentives to encourage partnerships with academia and industry in marine biotechnology.
- ○ Support research on the environmental effects of extracting marine organisms for biotechnology purposes.
- ○ Support the application to marine sciences of modern biotechnology tools commonly used in the biomedical arena.
- ○ Develop technologies to access and develop marine biotechnology sites, such as remote and manned submersibles, and techniques to screen products and commercially reproduce chemical compounds without requiring more raw material.
- ○ Focus on organisms found in extreme environments to identify unique products with high commercial potential.
- ○ Consider establishing a federal marine environment fund to benefit from royalties and payments from commercial uses of federally owned resources.

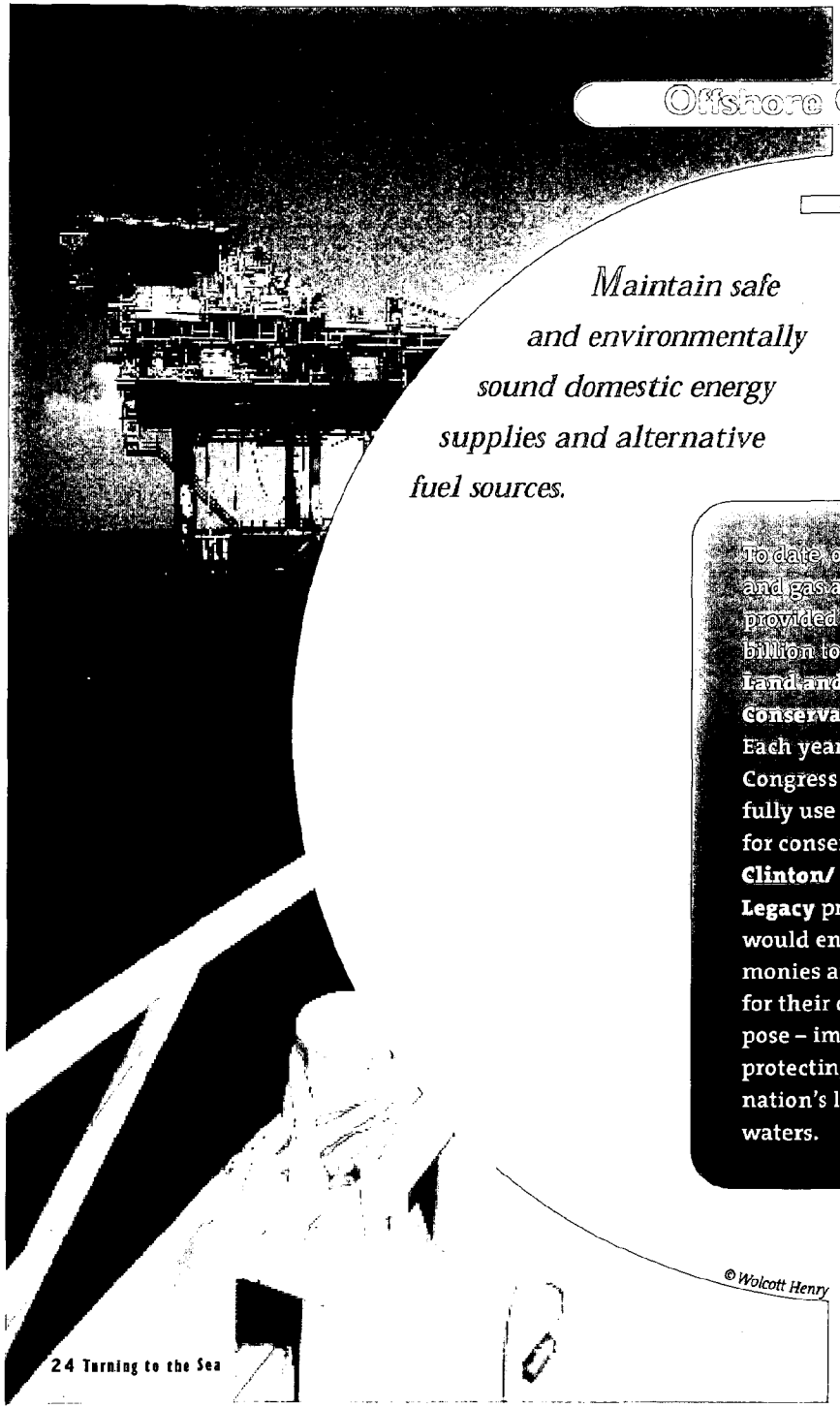
Dozens of promising sea-based products are being developed, including a cancer therapy made from algae and a painkiller taken from snails. Other products, such as an anti-inflammatory drug extracted from an organism called the Caribbean sea whip, are under review by the U.S. Food and Drug Administration.

http://www.fda.gov/fdac/features/1998/198_deep.html

For more information

- □ http://www.imb.nrc.ca/imb/imb.html
- □ http://www.nsgo.seagrant.org
- □ http://www.umbi.umd.umd.edu/
- □ http://www.biotech.wisc.edu
- □ http://www.eng.nsf.gov/bes/default.htm
- □ http://www.geo.nsf.gov/oce/biotheme.htm#tech
- □ http://www.nucb.org/

Gray's Reef National Marine Sanctuary



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Offshore Oil and Gas

Maintain safe and environmentally sound domestic energy supplies and alternative fuel sources.

The outer continental shelf contains significant oil and gas resources that are vital to our domestic energy supplies and national security needs, contributing 22% of domestic oil and 27% of natural gas production. Natural gas reserves in the outer continental shelf are particularly important because natural gas has major environmental benefits over other fossil fuels. Cleaner burning, it is increasingly being used in the conversion of electrical power-generating stations from oil- or coal-fired facilities.

The federal share of offshore oil and gas revenues averages about $4 billion a year. Much of the existing leasing and development occurs in the central and western Gulf of Mexico. In recent years, the rapid development of deep-water technology has led to a strong move by industry to both lease and operate in ever-deeper waters. Over 4,000 platforms are operating in waters up to 3,900 feet deep, and over 30 rigs are drilling in water deeper than 1,000 feet, including one deeper than 7,700 feet. By the end of 2000, production from Gulf deep-water fields is expected to account for one-half of the total Gulf of Mexico outer continental shelf oil production and one-third of the total outer continental shelf gas production.

Advances in technology have made offshore oil and gas production cleaner and safer than ever. Since 1980, 6.9 billion barrels of outer continental shelf oil have been produced with a spillage rate of less than 0.001%. Despite these advances, however, environmental concerns have led to congressional and executive moratoria since 1981, and many of our coastal areas are now closed to new leasing through the year 2012. In addition, new leases are permanently banned in National Marine Sanctuaries.

Many coastal states and communities object to oil and gas development off their coastlines. One way that coastal states and the public can par-

To date, offshore oil and gas activity has provided over $19.7 billion to the nation's **Land and Water Conservation Fund.** Each year, however, Congress does not fully use these funds for conservation. The **Clinton/ Gore Lands Legacy** proposal would ensure that the monies are spent only for their original purpose – improving and protecting our nation's lands and waters.

ticipate in decisions on federally regulated offshore activity is through the coastal zone consistency process, which allows them to review and comment on proposed projects or permits that may affect state coastal management programs. Federal actions likely to affect any land/water use or other natural resources in the coastal zone must be consistent with the states' enforceable policies.

Ongoing Concerns

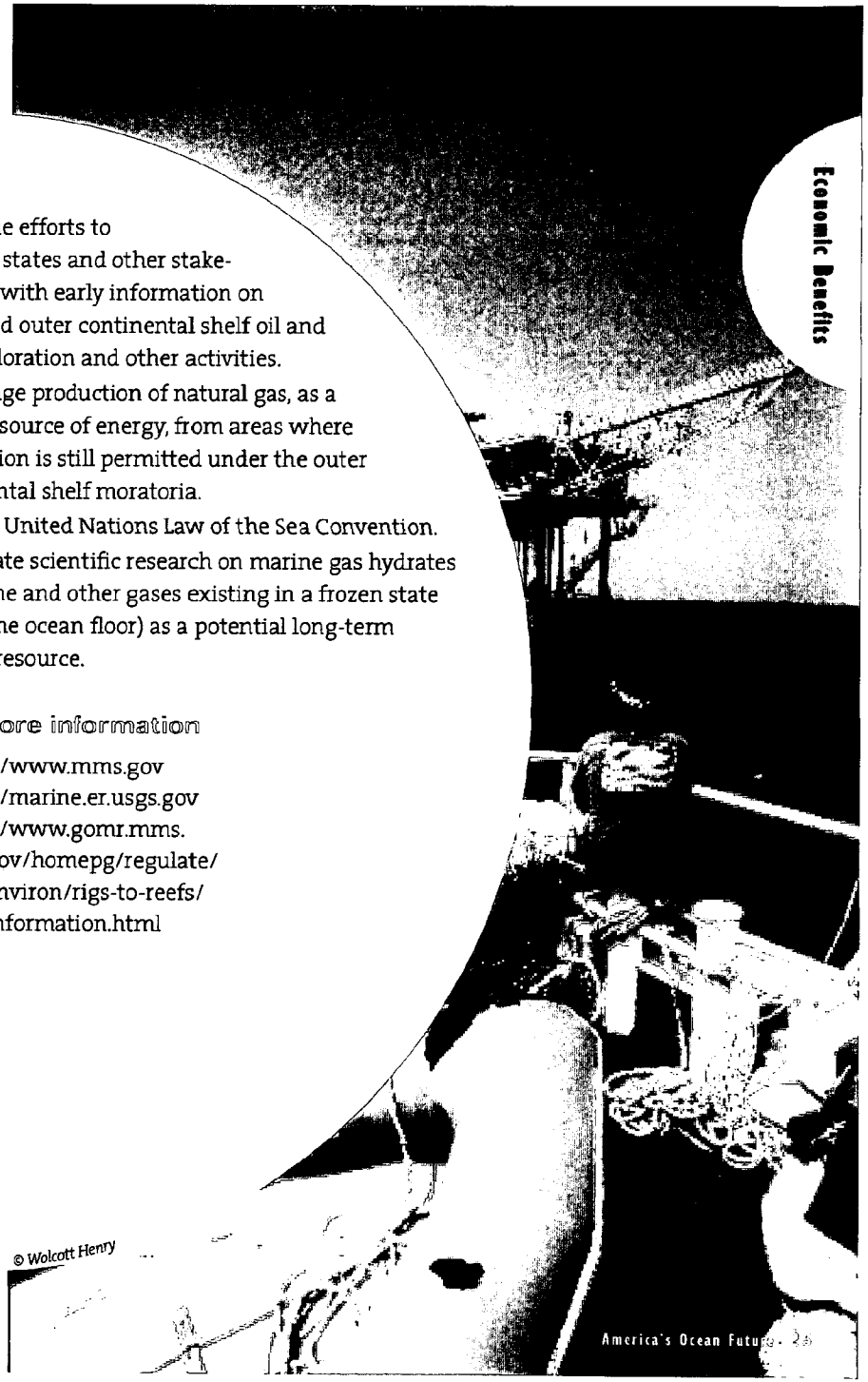
- Multiple-use conflicts can arise between outer continental shelf oil and gas activities and other ocean-based activities, such as commercial and sport fishing, tourism and recreation, vessel traffic, military operations, and marine protected areas.
- While outer continental shelf oil and gas development brings employment and revenue to coastal states and communities, it also may result in accelerated coastal development with its attendant problems, including additional demands on infrastructure and the environment.
- Uncertain outer continental shelf boundaries may lead to disputes with other coastal nations regarding ownership of certain oil and gas reserves unless the U.S. joins the United Nations Convention on the Law of the Sea.

Recommendations

- Increase research on methods and technology to minimize risks to human safety and to coastal and ocean environments.
- Through meetings, workshops, and negotiation, work with all stakeholders to ensure environmentally sound and safe outer continental shelf energy extraction.
- Continue efforts to provide states and other stakeholders with early information on proposed outer continental shelf oil and gas exploration and other activities.
- Encourage production of natural gas, as a cleaner source of energy, from areas where production is still permitted under the outer continental shelf moratoria.
- Join the United Nations Law of the Sea Convention.
- Accelerate scientific research on marine gas hydrates (methane and other gases existing in a frozen state below the ocean floor) as a potential long-term energy resource.

For more information

- http://www.mms.gov
- http://marine.er.usgs.gov
- http://www.gomr.mms.gov/homepg/regulate/environ/rigs-to-reefs/information.html

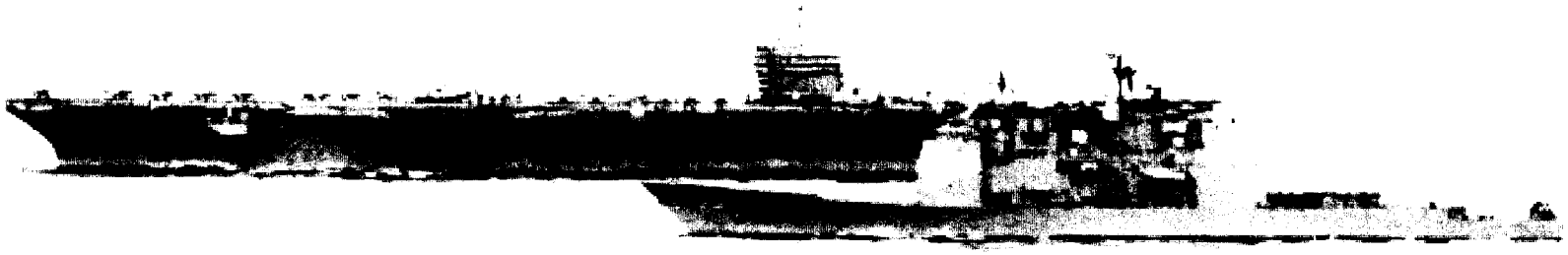


"Our naval service is no longer predominately an insurance policy for war, but an essential and complex tool for shaping the environment, reacting to crisis, preserving the peace, and building partnerships and coalitions that enhance stability and peace on a global level."

Admiral Jon Fitzig, Vice Chief of Naval Operations

Strengthening Global Security

Freedom of the seas is integral to the strength and security of our nation.



The Law of the Sea Convention

Preserve strong U.S. influence and leadership in global ocean affairs, and encourage international adherence to concepts that support U.S. interests.

The United Nations Convention on the Law of the Sea provides a comprehensive international legal framework governing the world's oceans. Currently, 131 nations are party to the Convention, including all of the major maritime powers (except the U.S.), most of our key allies, and many important nonaligned states. The Convention supports the full range of U.S. interests in ocean activities, law, and policy. It preserves our rights of military mobility in the world's ocean and coastal waters; ensures free movement of global maritime commerce; secures our national jurisdiction over living and nonliving resources off our shores; clarifies our high-seas freedoms for laying cables to support communications; establishes an internationally agreed-upon framework for national efforts in maritime law enforcement, marine environmental protection, and marine scientific research; and creates a framework for settling international disputes.

In the late 1980s, there was widespread agreement among the industrialized nations that the Convention's deep-seabed mining regime required basic changes. Recognizing that the Convention would soon enter into force without the U.S. and other major western powers as parties, the Secretary General convened informal negotiations aimed at amending Part XI of the Convention. These negotiations concluded in 1994 with an Implementing Agreement that amends the formerly flawed Part XI and meets all of the specific objections previously expressed by the U.S. and other industrialized nations to the Convention's deep-seabed mining provisions. All sectors of the U.S. ocean community represented at the National Ocean Conference affirmed their support of the Convention, and the President, in his June 12, 1998, keynote speech at the Conference, reasserted that accession to the Convention and ratification of the Implementing Agreement is a high-priority objective of U.S. ocean policy.

Ongoing Concerns

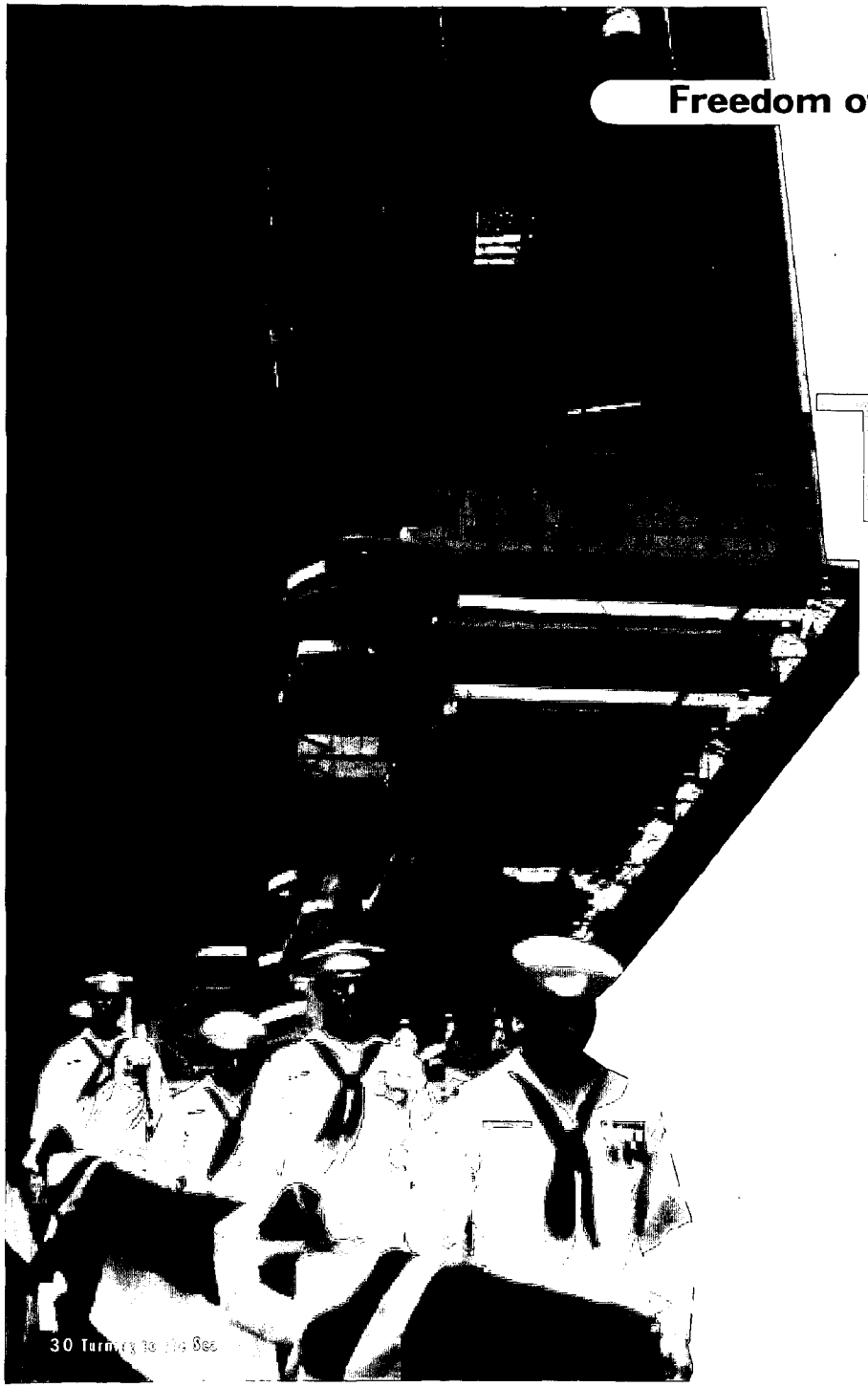
- Though the Law of the Sea Convention and its reforming agreement have been placed in the highest priority category of agreements requiring Senate action, the Senate Foreign Relations Committee has not scheduled hearings. Thus, the Senate has been unable to review the Convention and support the U.S. becoming a party to it.
- The U.S. position as a nonparty to the Law of the Sea Convention is increasingly undercutting U.S. influence over other nations' implementation and adherence to the provisions that support our interests. Examples of excessive maritime claims that are counter to U.S. interests are extended boundary claims that could affect U.S. access to offshore resources, and requirements for coastal state permission to transit through territorial seas or international straits.
- The U.S. position as a nonparty often slows or complicates approval for U.S. ship and aircraft access to conduct marine scientific research in foreign jurisdictional waters.
- The U.S. cannot nominate judges for the Law of the Sea Tribunal, optimize U.S. influence on maritime dispute resolution, or participate fully in the International Seabed Authority.
- The U.S. is at risk of losing its influence and leadership position in critical international fora for dealing with the oceans, such as the International Maritime Organization. U.S. proposals for maritime safety and environmental protection guidelines are increasingly met with open skepticism because of the U.S. position as a nonparty to the Law of the Sea Convention.

Recommendation

- The President, the Vice President, and the Cabinet should continue to work with the Senate – and particularly the Senate Foreign Relations Committee – to ensure that the U.S. joins the Law of the Sea Convention as soon as possible.

For more information

- http://www.state.gov/www/global/oes/oceans/index.html#law



Freedom of Navigation

Maintain U.S. national and economic security and leadership in promoting global stability and preserving global navigational freedoms.

The U.S. has always recognized and defended the traditional freedoms of navigation and overflight on and over the world's oceans for military and commercial purposes. Internationally agreed-upon freedoms of navigation – key to our ability to import raw materials and export finished products to global markets – are essential to our economic security. Freedom of navigation is also essential for national security, enabling the worldwide movement of U.S. military forces and the sealift and airlift needed for their support.

The complex global political/military environment of the post-Cold War era puts a premium on forces that can move quickly anywhere in the world's oceans, including through more than 250 international straits, to provide military presence for diplomatic purposes without infringing on any nation's sovereignty, to project power from the sea, to enforce United Nations sanctions, or to conduct humanitarian operations. In the past decade, there have been twelve U.S. and coalition military operations that were critically dependent on internationally recognized transit rights and high-seas freedoms of navigation. Forward presence of ocean-based military assets supports U.S. intelligence, surveillance, and reconnaissance activities, providing a better understanding of developing international tensions and potential threats, deterring hostilities, and promoting global stability and security.

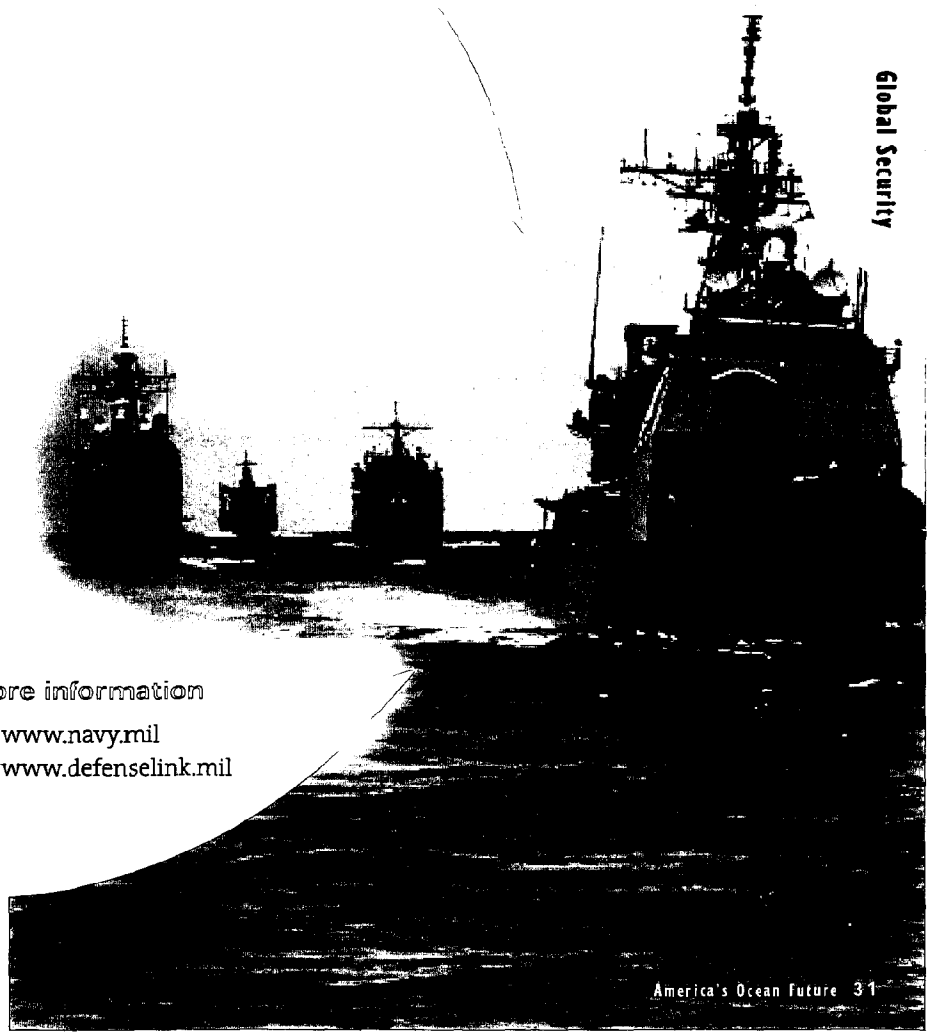
The customary international freedoms of navigation that are critical to economic, national, and international security are codified in the Law of the Sea Convention. Continued exercise of our navigational rights and freedoms is essential to the future strength of our nation and to global stability.

Ongoing Concerns

- Continued failure to join the Law of the Sea Convention could diminish U.S. influence and leadership in international ocean affairs and undercut our ability to resist excessive maritime claims worldwide.
- Failure to conduct our domestic ocean affairs and global operations consistent with the Convention could restrict U.S. navigational rights and freedoms critical to our economic and national security.
- Many nations make maritime claims and other proposals – such as military exclusion zones or nuclear-free zones – that could have the effect of limiting or denying U.S. military and commercial ship mobility in critical areas of the world's oceans.
- Domestic and international ocean initiatives and the U.S. military's ability to test, train, exercise, and operate in the marine environment have the potential to conflict.

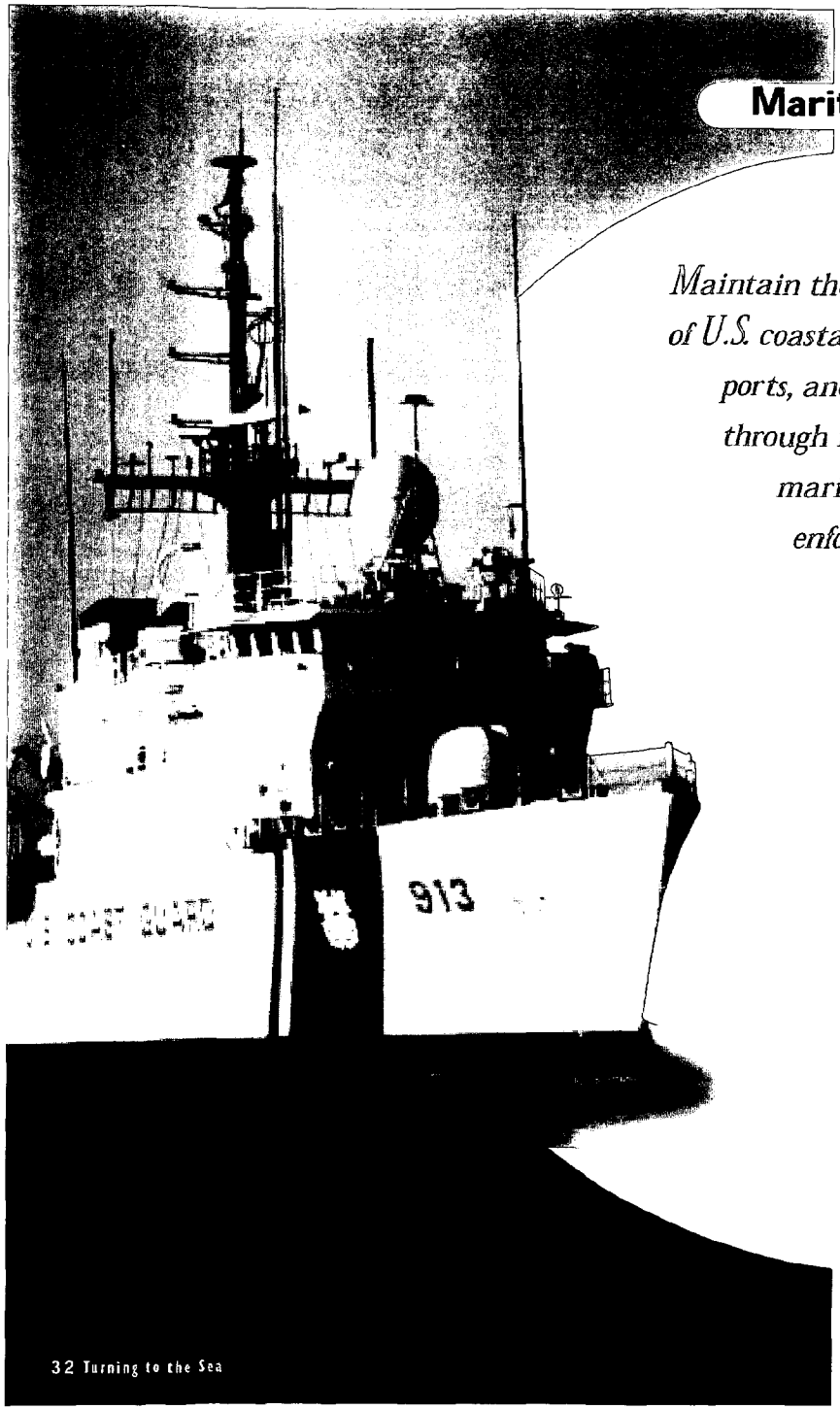
Recommendations

- The President, the Vice President, and the Cabinet should continue to work with the Senate – and particularly the Senate Foreign Relations Committee – to have the U.S. join the Law of the Sea Convention.
- Expand the U.S. freedom of navigation program using Navy, Coast Guard, and other national assets to exercise openly the traditional freedoms of navigation and overflight in areas of unacceptable claims.
- Work within an interagency structure to coordinate initiatives to maintain freedom of navigation and national security.



For more information

- http://www.navy.mil
- http://www.defenselink.mil



Maritime Law Enforcement

Maintain the security of U.S. coastal borders, ports, and harbors through improved maritime law enforcement.

The U.S. is a world leader in the enforcement of laws concerning drug and illegal immigrant smuggling, customs regulations, harvesting of living marine resources in our Exclusive Economic Zone, and marine safety and environmental protection. International maritime criminal activities pose clear threats to our borders, our economy, our environment, and our national security and require strong offshore law enforcement. Additionally, the post-Cold War era has brought emerging threats, such as terrorism, arms trafficking, evasion of international trade sanctions, and piracy, each with potential maritime components. Critical U.S. ports and waterways infrastructure, commercial carriers moving U.S. military cargo, and large numbers of U.S. citizens aboard cruise ships may be at risk.

The marine transportation system is especially vulnerable to illegal and terrorist activities because its scale, complexity, and pace of activity often overwhelm local, state, and federal detection and enforcement capabilities and private-sector protective measures. Increased cooperation with our international partners is needed to disrupt illegal activity before contraband is loaded onto vessels destined for the United States. Enforcement efforts must also take full advantage of maritime transportation choke points and challenge suspect vessels before they reach U.S. ports. As governments remove barriers to trade and travel, U.S. officials need more information on the cross-border flow of people and goods and on other maritime activities to better identify criminal and other illegal actions.

Ongoing Concerns

- International criminal and terrorist threats are constantly changing and adapting to current law enforcement capabilities. Today's communications and integrated intelligence systems lack the

sophistication to support real-time monitoring of vessels, people, and cargo movements.

- ○ High-level awareness of the emerging threats to the marine transportation system is required, along with the interservice, interagency, and international coordination needed to address them.
- ○ The U.S. currently claims a 12-nautical-mile contiguous zone, yet customary international law, as reflected in the United Nations Convention on the Law of the Sea, allows states to claim a 24-nautical-mile contiguous zone.

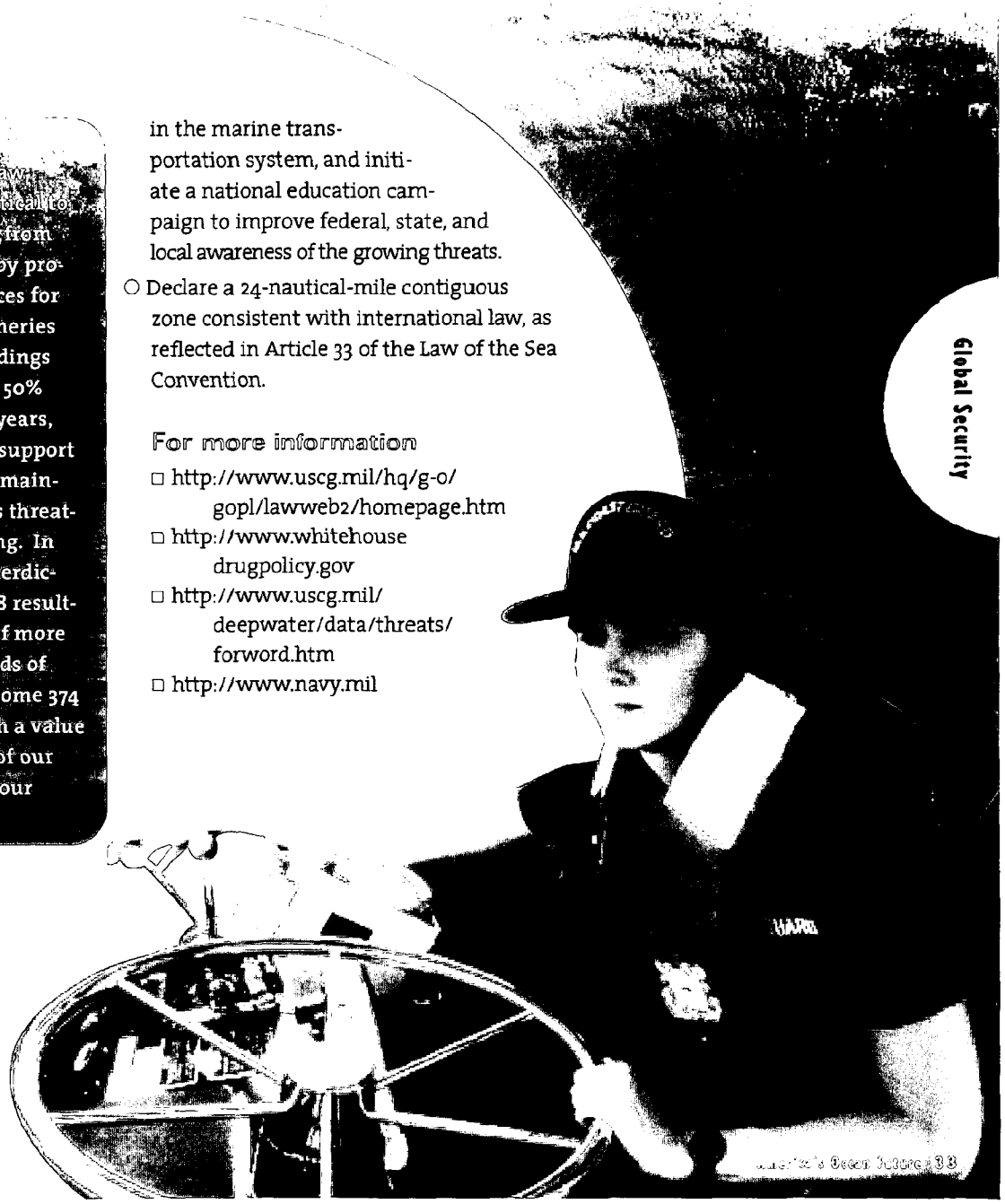
Strong maritime law enforcement is critical to discourage people from violating the law by providing consequences for those who do. Fisheries enforcement boardings have increased by 50% over the last four years, providing critical support to rebuilding and maintaining fish stocks threatened by overfishing. In addition, drug interdiction efforts in 1998 resulted in the seizure of more than 80,000 pounds of cocaine, keeping some 374 million "hits" with a value of $2.9 billion off of our streets and out of our schools.

Recommendations

- ○ Improve cooperation at the interagency, interservice, and international levels to address threats to our maritime interests, including collecting and sharing key information, and developing and integrating real-time intelligence systems for tracking cargo, personnel, and commercial vessel operations.
- ○ Improve U.S. capability to conduct surveillance, detection, identification, classification, and interdiction of maritime threats before they reach U.S. coasts and harbors.
- ○ Acknowledge the low level of current security awareness in the marine transportation system, and initiate a national education campaign to improve federal, state, and local awareness of the growing threats.
- ○ Declare a 24-nautical-mile contiguous zone consistent with international law, as reflected in Article 33 of the Law of the Sea Convention.

For more information

- □ http://www.uscg.mil/hq/g-o/gopl/lawweb2/homepage.htm
- □ http://www.whitehousedrugpolicy.gov
- □ http://www.uscg.mil/deepwater/data/threats/forword.htm
- □ http://www.navy.mil

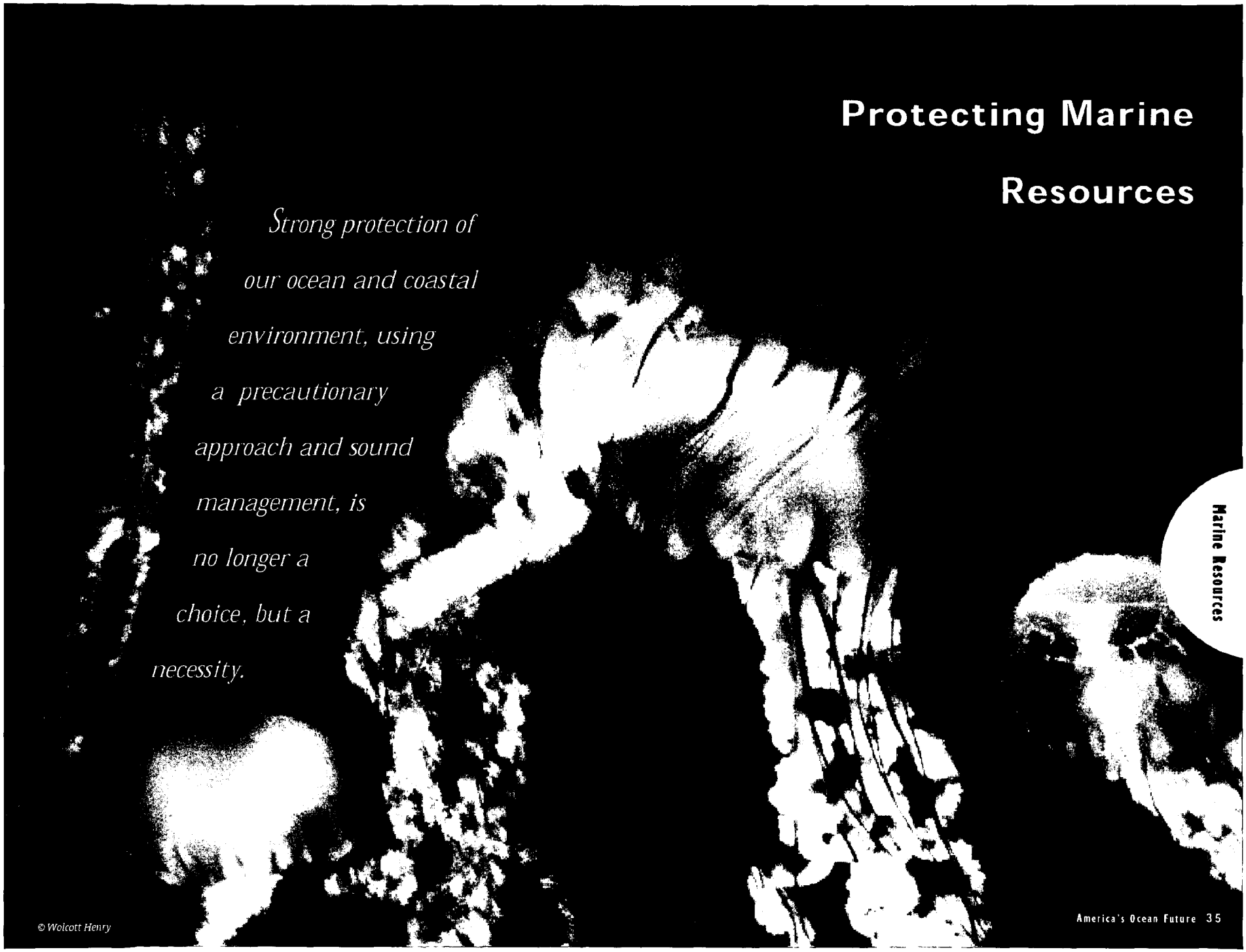


"There is a window in time, and that is now, when we could forever lose a priceless ocean heritage, or we could develop the foundation for an enduring legacy – an ocean ethic – an inspired gift from the 20th century to all who follow us."

— *Dr. Sylvia Earle*

Protecting Marine Resources

Strong protection of our ocean and coastal environment, using a precautionary approach and sound management, is no longer a choice, but a necessity.



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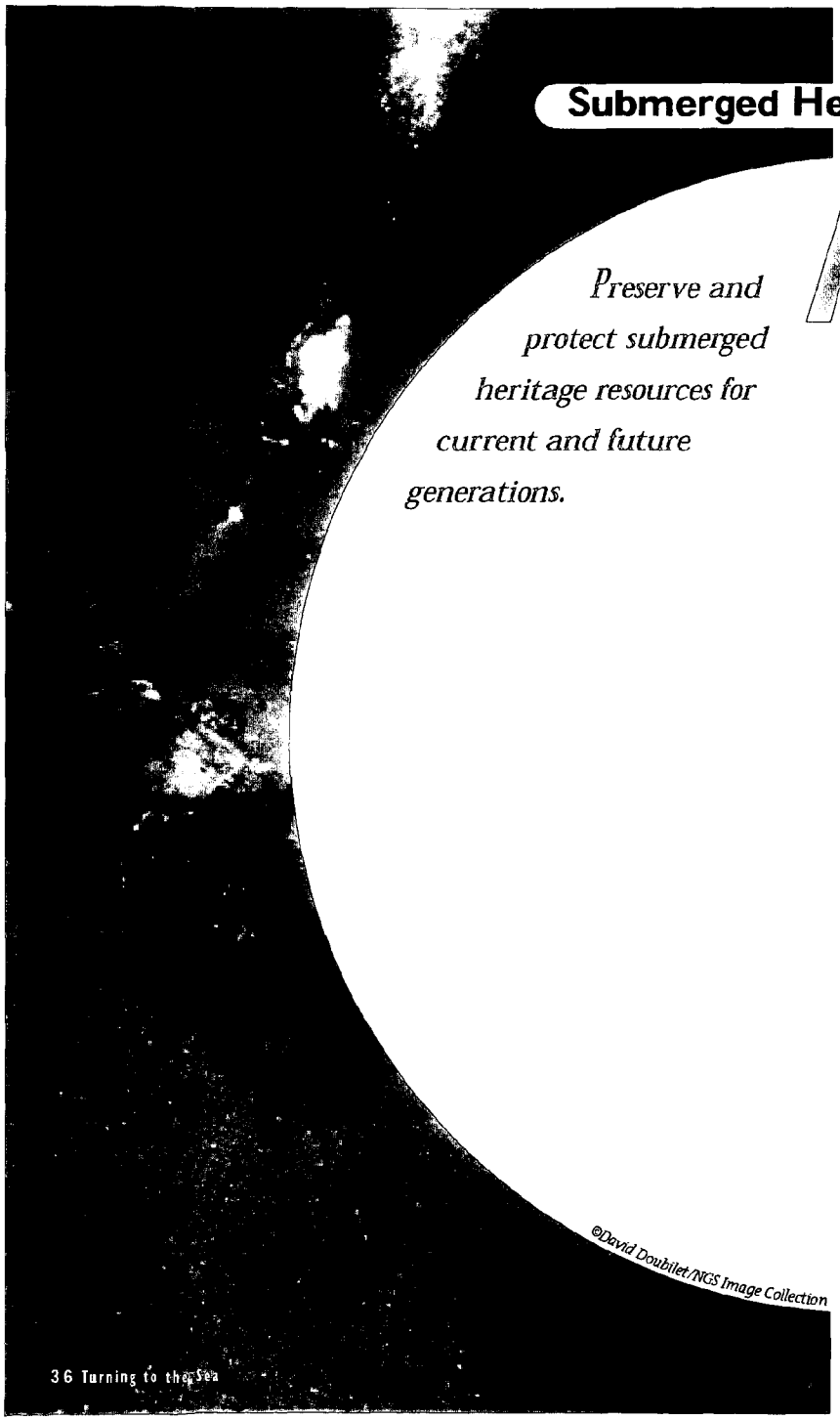
Submerged Heritage Resources

Preserve and protect submerged heritage resources for current and future generations.



©David Doubilet/NGS Image Collection

An estimated 50,000 shipwrecks, including the ironclad civil war vessel, the *U.S.S. Monitor*, are scattered throughout the U.S. territorial sea and the Exclusive Economic Zone. These shipwrecks and other sunken artifacts are time capsules of the world's history. Until the advent of scuba diving equipment and other technological developments in the 1950s, submerged heritage resources were largely undisturbed by humans. Advances in deep-sea technology have created unprecedented opportunities for discovering, researching, accessing, and preserving resources, and for educating the public about the history, people, and cultures associated with these unique and irreplaceable sites.

Unfortunately, new capabilities make these sites highly vulnerable to exploitation and destruction by treasure hunters and souvenir collectors, resulting in their loss and destruction. Even submerged heritage resources in state waters, which were to be protected from treasure hunting under the Abandoned Shipwreck Act, are still subject to commercial exploitation. Special care must be taken to preserve and protect these precious resources for scientific study and public interpretation and appreciation. Special care must also be taken to respect human remains, including tribal sites.

Ongoing Concerns

- Submerged heritage resources are often treated as commodities for private financial gain, rather than managed as public scientific resources in need of protection under laws based on historic preservation and environmental protection.
- In certain situations, submerged heritage resources cannot be removed from the marine environment without risk of harm to natural and cultural resources.
- Submerged heritage resources include diverse prehistoric and historic sites. The interests of tribes in such resources are often overlooked.
- The extent of damage caused to the environment by reckless recovery activities is unknown.

- While protections exist in many state waters and in federal marine protected areas, submerged heritage resources are exploited and destroyed outside of these areas.
- Certain sunken vessels and aircraft may be dangerous (e.g., contain unexploded ordnance), or should not be disturbed out of respect for the crew members who died on board. There may also be national security reasons why a sunken vessel or aircraft should not be disturbed.
- States do not always preserve submerged heritage resources, and states that want to do so are often unable to because of the historical law of salvage and finds.

Recommendations

- Enact federal legislation that will: prohibit the destruction and loss of submerged heritage resources; punish those who injure or destroy these and associated natural resources; provide for appropriate public access; develop a research and recovery permitting process; require adherence to scientific standards; provide for the conservation and disposition of recovered materials in qualified repositories; ensure sensitive treatment of any human remains; and protect sovereign immune vessels and aircraft that have not been expressly abandoned.
- Clarify, through legislation, the meaning of "abandoned" in the Abandoned Shipwreck Act so that states can better preserve submerged heritage resources.
- Support cooperation and collaboration with tribes, states, and communities on ways to protect submerged heritage resources, including legal regimes, consistent guidelines and procedures for evaluating best preservation and recovery plans, exploration and monitoring programs, and efforts to educate the public about the value and fragility of these resources.

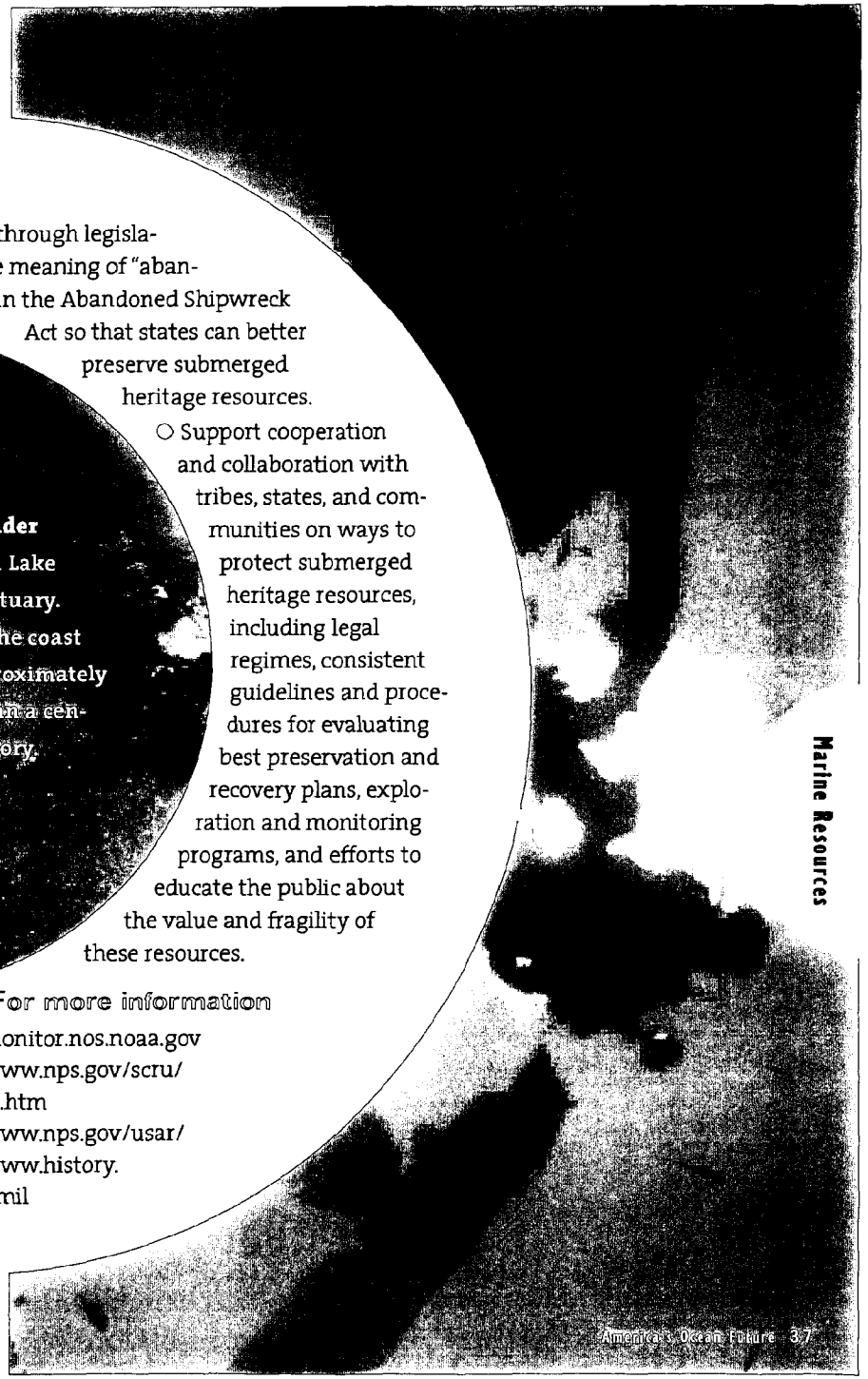
The federal government is proposing to designate Thunder Bay and surrounding waters on Lake Huron as a National Marine Sanctuary. The proposed sanctuary area, off the coast of Alpena, Michigan, contains approximately 160 shipwrecks that span more than a century of Great Lakes maritime history.

http://glerl.noaa.gov/glsr/thunderbay

©David Doubilet/NGS Image Collection

For more information

- http://monitor.nos.noaa.gov
- http://www.nps.gov/scru/home.htm
- http://www.nps.gov/usar/
- http://www.history.navy.mil



Coral Reefs

Protect and sustain the biodiversity, health, heritage, and ecological, social, and economic values of coral reef ecosystems.

Our nation's coral reefs cover approximately 17,000 square kilometers. Ninety percent of them are associated with U.S. islands in the Western Pacific (Hawaii, Guam, American Samoa, and the Commonwealth of the Northern Marianas); the remainder are located off Florida, Georgia, Texas, and U.S. islands in the Caribbean. These coral reefs support thousands of jobs and billions of dollars in annual revenues from tourism, recreation, and fishing; are valuable sources of new medicines and biochemicals; help prevent shoreline erosion; and provide life-saving protection from storms.

Despite their unique value, coral reefs in the U.S. and around the world are quickly being destroyed by a powerful combination of stresses, such as polluted runoff, sedimentation, unsustainable fishing practices, collection and trade in reef species, groundings and other damage caused by commercial and recreational vessel traffic, diseases, marine debris, and climate change. During the past two years, unprecedented levels of coral bleaching and mortality associated with abnormally high sea temperatures and other factors have occurred. As a result, approximately 60% of the world's coral reefs are at medium or high risk from human impacts, and many have been degraded beyond recovery.

As part of the National Ocean Conference in June 1998, President Clinton signed the Coral Reef Protection Executive Order (13089) to preserve and protect the biodiversity, health, heritage, and ecological, social, and economic values of U.S. coral reef ecosystems and the marine environment. To fulfill its protection efforts, the Order also created the interagency U.S. Coral Reef Task Force. Additional efforts are now required to effectively protect, restore, and sustainably use valuable U.S. coral reef ecosystems for current and future generations.

Ongoing Concerns

- The U.S. has not yet developed a coordinated national strategy to protect and restore coral reef ecosystems from the effects of human activities and natural stressors.

- The U.S. lacks a comprehensive mapping or monitoring program to assess or track the condition of U.S. coral reefs.
- Financial and technical resources are inadequate to help states, territories, communities, and other nations sustainably manage their coral reefs.
- As the world's largest importer of coral reef species, the U.S. may be driving the unsustainable use of coral reefs in other nations.

Recommendations

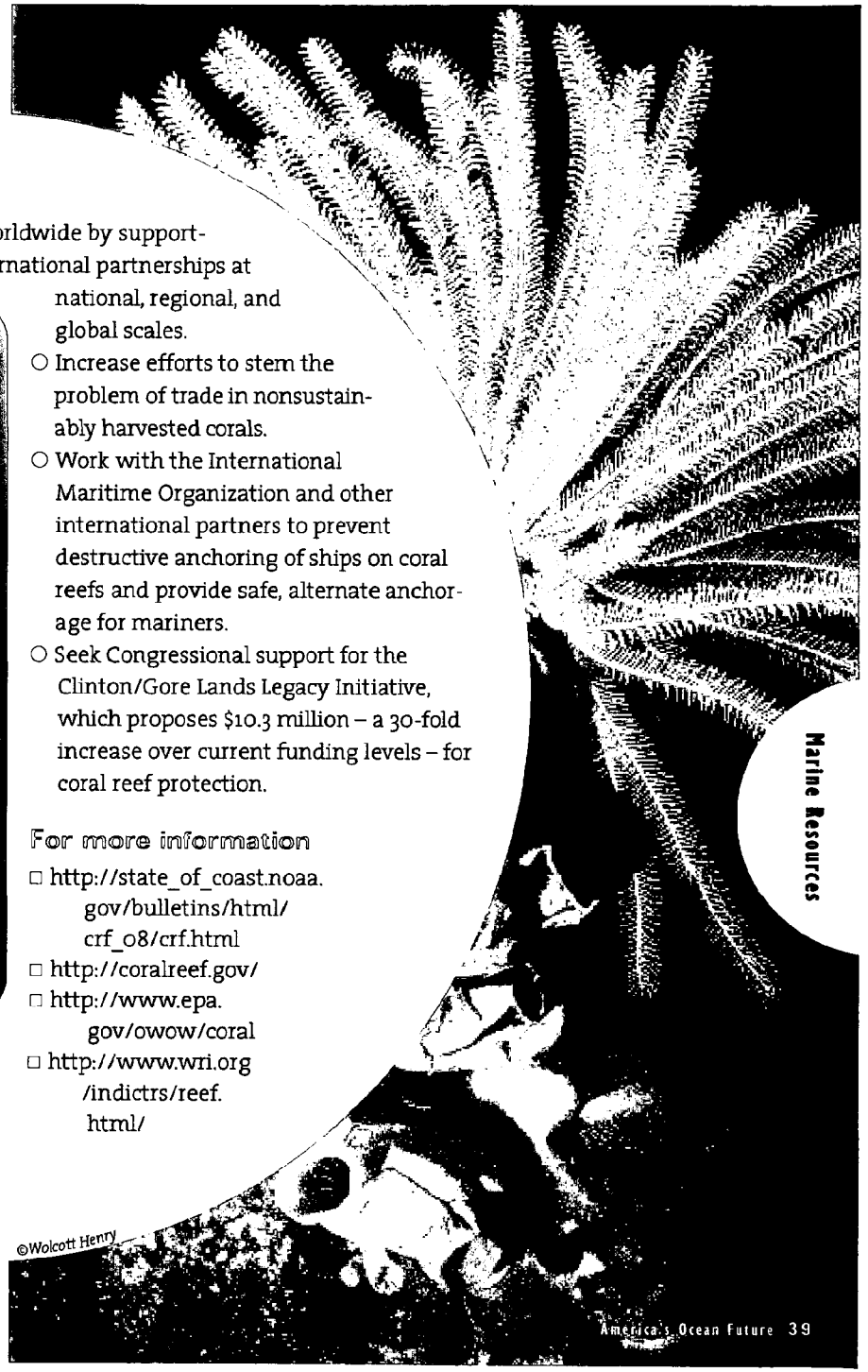
- Implement Executive Order 13089 as quickly as possible through joint efforts of federal, state, and local agencies; nongovernmental partners; and other nations as needed.
- Implement priority actions of the U.S. Coral Reef Task Force, including the commitment to prevent federal agency degradation of reefs consistent with Executive Order 13089.
- Increase research efforts to understand the causality behind the current worldwide decline of coral reefs and how it relates to disease, temperature change, and pollution.
- Assist in the design and implementation of local and regional reef management plans that integrate protected areas and fishery management with coastal zone and marine management planning efforts, and increase support for local actions.
- Increase monitoring, protection, and sustainable use of coral reefs worldwide by supporting international partnerships at national, regional, and global scales.
- Increase efforts to stem the problem of trade in nonsustainably harvested corals.
- Work with the International Maritime Organization and other international partners to prevent destructive anchoring of ships on coral reefs and provide safe, alternate anchorage for mariners.
- Seek Congressional support for the Clinton/Gore Lands Legacy Initiative, which proposes $10.3 million – a 30-fold increase over current funding levels – for coral reef protection.

Every year, thousands of volunteers collect vital information on the health of the nation's coral reefs, helping federal, state, and nongovernmental organizations monitor and manage these valuable resources. For example, the **Reef Ecosystem Condition Project** (ReCon) is training volunteer divers to collect important data on the temperature, salinity, and visibility of coral reef waters. And, in 1997-98, **Reef Check** used volunteer divers to survey over 300 reefs in over 30 countries.

http://www.ReefCheck.org/
http:www.cmc-ocean.org/pressrelease.html

For more information

- http://state_of_coast.noaa.gov/bulletins/html/crf_08/crf.html
- http://coralreef.gov/
- http://www.epa.gov/owow/coral
- http://www.wri.org/indictrs/reef.html/

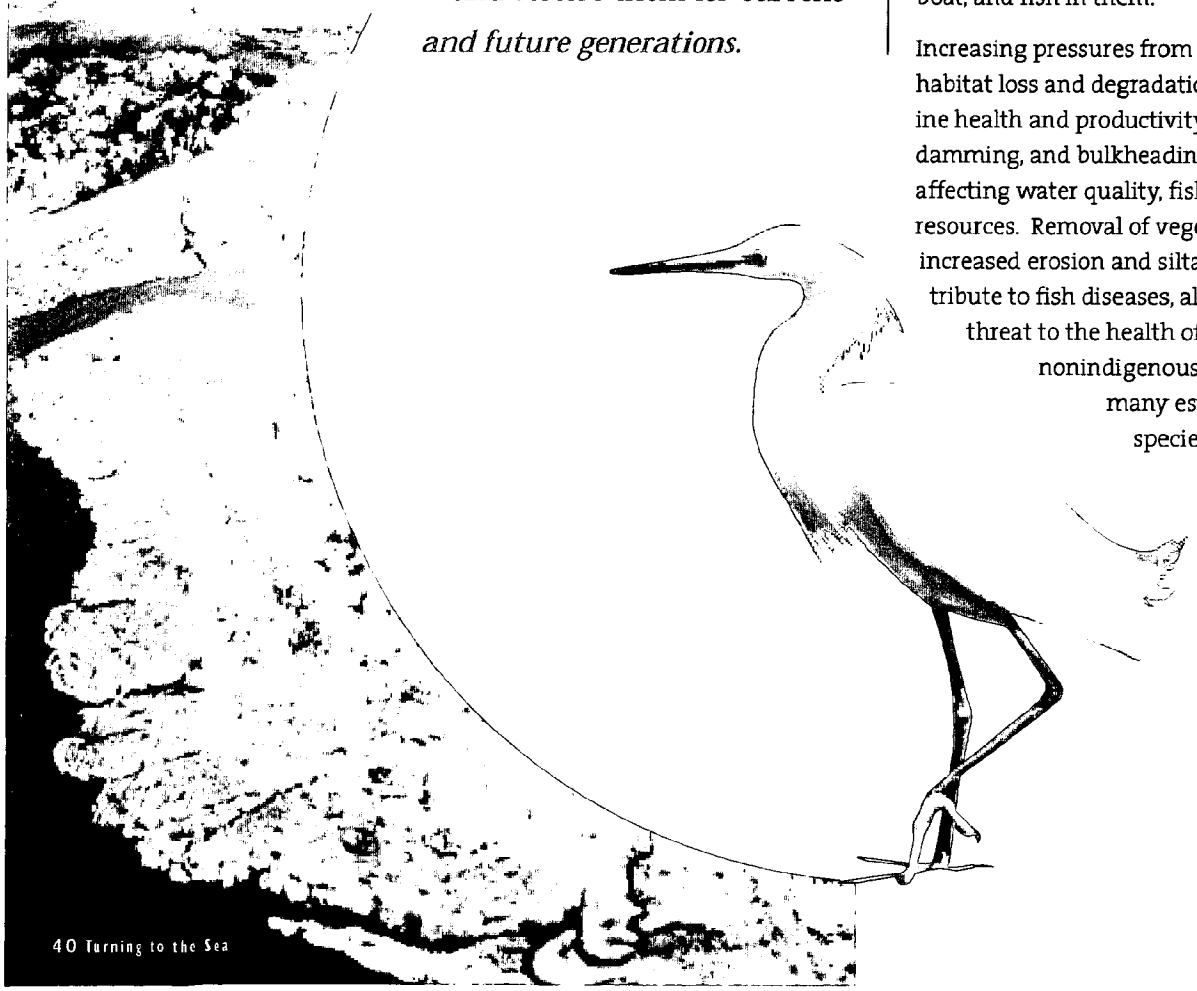


Estuaries

Recognize the value of our nation's estuaries, and protect and restore them for current and future generations.

Estuaries, where fresh water from rivers mixes with salt water from the oceans, are among the most productive environments on Earth. These transition zones from land to sea provide unique habitat for more than 75% of the U.S. commercial and 85% of the U.S. recreational fisheries. Estuaries are also popular places to live, work, and enjoy outdoor activities. More than 28 million jobs in the U.S. are created in association with estuaries, and more than 70% of Americans swim, boat, and fish in them.

Increasing pressures from inland activities and coastal development are causing habitat loss and degradation, fisheries declines, and overall reductions in estuarine health and productivity. Associated physical alterations, such as dredging, damming, and bulkheading, change the natural flow of fresh water to estuaries, affecting water quality, fish spawning, and the survival and distribution of living resources. Removal of vegetation can also affect water quality by causing increased erosion and siltation. Toxic substances and excess nutrients contribute to fish diseases, algal blooms, and low dissolved oxygen and can pose a threat to the health of humans and estuarine wildlife. The introduction of nonindigenous species is also affecting the ecological diversity of many estuarine environments, eradicating naturally occurring species and destroying essential habitat.



Ongoing Concerns

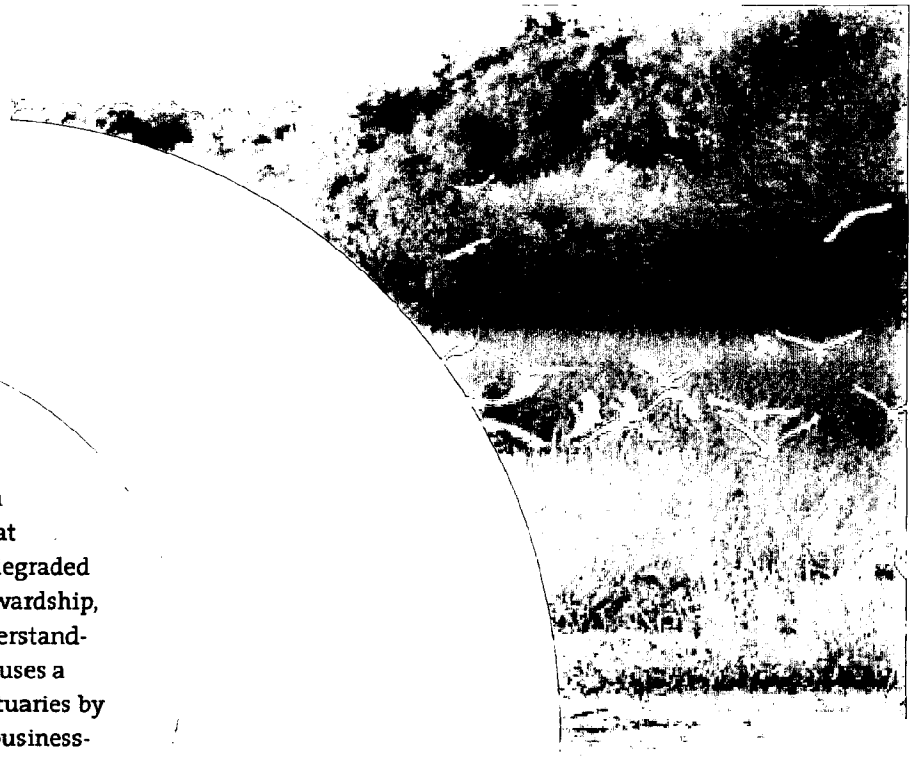
- Federal activities that affect estuaries are not always well integrated.
- Monitoring efforts in estuaries are often fragmented and not incorporated into overall monitoring data and analysis, hindering the ability of managers to evaluate and modify the effectiveness of their programs.

- Information on estuaries is often collected without reference to overall national research goals, or without the technological means to share and combine the data with other research efforts.
- Many people living inland and at a distance from the coast are unaware of how their actions affect estuaries.

Recommendations

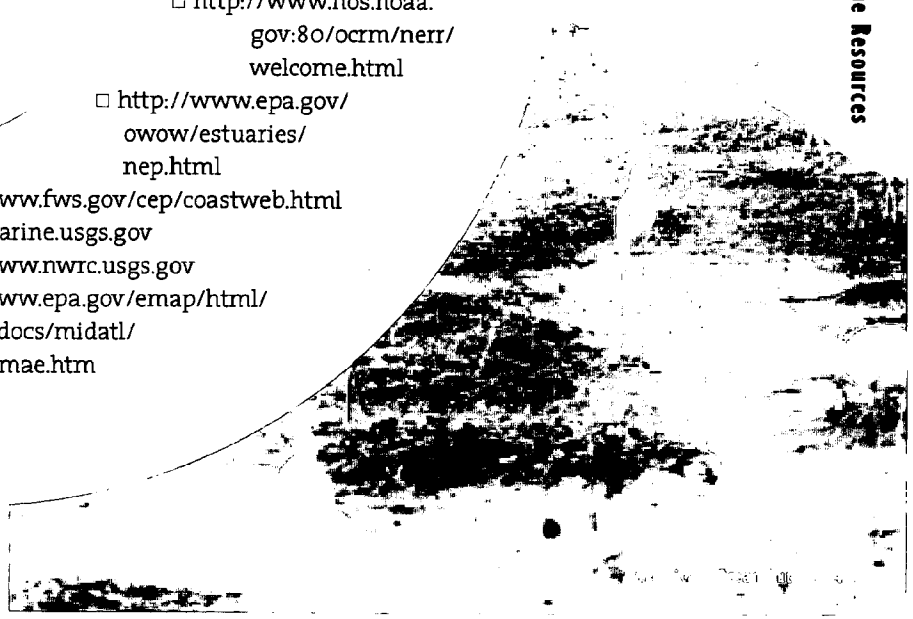
- Improve communication and coordination among the various federal agencies and programs sharing responsibility for estuarine protection.
- Coordinate federal programs with tribal, state, and local "smart growth" initiatives to more efficiently implement on-the-ground solutions.
- Improve estuarine monitoring activities and data reporting to facilitate an "adaptive management" process.
- Create a national framework for estuarine research.
- Increase public understanding of the connections between human activities and estuarine health through improved education and outreach.
- Seek Congressional support for the Clinton/Gore Lands Legacy Initiative, which would provide essential funding for the National Estuarine Research Reserve System and the National Estuary Program.

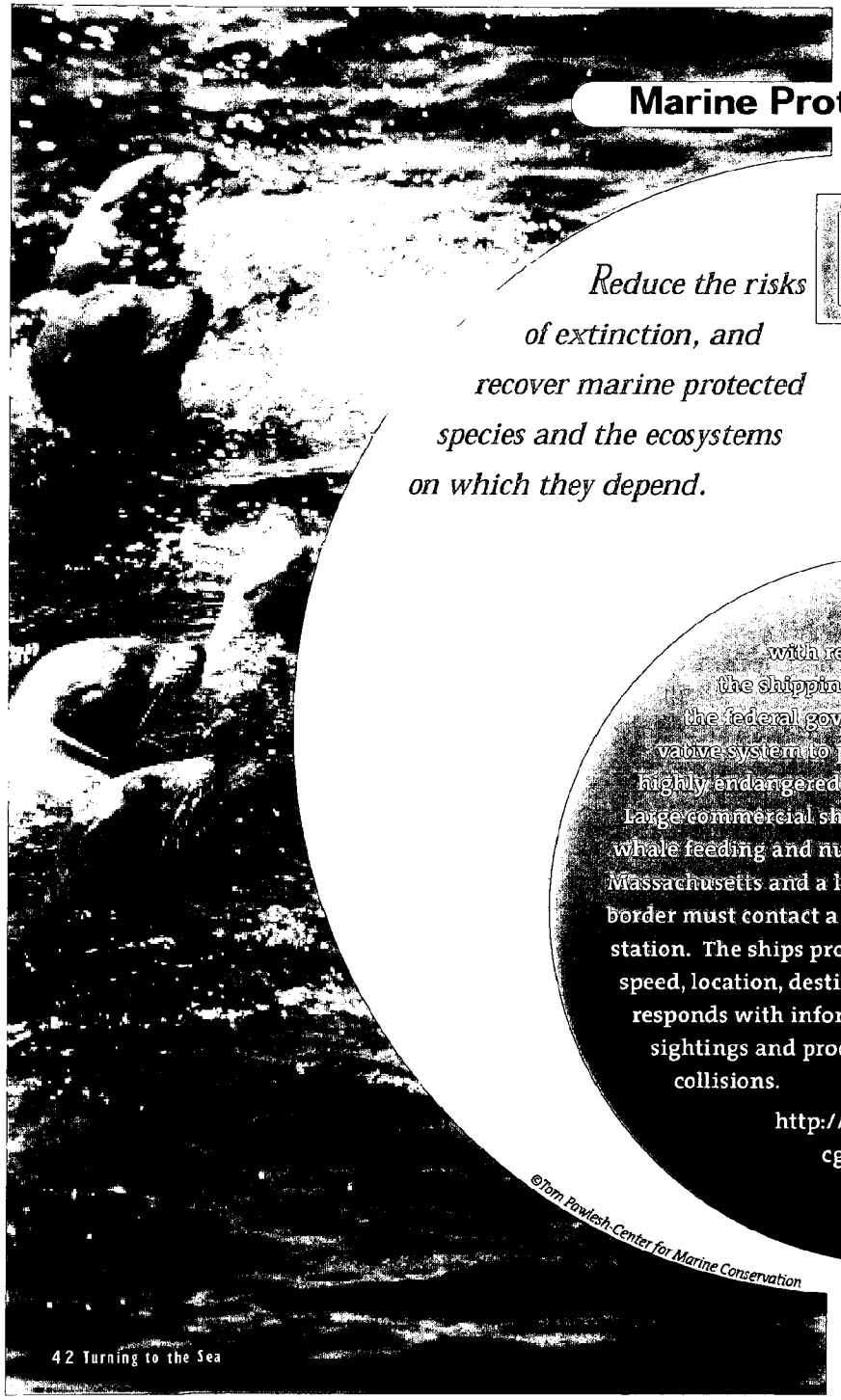
The National Estuarine Research Reserve System is a network of field laboratories that study and improve the health of degraded coastlines, linking programs of stewardship, public education, and scientific understanding. **The National Estuary Program** uses a collaborative approach to protect estuaries by encouraging states, communities, businesses, and the public to work together to effectively manage, restore, and protect their valuable estuarine resources.



For more information

- http://www.nos.noaa.gov:80/ocrm/nerr/welcome.html
- http://www.epa.gov/owow/estuaries/nep.html
- http://www.fws.gov/cep/coastweb.html
- http://marine.usgs.gov
- http://www.nwrc.usgs.gov
- http://www.epa.gov/emap/html/pubs/docs/midatl/cond_mae.htm





Marine Protected Species

Reduce the risks of extinction, and recover marine protected species and the ecosystems on which they depend.

During the past century, marine mammals, birds, turtles, fish, invertebrates, and other marine species have been overhunted or overfished, causing extinction or extreme population declines. Today, interactions with commercial fishing operations, overharvest for international trade, and degradation and loss of important feeding and nursery habitats have depleted many marine species. As coastal and marine waters have become increasingly polluted, many species have shown increases in diseases, infections, and tumors. Combined with increased disturbances from ship traffic, noise pollution, and other impacts, the cumulative effects of these stresses have reduced many marine species to extremely low levels and possible extinction. Specifically, between 1975 and 1999, the number of marine species or stocks listed as threatened or endangered under the Endangered Species Act increased from 20 to 61. Another 42 marine species or stocks are currently considered "candidates" or are proposed for listing under the Act.

There is serious concern for the future of a number of marine species protected under the Marine Mammal Protection Act or the Endangered Species Act, including Steller sea lions, North Atlantic and North Pacific right whales, Hawaiian monk seals, West Indian manatees, southern sea otters, and all six species of sea turtles. Destructive collecting practices and unsustainable collection levels have also severely depleted the populations of a number of species (e.g., seahorses and coral reef species). And habitat destruction is probably leading to the loss of less-studied marine organisms before they are even identified, much less protected.

Working with representatives from the shipping and fishing industries, the federal government developed an innovative system to protect the 300 remaining highly endangered **North Atlantic right whales.** Large commercial ships entering important right whale feeding and nursing grounds off Cape Cod, Massachusetts and a large area near the Georgia/Florida border must contact a U.S. Coast Guard-operated shore station. The ships provide the station with their course, speed, location, destination, and route, and the station responds with information on local right whale sightings and procedures that may help prevent collisions.

http://www.wh.whoi.edu/cgi-bin/rwhale.pl

©Tom Pawlesh-Center for Marine Conservation

Ongoing Concerns

- There is a lack of information on the population sizes and trends of marine wildlife, as well as on the threats to marine wildlife.
- The lack of coordination, especially in the international arena, reduces the effectiveness of recovery and protection actions.
- Delays in addressing population trends can dramatically increase the cost of recovery efforts.

Recommendations

- Increase research and monitoring activities to provide information on populations of marine wildlife, and threats and solutions to their decline.
- Develop and implement national goals and coordinated action plans to recover marine protected species.
- Increase coordination with tribes and states on research, recovery, and management of marine protected species.
- Address key existing and emerging threats, including modification/destruction of coastal and estuarine seafloor ecosystems by fishing gear, coastal habitat destruction resulting from shoreline protection efforts, and watercraft collisions with marine mammals.
- Develop a coordinated policy and action plan for dealing with interactions between the public and expanding seal populations, the growth of marine aquaculture, and the use and effectiveness of marine preserves.
- Develop solutions to safely deter marine mammals, sea turtles, and seabirds from becoming entangled in fishing gear; prevent incidental bycatch in commercial fisheries; and reduce the impacts of ship traffic on marine mammals.
- Consider the impacts of marine noise pollution on marine mammals, and develop solutions as appropriate.
- More effectively implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and improve cooperation with domestic and international partners, including increased training and capacity building for other countries.

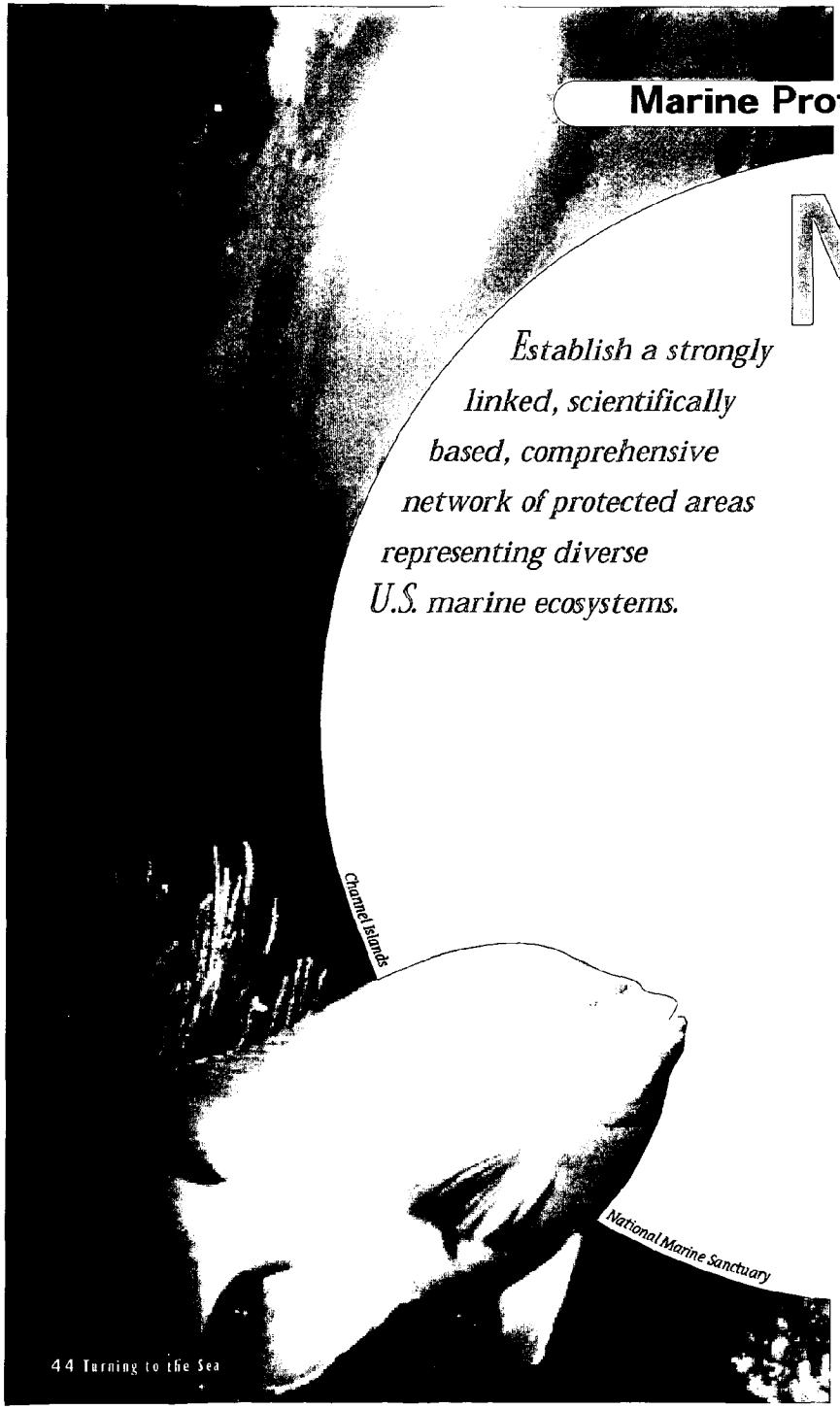
For more information

- http://www.nmfs.gov/prot_res/prot_res.html
- http://state-of-coast.noaa.gov/
- http://www.fws.gov/r9endspp/endspp.html
- http://www.fws.gov/r9dia/global/cites.html
- http://www.heritage.tnc.org/

Brown, Monterey Bay Aquarium

Marine Protected Areas

Establish a strongly linked, scientifically based, comprehensive network of protected areas representing diverse U.S. marine ecosystems.



National parks, wilderness areas, wildlife management areas, state forests, and city parks are all examples of land-based "protected areas." The designation of protected areas on land has a long history and proven track record for providing long-term protection, resource management, recreational opportunities, and other uses. Marine protected areas are defined as any area of intertidal or subtidal terrain, together with overlying waters and associated flora and fauna, and historical and cultural features, that have been reserved by law or other effective means to protect part or all of the enclosed environment. Categories of marine protected areas can range from strictly protected wilderness areas to multiple-use areas.

There are approximately 300 marine protected areas in the U.S. managed by federal agencies, state governments, or nongovernmental organizations. U.S. marine protected areas include National Marine Sanctuaries; selected National Parks, Seashores, Monuments, and Wildlife Refuges; National Estuarine Research Reserves; National Estuary Program areas; and certain areas designated for rebuilding fish stocks in Fishery Management Plans.

Marine protected areas are important management tools with unique potential to help communities protect and sustainably use their valuable marine and coastal resources. They have been used effectively to conserve and manage natural areas, reduce user conflicts and impacts from user activities, provide educational opportunities, enhance commercial and recreational opportunities, and provide undisturbed areas for scientific comparison with nearby degraded habitats. Despite these benefits and the fact that oceans cover over 71% of the Earth's surface, internationally, less than 1% of the sea is designated as marine protected areas. Domestically, about 1% of the ocean area under U.S. jurisdiction is designated as marine protected areas, and less than 1% of these areas protect marine life from fishing and other impacts. Many natural treasures on land have been given special protections to allow them to remain as undisturbed as possible as part of the National Wilderness Preservation System. No such system exists for U.S. ocean environments.

Ongoing Concerns

- The U.S. does not have an integrated, comprehensive network of sites representing the nation's major ocean and coastal environments.
- There is no comprehensive approach to designating, evaluating, or monitoring marine protected areas at either the state or the federal level.
- Marine protected areas have not been used effectively for the long-term protection and sustainable use of commercial and recreational fisheries.
- Limited funding prevents adequate enforcement and monitoring in existing marine protected areas.
- There are too few areas that preserve marine biodiversity by limiting fishing and other harvest activities.

Recommendations

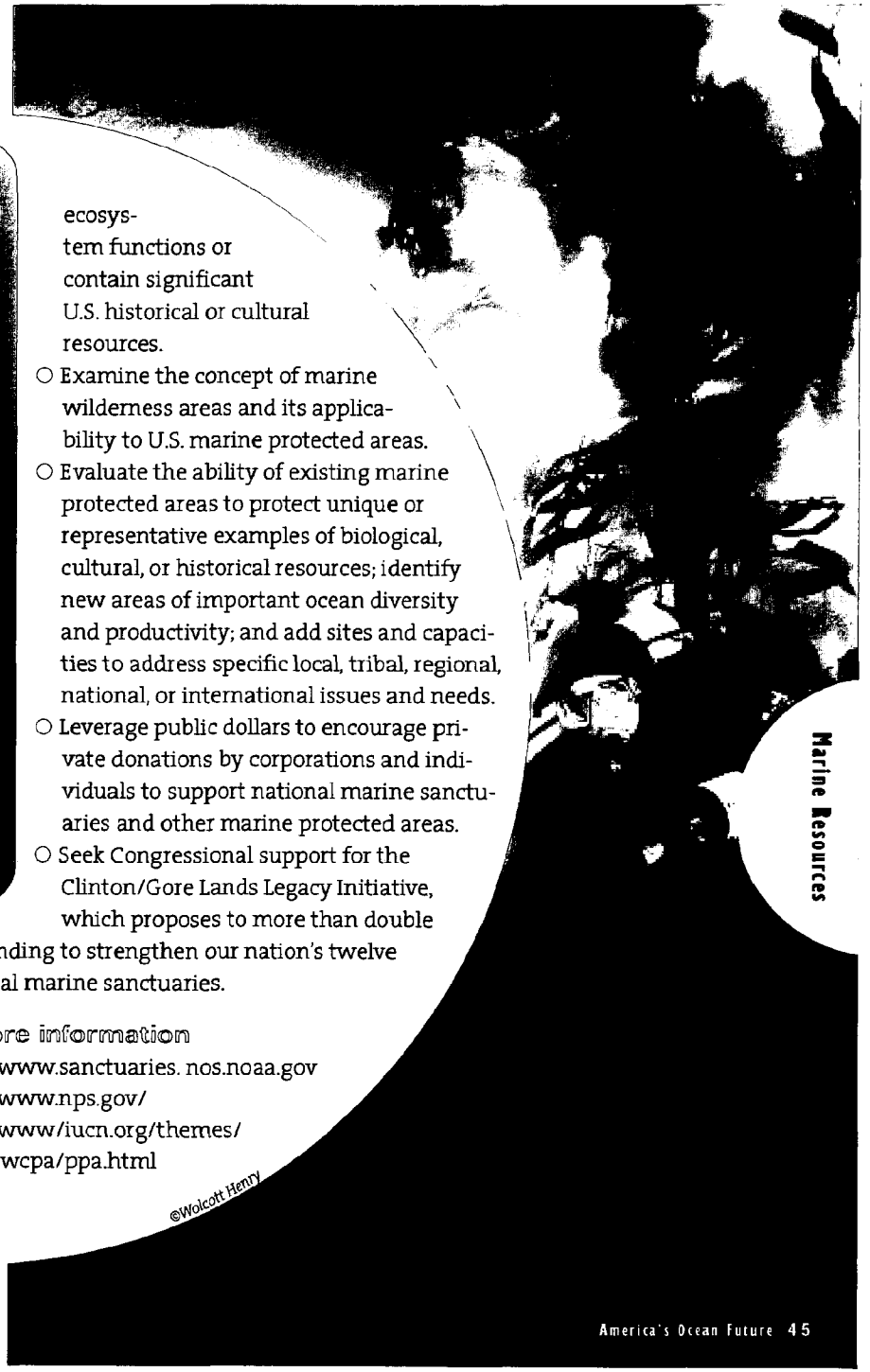
- Increase linkages among existing marine protected areas within the U.S. and with those in neighboring countries to create a well-coordinated network of sites for long-term monitoring, public education, sustainable use, research and exploration, and protection of natural resources.
- Establish criteria to evaluate the effectiveness of existing marine protected areas, and improve individual site performance and the success of the overall network.
- Identify areas of important ocean biological diversity and productivity, and habitats for endangered species and commercial and recreational fisheries species, including essential fish habitat and coastal and marine areas that provide key ecosystem functions or contain significant U.S. historical or cultural resources.
- Examine the concept of marine wilderness areas and its applicability to U.S. marine protected areas.
- Evaluate the ability of existing marine protected areas to protect unique or representative examples of biological, cultural, or historical resources; identify new areas of important ocean diversity and productivity; and add sites and capacities to address specific local, tribal, regional, national, or international issues and needs.
- Leverage public dollars to encourage private donations by corporations and individuals to support national marine sanctuaries and other marine protected areas.
- Seek Congressional support for the Clinton/Gore Lands Legacy Initiative, which proposes to more than double the funding to strengthen our nation's twelve national marine sanctuaries.

Concern for the future of the Tortugas, an area comprised of islands and rich coral resources in the Florida Keys, led federal and state agencies, local communities, fishermen, divers, and others to form a unique partnership to design and evaluate solutions to help protect this sensitive area. This group, using ecological data, socioeconomic information, and public input, unanimously recommended establishment of a new marine protected area for the Tortugas marine communities.

http://fpac.fsu.edu/tortugas/index.html

For more information

- http://www.sanctuaries. nos.noaa.gov
- http://www.nps.gov/
- http://www/iucn.org/themes/wcpa/ppa.html



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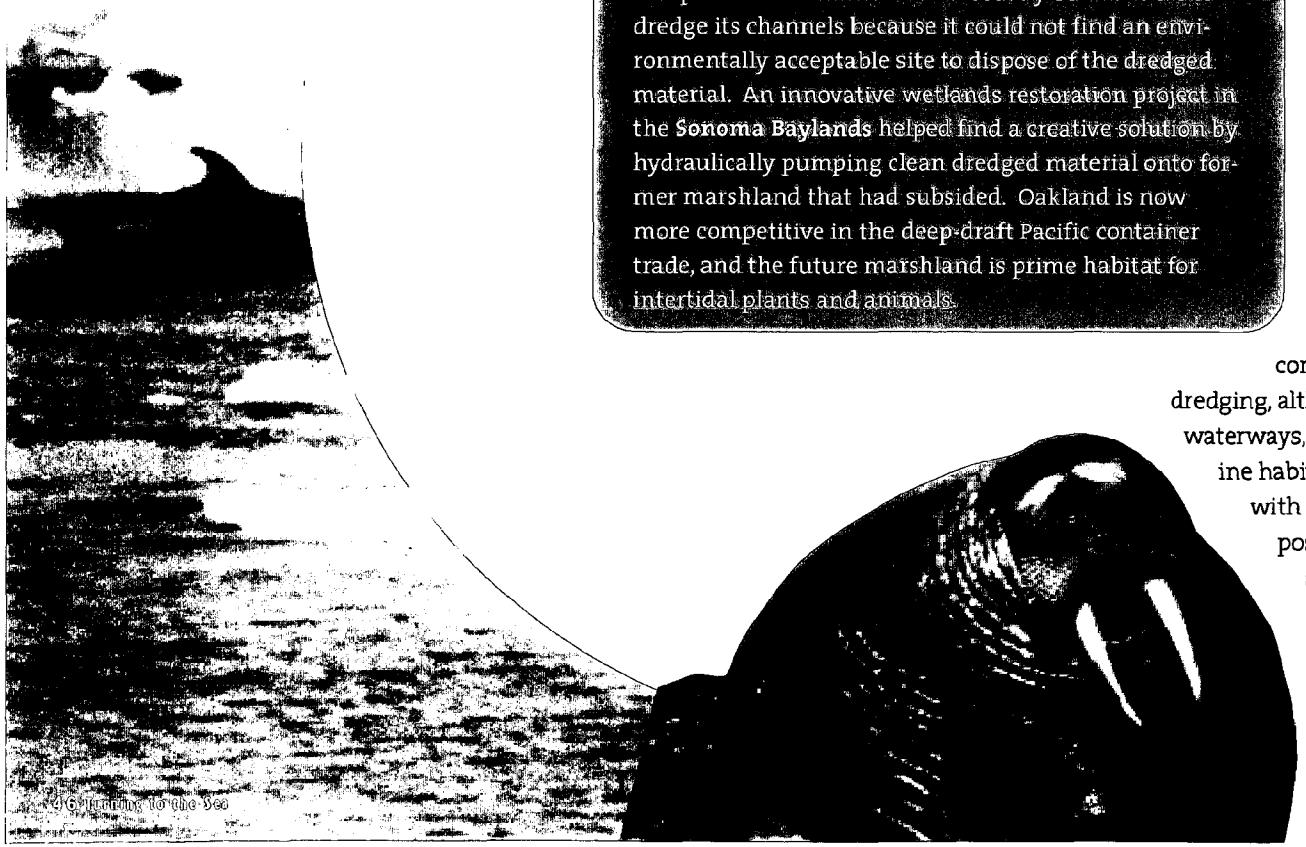
Ocean and Coastal Habitats

Understand, protect, restore, and sustainably use ocean and coastal habitats.

Ocean and coastal habitats are very diverse, ranging from coastal streams and sandy beaches to seagrass beds and kelp forests, and from coral reefs and arctic ice shelves to open ocean waters and deep ocean canyons. The nation's ocean and coastal habitats support some of the most valuable and diverse biological resources on the planet, including 66% of all U.S. commercial and recreational fish and shellfish, 45% of all protected species, 50% of nongame migratory birds, 30% of migratory waterfowl, and thousands of other species. These habitats also provide important services, including flood control, water filtration and storage, storm protection, food production, and recreation and tourism. While it is clear that human activities have degraded or destroyed many ocean and coastal habitats, in some cases, the scope and magnitude of these impacts are largely unknown, and we do not fully understand the complex processes related to ocean and coastal habitats.

The port of Oakland has until recently been unable to dredge its channels because it could not find an environmentally acceptable site to dispose of the dredged material. An innovative wetlands restoration project in the **Sonoma Baylands** helped find a creative solution by hydraulically pumping clean dredged material onto former marshland that had subsided. Oakland is now more competitive in the deep-draft Pacific container trade, and the future marshland is prime habitat for intertidal plants and animals.

Recent scientific examination of the effects of bottom trawling on the seafloor shows evidence of large-scale habitat alteration, particularly within less resilient seafloor communities. Other activities, such as dredging, although necessary to maintain our nation's waterways, can also harm valuable riparian and estuarine habitats and raise ancillary problems associated with contaminated dredge material and its disposal. Human activities, such as residential and commercial development, can alter or destroy valuable coastal wetlands, which are critical habitat for many species of fish, shellfish, birds, and other marine wildlife.



Ongoing Concerns

- There is limited understanding of the causes of recently observed changes in ocean chemistry and their potential impacts on ocean and coastal habitats.
- The nation's ocean and coastal habitats have never been comprehensively mapped or described.
- No coordinated monitoring program exists to track the health and condition of ocean and coastal habitats and integrate federal, state, and local data.
- There is no comprehensive, long-term planning and tracking of permits and use of ocean and coastal habitats, including impacts on essential fish habitat.
- Ocean and coastal habitats have tremendous social and economic values that are not captured in any assessment.
- Technical and financial resources are not available to adequately restore most damaged habitats or respond to emergency situations.
- Contaminated sediment, dredging, and the disposal of dredged material pose a threat to ocean and coastal habitats.

Recommendations

- Implement a coordinated, comprehensive effort to map and monitor the condition of U.S. ocean and coastal habitats, such as the Aquatic Restoration and Conservation Partnership.
- Produce an annual report card on the health of the nation's ocean and coastal habitats.
- Fully implement the essential fish habitat requirements of the Magnuson-Stevens Fishery Conservation and Management Act.
- Work with other federal, tribal, state, and local agencies to encourage the use of existing wetland restoration programs to effect on-the-ground change in coastal areas.
- Implement coordinated, comprehensive efforts to reduce the impacts of dredging and fishing on coastal habitats.
- Develop cost-effective, environmentally acceptable regional sediment management procedures that speed remediation of contaminated sediments and increase beneficial reuse of both clean and remediated dredged material.
- Assemble and disseminate information on the social and economic values of ocean and coastal habitats.
- Develop and implement new technologies to respond to threats and restore damaged coastal habitats.
- Support community-based partnerships to identify, design, and implement coastal habitat restoration projects.
- Increase research to understand the ongoing changes in ocean chemistry.

For more information

- http://www.nmfs.gov/habitat
- http://www.arcpartners.org
- http://www.fws.gov/cep/coastweb.html
- http://state-of-coast-noaa.gov/bulletins/html/chr_10/chr.html
- http://www.epa.gov/owow

Water Quality

Protect and restore coastal and marine waters to safeguard human health, sustain the rich diversity of wildlife, promote a thriving economy, and preserve a recreational and aesthetic resource for safe enjoyment by current and future generations.

oxic and nutrient pollutants, sedimentation, and disease-causing organisms are degrading ocean and coastal water quality and threatening public health, the environment, and the economic well-being of communities that depend on fishing, tourism, and marine commerce. While "point" sources of pollution, such as discharge pipes, continue to be a problem, the leading cause of water pollution today is "nonpoint" source pollution, which includes runoff from farmland, suburban lawns, and city streets, as well as pollution that is deposited from the air.

Increasingly, excess nutrients in polluted runoff are contributing to harmful algal blooms and robbing coastal and marine ecosystems of life-sustaining oxygen, creating "dead zones" that cover huge areas, such as the 7,700-square-mile dead zone in the Gulf of Mexico. Pollution can also alter the chemistry of the coastal ocean, which scientists fear is happening in the Bering Sea and other areas.

As pollution continues to contaminate our waters, more and more people are faced with the risk of illness from exposure to toxic contaminants and disease-causing microorganisms, either when eating the fish they catch or through direct contact with polluted waters. In 1998, approximately 30% of all beaches surveyed reported an advisory or closing, and 60% of coastal waters were under fish-consumption advisories.

Ongoing Concerns

- Water quality improvement efforts to protect human health and the environment have been focused primarily on inland and coastal waters. As a result, the impacts of pollution on the marine environment are not as well understood.
- While the federal government has developed national guidance on fish-consumption advisories and recreational water quality monitoring, many tribes and states do little or no monitoring, and variation in their methods and standards persists.
- Contaminated sediments along our nation's coasts are degrading water quality.
- Many former ocean disposal sites are unmonitored, and their impacts on

marine and coastal waters and ecosystems are largely unknown.

Recommendations

- ○ Implement the Administration's Clean Water Action Plan to effectively address polluted runoff and other sources of pollution, as well as improve coordination among federal agencies.
- ○ Increase research on the effects of water quality and ocean discharges on the marine environment, including on marine wildlife, and use this information to improve protection for ocean and coastal resources where necessary.
- ○ Assist tribes, states, and territories in adopting fully protective fish-consumption and beach water quality standards, conducting adequate fish tissue and beach water quality monitoring, and developing effective public notification and education programs. Consider legislation that promotes these goals.
- ○ Improve detection of pathogens in fish, wildlife, and recreational waters through research on new technologies, and reduce the occurrence of contaminants in coastal waters through improved controls on sewer overflows, stormwater runoff, and other sources of pollution.
- ○ Effectively manage and remediate both inland and coastal contaminated sediment sites to reduce their impact on coastal water quality.
- ○ Work with tribes and states to identify and address the health of coastal waters that are not meeting clean water goals.

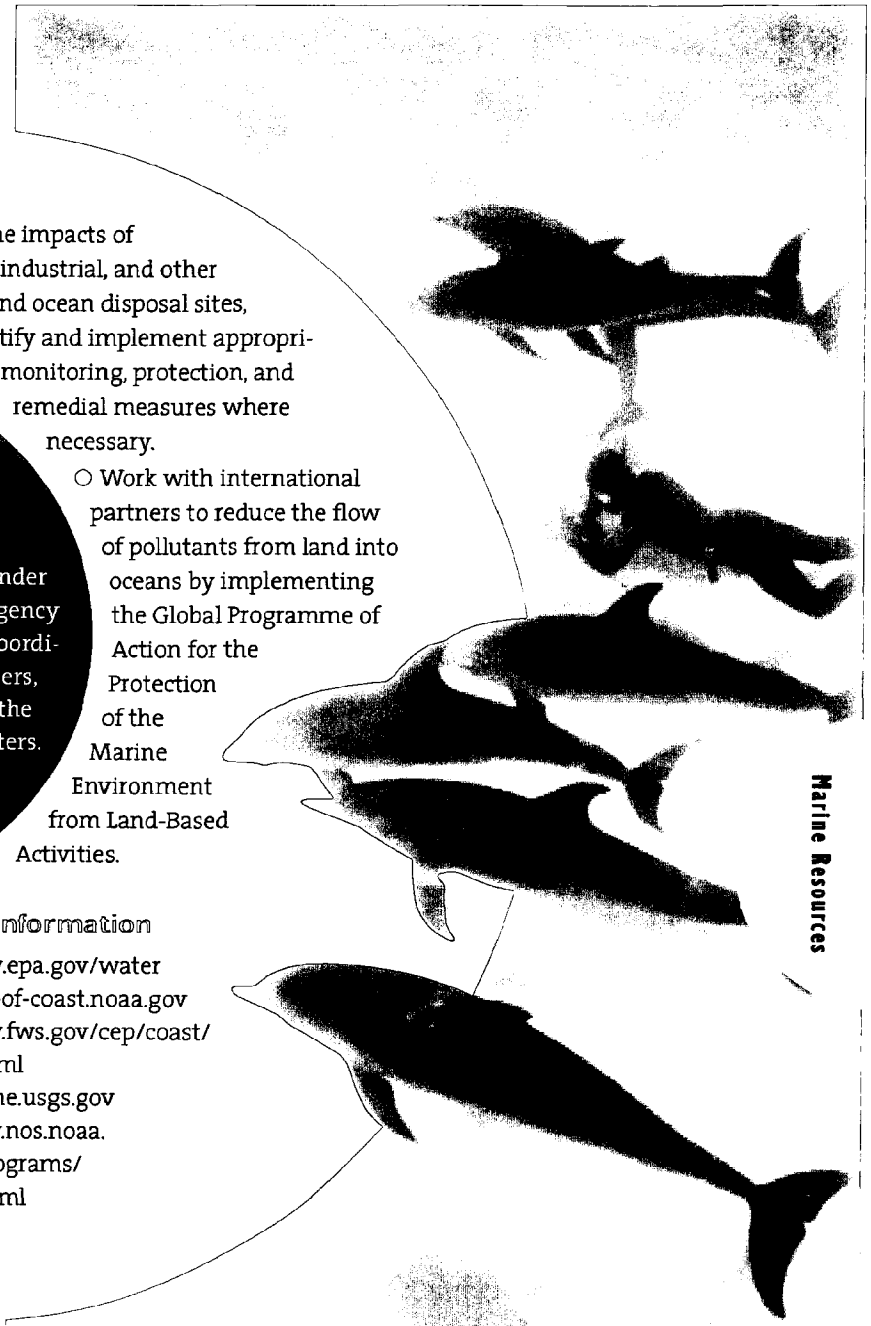
The President's and Vice President's 1998 **Clean Water Action Plan** uses collaborative watershed strategies to protect and restore water quality. Action items under the plan include developing a multi-agency Coastal Research Strategy, creating a coordinated monitoring plan for coastal waters, and issuing a report to the public on the condition of the nation's coastal waters.

http://www.cleanwater.gov

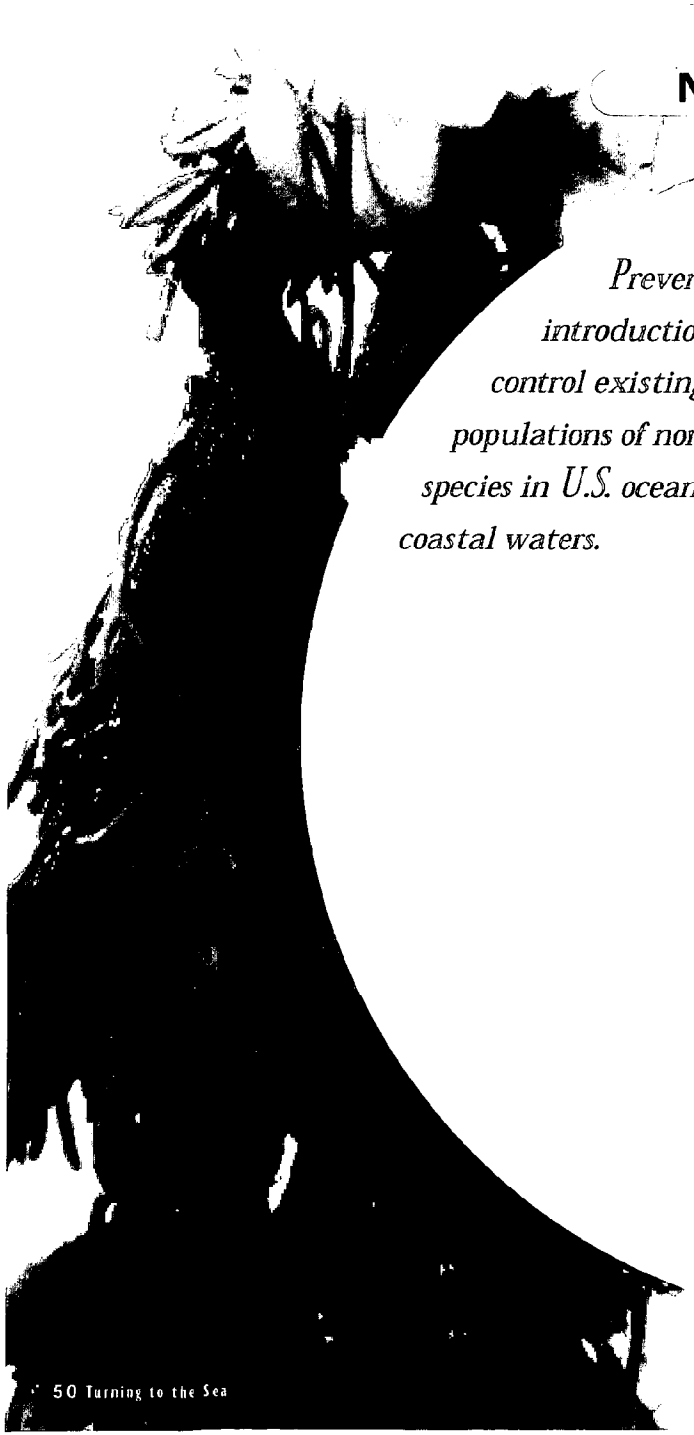
- ○ Assess the impacts of military, industrial, and other coastal and ocean disposal sites, and identify and implement appropriate monitoring, protection, and remedial measures where necessary.
- ○ Work with international partners to reduce the flow of pollutants from land into oceans by implementing the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities.

For more information

- □ http://www.epa.gov/water
- □ http://state-of-coast.noaa.gov
- □ http://www.fws.gov/cep/coast/web.html
- □ http://marine.usgs.gov
- □ http://www.nos.noaa.gov/programs/ncos.html



Nonindigenous Species



Prevent introductions and control existing populations of nonindigenous species in U.S. ocean and coastal waters.

©J. Carlton

The spread of nonindigenous species, such as zebra mussels, Asian clams, shipworms, and aquatic weeds, is one of the most serious threats to the nation's ocean and coastal ecosystems and the communities and economies that depend on them. One of the primary sources of aquatic nonindigenous species is discharge of ballast water in ships arriving from foreign ports. Every minute 40,000 gallons of foreign ballast water that may contain exotic species, including disease-causing pathogens, are discharged into U.S. harbors. Other sources include aquaculture, introductions of stocks for sportfishing, ship hulls, and floating debris.

Hundreds of nonindigenous species have now become established in the nation's coastal waters; over 240 nonindigenous species are found in San Francisco Bay alone. Once established, these species are almost impossible to eradicate. Nonindigenous species have displaced and eliminated native species, impacting fisheries and costing communities billions of dollars every year in control measures. For example, in 1996, foreign viruses reduced U.S. aquaculture production of shrimp by 50%, and failure to control the nonindigenous ruffe fish in the Great Lakes may cost over $500 million in losses to sport and commercial fisheries by 2005. Some nonindigenous species, such as cholera bacteria and some algae, have also had negative impacts on human health.

In February 1999, President Clinton established the U.S. Invasive Species Council through Executive Order 13112. The Council, chaired by the Secretaries of Interior, Agriculture, and Commerce, is responsible for fulfilling the Executive Order's mandates, including the development and implementation of a national action plan to address invasive nonindigenous species. While the action plan is a significant start, immediate and substantial progress is still required.

Ongoing Concerns

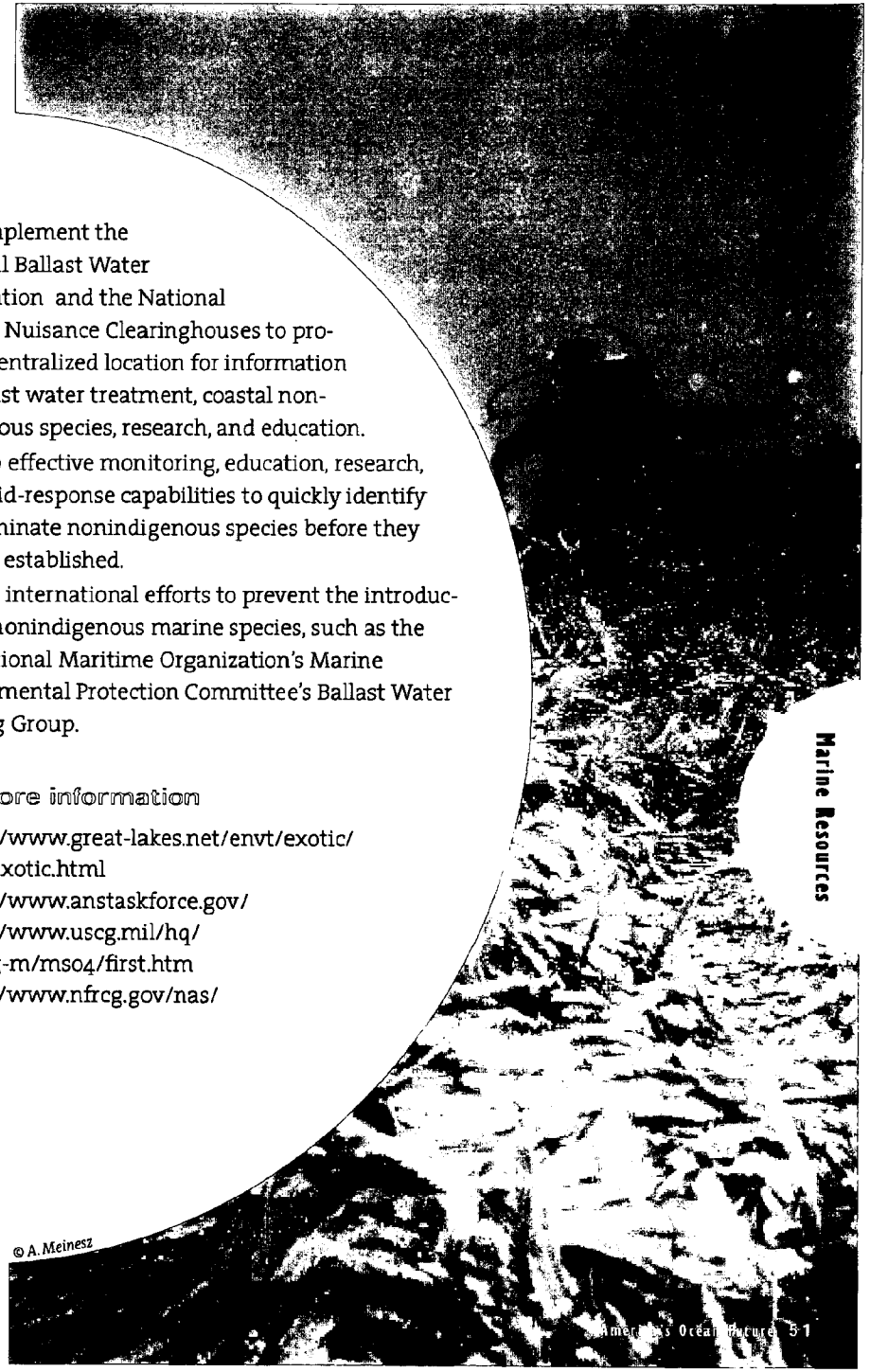
- The U.S. lacks comprehensive, coordinated strategies and actions to prevent the introduction and spread of nonindigenous species in ocean and coastal ecosystems and to identify and respond to nonindigenous species present in coastal areas.
- Little information is available on the potential threats of nonindigenous species, how to prevent their introduction, or their costs to marine and coastal ecosystems.
- U.S. efforts to date have focused on controlling existing introductions, and relatively little has been done to effectively reduce the continuing influx of nonindigenous aquatic species into coastal areas.
- There is no international system for controlling introduction of marine nonindigenous species.

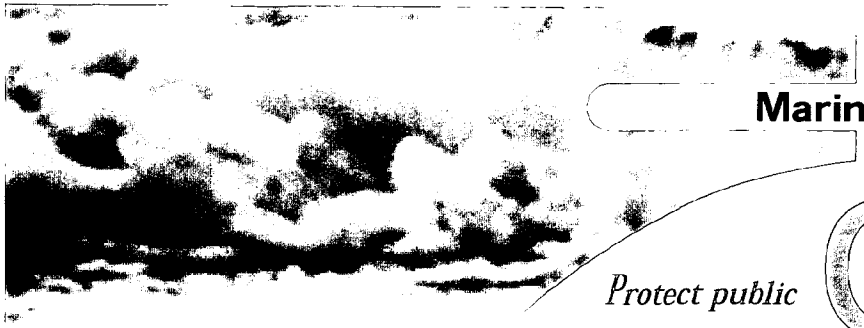
Recommendations

- Increase efforts to prevent and control introductions of nonindigenous species into marine and coastal ecosystems through the Aquatic Nuisance Species Task Force established under the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990.
- Increase support for existing regional initiatives in the Great Lakes, Pacific, and Gulf of Mexico to control and prevent introductions of nonindigenous species.
- Develop and implement coordinated regional strategies in other areas, and integrate all regional efforts into a national strategy as part of the national nonindigenous species plan required under Executive Order 13112.
- Fully implement the National Ballast Water Information and the National Aquatic Nuisance Clearinghouses to provide a centralized location for information on ballast water treatment, coastal nonindigenous species, research, and education.
- Develop effective monitoring, education, research, and rapid-response capabilities to quickly identify and eliminate nonindigenous species before they become established.
- Support international efforts to prevent the introduction of nonindigenous marine species, such as the International Maritime Organization's Marine Environmental Protection Committee's Ballast Water Working Group.

For more information

- http://www.great-lakes.net/envt/exotic/exotic.html
- http://www.anstaskforce.gov/
- http://www.uscg.mil/hq/g-m/ms04/first.htm
- http://www.nfrcg.gov/nas/





Marine Debris

Protect public health and the marine and coastal environment by increasing public awareness of the impacts of marine debris and by working creatively to eliminate it from our beaches and waters.

Often called "beach litter," marine debris is a major problem on beaches and in coastal waters, estuaries, and oceans. Close to 80% of debris is washed, blown, or dumped from shore, while 20% is from recreational boats, ships, fishing vessels, and ocean platforms. Most marine debris is man-made and slow to degrade, such as cigarette butts, soda cans, plastic bags, and fishing gear. Studies have shown that marine debris threatens over 265 different species of marine and coastal wildlife through entanglement, smothering, and interference with digestive systems. "Ghost fishing" – entrapment of fish and marine mammals by lost or abandoned nets, pots, and gear – is reducing fish and wildlife populations. In addition, certain types of marine debris, such as broken glass and medical waste wash-ups, can pose a serious threat to public health, causing beach closures and swimming advisories and robbing coastal communities of significant tourism dollars. The U.S. Army Corps of Engineers spends $9.4 million annually to remove drifting and floatable debris from the New York/New Jersey Harbor alone.

Ongoing Concerns

- Implementation of effective marine debris control measures is currently hampered by a lack of consistent monitoring and identification of sources of debris.
- Implementation and enforcement of local anti-litter regulations and management of debris entering and exiting sewer systems are inadequate to effectively address the marine debris problem.
- Marine debris can be the result of small-scale pollution by individuals who consider their discharges or littering to be of negligible impact compared with large-scale polluters. However, the cumulative impact of continuous, small-scale pollution can be dramatic.
- Plastic makes up about 60% of the debris found on beaches. The increase in the use of various kinds of plastic as durable, lightweight packaging has heightened the need for proper management and disposal.

Recommendations

- ○ Reestablish an interagency marine debris working group to coordinate development and implementation of monitoring, source identification, control, and education programs to address and find creative solutions to the marine debris issue.
- ○ Improve controls on potential sources of marine debris, including working with communities to implement and enforce anti-litter laws, improve floatable controls for local sewer systems, and employ statistical marine debris monitoring protocols.
- ○ Accelerate cooperative efforts with industry, with tribal, state, and local governments, and with environmental and fishing groups to find creative ways to prevent and clean up marine debris and to increase public awareness of its impacts.
- ○ Support and encourage research efforts to pursue new packaging technology, and increase recycling opportunities, particularly for plastics.

During the 1998 International Coastal Cleanup Campaign, coordinated by the Center for Marine Conservation and sponsored by private and government donors, over 159,000 people removed approximately 3.3 million pounds of marine debris from 6,888 miles of U.S. shorelines. The Campaign's efforts have led to increased recycling efforts, more trash bins at beaches, and better federal and state laws to keep coastal areas litter-free.

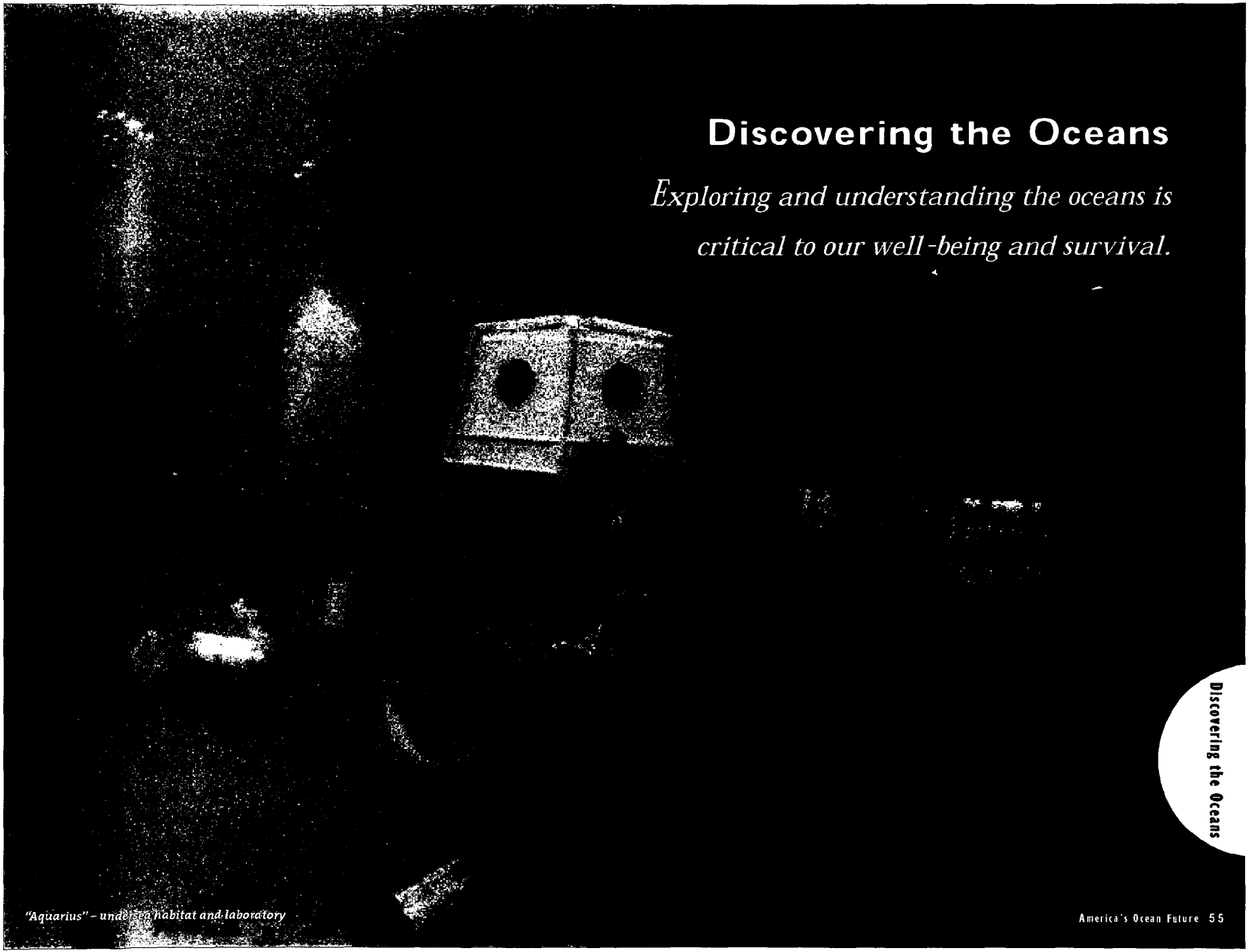
http://cmc-oceans.org/mdio/MDIO.html

For more information

- □ http://www.epa.gov/owow/oceans/debris/index.html
- □ http://www.uscg.mil/hq/g-m/nmc/seapart.htm
- □ http://www.yoto98.noaa.gov/books/debris/debris1.htm

"I really don't know why it is that all of us are so committed to the sea, except I think it's because in addition to the fact that the sea changes, and the light changes, and ships change, it's because we all came from the sea.... We are tied to the ocean. And when we go back to the sea – whether it is to sail or to watch it – we are going back from whence we came."

— President John F. Kennedy



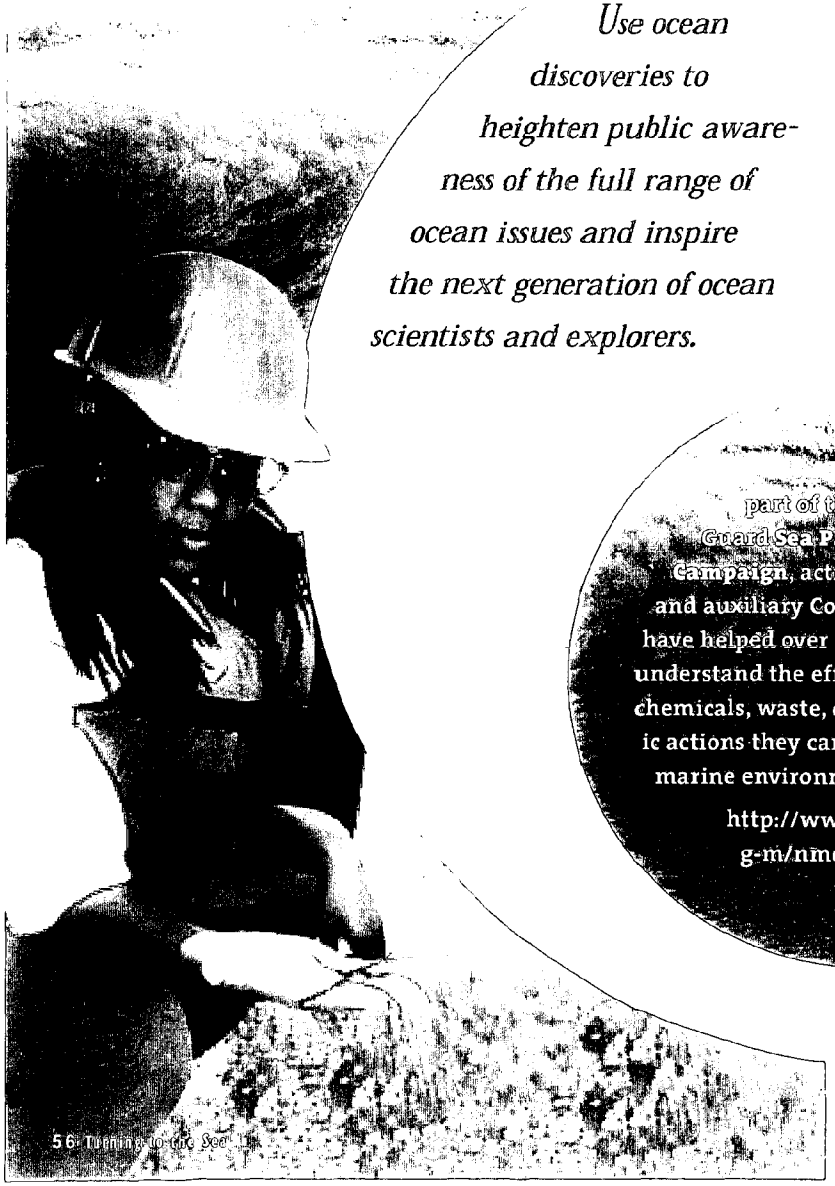
Discovering the Oceans

Exploring and understanding the oceans is critical to our well-being and survival.

"Aquarius" – undersea habitat and laboratory

Ocean Education

Use ocean discoveries to heighten public awareness of the full range of ocean issues and inspire the next generation of ocean scientists and explorers.



People are drawn to the oceans by their beauty, power, and infinite possibilities. Their inspirational power is demonstrated in centuries of literature, art, and music. Yet relatively few people understand the complex relationship between the oceans and the Earth's atmosphere, or grasp the magnitude of human impacts on fragile marine resources.

A recent survey found that many Americans have misleading ideas about the ocean and coastal environment. For example, only one in six knows that the leading source of petroleum pollution in rivers, lakes, and bays is car oil washed off streets into local waterways; most people think the leading sources are oil rigs, tankers, and refineries. Similarly, the majority of adults recently surveyed are unaware that the leading cause of entanglement of marine wildlife is abandoned fishing lines and nets. And four out of five Americans do not identify pollution running off the land as a problem for the oceans, although it is the leading source of marine pollution.

Continuing intensification of human activity near the coasts presents complex issues about marine and coastal ecosystems and societal choices. Comprehensive ocean awareness is critical to effective citizen participation in decision-making processes. Citizens have increasing needs for informal education and lifetime learning, as well as basic scientific literacy, to be capable of making sound choices. Children in particular need to be engaged in ocean and coastal marine science. Young students have been motivated by hands-on experiences, such as the National Ocean Sciences Bowl®, aquarium programs, GLOBE, Sea Partners, and Sea Camp. The ocean science community has the opportunity to make the oceans a major context in which to study the interactions of science, technology, and society.

As part of the U.S. Coast Guard Sea Partners Campaign, active duty, reserve, and auxiliary Coast Guard members have helped over 2,000,000 people understand the effects of oil, hazardous chemicals, waste, debris, and what specific actions they can take to protect the marine environment.

http://www.uscg.mil/hq/g-m/nmc/seapart.html

Ongoing Concerns

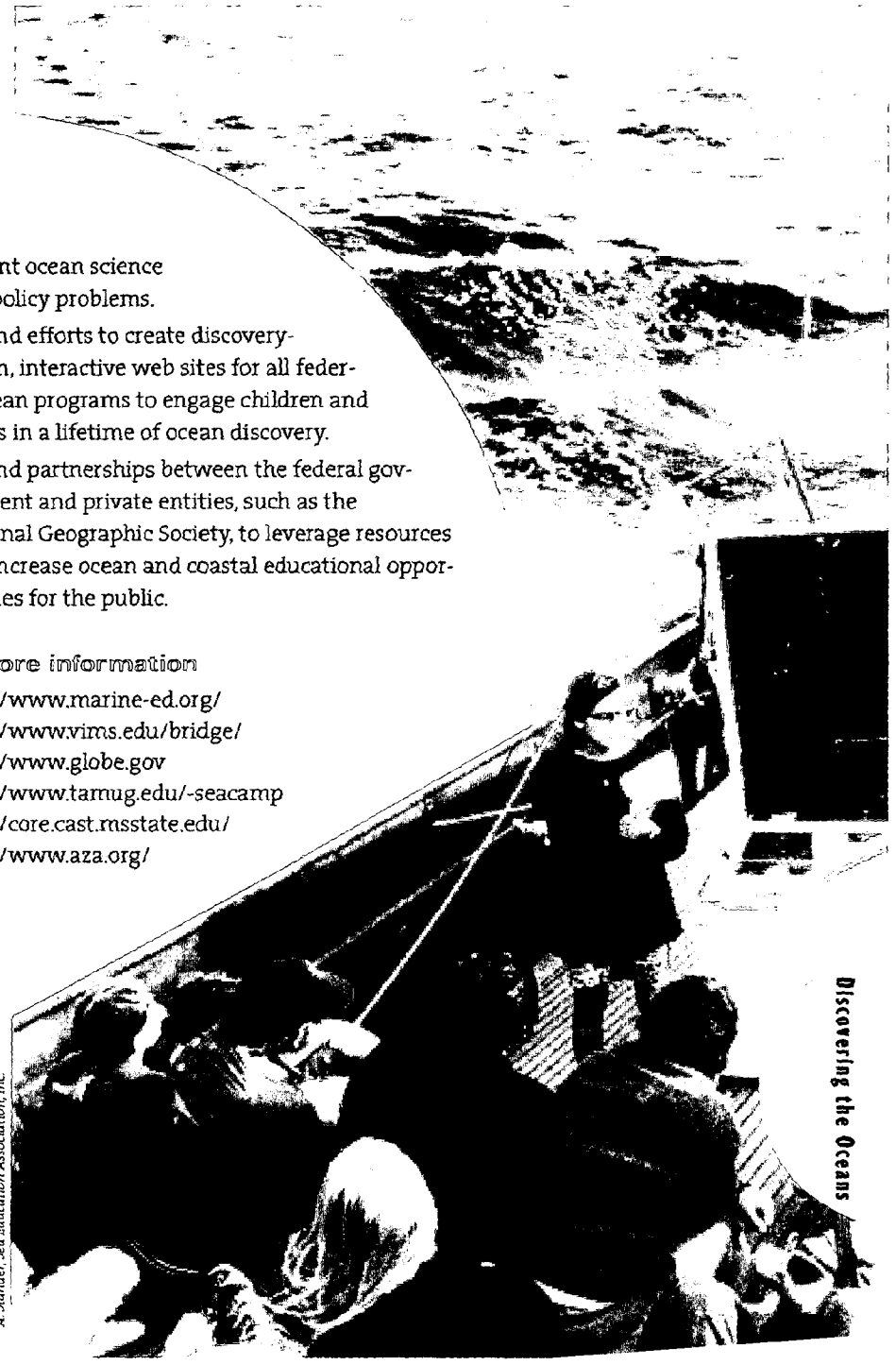
- Although the government and private institutions support ocean science education and outreach programs, these efforts are rarely driven by a specific plan to assess and improve the quality of ocean science education for students, teachers, and the general public.
- Current ocean and coastal educational materials are not as effective or useful to educators as they could be because they are often not closely related to mandatory curricula and are highly variable in quality.
- Teacher education is critical, yet opportunities for it are limited.
- Federal agencies often have very specific educational responsibilities, such as boater education, safe handling of seafood, conservation, and pollution prevention. Many of these can benefit from and contribute to basic ocean educational materials and programs.

Recommendations

- Establish a nationally coordinated effort to improve and promote ocean science education.
- Make ocean science education materials widely available to educators and the general public.
- Develop partnerships and networks with education groups, such as the National Marine Educators Association, the National Science Teachers Association, and the American Zoo and Aquaria Association, to facilitate interaction between the ocean community and educators.
- Develop model programs, such as the Model Congress program, that bring students together to debate and create solutions to current ocean science and policy problems.
- Expand efforts to create discovery-driven, interactive web sites for all federal ocean programs to engage children and adults in a lifetime of ocean discovery.
- Expand partnerships between the federal government and private entities, such as the National Geographic Society, to leverage resources and increase ocean and coastal educational opportunities for the public.

For more information

- http://www.marine-ed.org/
- http://www.vims.edu/bridge/
- http://www.globe.gov
- http://www.tamug.edu/~seacamp
- http://core.cast.msstate.edu/
- http://www.aza.org/

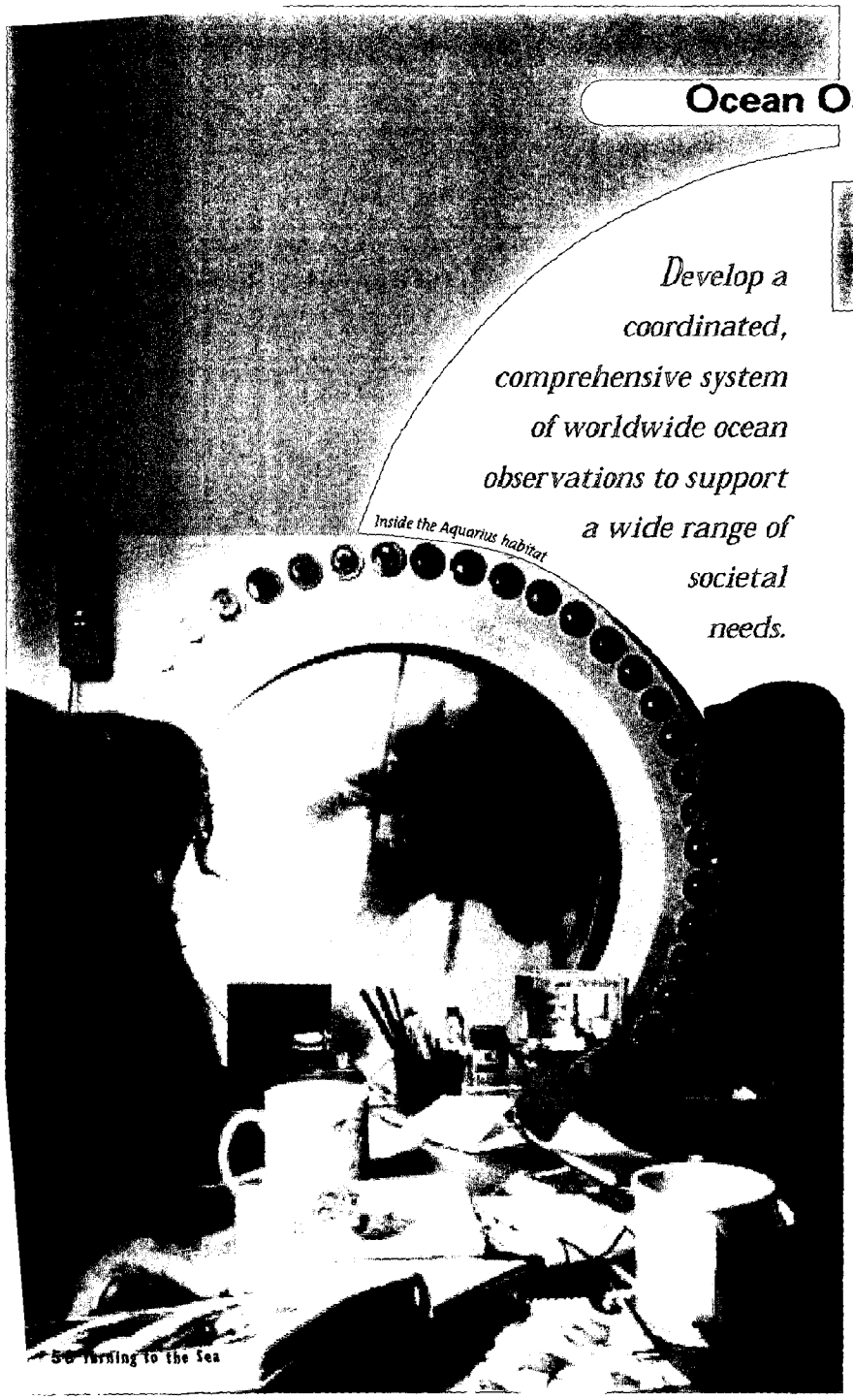


A. Stander, Sea Education Association, Inc.

Discovering the Oceans

Ocean Observations

Develop a coordinated, comprehensive system of worldwide ocean observations to support a wide range of societal needs.


Inside the Aquarius habitat

Recent technological developments have significantly improved ocean-observing systems. Satellites, ships, and buoys collect many kinds of data on and within the ocean, but these observations are not comprehensive. Gaps exist in coastal, open-ocean, and seafloor data sets. In addition, the federal programs collecting ocean observations are poorly integrated. By improving the coordination of data collection, storage formats, and dissemination processes, an integrated ocean-observing system would provide comprehensive near-real-time information on ocean and coastal conditions for the full range of users. Such a system would improve weather forecasting, detect and forecast oceanic components of climate variability, facilitate safe and efficient marine operations, make U.S. ports more competitive, and provide daily tactical support of military operations worldwide.

Marine ecosystems and living marine resources would also be better protected if more complete and accurate data were collected on ocean temperature, salinity, and dissolved chemicals and nutrients that affect commercial fish stocks, marine mammals, marine ecosystems, and coastal habitats. An integrated system would make more accurate predictions of natural hazards possible, allowing for mitigation of damage from hurricanes, coastal flooding, icebergs, tsunamis, and seafloor disturbances causing pipeline and telephone cable ruptures. The advanced warning derived from observing systems and climate predictions saved an estimated $1 billion in California alone from losses related to El Niño, which totaled $15 billion nationally in 1997-98. Global ocean observations could even protect public health by collecting the necessary data to understand the fate of pollutants, pathogens, harmful algal blooms, and other health hazards that close our beaches and shellfish beds. This system would also support fundamental scientific research and enhance public education and awareness of ocean issues.

Ongoing Concerns

- Current ocean-observation efforts are limited in scope. For example, volunteer merchant vessel observations are limited to shipping lanes; most satellites can only make surface-water or very shallow-water measurements; research

vessels are limited to short-term, small-area observations; and Navy data are not always publicly available. Where data do exist, there are no mechanisms to fully integrate them.

- ○ No clear mechanisms exist for translating large-scale, international ocean experiments into long-term, operational observation efforts, or for transitioning emerging new ocean-observation technologies to operational use.
- ○ Data from different sensors, such as satellites, drifting floats, and buoys, do not share commonalities in data format, access, and dissemination, and cannot be rapidly integrated to serve the many different users.

The Argo program is deploying a global array of 3,000 instruments to observe the waters below the ocean's surface. The Argo array will be a critical addition to an ocean-observing system equivalent to the existing atmospheric observation system; and in combination, these systems will collect data necessary to forecast weather, predict phenomena that influence global climate, and support national security and basic research needs.

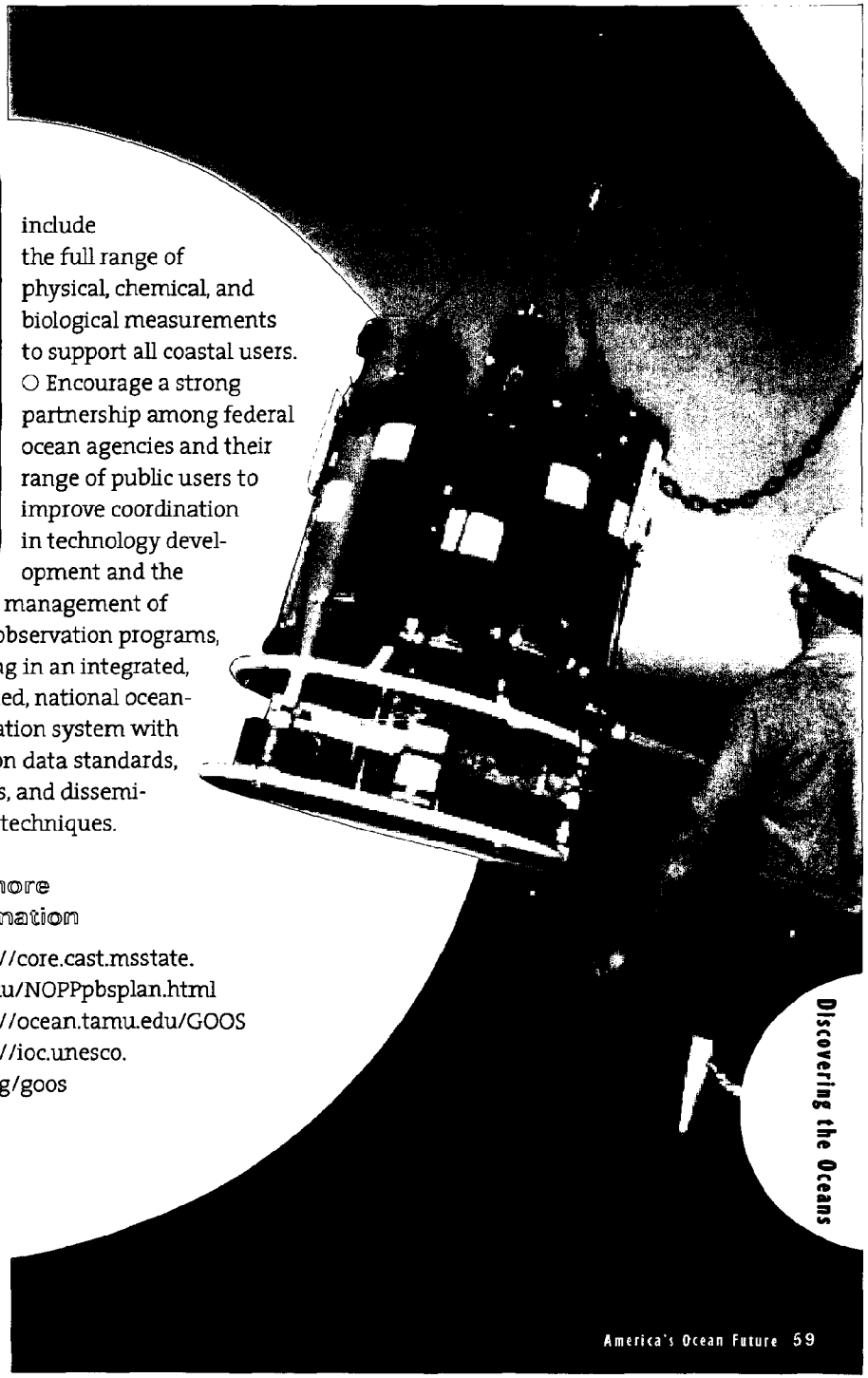
http://www.argo.ucsd.edu

Recommendations

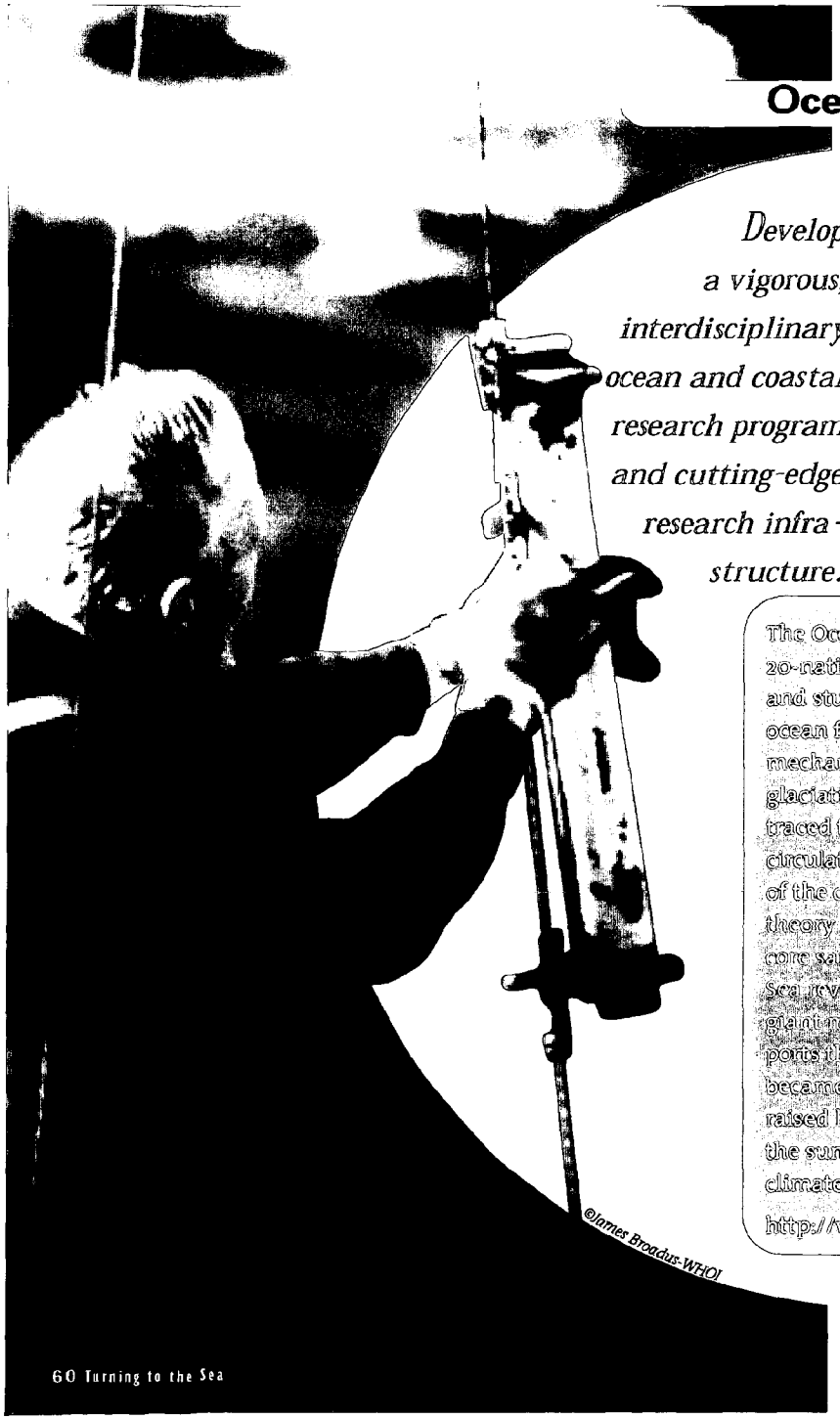
- ○ Expand open ocean-observing capabilities to enhance sampling of the full water column. In complement with satellite observations of the ocean surface, this will advance our understanding of ocean circulation and air/sea interactions to improve weather prediction and our understanding of climate change, and support basic research, fisheries, and national security.
- ○ Expand and integrate seafloor observation capabilities to improve basic knowledge of the Earth's temperature, chemistry, and structure. This will support pipeline and cable-laying operations, national security and research needs, and improved disaster warnings from seafloor disturbances.
- ○ Expand and coordinate coastal-observing capabilities to include the full range of physical, chemical, and biological measurements to support all coastal users.
- ○ Encourage a strong partnership among federal ocean agencies and their range of public users to improve coordination in technology development and the management of ocean-observation programs, resulting in an integrated, sustained, national ocean-observation system with common data standards, formats, and dissemination techniques.

For more information

- □ http://core.cast.msstate.edu/NOPPpbsplan.html
- □ http://ocean.tamu.edu/GOOS
- □ http://ioc.unesco.org/goos



Ocean Research



Develop a vigorous, interdisciplinary ocean and coastal research program and cutting-edge research infrastructure.

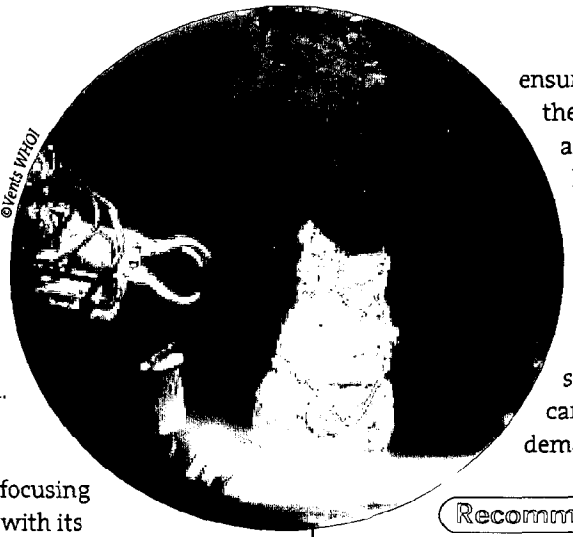
Over the last century, human activities have increasingly produced serious chemical, physical, and biological changes in the oceans. Water and air pollution are adding to the oceans vast quantities of fertilizers and pesticides that modify the chemistry of ocean water, particularly along the coasts. Overfishing, habitat destruction, invasive species, and pollution are contributing to the decline of fish, marine mammals, and other species and reducing the biological diversity of marine ecosystems. And climate change has the potential to produce changes in ocean temperature, salinity, sea level, circulation patterns, and other physical characteristics vital to marine and terrestrial life.

Issues such as *Pfiesteria* outbreaks, red tides, brown tides, the "dead zone" in the Gulf of Mexico, introductions of nonindigenous species, and preserving Pacific salmon highlight the limits of our present scientific understanding. Fortunately, powerful new technologies are enhancing our ability to manage our precious marine resources and answer immediately pressing and long-term questions about preserving biodiversity, climate change, and other critical issues facing us in the 21st century. We can harness advanced information theory and computational systems to assemble and analyze data. We can use new tools – from gene sequencers to autonomous vehicles and global satellites – to simultaneously explore questions about the oceans at subcellular and global scales.

Because the oceans are characterized by complex interacting physical, chemical, and biological systems, research to understand ocean processes cuts across many different scientific fields. A number of federal agencies have interests in ocean research, and each agency funds research that meets its specific mission needs.

The Ocean Drilling Program, a 20-nation cooperative effort to drill and study core samples from the ocean floor, has established the mechanisms and timing of global glaciations and climate change; traced the history of changes in the circulation, chemistry, and biology of the ocean; and confirmed the theory of plate tectonics. A recent core sample from the Caribbean Sea revealed a detailed record of a giant meteorite impact, which supports the theory that dinosaurs became extinct after a meteor raised huge dust clouds, blocking the sun and triggering climate change.

http://www.oceandrilling.org/


©Vents WHOI

Ocean research could benefit from coordinated research programs across agencies and disciplinary boundaries. To encourage such coordination, in 1997 Congress established a new National Ocean Partnership Program. The heads of twelve agencies oversee a program that provides funding for new government/industry/university partnerships in research and education. In addition, the National Science and Technology Council's Committee on Environment and Natural Resources is focusing on improved interagency coordination with its FY 2000 budget initiative, "Integrated Science for Ecosystem Challenges." One component of this program is slated to increase research on harmful algal blooms and other coastal water quality issues. The National Ocean Partnership Program and the Committee on Environment and Natural Resources provide mechanisms by which agencies can agree on priorities for cooperative ocean research. Early efforts have been promising, but more needs to be done.

Ongoing Concerns

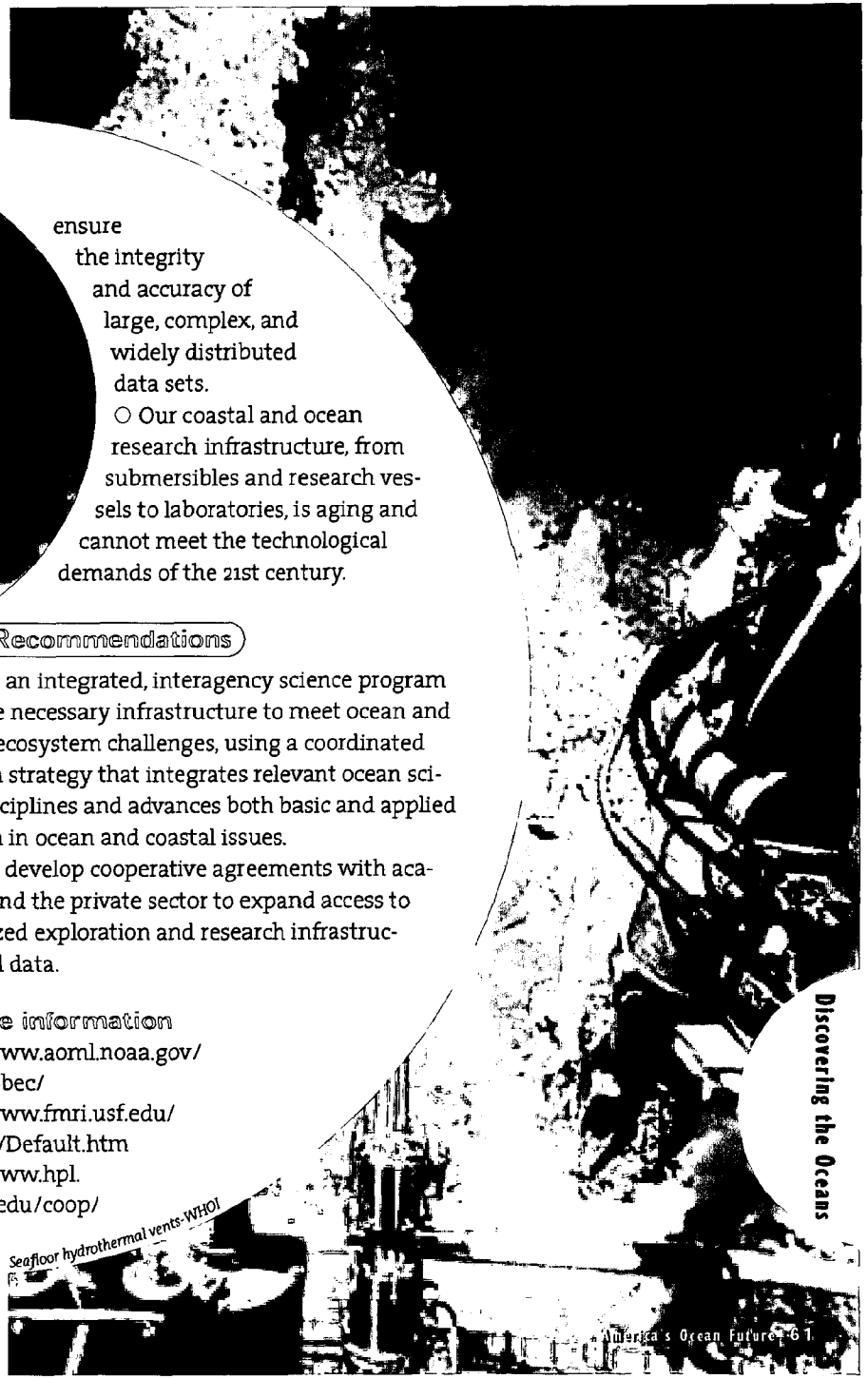
- ○ Oceanography and marine ecosystem science need an increased interdisciplinary approach, linking the fields of physics, biology, chemistry, and geology, and allowing a better view of the Earth as an integrated system.
- ○ Current ocean and coastal research efforts do not take full advantage of opportunities for increased coordination, both in research objectives and in shared research infrastructure.
- ○ There is a lack of standardized practices and procedures to ensure the integrity and accuracy of large, complex, and widely distributed data sets.
- ○ Our coastal and ocean research infrastructure, from submersibles and research vessels to laboratories, is aging and cannot meet the technological demands of the 21st century.

Recommendations

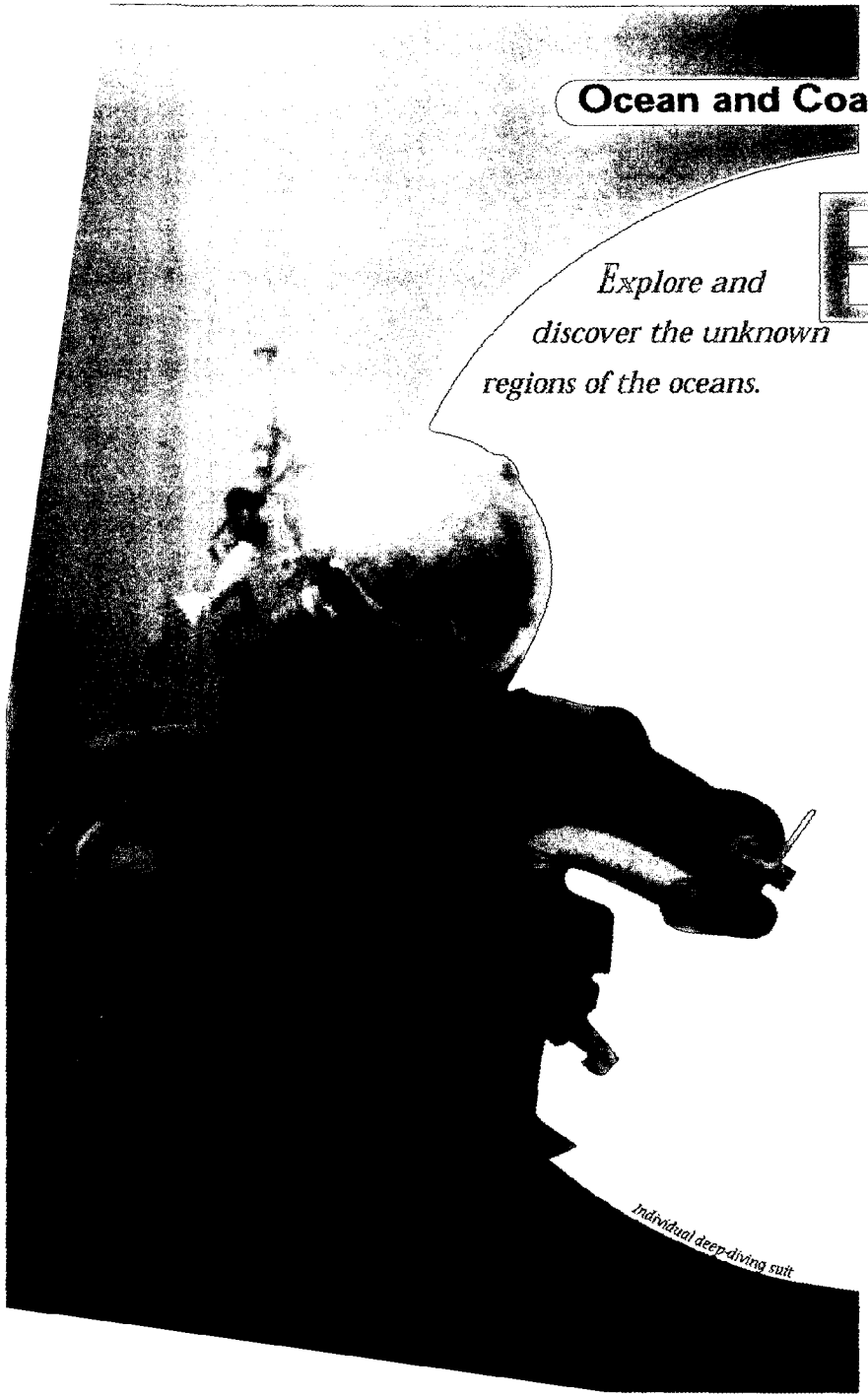
- ○ Develop an integrated, interagency science program with the necessary infrastructure to meet ocean and coastal ecosystem challenges, using a coordinated research strategy that integrates relevant ocean science disciplines and advances both basic and applied research in ocean and coastal issues.
- ○ Actively develop cooperative agreements with academia and the private sector to expand access to specialized exploration and research infrastructure and data.

For more information

- □ http://www.aoml.noaa.gov/ocd/globec/
- □ http://www.fmri.usf.edu/ecohab/Default.htm
- □ http://www.hpl.umces.edu/coop/


Seafloor hydrothermal vents-WHOI

Ocean and Coastal Exploration


Individual deep-diving suit

Explore and discover the unknown regions of the oceans.

Exploring the oceans has been an important human goal for centuries. Yet, while we have spent much of our history learning about what lies at the ocean's surface, we still know relatively little about what lies below. In just the past 50 years, we have discovered that the greatest mountain chains and canyons on Earth exist beneath the sea. Only 20 years ago, we discovered totally new chemosynthetic life forms that exist around deep-sea hydrothermal vents. Considered by some to be one of the most significant biological discoveries in the latter half of this century, these organisms derive energy from chemicals – not the sun, revolutionizing theories of photosynthesis as the basis of all life. These organisms have adapted to living in a highly pressurized, sunless, superheated environment, and may provide insight into our understanding of the origins of life on Earth and other planets.


Alice Alldredge, UCSB

Such discoveries demonstrate that the deep ocean remains the last great frontier of our planet for exploration and discovery. Although no one can predict what exploration will yield, exploration and research have led to discoveries that have changed our lives fundamentally and have provided knowledge critical to sustainably managing our natural resources.

Ongoing Concerns

- There is a lack of information about many ocean ecosystems, including the ocean's deepest regions, affecting our ability to manage them and to develop new uses and potential products.
- Only four manned submersibles in the world, none of them operated by the U.S., are capable of descending to half the ocean's maximum depth. The deepest-diving U.S. manned submersible currently operating (the *ALVIN*) can reach only an estimated 63% of the ocean floor.
- Not enough effort is made to bring the excitement of ocean exploration – truly the last frontier on Earth – to the public and to popular media.

Recommendations

- Establish a national strategy to expand exploration of the oceans, including more in-kind support by federal agencies for private ocean exploration initiatives.
- Support exploratory research in geographic areas, such as the deep-sea vent sites, and topical areas, such as undiscovered deep-sea species.
- Invest in the development of cutting-edge technologies and vehicles to observe and explore the oceans from the surface to the seafloor.
- Develop ways to explore the oceans remotely, including new observatories and sensors and innovative uses of technologies.

On Earth Day 1999, private and federal partners launched the historic **Sustainable Seas Expedition** to explore and map the nation's 12 National Marine Sanctuaries, providing the first comprehensive study of some of the organisms and physical characteristics in these areas.

http://www.sustainableseas.noaa.gov

The ALVIN-deep diving (over 2.5 miles) submersible. WHOI

For more information

- http://www.nurp.noaa.gov
- http://www.nationalacademies.org/nrc
- http:www.whoi.du/index.html

"Oceans are critical, not just to our economy; not just to our food supply; not just to America's trade and security; but to the fabric of life itself. Those dark-blue waters are perhaps the single greatest natural treasure on God's Earth."

— *Vice President Al Gore*

Official White House photograph