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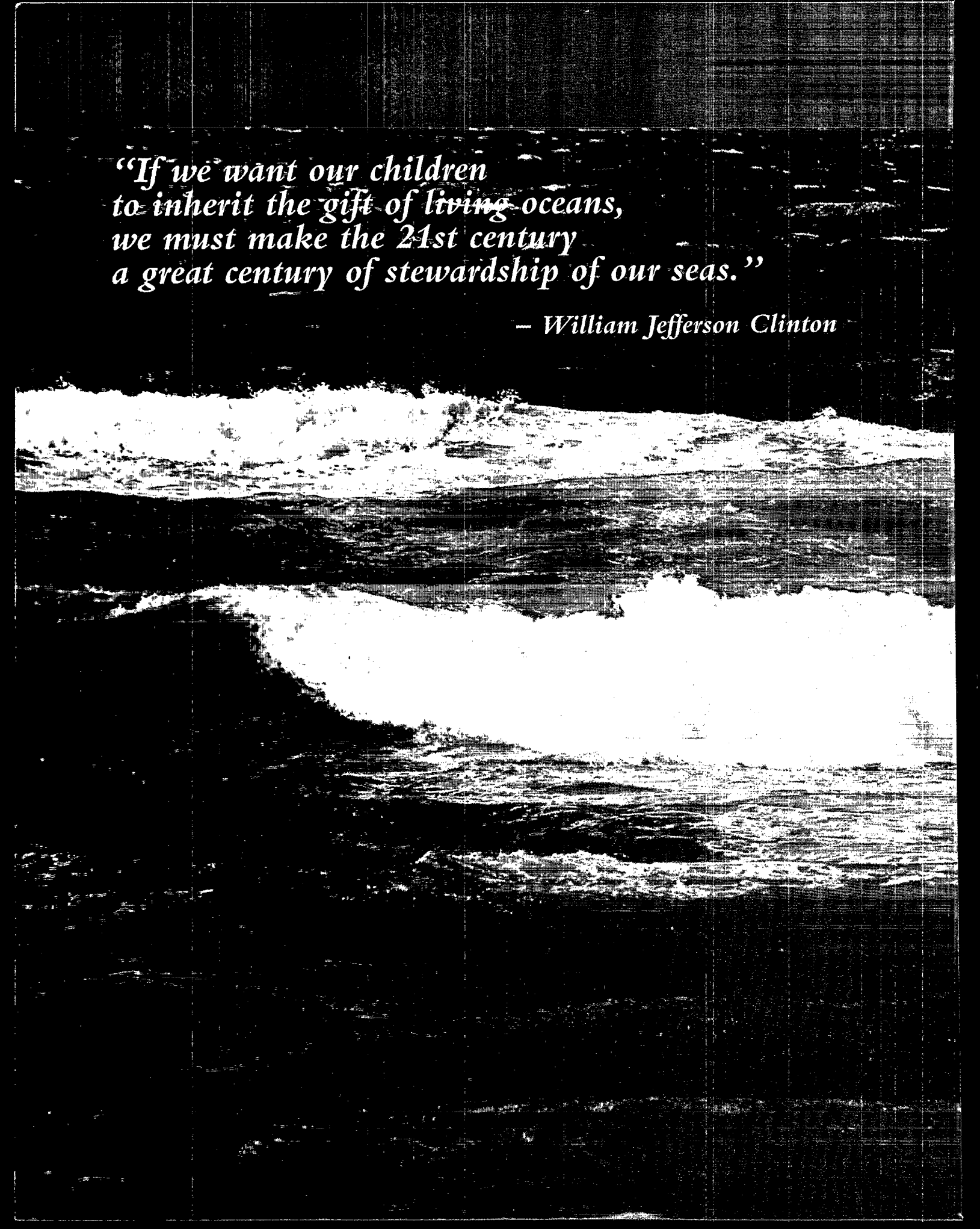
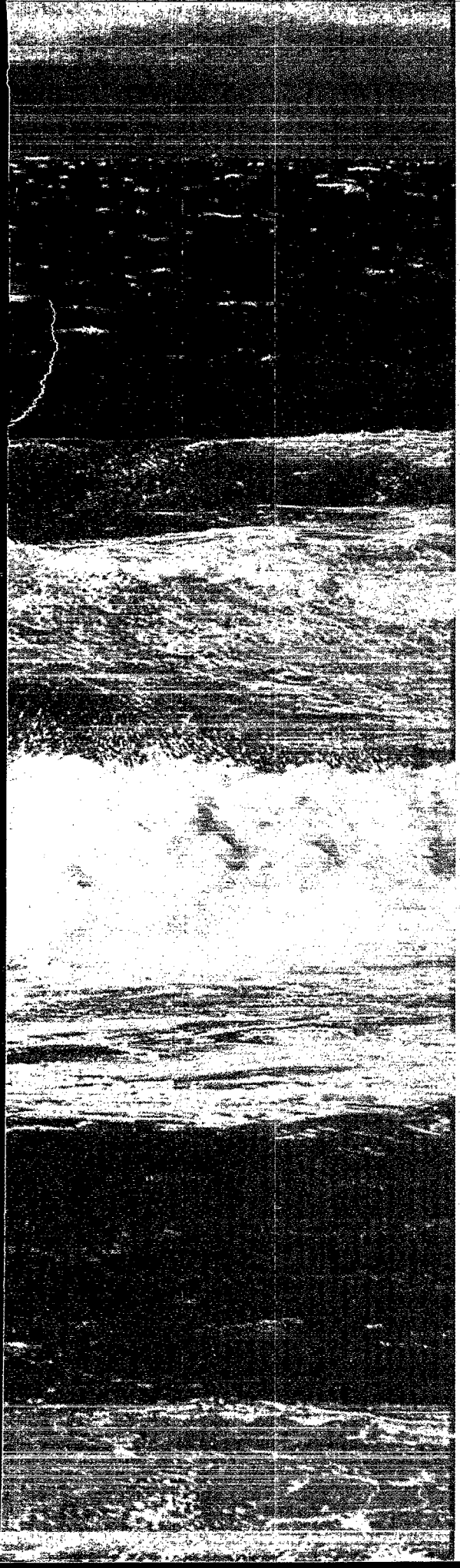
NATIONAL OCEAN CONFERENCE

Oceans of Commerce
Oceans of Life

June 11–12, 1998
Naval Postgraduate School
Monterey, California


"If we want our children
to inherit the gift of living oceans,
we must make the 21st century
a great century of stewardship of our seas."
– William Jefferson Clinton



NATIONAL OCEAN CONFERENCE

Oceans of Commerce Oceans of Life

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"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. This is the day we move full speed ahead to a brighter future for the oceans and for the economy."

– Vice President Al Gore

"It's important for all of us to pause and consider what we wan to leave to future generations, an how we'll honor the past and imagine the future and give gifts to those who will live out their lives in the 21st century."

– First Lady Hillary Rodham Clinton

PHOTO: RONALD BELL, U.S. DEPARTMENT OF COMMERCE

"We've made the investment needed to venture into the skies, and it has paid off mightily. We've neglected the oceans, and it has cost us dearly. This is the time to do for [the oceans in] the 21st century what our predecessors did for space. This Year of the Ocean marks the beginning for the millennium of the oceans."

– Dr. Sylvia A. Earle

Foreword

The United Nations proclaimed 1998 the International Year of the Ocean. As part of the ongoing Year of the Ocean activities, the Department of Commerce and the Department of the Navy co-hosted the National Ocean Conference on June 11 and 12, 1998, in Monterey, California. The purpose of the conference was to highlight the important role the oceans play in our daily lives and to raise awareness of ocean issues among the public and all of the key stakeholders: government, business, academia, environmentalists, and other nongovernmental organizations. The National Ocean Conference set out to focus the critical dialogue that must develop for our own collective national and global interests in the oceans for the 21st century.

Almost 1,000 individuals participated in the conference at Monterey with nearly 1,000 more active participants at 33 conference satellite downlink sites across the nation. Thousands more viewed the conference over the Internet, and several television stations provided live coverage. As the first truly national meeting on the ocean, the National Ocean Conference was a historic achievement and an important beginning. It successfully raised ocean issues to a higher priority on the national agenda and began a serious dialogue among those who will help shape the future of the world's oceans.

It is our hope that the issues raised at the conference will become part of a national dialogue on sustaining our oceans not only among policymakers and the ocean community, but also among our nation's schoolchildren and the general public. It is there that dialogue and action will guarantee the important balance that we must maintain, globally, for the use and conservation of our world's greatest resource—the oceans.

John H. Dalton
Secretary of the Navy

William M. Daley
Secretary of Commerce

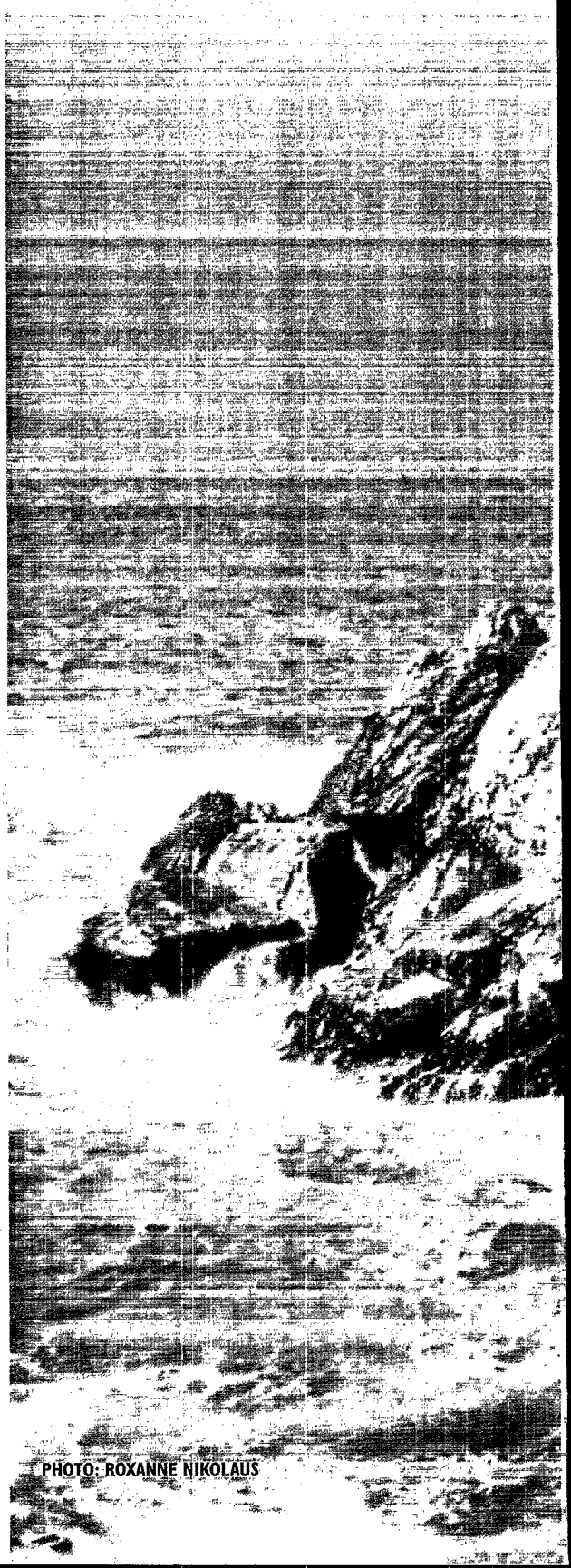


PHOTO: ROXANNE NIKOLAUS

Ocean Initiatives for the 21st Century

Below is a summary of the initiatives President Clinton announced during the National Ocean Conference. The President and Vice President are proposing an additional $224 million through 2002 to support these efforts. The full text appears on page 186.

Building Sustainable Fisheries

The Administration announced measures to reduce overfishing, protect essential fish habitat, and sustain fishing communities, including a ban on the importation of undersized Atlantic swordfish ($194 million).

Creating Ports for the 21st Century

The Administration launched an $800 million ports modernization and safety program, financed by a proposed new Harbor Services Fund, to handle the expected increase in vessel traffic in the 21st century.

Joining the United Nations Convention on the Law of the Sea

The President called on the U.S. Senate to recognize the breadth of support among all sectors of the U.S. ocean community to ratify and join the Convention to maintain America's leadership in international ocean affairs.

Protecting Coral Reefs

President Clinton signed an Executive Order directing federal agencies to expand research, preservation, and restoration activities and announced the completion of restoration of 18 damaged reefs in U.S. waters ($6 million through 2002).

Protecting Our Oceans from Offshore Oil Drilling

The President issued a directive extending the moratorium on offshore oil and gas leasing for an additional 10 years and permanently barring new leasing in national marine sanctuaries.

Exploring the Last U.S. Frontier

The Administration is launching a program to map and explore U.S. ocean waters with advanced underwater technology to unravel deep-sea mysteries and discover ocean opportunities ($12 million).

Protecting Our Beaches, Coastal Waters, and Health

The Vice President announced a new Web site listing beach advisories and closings and a coordinated strategy to respond to toxic algal blooms. He and President Clinton called on Congress to fully fund the Administration's $2.3 billion Clean Water Action Plan.

Monitoring Climate and Global Warming

The Administration announced an expanded ocean monitoring system in the North Atlantic and North Pacific to better understand the role of the oceans in shaping our weather and climate ($12 million through 2002).

Providing Public Access to Military Data and Technology

The Administration announced the declassification and release of classified Navy data to help increase our understanding of marine life and enhance weather forecasting and climate change research. The Department of Defense will produce computer-based nautical charts to replace paper charts.

Opening Address

Vice President Al Gore

(From the Cross-Cutting Issues Plenary Session)

Welcome to the nation's very first National Ocean Conference. It's fitting in this International Year of the Ocean that the United States of America have this conference. And it's fitting that we come here to this spectacularly beautiful location—where the awareness of the importance of our oceans is so high—in order to have this conference.

Thomas Mann once wrote that "The sea is not landscape, it is the experience of eternity." I think all of us at some point in our lives have felt that sense of romance with the ocean—the sense that those dark-blue waters are much more than a source of food and commerce and scientific insight. They're also a source of inspiration and pride, and perhaps the single greatest natural treasure on God's Earth. That's why this conference is actually so long overdue. There's no other natural resource upon which we depend so much but about which we know relatively so little. Together, we must find new ways to protect and explore and harvest the oceans that are so crucial to the fabric of life itself.

Increasingly, our relationship to the world's oceans is changing significantly with rapidly increasing population and with new technologies that are magnifying our ability to exploit natural resources. One needs to think only briefly of drift nets, but there are many other technologies as well. A lot of the technologies are great blessings, but some of them have side effects that weren't fully anticipated. Some of them, when used to the maximum by the billions of people on Earth, can exploit beyond safe thresholds.

There's no doubt that oceans have become a rich source of economic growth. They sustain one out of every six American jobs now. Our coastal areas produce 85 percent of all tourism dollars, and our beaches are now the leading tourist destination in America.

The spectacular beauty of the California coastline is world renowned. I'm one of the millions of people who have had my breath taken away by the spectacular beauty here. It's amazing and unique. Yet, in many areas of our coastal waters and elsewhere in the world, too many of our precious waters suffer from overfishing and pollution threatening our food and water and jeopardizing the beaches where our children swim.

Our oceans are an endless universe of exploration and discovery. They're home to the dazzling coral reefs that are, as some say, "the rainforests of the sea," the key sources of biodiversity, and, thus, the sources of lifesaving medicines and treatments. New discoveries are being made all the time, especially since the mysteries of DNA have begun to be unraveled.

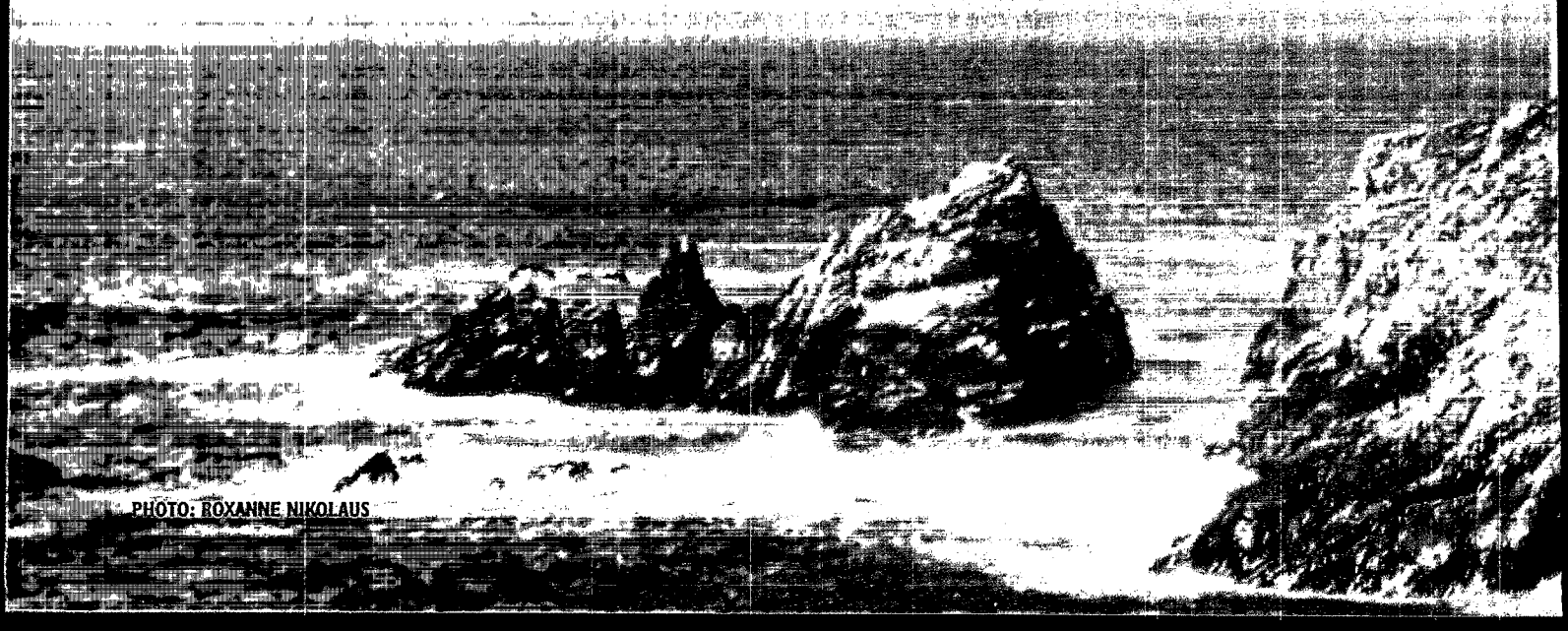


PHOTO: ROXANNE NIKOLAUS

The oceans are also a crucial barometer of weather and climate. This past year, with El Niño hitting us the way it did, has reminded all of us freshly how important is the connection between what goes on in the oceans and what goes on in weather and climate. But for all of the potential in those ways and in other ways, oceans are surprisingly too often a neglected scientific resource. Until very recently, we knew more about the surface of the moon than we did about the ocean floor.

I'm pleased to announce, on behalf of the President, several new initiatives that will dramatically increase our understanding of the oceans and our efforts to protect them:

- We will launch a new $12-million effort leveraging tens of millions more from industry and foundations to explore and map the U.S. domestic ocean, to find new forms of marine life, to discover lifesaving pharmaceuticals, and to finally assess the full economic value of our oceans.

- We will launch new partnerships with states, local communities, and the private sector to sharply reduce pollution in coastal waters and also make the information available instantly to the public on when beaches have to be closed and why.

- We will develop a new and sophisticated ocean monitoring system to give us a much better understanding of that critical relationship between oceans and global warming.

- We will release to the public previously top-secret Navy and military data about the oceans—data that do not compromise our national security and that will teach us a great deal more about climate and weather systems.

- We have strengthened our efforts to protect and restore our fragile coral reefs through an Executive Order signed by the President on June 11, 1998. We are proposing an additional $6 million to further this effort and restore damaged reefs in the Pacific, in the Atlantic, and in the Gulf of Mexico.

Of course, we have much more to do, and that's why we're here. We have an agenda that's coming out of each one of the conference's four issue forums:

- Oceans and Commerce—As ports flourish and tourism continues to grow, we must look for creative and sustainable ways to harness the growth that comes from fishing, shipping, recreation, and tourism.

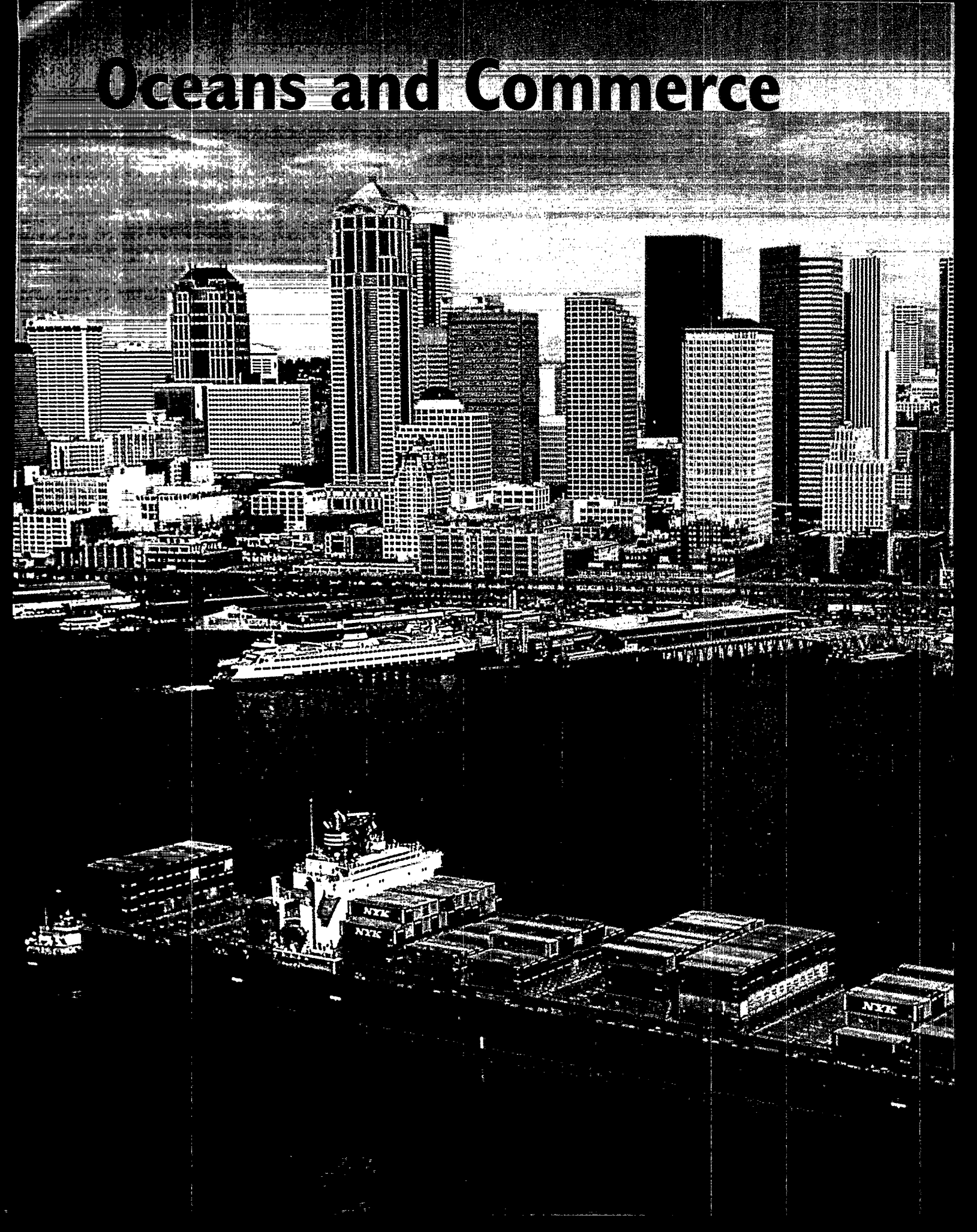
- Oceans and Global Security—With so much of our security and trade floating upon those dark-blue waters, freedom of the seas is in our clear national interest. We must work with other nations to safeguard it.

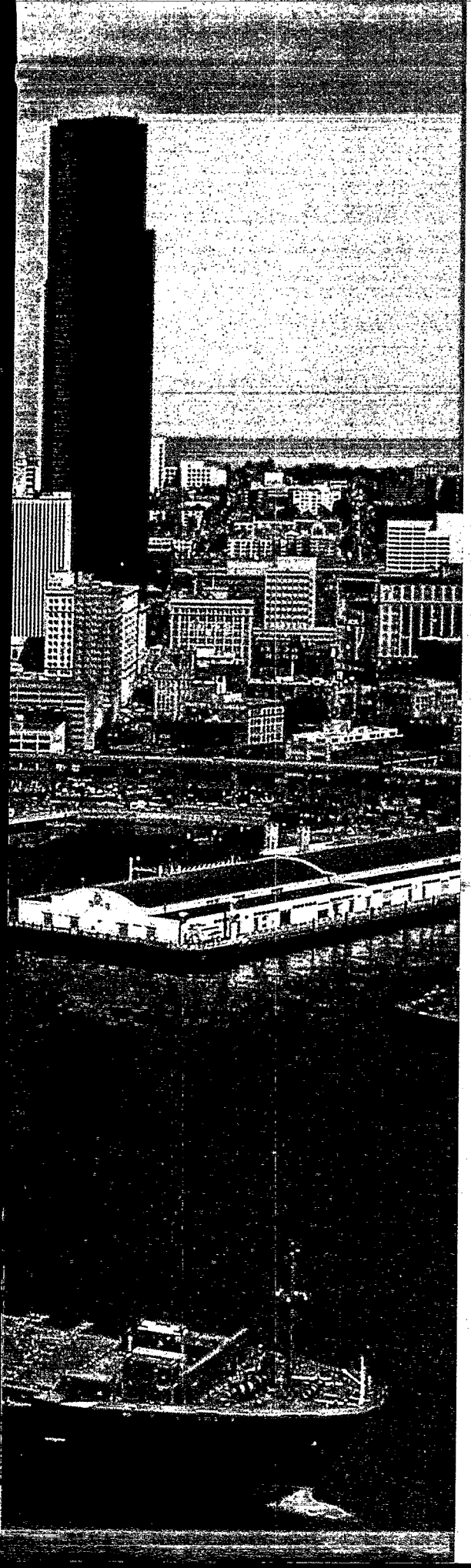
- Ocean Environment and Health—We must balance the economic growth that comes from our seas and the fish and fragile ecosystems that thrive in them.

- Ocean Exploration, Education, and Research—In the 21st century, the oceans can yield profound new scientific breakthroughs. We must seize these new opportunities now because we don't have a moment to waste.

This conference and the work of its participants can help us develop a comprehensive agenda to protect and harness our oceans for the 21st century. There's no greater challenge for all of us and for our nation.

Oceans and Commerce





As ports flourish and tourism continues to grow, we must look for creative and sustainable ways to harness the growth that comes from fishing, shipping, recreation, and tourism.

PANEL CO-CHAIRS

THE HONORABLE D. JAMES BAKER
Under Secretary for Oceans and Atmosphere
Administrator, National Oceanic and Atmospheric Administration
U.S. Department of Commerce

THE HONORABLE JOHN GRAYKOWSKI
Acting Administrator, Maritime Administration
U.S. Department of Transportation

PANELISTS

PHILIP ANDERSON
Director, Interjurisdictional Resource Management
Washington Department of Fish and Wildlife

THE HONORABLE MADELEINE Z. BORDALLO
Lieutenant Governor of Guam

RICHARD DU MOULIN
President and CEO, Marine Transport Lines
Chairman, International Association of Independent Tanker Owners

CHARLES W. FOSTER
Executive Director, Port of Oakland

DR. M.R.C. GREENWOOD
Chancellor, University of California/Santa Cruz

ROGER MCMANUS
President, Center for Marine Conservation

THE HONORABLE RON SIMS
King County Executive

JEKABS "JAKE" P. VITTANDS
President, Metcalf & Eddy

FACILITATOR

LEE LANGSTAFF

PHOTO: PORT OF SEATTLE

Oceans and Commerce

Panel Co-chair Introductory Remarks

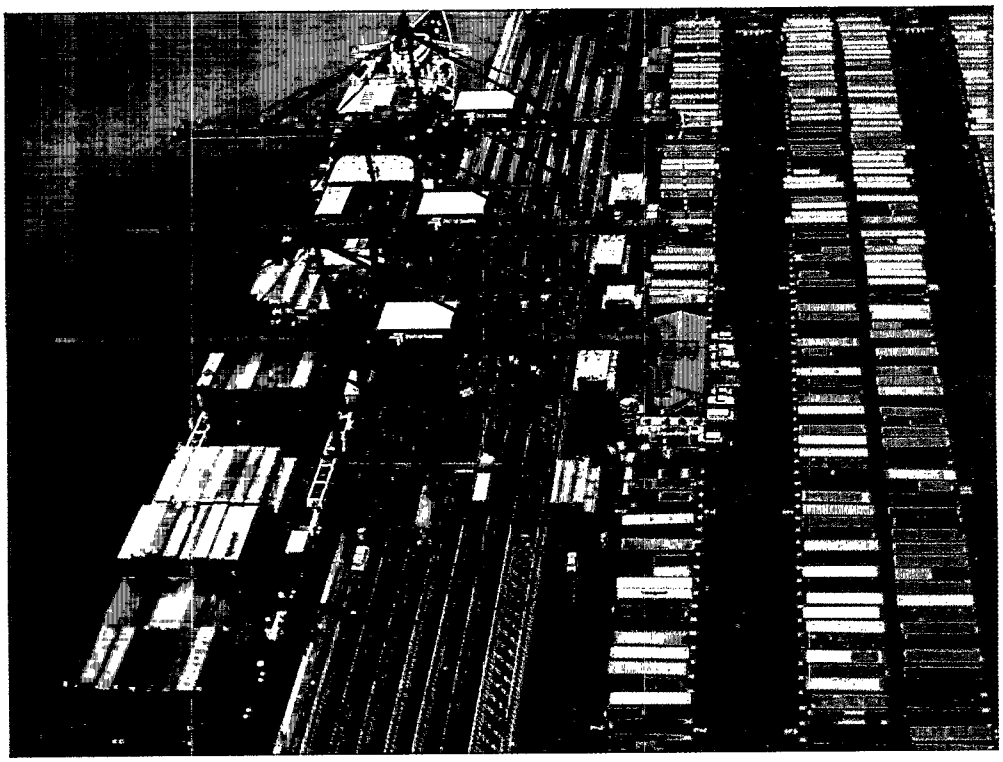
The Honorable D. James Baker

Under Secretary for Oceans and Atmosphere; Administrator, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

Good morning, everybody, and thank you for being here. One of the points of the conference was to be able to create this shared vision of the future for ocean issues.

I'm Jim Baker, Under Secretary for Oceans and Atmosphere at the U.S. Department of Commerce and Administrator of NOAA [National Oceanic and Atmospheric Administration]. I'm especially pleased to be co-chairing this session with John Graykowski, who is the Acting Administrator of the Department of Transportation's Maritime Administration [MARAD]. John came to MARAD recently, in 1997, but has 14 years' experience in Congress, including the Senate Merchant Marine Subcommittee.

It's a great pleasure for me and John to be here as co-chairs to kick off this exciting and ground-breaking conference. As President Clinton said in his 1998 statement about the Year of the Ocean, "This provides us with an extraordinary opportunity to learn more about the ocean's unique environment and to collaborate on protecting and preserving its invaluable resources." This conference is a milestone in enabling us to do that.



More than 95 percent of foreign trade by tonnage comes to U.S. ports by sea. Maritime transportation is the safest, cleanest, most efficient, and most economically sound means of transporting large quantities of goods over long distances.

Photo: Port of Seattle

A key purpose of the conference is to significantly broaden the dialogue that we currently have, to introduce a sense of community among the multiple communities that have committed to the use, sustained health, and exploration of the ocean. That's why you'll find fishermen, farmers, teachers, coastal, corporate, scientific, academic, and government leaders all sitting here together. I hope you'll seize this opportunity to have a dialogue with your colleagues during the conference and afterwards, because everyone's perspective is important.

We have a very distinguished and diverse panel to address the issues of commerce, "Oceans of Commerce, Oceans of Life" being the theme of our conference. Let me just say a few words about the role of the Department of Commerce, and then I'll turn to the other panelists. We're committed to balancing the economic potential of the sea with safeguards to make sure that resources aren't carelessly depleted. We know that the economy and the environment require informed planning, stewardship, and partnership. We're here to consider challenges and opportunities that we face together in balancing economy and environment.

We still don't have a good economic estimate of the value of our territorial sea, our 200-mile zone. We said today in the film that:

- One out of every six jobs in the United States is marine-related.
- Fisheries add about $20 billion to the U.S. economy.
- Ninety-five percent of foreign trade by tonnage comes to our ports by sea.

- Coastal tourism and recreation are the largest and fastest-growing segment of the U.S. service industry.
- We are seeing more and more push for deep-sea drilling—very deep-sea drilling—for oil and gas as it becomes technically feasible.
- The telecommunications industry continues to explode, and a part of that is looking for a vastly increasing undersea global cable network.

We at NOAA have been working hard on developing better partnerships. We're implementing tough new laws that help us bring back our depleted fisheries and manage them so that they'll be preserved for the future. At the same time, we've been assisting communities that have relied solely on fishing to find other opportunities to build coastal economies.

We are also looking to expand fisheries. We're strongly supporting biotechnology and aquaculture. Just in the past few years, research funded by our National Sea Grant Program has yielded five drugs with a potential market value of more than $2 billion annually. In the coming years, development of ecologically sound aquaculture techniques can play, we believe, a key role in meeting global food needs.

We've also developed and are operating a PORTS—a physical oceanographic real-time system. This provides real-time water level, current, and other oceanographic and meteorological data to help shipmasters and pilots avoid costly groundings and collisions so they have accurate data to operate with.

Our coastal zone management program is another very good partnership. It spurs solid federal–state cooperation programs, enhancing our nation's coastal resources, while fostering vibrant and prosperous coastal communities. Thirty-two of the 35 eligible states have currently signed up for that program.

But we need to do more. We must come up with an overall plan to govern the precious ocean resources for all Americans. To do so, we need to educate Americans that the health of the ocean is vital to the quality of all of our lives and our economy. Collectively, we need to learn how to make oceans healthier and to use their resources in a sustainable way.

I feel very lucky to be part of this stewardship and to work in partnership with so many others across the country who are so committed to balancing commercial uses of the ocean with protection of these vital resources. We believe partnerships are key to effective stewardship of the ocean. The health of the ocean is everyone's responsibility, and it's everyone's business. No one factor is responsible for the decline, and no single solution will turn things around. But we do have control over how we collectively and cooperatively exercise that control. This conference offers us a unique opportunity to begin laying the groundwork and charting a sound course for the 21st century.

The Honorable John Graykowski

Acting Administrator, Maritime Administration, U.S. Department of Transportation

I'm John Graykowski. I'm the Acting Administrator of the Maritime Administration, which is one of the modal administrations of the Department of Transportation. Along with our sister agency, the United States Coast Guard, we are the two preeminent agencies in the United States government that are involved in all aspects of commercial maritime transportation. We join this panel today, which represents in a great way a small slice of the diverse interests and the diverse uses that the oceans bring to our country and our economy.

My primary focus, as a part of our Department of Transportation and Secretary [of Transportation] Rodney Slater's representative here today, is to bring some thoughts in mind to the issues relating to marine transportation, because our oceans, as you heard this morning from Secretary Dalton, are indeed an integral part of our seamless global

We must come up with an overall plan to govern the precious ocean resources for all Americans. The health of the ocean is everyone's responsibility, and it's everyone's business.

– The Honorable D. James Baker

In the coming years, development of ecologically sound aquaculture techniques may play a role in meeting the global demand for seafood.

Photo: ©1998 Harbor Branch Oceanographic Institution, Inc.

transportation network. Since our nation began, our survival and growth in the world economy have been linked to the maritime industries and the maritime transportation system. This is no less true today, for without an effective, safe transportation system, we as a nation cannot maintain our global economic leadership or fulfill our vital national security and global security missions.

Marine transportation, whether on the ocean or on our vast inland waterway system, is probably the second oldest form of transportation. Since the dawn of time, mankind has been using this indispensable, God-given form of transportation to carry goods throughout the world. Today we realize, just as the founders of our nation realized, that we're an island nation whose security and future are dependent on our ocean resources and on marine transportation.

As you heard this morning, more than 95 percent of everything that comes in and out of this country comes in and out on a ship. The global trade that has underpinned the tremendous growth that our country has benefited from in these last decades couldn't have occurred and wouldn't be possible without the massive technical changes the marine transportation industry has brought to bear over these last decades. I'm sure everyone will agree that this will remain the case for all time, since marine transportation remains the safest, the cleanest, the most efficient, and the most economically sound means of transportation for large quantities of goods over long distances.

For example, a ship loaded with one metric ton of goods sails further and causes less air pollution per gallon of fuel than an airplane. Ships and barges have the fewest accidental spills or collisions of all forms of transportation. Ships and barges routinely load and discharge millions and millions of barrels of petroleum around the United States, from Alaska to Maine, with accidental discharges—fortunately very rare and exceptional—generally marked in quarts and ounces.

Oceans are also critical to our economy, as we heard, which is dependent on trade to link America's businesses to water transportation and ensure that low-cost goods and services are available to consumers worldwide. In the last decade, growth in U.S. exports has been responsible for one-third of the nation's economic growth.

Ocean-borne commerce in and around the United States is expected to double—and perhaps triple—over the next 15 years, which will put far more stress on our already burdened port and waterway infrastructure. This is why, along with the Coast Guard, Secretary Slater has begun a waterways management initiative to address and identify and move forward on all of the concerns relating to our marine transportation system. We must meet this challenge if our country is to remain in the position it's in and indeed grow over the next century.

Most people don't ever consider the direct benefits we receive as a country from marine transportation. For example, a pair of shoes made in Asia costs $50. Of that, roughly 50 cents of it is related to the cost of transportation. Without marine transportation and the ports, California wine couldn't be sold in Europe. Shoes and clothing from Asian markets couldn't be sold here.

The point is that America is no longer an insular marketplace. And we all, as consumers in this country, have come to expect and rely on the fact that much of what we consume is provided from global markets. These expectations won't diminish; rather, they'll only grow as our world economic ties grow stronger. Thus transportation, which puts real life to all trade agreements, must keep pace with this growth and continue to be the least-cost element in trade.

None of this will happen without our port and waterway transportation system. Our country is only as good as our ports, which are in every sense custodians for coastal communities. Each year, ports contribute millions of dollars to our economy and thousands of jobs. Shipping, shipbuilding, ports, and the sea are intricately interwoven in our tapestry. Hundreds of thousands—indeed, millions—of jobs are directly or indirectly related to ocean transportation and ocean commerce. These industries have been our heritage, and they've been engines for our economic growth and all of the benefits we realize today. This has been true from the days of Nantucket and will be to the days of tomorrow's mega-ships.

Our challenge today is to preserve this heritage, to strengthen it, and at the same time maintain the essential balance among all worthy parties. Oceans of commerce are truly oceans of life, and with our stewardship and our common commitment, they'll remain so for our children and beyond. This conference won't succeed without all of you bringing to bear your thoughts and your commitment and what you believe to be necessary to make all of us truly part of our oceans of commerce and oceans of life.

Panelists' Statements

Jekabs "Jake" P. Vittands

Jake Vittands is President and CEO of Metcalf & Eddy, a corporation involved with water quality and wastewater management and other similar issues.

My interest in the ocean began long before I was involved professionally. As a high school student, I worked on a commercial fishing boat in

New Bedford, Massachusetts. Now I live in another important fishing community, Gloucester, Massachusetts, and much of my recreational life is ocean-based. Therefore, this conference represents a rare opportunity for me, and I'm grateful.

My comments center around the need for the continued focus on the ocean environment as part of the inevitable urbanization of our world. Urban harbors provide access to the ocean's wealth, refuge from its fury, and, increasingly, home for much of the world's population. But our coastal ecosystem is at risk. Population growth and urban sprawl are resulting in growing loads of sewage and other wastes, loss of critical wetland habitats, overdevelopment of beaches, and destruction of prime fish nursery areas.

Let me start my remarks by giving a few statistics:

- During the next 25 to 30 years, the number of people living in urban areas is expected to double.
- Right now, about 60 percent of the world's population lives within 60 miles of the ocean. This will grow to 75 percent, or almost five and a half billion people, in the next 15 to 20 years.
- Much of the population is clustered in coastal mega-cities of eight million people or more. In fact, 9 of the 10 largest cities in the world are on sea coasts.
- In the U.S., coastal populations are growing faster than the nation as a whole. Estimates show that coastal populations will grow by almost 25 percent, to 165 million, in less than 20 years.

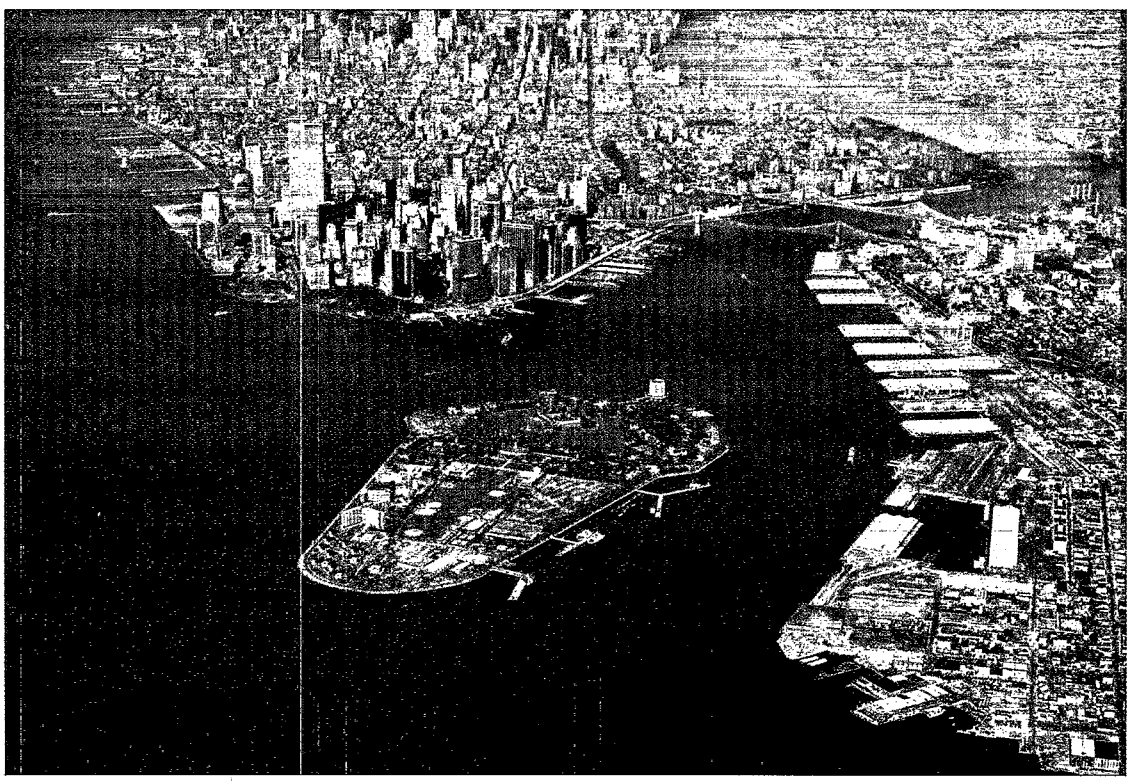
Happily, American cities are experiencing a rebirth. With new growth in business and tourism, every one of the 10 largest American cities is experiencing lower unemployment now than it was in 1993, and the average pay for city jobs is growing faster than for suburban jobs. One of the drivers behind this urban renaissance is the quality of life that cities can provide. In places like Boston, Baltimore, King County and Seattle, and San Diego, sparkling and vital harbors are the backbone for this economic growth.

Although it is difficult to place a precise total economic value on coastal and ocean resources and activities in the United States, some estimates, based only on payroll employment in coastal communities, have demonstrated that economic activity contributes to more than 30 percent of the gross national product. Try buying property near the ocean in an urban area. Coastal and marine resources provide the basis for much of this economy, including ocean-related tourism, recreation, sport and commercial fishing, as well as other marine industries, transportation, and manufacturing.

An example of how a healthy harbor begets a healthy economy is the cleanup of Boston Harbor. This massive project to control wastewater and contaminated runoff from two and a half million people in the greater Boston area began in the mid-1980s. By the time it is completed next year, it will represent an investment of over $4 billion.

The investment is already paying off. Cleaner waters paved the way for the designation of 30 Boston Harbor islands as our newest national park, with projections of up to half a million visitors a year pumping $200 million annually into the Boston economy. Commercial lobster and

Much of the world's population is clustered in coastal mega-cities of eight million people or more.



shellfish harvests from the harbor are valued at more than $10 million annually. The governor of Massachusetts and the mayor of Boston have announced a $30 million Back-to-the-Beaches Program to restore Boston area beach conditions, including new benches, sand walkways, bathhouses, and park areas.

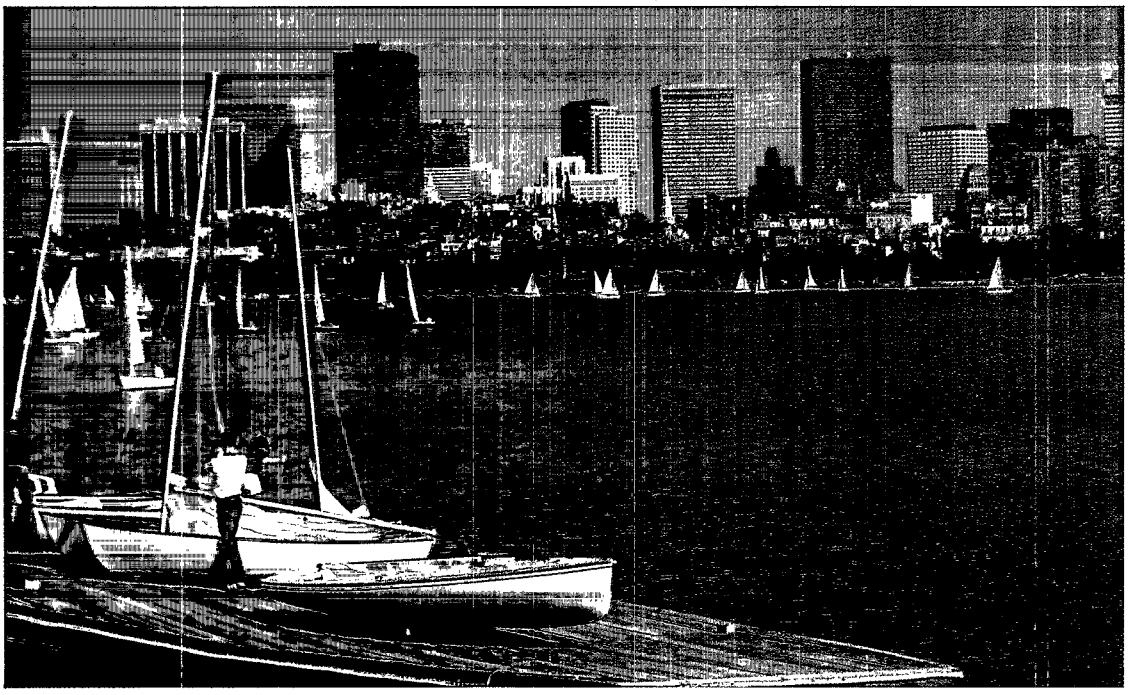
Water-based commerce has seen a resurgence as well. The Port of Boston has developed business in both the cruise and the cargo industries, with travelers and freight from around the world arriving and departing from Boston's shores daily. Since 1980, cargo container traffic at the Port of Boston has tripled. And with over 60 ship calls in 1997, the Port of Boston is now considered one of the fastest-growing high-end cruise markets in the country. Researchers at the Massachusetts Institute of Technology recently announced that they had successfully hatched haddock roe using Boston Harbor water, opening the door for a local aquaculture company to produce haddock commercially.

I know that some of this good news is attributable to the robust economy we're experiencing around the country, but I believe that much of this economic success activity wouldn't have been possible in the harbor that was deemed just 15 years ago as the dirtiest harbor in the country.

The challenge remains. We're still consuming far more than our fair share of the world's natural resources and depleting the riches of our oceans faster than they can be renewed. We have long depended on our preeminence around the globe to cast our net further and further afield to provide goods and services to support our society. But I believe that trends toward increasing globalization and population growth in developing countries are pushing us to find a new template for our cities of the future—one that embraces the principle of sustainability by providing a high quality of life for today's inhabitants, while ensuring broad opportunities for future generations.

This focus on sustainability will represent a test both to those of you in the government and to myself and my colleagues in the private sector. Together we must apply our energy and our creativity to finding new policies, new programs, and new technologies for protecting our oceans in the 21st century and beyond. I'm honored to be part of this conference today. Thank you.

Sparkling and vital harbors are the backbone for urban renaissance and economic growth in cities like Baltimore, Boston (below), Seattle, and San Diego.



The Honorable Ron Sims

Ron Sims is Executive of King County, Washington, which includes Seattle, the center of maritime economy in the Northwest.

Good morning. I'm honored to be here this morning, and it's a pleasure to have this opportunity to participate in this conference.

I grew up in Spokane, Washington, which is a landlocked community 300 miles east of Seattle, Washington, bounded on the west by the majestic Cascade Mountains and on the east by the Idaho Panhandle. The oceans of my childhood were merely large bodies of water that were larger than Idaho's Lake Coeur d'Alene, and in most cases a great deal warmer. Once in a while we'd debate whether the Vikings or Columbus first traversed these huge bodies of water to discover America. Later on, a lot of us smiled as we realized that adults could be so wrong for such a long time by believing that the Earth was flat because they couldn't see over the ocean's horizons. Little did I know that the migratory journey of the salmon that began close to my home in Spokane at Red Fish Lake and ended 900 miles later would have such a dramatic impact upon my life.

I'm the elected County Executive in King County. King County is one of the largest counties in the United States. We have a budget of $2.7 bil-

lion annually and over 19,000 employees. King County is growing very rapidly. It has had 197 consecutive months of sustained economic growth and an unemployment level of just under 2.7 percent. It helps to be the home of Boeing Aircraft and Microsoft.

Marine waters are the lifeblood of the three most populous counties in Washington State. The use of these waters has quantifiable impacts upon 2 million people. Marine waters have continued to define the region's general economic, political, and social well-being. These waters bring employment, but that same employment produces many challenges that we face.

King County is one of the most trade-dependent metropolitan areas in the United States. We rely on the activities of the Port of Seattle, since one out of every three jobs—approximately 90,000 individuals—is dependent upon port activity. Two-way trade—exports and imports—totals $35 billion annually in our county. King County citizens have the highest per capita income from international trade, more than any other county or state in the union.

Last year, in order to sustain this growth, though, we had to invest $350 million of local funds to have what we call a fast quarter project, which would complement port development to sustain our economies. What you're going to hear me do is go through a litany of things that we in local government face in terms of what impacts marine environments have on our lives.

King County, one of our suburbs—the City of Renton—and the Boeing Company all participated recently in the financing of a major river-dredging or scalping project, which included the creation of a new fisheries habitat and levee reconstruction. Although I fretted, as did Boeing, that the Army Corps of Engineers and the National Marine Fisheries Service wouldn't agree on the project details, they did so. Now Boeing can continue to manufacture 737s on the bank of the Cedar River, which is the gateway to the chinook salmon-spawning grounds in our region.

All is not well in our state and in our county. We once had an incredible fishery, which has been decimated so one no longer has a coastal fishery of salmon or halibut. No one has a Puget Sound fishery for salmon or halibut. We overfished it and mismanaged it. One of the sad results is that we have now an incredible degree of hostility between the Native American community, which has tribal rights to half our fish. It has become a major political and social issue in our state.

Recently the National Marine Fisheries Service announced the potential listings of the chinook salmon, rainbow trout, Columbia River steelhead, and Washington's Hood Canal chum salmon as threatened. All of those impact substantially the three most populous counties in our state. My county will have to invest $200 million in up-front costs in order to meet those listing requirements, and it will cost us, at minimum, an additional $10 million a year forever. This doesn't include the $70 million that the City of Seattle is going to have to spend to restore one of our major watersheds, or the City of Tacoma's $15 million to restore another watershed in order to meet these listings.

But I'm not complaining. Citizens of my state are paying a large price because prior elected officials thought the world was flat. They believed that the fish were an unlimited resource that could quickly adapt to the impacts of growth and human conditions, and they believed that terrestrial activity had no impact upon the marine environment.

In order to meet the obligations to keep the Puget Sound clean, King County will have to spend $1.2 billion over the next 15 years on a waste treatment system designed to remove heavy metals and to reclaim water. We'll implement that over the next 15 years. We'll need additional funds for stormwater collection. As a result, we'll spend almost $2 billion over the next 15 years to keep our marine environment clean.

I have a list of things I want the government to do. But in closing, when I was in college, I had a huge Afro, sunglasses, T-shirt, jeans, and boots, and came back and told my father that he was irrelevant. I said, "Daddy, you're the mainstream, and the mainstream has left us a quantity of issues unresolved." My son came back from college recently. He's bald-headed, has an earring, T-shirt, jeans, and boots. He said to me, as I was writing his tuition check, "Daddy, you're irrelevant," and listed an encyclopedia of challenges that we had failed to meet, including marine environments.

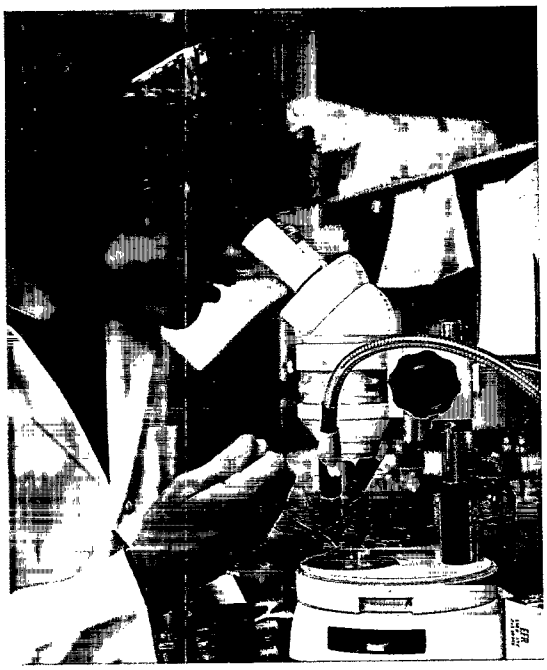
One would hope that we're going to be capable, through this conference and other conferences, of stepping up to the responsibilities to make sure that our oceans, which are an indicator environment of human conditions and activity, are clean. Because if we do that, then we'll have preserved the quality of life that we've all worked so hard to enjoy. Thank you very much.

We're an island nation whose security and future are dependent on our ocean resources and on marine transportation.

– The Honorable John Graykowski

Dr. M.R.C. Greenwood

Dr. M.R.C. Greenwood is Chancellor of the University of California at Santa Cruz and also currently the President of the American Association for the Advancement of Science [AAAS], the largest scientific organization in the United States.



In 1992, there was a substantial growth in patent applications for new biopharmaceutical compounds and products derived from the ocean filed by companies not previously involved in ocean research.

Good morning, everyone. Part of what I'd like to say this morning, as coming from the perspective of a chancellor of a research university and as a biologist myself and president of the AAAS, is that of course we all share the responsibility and the need to pursue economic development. But we also share this complex duty to protect and maintain our natural environment.

The world isn't flat. Oceans can become polluted. We can run out of organisms. We can kill coral reefs. And it's certainly possible that we can destroy the ocean instead of nurture the ocean.

If one accepts the fact that in many ways the environment—and particularly the ocean environment—is our economy, then the question that we face for the future is whether or not the jobs we create are jobs that are helping to nourish the environment and develop the commercial and productive capacities of the ocean, or whether we'll be creating jobs to undo the damages that we weren't smart enough to think about or willing enough to invest in today.

As we know, half of the organisms in the oceans are still unknown. Many of these organisms we have reason to believe will have commercial potential. A particular example that I'll choose for a moment to talk about is the biopharmaceutical area. The University of California [U.C.] has the largest Sea Grant Program in the country. About a tenth of the resources in the nation that come into the National Sea Grant Program come to the University of California Sea Grant Program. Two of those five chemicals that Dr. Baker told you were on the way to a $2 billion market were actually developed by scientists participating in U.C.'s Sea Grant Program.

The patent applications on biopharmaceuticals derived from the ocean are rapidly increasing. The latest statistics in 1992 showed substantial—almost logarithmic—growth in new compounds and products being filed for by companies that haven't previously been involved in ocean research.

Now, of course, the first question to ask is, If we can save lives with these products, can we also save the lives and preserve the organisms that produce these products? Can we use the incredible power of molecular biology and technology today to synthesize and produce independently, having once studied the characteristics and the qualities of compounds that can subsequently then be manufactured, without incurring additional ventures into the ocean?

This is very important to us in California, because our ocean-dependent industries already provide more than 370,000 jobs and $70 billion in annual income. In California, even more people—more than 60 percent—live in the coastal counties. Yesterday, when we were dedicating the NMFS [National Marine Fisheries Service] facility in the area of U.C. Santa Cruz, it was pointed out that 30 years ago, the population of this area was less than half of what it is right now, and it's expected to grow.

What are we doing here in the U.C. Santa Cruz area and the Monterey Bay area? Well, one of the things we're fortunate to have—and one of the reasons I think you're here today—is that there are over 28 organizations in the Monterey Bay Crescent area that are involved in ocean preservation, education, or research. There are almost 1,700 scientists and researchers and educators in this area—a collection of talent that I believe can't be equaled virtually anyplace else in the world or the country. More important, it's a coalition of individuals who don't have all the same perspectives. So we're forced to learn from each other—those whose main interest is conservation and those whose main interest is commerce and those of us who believe our job is to help the young in this country, to help young minds understand that it is, in the final analysis, a question of balance.

Can we find this balance? Can we find it here regionally? Can we make Monterey Bay, a large geographical area, a unique one with a canyon unlike one finds in virtually any other harbor or bay? Can we make this a regional model both for policy analysis and cooperation and also for scientific discovery? That's the challenge that we've put in front of us.

I don't have time today to go through for you the various projects that go on in the area, but if you take the time to look around and talk to people while you're in the area, I think you'll get a good handle on that. Up at our end of the bay—at the northern part of Monterey Bay—we've tried to put together a unique kind of partnership that involves a state facility, a federal facility, the National Marine Fisheries Service, a privately funded facility, the Marine Discovery Research Center—which teaches children and their teachers, K through 12, about the wonderful organisms, but also about research—and of course

our own research laboratories. I believe that sustained commercial use of the oceans requires a well-educated public and work force, and this education has to be both school-based learning outreach, such as the Marine Discovery Centers at all the U.C. coastal campuses, as well as efforts as seen by the phenomenal interpretation of the Monterey Bay Aquarium programs.

I'd like to close by calling your attention to a recent report from the President's Committee of Advisors on Science and Technology, the so-called PCAST report. This report is called *Teeming With Life: Investing in Science to Understand and Use America's Living Capital.* The PCAST report reminds us that our environment furnishes us with clean air, clean water, food, clothing, shelter, medicine, and many aspects of aesthetic enjoyment. It stresses that we must sustain this capital by developing a knowledge base that will allow us to monitor, manage, use, and conserve biodiversity in ecosystems; to discover and study new species and their potential uses; and to explore fundamental ecological principles and design methods of valuation of natural capital. Put that together with the ocean agenda that those of us in the Monterey Bay Crescent Ocean Research Consortium have asked for, and I believe we do have the way. The main question is, Do we have the will? I hope that we can answer some of those questions today. Thank you.

Charles W. Foster

Charles Foster, Executive Director of the Port of Oakland, has been involved in the Port of Oakland for many years and is helping that port, as well as others, adjust to the new world of doubling or tripling of trade by sea.

Good morning. On behalf of the nation's public ports, I'd like to thank President Clinton and Vice President Gore for their leadership in hosting this important conference and extend my thanks for the ability to participate in this forum today.

The U.S. public port industry supports the creation of a national ocean policy. Ports appreciate the focus of this conference and what it will bring in terms of challenges and opportunities we face in managing our coastal resources. Today I'd like to consider three important points regarding the proper management of these resources:

- First, U.S. public ports are looking for a strengthened commitment from the federal government to renew its partnership with ports.
- Second, in that we believe that management and regulation of the ocean and coastal areas have become increasingly complex, especially for port and waterway users, we want to encourage the various federal agencies with jurisdiction over coastal issues to continue along the path of establishing better coordination among agencies and, where appropriate, reduce or eliminate overlapping regulatory jurisdiction.
- Third, despite the complexity of the challenges ahead, we suggest that the ports will continue to be leaders in the stewardship of our coastal and ocean resources.

Now, let me elaborate briefly. The port industry feels that the federal government must reaffirm the 200-year partnership with U.S. ports that has built and maintained the world's finest maritime transportation system. Development and maintenance of transportation infrastructure in the nation's coastal zone are critical to our transportation system and also critical to our ability to compete in the world market.

The worldwide economy is expanding. More and more nations are enjoying improved economic conditions and are entering into a global marketplace. The result is that the volume of goods being traded worldwide is growing at an incredible pace. It is expected to triple by the year 2020. While trade volumes are growing, competitive forces within the maritime trade are greater than ever. Larger vessels and increased volume of air cargo strain land facilities and the capacity of our navigational channels in our nation's ports and waterways.

More trade means more goods will be transported in and out of ports via our nation's highway and rail systems. The need to improve waterway infrastructure, rail, and highway systems is critical. Large ships typically require deeper channels and berths. Channel depths that were sufficient for large vessels just a few years ago are now substandard. The U.S. public port system spends $1.3 billion annually to maintain improved port infrastructure, plus a substantial amount of monies generated by the private sector. West Coast ports will reach capacity by the year 2020.

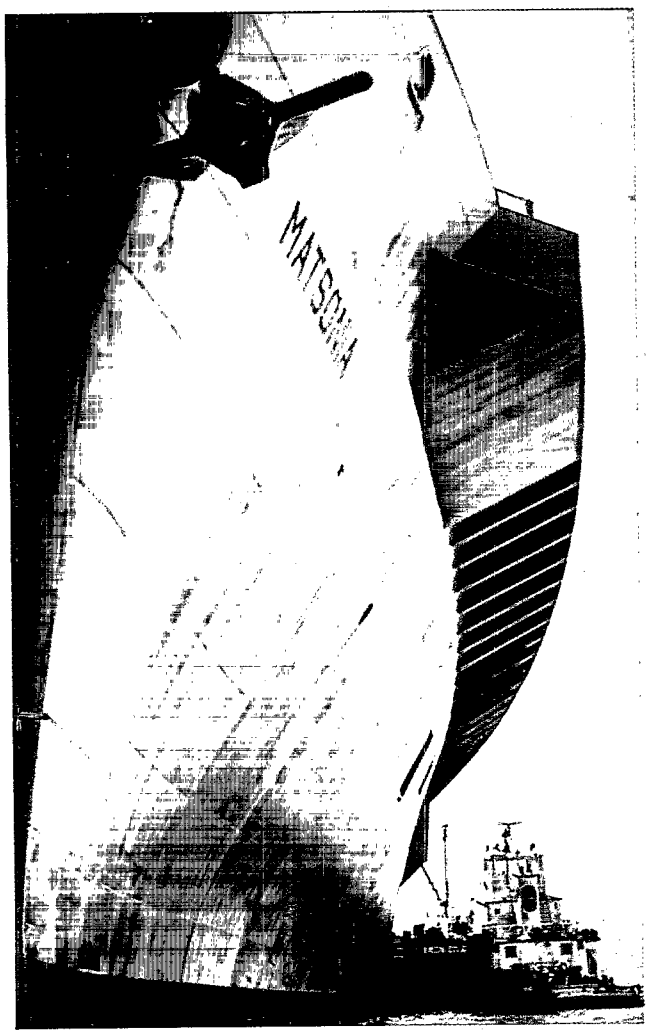
We hope that the federal government will continue its commitment to its partnership in the passage of the Water Resources Development Act of 1998 and recognize the paramount importance of improving and maintaining the navigational channels. In addition, the commitment must be reinforced through the appropriation of sufficient funds to maintain and improve navigational channels, associated infrastructure, and environmental mitigation as required.

Over the last 30 years, we've enacted dozens of individual laws and regulations to address narrowly focused concerns. The time has come to reexamine this system and to develop a more

integrated framework so that fewer resources will be wasted fighting on individual interests and so that decisions are better made in the public's interest.

In 1992, it took the personal intervention of President Clinton to spur an action of public interest. The President told the federal agencies in the San Francisco Bay area to get on with it, to approve a dredging project at my port, the Port of Oakland, which had been delayed for over 20 years because of regulatory inaction. This is not to say, however, that the port and waterway projects should proceed at the expense of preserving the environment. In fact, the Port of Oakland built a 300-acre wetland site as a part of its dredging project.

Ports have been and will continue to be leaders in the stewardship of coastal and ocean resources. Public ports spend millions of dollars each year in developing public access sites; creating, restoring, and enhancing wetlands and other habitats; monitoring water quality; and recycling various materials.



Growing trade volumes have lead to increases in the size of vessels and the volume of ship-borne cargo, straining land facilities and the capacity of the nation's ports and waterways. Channel depths that were sufficient for large vessels just a few years ago are substandard today.

Photo: Chevron Corporation

The oceans are our lifeline. They provide for us the means of connecting global markets. Ports provide the platform for the transfer of goods from ships to truck to rail, as well as facilities for cruise ships, ferries, commercial fishing vessels, and recreational boat operators. The port industry has demonstrated its leadership in developing projects that achieve the economic and environmental objectives, and we stand ready to work with the national commission to develop a coherent, integrated national ocean policy. Thank you.

Richard du Moulin

Richard du Moulin is the Chairman and CEO of Marine Transport Lines and Chairman of the International Association of Independent Tanker Owners, INTERTANKO.

Good morning. The responsible use of the ocean is a prerequisite for America's future success as a nation in a highly competitive world market. But other than the *Titanic* or the *Love Boat* or dramatic coverage of a tanker accident, the maritime industry—ships and ports—is hidden from the public.

There is a major disconnect. People fill up their gas guzzlers, but they hate tankers. The public is more familiar with the airline industry. If suddenly all planes are grounded, vacations would be ruined, businessmen would revert to teleconferencing. But if marine transportation stopped, raw materials wouldn't reach America, grain exports wouldn't get out, and 99 percent of all manufactured exports and imports would cease. Industrial America would come to a halt within weeks. It is our challenge to reach the public and establish a priority that gets political support. I compliment the administration for this Year of the Ocean initiative.

I'm here representing my company and the world tanker industry. My company is Marine Transport Lines. It's the oldest company in America, founded in 1816. It started whaling, and then in the California gold rush, clipper ships brought the forty-niners out here. Maybe some of you still have some of the money that's left over from their prospecting. Today we're moving Alaska crude oil and chemicals along the coast of the United States.

INTERTANKO is the International Association of Independent Tanker Owners, a primary trade organization for our industry. Our members transport the majority of America's oil imports, for example, but I'm unofficially representing all shipping companies—container, dry bulk, passenger, tug, and barge. Why? Because we all have a common interest in America's port systems, infrastructure, and associated regulations. We want to

deal with the issues of dredging, hydrography, vessel traffic control and information systems, pilotage, and terminals all together—what we would call waterways management.

We have a common problem, like blocked arteries putting the heart and the body at risk: an inefficient port system with inadequate investments and waterways and disjointed waterways management. Misguided attempts by some states to create their own vessel operating regulations is jeopardizing U.S. competitiveness, security, and the environment. This affects all ships, all industries, and all citizens, whether they know it or not. Generally speaking, America's port systems pale in comparison to the great ports, such as Rotterdam, Singapore, and Hong Kong.

Focusing for a moment on the tanker industry, we're most visible to the public under adversity. The grounding of one tanker, the *EXXON Valdez,* in Alaska produced OPA 90 [the Oil Pollution Act of 1990], the most complex law in the history of the United States. The tanker industry has never been criticized for service, efficiency, or costs—only for safety. Whether it's fair or not, our poor public image is our greatest challenge.

The reality is that only 12 percent of oil in the oceans comes from tankers. Over 60 percent comes from industry and the public ashore. Every mariner witnesses this when they steam in from the open ocean and approach coastal waters. They note the change in the environment, both air and water.

Another reality is that over 20 percent of the cost of a new tanker is invested in safety and environmental features, which compares to about 6 percent for a typical shoreside plant. Nevertheless, the public is holding us to a zero-pollution standard, and we're working hard to achieve that and to communicate better with the public.

As the tanker industry has gone public and assumed a leadership role for safety, we've picked up more credibility and allies. Two years ago, we established ISM—International Safety Management—certification by IMO, which is the International Maritime Organization. By their deadline of July 1, 1998, we picked ISM as a membership criterion for all our tanker-operator members. As of today, 97 percent of our 273 ship-operating members have ISM certification. If the six or seven remaining companies don't achieve it by July 1, they'll be kicked out of INTERTANKO.

This leadership role for ISM, combined with our 1996 port and terminal safety study of the United States and our high regard for the Coast Guard's Prevention Through People initiative, led us to a formal partnership between INTERTANKO and the U.S. Coast Guard, which Admiral North and I signed a month ago. We're also working in Europe with Dr. Salverani and Neil Kinnock of the European Union on issues of port state enforcement.

The key to economic and environmental success is to recognize that we have a system problem—not just ships—that requires federal leadership. When we need new regulations, they must be consistent with international conventions. The Coast Guard's presence at IMO is a critical part of this process. Transportation Secretary Slater's initiative for waterways management recognizes the concepts of a chain of responsibility and a systems approach. We need to see a long-term commitment to waterways management with the federal government providing leadership and working with the states, ports, and industry and other public interest groups. Thank you.

The Honorable Madeleine Z. Bordallo

Madeleine Bordallo has 40 years' experience working in Guam. She is the first woman to be elected Lieutenant Governor of Guam.

Thank you very much. Greetings from Guam. As we say on Guam, "Hafa Adai." I'm here this morning to deliver the paper on behalf of our governor, Carl T.C. Gutierrez.

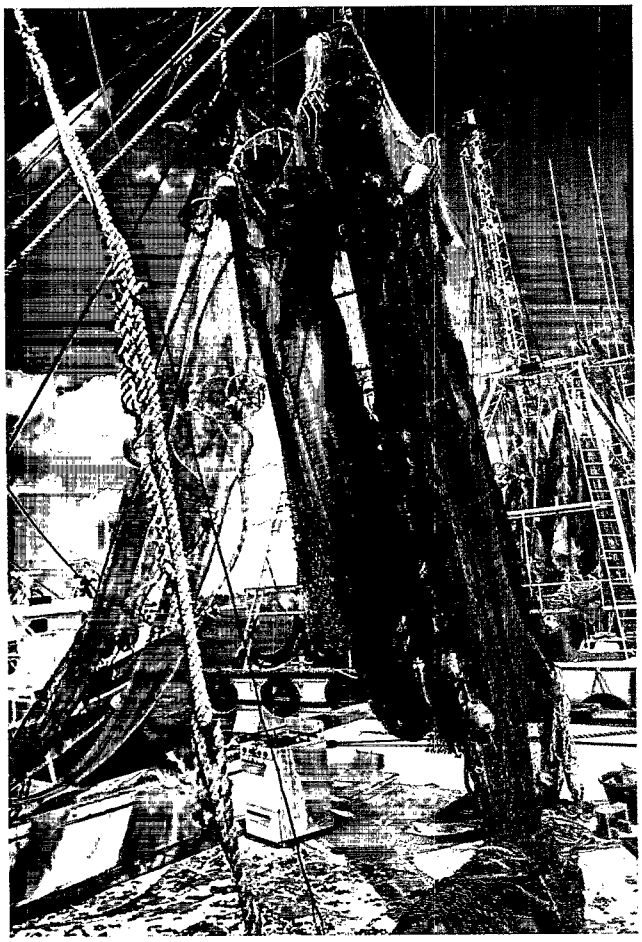
The questions most frequently asked are: What are the problems facing the reefs? What kind of innovative leadership can small islands offer? How can the processes used in coral reef management be translated to the management of the ocean in general?

The single greatest threat to coral reefs today is land-based pollution: point-source discharges in terms of sewage disposal and inadequate design of stormwater discharge, and nonpoint-source pollution from stormwater runoff. The Pacific Islands, and particularly Guam, saw major development investment in the early '80s through the early '90s. This resulted in a massive amount of surfacing and paving of land and discharges into our bays and lagoons, which hadn't been anticipated. We can pass laws and develop programs, such as those mandated by federal statutes to reduce and prevent nonpoint-source pollution, but until the financial assistance to replace outdated systems is available, those laws won't be much more than good intentions.

Overfishing is another major problem for the island. Populations have increased dramatically over the past few decades, putting more strain on the reef resources. The improvements made in fishing equipment and methods have further strained the fisheries. The use of scuba gear in conjunction with spear guns is one of the greatest offenses to our resources. The largest fish, which will produce

This focus on sustainability will represent a test both to the government and to the private sector. Together we must apply our energy and our creativity to finding new policies, new programs, and new technologies for protecting our oceans in the 21st century and beyond.

– Jekabs "Jake" P. Vittands



Rapid population growth, the associated increase in food demand, and advances in fishing gear and methods are adding to the strain on the nation's fisheries and reef resources.
Photo: NOAA

the greatest number of new resources, are the targets of the new fishing techniques.

The lack of public education is another problem in protecting our resources. Reefs are, for the most part, out of sight from the residents. We have to continue to work to keep the reefs at the forefront of public attention.

Finally, larger global-scale problems related to global climate change present a challenge. Coral bleaching and a frightening new number of coral diseases will require that our marine labs devote more resources toward finding the cause and the solution to these problems, and this will require significant support from the world community.

Small islands may provide the greatest leadership in understanding, protecting, and intelligently managing the coral reefs and the reef resources. Guam is demonstrating leadership through several projects. The University of Guam Marine Biology Lab, one of the finest in the world, has developed methods for coral cultivation, which not only brings coral aquaculture into the realm of possibility for small-scale commercial operators, but they have found methods for increasing the rate of growth in the operation. The university is currently working with a private company to develop a commercial coral cultivation facility on Guam. What is the advantage of this? Corals are valuable in the aquarium trade, for research, for biomedical and pharmaceutical use, and for ornamental use.

Our marine lab is also working on the cultivation of certain sponges that grow in Guam's waters and provide medical benefits in the production of substances that are inhibitors of an enzyme that causes inflammation. The known value of the benefit today is $3.3 million an ounce for these substances, and the University of Guam will lead in the research to increase their production both in a laboratory and in nature.

Guam has taken the lead by establishing five marine no-take preserves in order to replenish our reefs. These preserves are permanent and comprise 10 percent of our total reef area. Guam and other small islands are taking it upon themselves to provide the management leadership.

Guam is working toward the development of a new approach to Sea Grant Programs, working as equal partners with the other colleges and universities in Micronesia. Guam is attempting to establish a regional Sea Grant consortium that will serve all the research interests in the region. This is a new concept for maximizing the scant financial resources available and for forming partnerships, which will ensure an expansion of information exchange as well as in-the-field benefits for the resources.

The community of Guam has shown leadership in the private sector through such organizations as Kids for Coral, created by a single teacher and student in one of our schools in 1989. This organization quickly expanded, and participants took it upon themselves to educate the community of Guam about our coral reefs and the dangers they face. The organization has garnered international and national awards and has helped other schools develop similar programs throughout the world.

What is making the coral reef initiatives work on the local level, the regional level, the national level, and the international level is the realization of partnerships. I can't emphasize too strongly the importance of equality at the table. In order to make the process of environmental management work—and the coral reef initiative is the first example where we've seen it works well—every participant must check their ego at the door, forget territorialism, and develop partnerships that more closely mirror marriage than traditional government. There has been very little money available in the coral reef initiative efforts, but there has been a tremendous amount of success because there was a commitment of partners. Success is as simple as that—partnerships.

I'd suggest the coral reef initiative process—particularly the U.S. process that formally began in December 1993—be studied for its initial failures and subsequent successes, and that this serve as the example for undertaking the vaster issue of ocean management. I'd also suggest that the partners who made the coral reef initiative work be integral players in the process of developing ocean policy and ocean legislation or programs. This has been one of the great success stories in resource management, and its understanding will be important in expanding that success beyond the reefs and into the management of our deep-ocean resources.

It has indeed been an honor for me to be here to participate in this very important conference. Thank you.

Philip Anderson

Philip Anderson is the Staff Director of Interjurisdictional Resource Management for the Washington Department of Fish and Wildlife. He also has experience as a charter fishing vessel operator.

Good morning. My name is Phil Anderson. I work for the Washington Department of Fish and Wildlife. I've been a member of the Pacific Fishery Management Council for the past 11 years. I live in Westport, Washington, which is a small fishery-dependent community located along the Washington coast. It has a population of about 2,000.

The Pacific Ocean's fishery resources provided the revenue and jobs that created the foundation for many of the coastal community economies along the West Coast. Indian tribes have historically used and continue to use fishery resources, such as salmon, halibut, and crab, for subsistence and as a source of employment and economic well-being.

Today many of the coastal communities and cultures along the West Coast remain dependent on the economic and employment opportunities generated from the recreational and commercial fishing and processing plants. In 1995 alone, the value of commercial landings for crab, shrimp, and groundfish that were delivered into the coastal ports of Westport and Ilwaco exceeded $45 million. The jobs associated with the processing of these species also represent a vital component of the employment base and economics of those communities. In 1995, over 100,000 recreational angler trips originating from Washington coastal ports generated more than $17 million in revenue. In addition, nonconsumptive recreational activities, such as whale watching and bird watching provide jobs and generate revenue for charter boats, motels, restaurants, and other businesses that rely on ocean recreational activities.

Salmon abundance has declined dramatically during the past two decades, and some stocks are listed or proposed to be listed as threatened or endangered under the Endangered Species Act. The declines have resulted from a combination of factors, including harvest management strategies that overharvested wild stocks to access hatchery stocks; loss of critical spawning and rearing habitat resulting from dam construction, water diversion, pollution, poor logging and agricultural practices, and urban development; hatchery management practices that in some cases compromise the genetic integrity of wild stocks; and chronic poor ocean survival conditions.

Ocean salmon harvest management currently uses strategies designed to be responsive to the needs of wild stocks. However, stock-specific data are limited and, in some cases, inadequate to address specific stock concerns. We must invest in additional resources and research to provide that important information. Efforts to achieve habitat conservation and rehabilitation will be critical for fishery restrictions to result in improved salmon abundance and recovery of depressed stocks.

In some cases, certain groundfish species have purposefully been fished down to levels that are anticipated to result in maximum sustained yield. In other cases, weak stocks and multispecies fisheries have been overharvested to provide access to more abundant stocks. Recent stock assessment results suggest that poor ocean environmental conditions have resulted in little or no recruitment, hastening the decline in some groundfish populations. Halibut populations appear to be robust, and crab populations, while cyclical, have remained healthy.

Groundfish management strategies must be more responsive to the conservation needs of specific species. We must invest in additional research and stock assessments to allow fishery managers to adequately address the needs of individual species. In the absence of quantitative stock assessment information, fishery managers must employ risk-averse strategies, including the use of marine reserves, where appropriate, to protect populations that we know little or nothing about. On-board observer programs or other data-collection strategies are also imperative to accurately account for market- and regulatory-induced discard mortalities.

Finally, we must provide managers with the tools to address the overcapitalization of the fleet. Congress must remove the moratorium on individual quota systems. The Pacific Ocean's fisheries resources can continue to be the source

One would hope that we're going to be capable of stepping up to the responsibilities to make sure that our oceans, which are an indicator environment of human conditions and activity, are clean.

– The Honorable Ron Sims

of important job opportunities and revenue for coastal communities. Fishery management strategies, when accompanied by the necessary investment and research and data collection, can continue to provide recreational and commercial harvest opportunities, while providing strong conservation and protective measures for fisheries resources.

Thank you for providing me the opportunity to participate in this most important National Ocean Conference.

Roger McManus

Roger McManus is the President of the Center for Marine Conservation and has been involved in marine management issues for many years.

Thank you. We've come a long way in recognizing the value and the needs of taking care of our environment. And as I've commented to some of my colleagues on numerous occasions, we should take great satisfaction in the accomplishments that we've made in our more enlightened attitude toward the environment.

To move on to my remarks, to show you how bad the situation has gotten, the radical environmental journal *The Economist* recently featured a story on the oceans in which it notes, "Despite being badly governed, the sea provides vast benefits." The pity is that if people gave the sea a chance, it would repay them handsomely. If people want to preserve the seas and extract the full benefit from them, they must now moderate their demands and structure them. They must take stewardship of the ocean, with all the privileges and the responsibilities that implies.

I know we're going to spend a lot of time over the next couple of days talking about problems, but I'd submit that we try to talk more about solutions because we know the problems well. Nothing new will probably come out of the next couple days that will enlighten us as a community about what problems we face. The Heinz Center and numerous other folks have done a valuable service in articulating those problems very carefully. I'd note, however, that *The Economist* noted that Dr. Baker, for example, was concerned that changes to coastal water chemistry are as serious a problem as global climate change, and, clearly, a number of speakers have looked to population growth and other problems. The oceans are going to be stressed and asked to do more in the future than they can possibly do. The problems are very well known.

Perhaps the biggest problem we have at this meeting is the problem of facing up to reconciling real national security and navigation needs with coastal and marine resources stewardship needs. This is a problem that won't be reaching the surface very often in some forums, but it's got to start here.

Nonconsumptive recreational activities, such as whale and bird watching, provide jobs and generate revenue for charter boats, motels, restaurants, and other businesses that rely on ocean recreational activities.
Photo: Stan Butler

While we shouldn't spend a whole lot of time talking about problems, we should bear witness to them and take responsibility for them. This panel has certainly reflected that sentiment. The real question is, What are we going to do about these problems? I think the focus on this conference needs to be on the Congress. The Congress needs to pass the Oceans Act. It's been 30 years since the Stratton Commission did a stem-to-stern review of national ocean policy, and it is needed again.

We have an Exclusive Economic Zone [EEZ] that is one of the largest, most diverse in the world—larger than the terrestrial territory of the United States. This area should be a stewardship priority for the nation. A panel on commerce and the ocean suggests two perspectives. First, what is the importance of the ocean environment to ocean commerce? As many people on this panel have reflected, the simple and correct answer is, the environment is virtually everything. When we degrade the marine environment and diminish its resources for short-term profits, we pass the costs on to the American public. We've done that over and over again. For example, even in this day and age, we ignore the costs of pollution and public health. We knowingly send millions of Americans to beaches in coastal areas in this country without the decency to make sure that those areas are safe or to inform people of dangerous conditions.

I'll note that we've had a lot of talk about balance on this panel so far, and I'm sure we're going to hear a lot about that over the next couple of days. It's hard to come out against balance, but I'd submit that usually balance in the management of coastal resources has meant degradation. We know what the destinations of the course of balance are. There's declining water quality to balance immediate concerns. There's sickness and disease as a result of balance frequently. Loss of wetlands is a result of balance. Declining fishery production is clearly a loss of balance. If you've been paying attention to what happened in New England, loss of biological diversity is a loss of balance, loss of productivity, and really loss to the economy. We've got to reexamine our priorities in this area.

A second perspective for such a panel is, Are we effectively managing our ocean territory like a business? I'd submit that we're not. We need to be managing our ocean, our EEZ, like a business in stewardship for the American people. We manage it more like we're looking toward the quarterly income and expense statement. If you'll pardon me, I'm from Washington, and I'm not very happy about that. We usually look at things for the next election process.

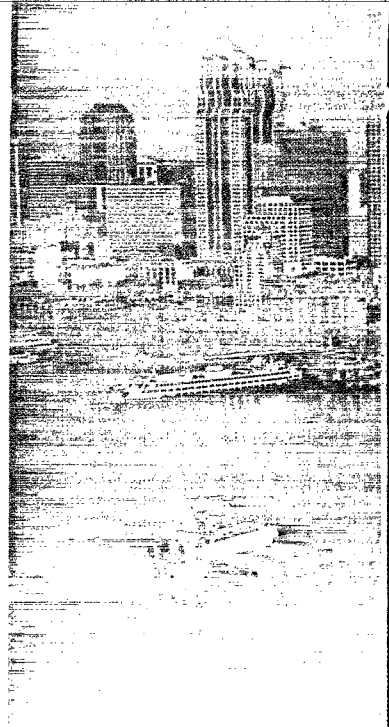
If you look at how we're doing as a business, it's not very good. We stand by, we watch our assets degrade without taking good care of them. We regularly subsidize activities that lose money. We routinely give away the stockholders' property without any compensation to the stockholder, and we have no one in charge overall of our ocean strategy. We have no business plan for this business. We have no plan to take care of the largest territory of the United States of America [the 200-mile EEZ]. We simply have no plan, and that's why we need the Congress to pass the Oceans Act.

Who is responsible for all of these problems? I love, coming from that era, to recall Pogo's statement, "He is us."

We now have an opportunity with this conference—which is an enormous step forward by the administration—to focus on these issues. There is no more important challenge to this forum than confirming the need for a change in our course and establishing a plan for the oceans for the 21st century. There's been a lot of work done in preparation for that. Many of you have received a copy of the ocean agenda prepared by the environmental community, the Heinz Center. Others, as I mentioned before, have also come up with recommendations toward that end. It's a good starting point, but we have to move Congress along and have to get the administration to support the independent commission that would come out of the Oceans Act.

I've emphasized the Congress, but I'm here to tell you that I don't think this administration has given high priority to ocean stewardship. It's just not the same as the other environmental issues that the administration has been concerned about. This conference, I hope, will give us all an opportunity to encourage the President and the Vice President and their staff to change course in that regard.

The plan that we should develop, as *The Economist* notes, must reflect moderation in demands and the structure to ensure their benefits. It must have clear management objectives—not calls for balance, but clear management objectives—based on the best available science. Recognizing that management cannot wait for perfect knowledge, it must prescribe active stewardship above all else. That's the most important opportunity for this administration at this time—not to postpone action to wait for perfect knowledge, but to commit to leadership for ocean stewardship. Ocean stewardship needs to be a national priority. It's not now. It should be there, and this conference should help make it so.



Comments from the Audience

The Honorable John Graykowski

I think this panel and the utility of it will be judged not only on the quality of the individuals—which is remarkable, I'm proud to be a part of it—but it's going to depend in as large a part on what you all contribute at this point.

We want to have what would be termed a "genuine dialogue." We've got to hear from all of you, because we've presented some things here that may have struck you in a positive, negative, or thoughtful way, anything other than a neutral, apathetic, "I don't care" way. We want everybody walking out of here saying, "This was good, this was useful, and we're going to keep thinking," because that will provide the motivation and impetus for us to move forward in the public policy realm, certainly, as well as other areas.

Clayton Cook

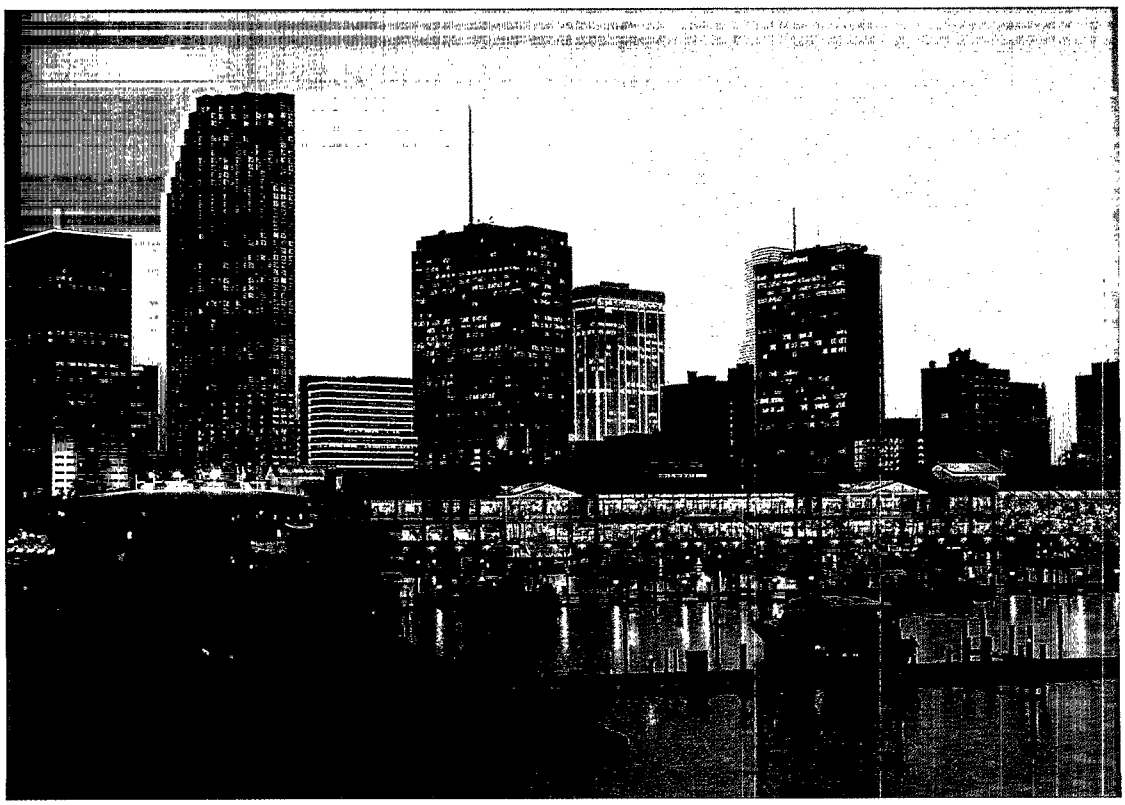
My name is Clayton Cook. I wonder if the Administrator Graykowski could comment on what the Maritime Administration is doing in the development and construction of new vessel designs for passenger and cargo carriage to help in ocean commerce. I have particularly in mind, I think, their Title XI program and their Maritech program.

The Honorable John Graykowski

Two things that Rich [du Moulin] alluded to that I'll mention very briefly, which people don't realize—and I made that statement emphatically, and I do believe it to be true. There is no safer, more economical, or more environmental way to move goods or people than on the water. What has been invested just recently, post–OPA 90, by the marine transportation industry is nothing less than staggering.

Last weekend I was at a keel-laying ceremony where Arco is in the process of spending $350 million on two state-of-the-art, absolutely world-class crude oil tankers that will carry oil between Alaska and Puget Sound. As Rich indicated, a significant percentage—which I think is 20 or 30 percent—of the cost of that is directly related to environmental controls.

That commitment has been echoed and amplified and mirrored by the entire marine transportation industry, which has got it in terms of the message that emerged from the OPA experience. We've been supportive of that. We've been financing ships in that area. Across the cargo spectrum, ships are safer, and they're smarter by themselves. The people running them are smarter, not just due to what we're doing, but what Bob North and the Coast Guard do to work with the industry to make safety truly, as the Secretary terms it, "the North Star we guide our transportation system by."



In recent years, 40 percent of new commercial development and 46 percent of new residential development happened near the coast.

On the people front, and cargo as well, everyone knows how crowded roads are today. There's no such thing as an open highway anymore. And I'd submit that every person we can take out of a car and every box we can take off of the roads makes all of our lives and the quality improve dramatically. We're moving in the area of people as well as freight. And, Clay, we've worked on it—our high-speed ferry project. This country is woefully behind the rest of the world in ferry transportation, so all of you should think about it. You can move people fast, safe, and efficiently with a very low cost input. Those are projects that we're working on around the country, but we need more of them.

Richard du Moulin

There's been a huge emphasis on the hardware side of ships in terms of preventing accidents over the past 20 years. And statistics—whether they be in shipping or aviation or trucking—show that 80 percent of accidents are caused by human error. I'd put a bet that 80 percent of the remaining 20 percent are human error in the process of supplying spare parts or maintenance. So, really, virtually everything can be connected to the human factor.

IMO has two conventions that have just gone into force. One is the STCW, Standards of Training Certification Watchkeeping, and the other is ISM, International Safety Management, which deals with having a safety management system on board the ship and on the shore organization. New technology—e-mail communication, for example—mixed in with these new conventions is really moving industry—and this isn't just tankers, but all types of ocean-going ships—forward very fast in terms of improving their safety processes and navigation.

It's really the human factor that needs emphasis nowadays. Double hulls are fine; they're a help. But having good crew doing correct navigation and good shoreside support for maintenance and planning will get you a lot further than just focusing on hardware. As a parallel, there are times when our military has focused on hardware and not on people, and you don't have a good military force. It's the people and the processes where the emphasis is now going, and it's about time.

The Honorable Ron Sims

In our county, we have to deal with transportation issues because we're the provider of it. So we have an intense interest in the development of new technologies in transportation. I don't sense that in maritime, not with the companies.

I'll give you an example. We have real-time indicators. I don't sense that we have an elaborate system throughout the country for real-time information on currents and tidal action. Maybe I'm wrong, but I don't see it. I have a friend who boats, and I know that the navigational charts we have aren't current.

I couldn't run a transit system with the same information that I've seen people have to navigate in the waters of Puget Sound. I understand boat technology. But it seems that that is defeated unless there is a counter-investment by the federal government on navigable waterways, and running it the same way we run transportation systems—real-time, high-technology information being provided to people.

Dr. Nancy Foster

My name is Nancy Foster. I'm from NOAA. I manage the part of NOAA that has responsibility for those two programs. I couldn't agree with you more.

I think that when we talk about ports in the 21st century, we talk about safety and navigation and conservation in U.S. effectiveness. It's intuitively absurd to talk about those things without talking about updated nautical charts and the position of real-time data. I can tell you that this administration is very supportive of our making progress in those areas. And we've actually even attracted the attention of Congress when it comes to the backlog in nautical charts. It's one of those things that we got so far behind in that it will take us a while to catch up.

The Honorable Ron Sims

We will look for the year 2000 budget because to us, policy without budget is no policy at all. We look forward to seeing an increased amount of funding in that area in the 2000 budget, and I hope this conference generates that kind of push.

José Campos

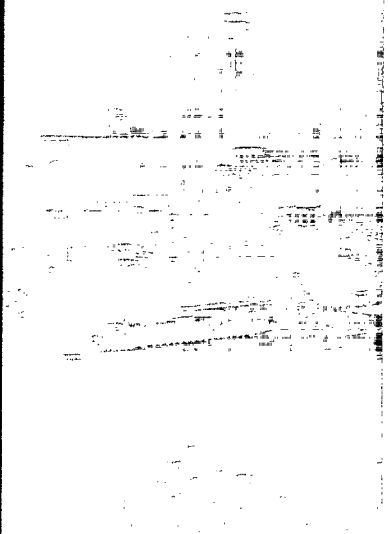
José Campos from the Caribbean Fishery Management Council. The Caribbean region has somewhat been the forgotten zone regarding ocean issues, talking about coral destruction, habitat, and so forth. Dr. Baker, gentlemen, any answers?

The Honorable D. James Baker

These are issues that are important to us, and I think we're doing more in the Caribbean to focus on them. Last year, during the International

We all share the responsibility and the need to pursue economic development. But we also share this complex duty to protect and maintain our natural environment.

– Dr. M.R.C. Greenwood



Year of the Reef, we had some new initiatives that were important that helped emphasize what we were spending, and we were able to get some additional funding into the coral reef issues. The coral reef initiative that Lieutenant Governor Bordallo mentioned is another example of what we're doing. We're seeing increased stress on tropical fisheries. I think there's no question about that, and it is an area we're going to pay increased attention to.

John Gray Smith

Hello, my name is John Gray Smith. I'm chairman and chief executive officer of a company called the Conservation Consortium. In addition to being the head of the company, I'm also a Cape Codder. Cape Cod is a world away from here. It's a tiny little spit of sand that sticks out into the Atlantic Ocean. It was the place the Pilgrims landed before this country began. It's a place where we're currently suffering from the ills of nonpoint-source pollution, the destruction of our coastal ecosystem, and the poisoning of our ocean's nurseries.

My personal focus is on alternative resource development and alternative technologies to find ways to mitigate this decline, to find ways to introduce alternatives to the problems that we're all facing.

We're all equally Cape Codders in a way, because we all depend on the ocean. As we've heard here today—as I'm sure we're going to hear more over the next few days—we have to take the responsibility to bring this issue to the forefront of all of our fellow Americans. Because if this country doesn't take the ocean as a serious objective in the 21st century, we're going to be a country in isolation that's going to be dependent upon the rest of the world in order to help us.

A comment was made that it's time for us to back off and stop focusing strictly on the study. It's time for us to start to get behind the solution, to bring these things to the forefront, and to start to implement them. This is what is needed.

The Lieutenant Governor from Guam put it directly and put it succinctly. We need funding to put these infrastructure changes into play in order to be able to mitigate these damaging situations that aren't due to our innocence. They aren't due to our ignorance. They're due to older philosophies that didn't understand the complex web of interconnection between ourselves and our environment.

It's time for us to take the initiative, to be good stewards, to take this initiative, to start to move forward into the 21st century. I ask you all to please look at alternatives. Let's move into the 21st century.

Another gentleman came up—and I can tell you we're proud to note he was in a way a part-time Cape Codder—and he catalyzed this country to move forward to a great objective. This was going to the moon. Going to the moon was a unique initiative. It wasn't done before. It was something that required us to take advantage of the ingenuity and the brain power that exists in this country to move into that new environment.

I tell you today that, in my opinion, as a Cape Codder, we must take this initiative to look at the ocean the same way that we looked at traveling to the moon. We must move forward to take the initiative to seek those alternates and to bind together to make this a council that makes something out of it.

Harry Strong

My name is Harry Strong. I work at MitreTek Systems in McLean, Virginia. I was taken by your comments about needing more resources. Our organization is a not-for-profit that supports the government. We work with the National Ocean Service, the National Weather Service, and the Coast Guard, and have been associated with programs like work waterway safety, charting activities, as well as vessel traffic services.

The thing that strikes me, it's not only the issue of money. It's also the issue of somehow integrating dollars—being able to pull dollars together—in some organized fashion. If you're going to improve the profitability and the efficiency and safety of ports, there are all these issues that seem to be in different places. I'd be interested in any comments that you might have with regard to how we might do a better job of being able to integrate the requests for the resources that are necessary—not only the ones that we have now, but also for increased resources.

The Honorable John Graykowski

We've moved out very dynamically with the Coast Guard on what is called the Waterway Management Initiative. But we have to look at transportation from a systemic approach.

I think everybody would see it and has said it—and I know Charles [Foster] knows it every day—everything begins and ends with the port here. We can have the most wonderful transportation system in the world, but nothing is going to leave the shores unless it fits together.

One of the complaints we heard in our seven regional listening sessions with over 400 people is

your point entirely. [See Summary of the U.S. Coast Guard/DOT Regional Listening Sessions on page 214.] There are 50 federal agencies you have to deal with to get in and out of the port. What we'd like to put forward, because this is integral to the transportation system, is this concept of one-stop shopping. The government can work better, and we have a service community.

We're right, there has to be a business plan. And I think we're evolving toward sort of one focal point for ports and waterways management in the federal government.

Roger McManus

I think this triggers a notion that, while we're not very well organized right now as a government to deal holistically with marine issues, this comment reflects a growing interesting idea in this conference that we need a national budget for the oceans in the year 2000. It's an incredibly good organizing principle and goes across the board, from transportation to other issues.

Of course, the budget isn't the sole solution to our problems. Spending more money won't necessarily solve the problems. One of the comments that came up earlier along that line is, while we have fantastic riches in the ocean with regard to the pharmaceutical industry—I think pharmaceuticals would be the major product from the oceans in the 21st century by dollar measures—we have absolutely no national policy, no national regime, no national authorizing legislation, or what-have-you to manage this enormous potential resource that could be literally captured by other countries in our own Exclusive Economic Zone, and we wouldn't have anything to say about it.

Let me just add one thing to a previous comment, because I don't want to neglect the Caribbean, which was brought up earlier. Here is another example where the United States has one of the largest, if not the largest, of territories in the entire Caribbean. We're a Caribbean nation, and yet, again, our plans for managing our resources and living up to our stewardship responsibilities for that area along with the other nations of the region are woefully inadequate.

Richard du Moulin

Basically, a lousy port environmentally is a lousy port commercially. The two go hand in hand. A port that operates efficiently has good maintenance dredging, has good vessel information, ongoing information on tides and currents to the pilots and masters. A port that's run properly is good commercially and good environmentally. The two go together and must go together. The great ports I mentioned overseas have very good environmental records as well as good commercial facilities. So working together is the correct way to do it.

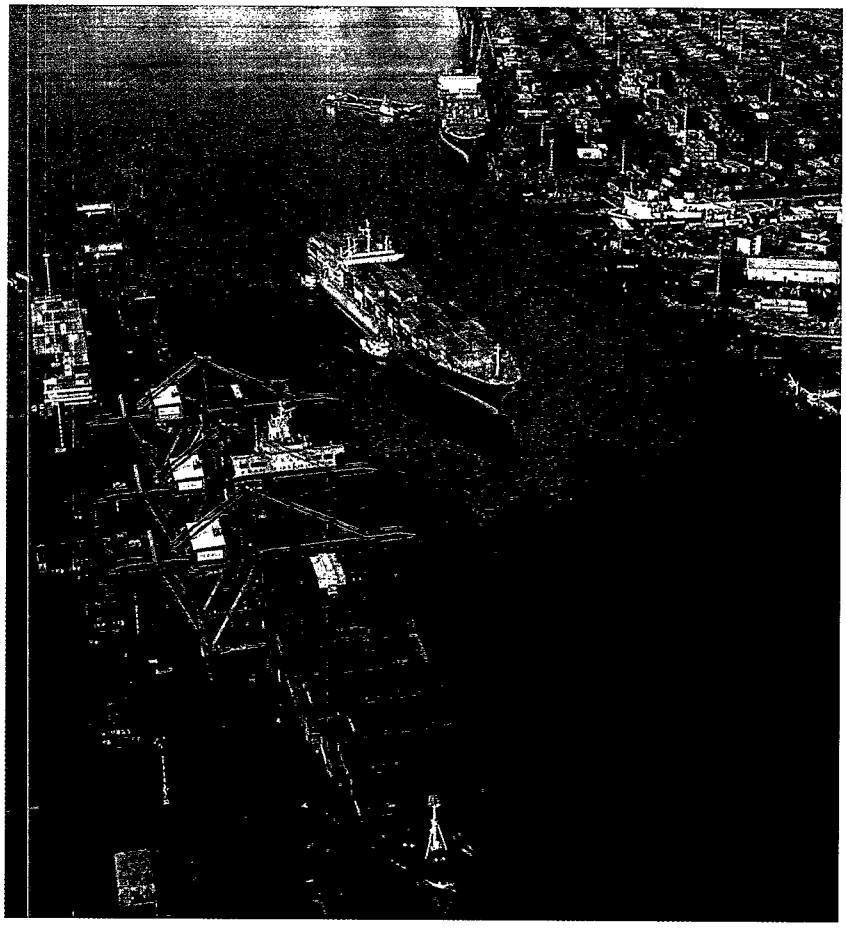
Rod Peters

Rod Peters of the Environmental Defense Fund. I want to bring up an issue that's often overlooked, including by this panel, and it's a critical issue.

As international commerce expands greatly, as the panelists have said, one of the things that's also going to expand is the risk of biological invasion. Just up the coast in San Francisco today we have the most invaded estuary in the world. These critters catch rides on tankers and freighters and not only wreak environmental havoc, but can actually wreck the infrastructure that supplies water and goods—in California's case, to half the population of the state.

The ports have to take the lead, and the federal government has to support them in this role, to keep those exotics out. We've got to keep them out. The technology is there. It takes political will and money, and I hope the ports will step up to the plate.

In design, management, and maintenance, ports need to be looked at as a complete system that includes vessel traffic control, pilotage, terminals, dredging, and hydrography.
Photo: Port of Seattle



Charles W. Foster

Let me add one other observation. I'd add to that participation of the ocean carriers, the builders of these vessels. You mentioned the ports and the federal government, but there are other parties. If you look at the profile today of the carriers serving the world marketplace, 90 percent are foreign carriers, and in many cases are building their vessels outside of the country and in fact are international operators. It means a partnership between all of us to build the kind of technology that will address the issue you just mentioned with respect to exotic species that are transported around the world.

The Honorable D. James Baker

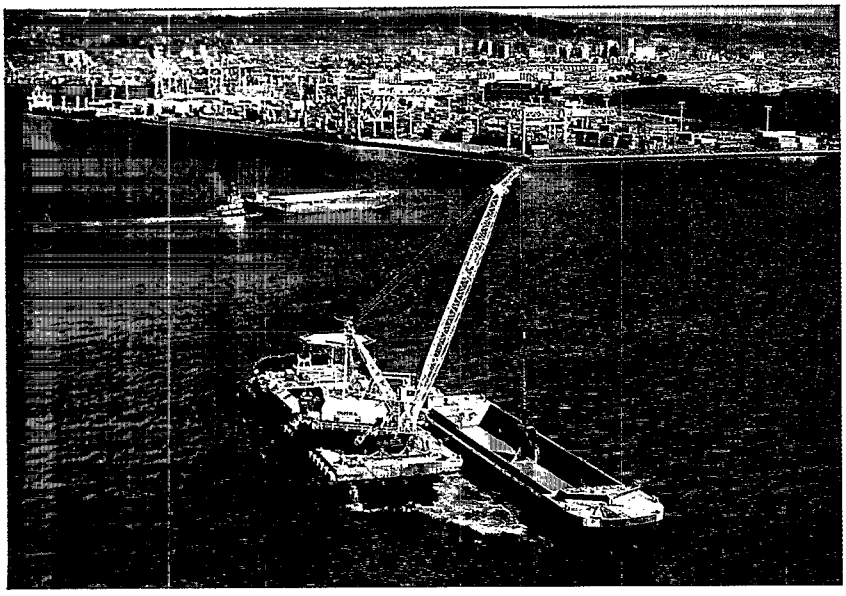
Let me just comment on the invasive species question. We do have an interagency government program that is aimed at addressing these issues, and we have some funding for that. We're trying to have a cooperative effort, but it's one of these examples where I think we identified a problem and much more needs to be done.

Scott Hajost

Scott Hajost, IUCN [International Union for the Conservation of Nature]. I just want to follow up on Rod's comment—two important points.

Our efforts with respect to invasions and the way of IMO to address this issue is where we bring in the foreign carriers. I think we really have to move aggressively in IMO to address this issue in terms of ballast water. There's also another dimension. We need to integrate the rules of the world trading system. They do have some implications for our ability to take measures here domestically that may affect our ability to control exotic species invasion. I think we need to integrate both those aspects on the international level.

A port that is run properly is good both commercially and environmentally. It has good maintenance dredging, good vessel information, and ongoing information on tides and currents readily available to pilots and masters.
Photo: Port of Oakland



Dr. M.R.C. Greenwood

I want to speak also to the issue of the exotic species. This is one of those examples where the ocean really is a living laboratory for us. It's a relatively new problem. It's not an unknown problem in the ecological systems. But it's one for which we need substantially more funding and knowledge because this is one of those issues that illustrates the point that if you don't fund the basic research base so that you have the knowledge to make the policies, you end up essentially having eaten your seed corn and developing a situation that you can't control.

Ann Notthoff

Ann Notthoff, with the Natural Resources Defense Council in San Francisco. I wanted to follow up a little bit on the United States' role in IMO, and as far as being a leader and providing environmental stewardship and sound environmental programs internationally.

I'm happy to hear from INTERTANKO that industries got it here in the U.S. that oil spill prevention is the best way to deal with spills, as opposed to response. Because once oil hits the water, we've lost most of the game anyway. One of the programs that I've been involved in recently is working with NOAA and the Coast Guard to try to keep tankers' routing away from the Monterey Bay National Marine Sanctuary. We keep hearing from our representatives from NOAA and others who work with IMO that while we can make these cases for moving the tankers out of sensitive marine resources here, that it's very difficult to sell that at the IMO level. I wondered if there were some comments from the panel about how the U.S. could be more of a leader in the international arena in terms of promoting sound environmental stewardship and maritime practices.

Richard du Moulin

First of all, my comments about tanker history are international, not just U.S. The international tanker industry is really aware of what it has to do and is working hard at doing it. The difficulty of approaching some of these large issues locally is that you've got ships of all flags trading all around the world, and if you think you solve it

locally but you don't pull in the rest of the world's system, you're kidding yourself. It really has to be an international approach, and then it has to be enforced very rigidly by the flag and port states.

We used to be a flag state. We used to have a big merchant marine. Now we have a small merchant marine. We're now more a port state. What you've seen at IMO is that it's more an organization of port states than the original flag states. A lot of the issues are hitting IMO, and they're pretty complex. That's why the role of the Coast Guard is so important to coordinate America's input and to be there to try to come up with the solutions that work. They're not simple, but if they're attacked only in local regions without the coordination, they're going to fail.

A parallel would be aviation. If every state tried to have its own local regulations and a plane flying across the country had to change operating procedures every time it crossed the border, it wouldn't work. You need some federal guidance, and it has to be worked internationally.

In the meantime, I think the liability that ship owners are under has put enough of a scare in everybody that people are cleaning up their own acts. OPA 90 did have that positive impact by putting the final scare into everybody.

The Honorable D. James Baker

Let me just comment on IMO. The responsibility for U.S. input to IMO is through the Coast Guard, and we follow that. There are rules protecting the Great Barrier Reef in Australia that IMO has passed. And in the past couple of months, the administration agreed that we'd take the IMO proposal to protect the northern right whale, an endangered species. President Clinton agreed we'd take the IMO rules that would involve warning ships as they go into the feeding and breeding grounds of the right whale. We're making some progress in that area.

Fred Westlund

My name is Fred Westlund. I'm with a research company called Westlund & Tuft Technology. We're presently harnessing dipole attraction forces. When you talk about the cutting edge of technology, we're there. We're doing some amazing experiments, and we now know how to greatly increase the efficiency of producing electrical energy. With this, we'll reduce air and water pollution. This is cutting-edge technology. We're here to gain assistance from a research center and also to get funds. Thank you very much.

Larry Landry

I'm Larry Landry, from Landry & Associates. I represent 45 fishing-dependent communities in the Gulf of Alaska. It's interesting that there was no discussion of Alaska in a commerce panel on the oceans. I'd just like to make a few comments.

There should be a serious discussion of bycatch management and tying that to resource allocation. And, to respectfully disagree with Mr. Anderson, there should be no new individual fishing quota systems. They have some merits, but they have some fatal flaws, and they're destroying communities in Alaska, especially in the Gulf of Alaska. It's a complex subject, but I'd like the panel to discuss the issues of resource access and bycatch management. There has also been no discussion of bottom dragging, its effect on the environment, and those issues.

There are a number of very serious Alaskan issues that affect commerce. Specifically, there are 45-plus fishing-dependent communities in the Gulf of Alaska that are being destroyed by federal and state regulations. I'd respectfully urge that these issues be addressed as you talk about commerce.

Philip Anderson

We know that we have communities that are dependent on fisheries, from Dutch Harbor to San Diego. We know that we have communities within Seattle that are dependent on the fisheries both in Alaska and off the West Coast. So the comments that I made relative to the dependence of coastal communities on fisheries were meant to be very broad, addressing all of those communities. We recognize that there are dozens of communities stretched all up and down the West Coast and Alaska and on the East Coast and in the Gulf that are very dependent on fisheries. So the fact that we didn't have a person here from each state doesn't mean that the comments that I made were meant only to apply to Washington or West Coast states.

The other response is regarding IQs, or individual quotas. I understand your comments and appreciate your concern about the effects of individual quota systems, like the one that has been designed in Alaska. The definition and the breadth of definition that the National Marine Fisheries Service has given to IQs, however, have tied our hands in terms of addressing overcapitalization in West Coast fisheries. My comments weren't particularly directed at the IQ system as we know it or as it has been designed in Alaska. But because of the breadth of the definition that National Marine Fisheries has applied to indi-

The oceans are our lifeline. Development and maintenance of transportation infrastructure in the nation's coastal zone are critical to our ability to compete in the world market.

– Charles W. Foster

The responsible use of the ocean is a prerequisite for America's future success as a nation in a highly competitive world market.

– Richard du Moulin

vidual quotas, we have—absent going forward with some kind of a permit by that program—been unable to design systems that we need to address overcapitalization and rationalization of the fisheries, making those fisheries more economically viable in the face of declining resources.

Roger McManus

Alaska is extraordinarily important to our fisheries production in the United States. It's something like 40 percent of our fisheries. I think the comment illustrates an important distinction that we need to make in our policy thinking. That is, number one, How do you manage the resource effectively to provide for production and ecological needs? Second, How do you allocate that resource to meet the needs of communities?

One of the things that we have to wrestle with in the future is finding a way to make those distinctions and keeping those conversations clear. The biologists will probably have more specific responses for the first set of questions, but the second set of questions has to be addressed by the communities. The communities have to have a greater say in who gets the resource. It may be from a very traditional perspective, or it may be from a not-so-traditional perspective. But that's an extremely important point.

I'd like to add that the 104th Congress made major advances in the reauthorization of the Magnuson Act, and bycatch was one of the issues addressed by the 104th Congress. It's not clear at all to me yet that this administration is taking as aggressive a stand against bycatch as that Congress intended, and the 104th Congress has certainly not got the highest environmental record of most Congresses we've been familiar with in recent history.

Last, but not least, we have an extraordinary opportunity in the near future with regard to managing the Bering Sea. The reason why I say that is we have a number of private and government efforts starting to focus on the Bering Sea. It's a very tightly defined, good area to look at.

We need more experience in how to manage marine areas. The solutions are not nearly as self-evident as some of us would like to think. The opportunities for expanding our ability to manage marine areas are certainly presenting themselves in Alaska, and we should take advantage of it.

Kathy Fletcher

I'm Kathy Fletcher, with People for Puget Sound. The discussion of oil spills and tanker transport has been a little bit one-sided, I think. I can't respond to a number of issues that have come up, but I do come from one of the states that was characterized as misguided in its efforts to institute some protective measures to prevent oil spills.

The degraded condition of the oceans and the estuaries, like Puget Sound, is one of the reasons that the prospect of a catastrophic oil spill is so devastating. While it's not the oil or shipping industry's fault that the marine environment is so degraded, it certainly puts a heightened reason for us to do everything we possibly can to avert the potential for a catastrophic oil spill in a place like Puget Sound.

One observation I'd like to make is that in fighting for incremental increases in spill-prevention measures applicable in the maritime industry, it seems that you almost have to have your *EXXON Valdez* spill in order to get the protections that are obvious and sitting there and waiting to be instituted.

Right now we're in the middle of a battle to get tug escorts on latent tankers coming to Puget Sound—a 70-mile stretch as they come into our inner waterways before they pick up their tug escorts. The Clinton Administration and the Coast Guard have an opportunity to show they're leaders in this area by helping us get those tug escorts. Unfortunately, the messages we get so far are that we're going to have to suffer through some more years of analysis, further risk assessments and studies, and so forth. At this point, we have nearly every local government, Indian tribe, and member of our congressional delegation saying, "Well, at least give us some tug escorts on an interim basis. We can study until the cows come home." I think these opportunities for leadership are there, and I hope that the Year of the Ocean will prompt that kind of action and that we don't each have to suffer our *EXXON Valdez* spill before we get that.

Richard du Moulin

Tanker accidents and shipping accidents in general aren't caused by lack of regulations. They're usually caused by some problem in the system, which could be the ship in many cases. They're also caused by lack of enforcement. The enforcement has improved dramatically over the years, and industry is now becoming a more active part in that in a more positive way, because of the awareness both by the public and by industry.

States, in my opinion, aren't equipped to figure out how ships should operate any more than they're equipped to know how airplanes should operate. Let the authorities who know ship operations—nationally, at the federal level, and internationally—set the operating regulations and

enforce them. If the enforcement isn't being done adequately, the political process—the local pressure—ought to make sure it's being done right. Again, it goes back to the system. It's the system that needs the improvement. Thank you.

Bob Morris

Bob Morris, Maritime Safety. From a networking perspective, I'd be interested to hear some of your thoughts about what we can do. We take a U.S. position, so you all have input.

Second, in terms of solutions mentioned before, as a principal issue and something Dr. Foster just mentioned and Mr. Graykowski mentioned, these regional listening sessions around the country aren't seeking solutions to the things that need to be done to ensure that ports, waterways, and their whole connections can support the kinds of traffic we've heard will be two or three times what we have today in the 21st century in a safe and environmentally sound and efficient manner. We're moving ahead this fall toward seeking solutions, developing options and things we can do to find solutions and implement them.

Third, Mr. du Moulin mentioned the concept of balance—engineering solutions, I like to call it, versus people solutions. We do need to do more people solutions and keep that balance. It's probably been overbalanced in terms of engineering solutions. Over the years, we've tried to balance that out in the Prevention Through People program to ensure that mariners are capable of operating the equipment they get, as well as having good equipment and safe equipment for them to operate. So the STCW amendments that he mentioned and the ISM Code are all good things that move in the people direction, as well as their efforts to arrange a licensing evaluation program to try to look at people solutions, as well as engineering solutions.

Tom Tilas

My name is Tom Tilas, Chairman of the Whale Conservation Institute. I have a quick question, because we have a very pressing problem with the northern Right whale, as Dr. Baker mentioned. I'm asking both John [Graykowski] and Richard [du Moulin]: What particularly can you do within your jurisdiction of INTERTANKO and the Maritime Administration with the Coast Guard to intervene and help with the particular problem we're having with the under 300 Right whales that are endangered? I'm looking for help or comment.

The Honorable John Graykowski

We've got to push everybody to be responsible. I think the situation generally among ship owners I know is that they're all approaching my generation, and they feel the stewardship responsibility very heavily.

Audience Member

We're working with IMO to implement a reporting system for vessels in those areas.

Rear Admiral Bob North

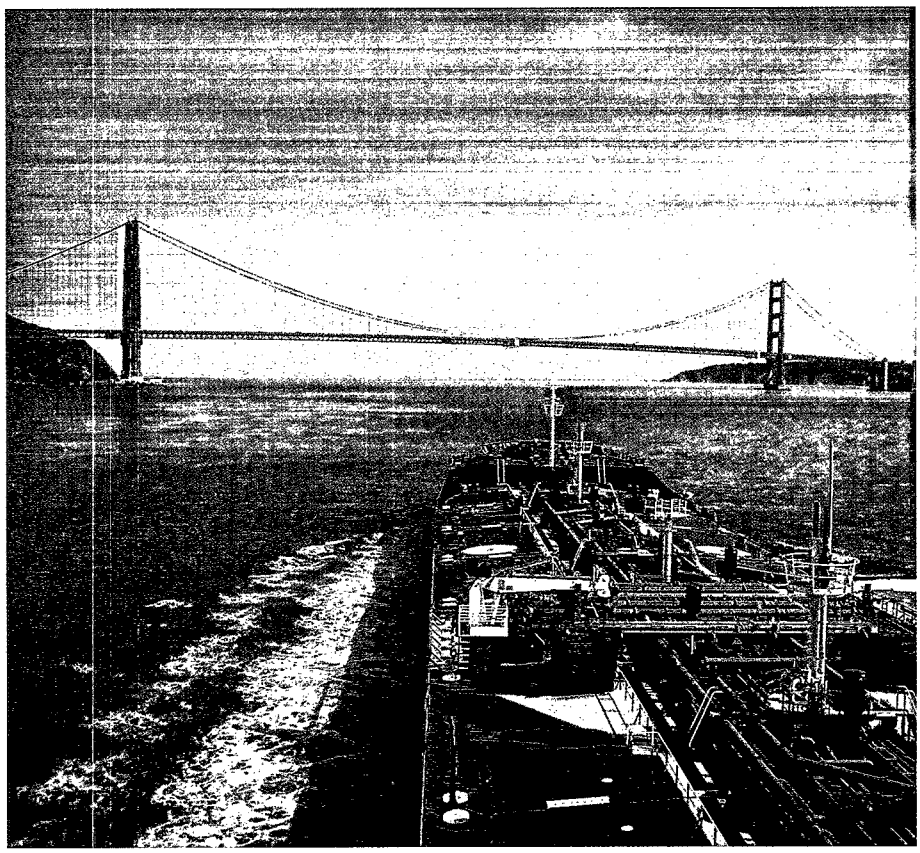
When will that be done?

Audience Member

We're hoping to start work on that in the [IMO] Navigation Safety Subcommittee coming up in July, I believe, working probably in the summer at the Maritime Safety Committee.

Audience Member

How about INTERTANKO?



Safety is a primary concern for both the tanker industry and coastal states. Over 20 percent of the cost of a new tanker is invested in safety and environmental features. California legislation requires oil companies to have emergency response plans and cleanup capabilities in place before they enter state waters.
Photo: Chevron Corporation

Richard du Moulin

Our expertise isn't the whale issue. But we're supportive of international solutions, and our ships will abide by them.

Jim Murley

Jim Murley, Secretary of the Florida Department of Community Affairs, along with Bob Jones. We both serve on Governor [Lawton] Chiles' Study Commission for the Oceans.

Dr. Baker mentioned the state coastal management programs, and many of them address ocean issues. I was wondering if perhaps Dr. Baker and maybe Mr. Sims could give us their views or their visions of the states' role in this issue of ocean management and government.

The Honorable D. James Baker

We've seen states as critical. California and Florida in particular have been states that have developed very comprehensive coastal and ocean management plans.

The Coastal Zone Management Plan, which we're responsible for in the federal government, is strictly a state–federal partnership. States decide what they want to do and how they want to do it, and we're simply there to maintain the overall national standards. We provide funding to those states that can meet the standards. But these are things that come from the states.

One of the things that I hope we can get from this conference is a reaffirmation of the importance of states' roles in ocean governance. It's something that several states have led the way in. We could see much more of that in the 21st century. This devolvement of power down to states, to local governments, to the private sector is critical.

The Honorable Ron Sims

The only thing I'd add to Dr. Baker's comments is that we obviously feel very strongly there's a role that regional governments and states must play in coastal management, and there's a need for a partnership. What we're looking for is a concise funded partnership. There's been a devolution, as we say in the vernacular, down to the states and to the counties. We didn't see a trickle-down of the funds to implement those things. It's important to have the partnership. I think where we need to have another understanding is how we will mutually finance what we wish to accomplish in those coastal areas.

Charles W. Foster

Again, I want to emphasize what Richard [du Moulin] had said earlier, that this is a national and, in many respects, an international system. The Port of Oakland operates not only a seaport—fourth largest in this country in terms of container business—we also operate an airport. I can tell you that if we aren't very careful, we'll find ourselves moving in the same direction that airports unfortunately have gone in addressing to some degree some of the community nuances: curfews and departure patterns that are marginal. I urge us to use caution as we look at addressing the nuances of our states and our communities, as we again address also the notion that this is a system, a national or international system.

The Honorable Ron Sims

The only thing I'd like to reply to on that is I can tell you that the inability to site new airports for increased traffic needs is the result of the fact that we've been indifferent to customizing approaches for citizens. Their reaction is: since you haven't listened, since you weren't willing to work with us, we're not going to let you have another—not only another runway, but another airport at all.

I think there's a need to recognize we're in a democracy. People pay their taxes, and they want their government to listen. There's going to be a need—whether one likes it or not—to have customized approaches at the local and state levels.

Rod Moore

I'm Rod Moore of West Coast Seafood Processors Association. Our members are all processing companies, from San Luis Obispo to Bellingham, Washington, mostly located in small communities—all onshore, all American-owned.

In the commercial seafood industry, we hear a lot of buzz words about overfishing, bycatch, and this sort of thing. According to NOAA's own figures, only 12 percent of the stocks that we know about are overfished in U.S. waters—which is more than should be. But it's not the massive number that people keep talking about. In terms of bycatch, looking at both FAO [Food and Agriculture Organization of the United Nations] data and NOAA's own data, a lot of the bycatch is caused by regulatory discards, rather than other reasons.

Phil mentioned some of the importance of the commercial seafood industry to employment. But what hasn't been talked about here is the fact that the seafood industry provides healthy, nutritious

food to the American people. Everybody who has a tourist economy—for example, the restaurants downtown here that serve fish—it all comes to you compliments of American fishermen and American processors.

You haven't talked about the importance of fish as cargo. In King County—Tacoma and Seattle—I know Mr. Sims is probably well familiar with the volume of seafood that goes through his port. For smaller ports, commercial fishing vessels provide a great deal of the tonnage that's used by the Corps of Engineers to determine what kind of allocation for dredging and port improvements to go on.

Also what haven't been mentioned are the actions of the seafood industry itself. It's been trying to work cooperatively to promote research, especially on the West Coast. We've been going through major efforts to work cooperatively with the National Marine Fisheries Service. We're trying to develop our own principal responsible fisheries. That hasn't been mentioned here, either.

Rather than your talking about retraining workers or converting to aquaculture, let's recognize both the commercial importance of the seafood industry and our efforts to use and conserve marine resources.

Roger McManus

I think the fishing industry has made enormous strides, like the rest of us, in the last few years to recognize the real problems and seek to address them. And I think we need to mention that. Clearly, we can bandy around statistics. Maybe Dr. Baker can help us out on this.

But I think worldwide there is legitimate and real concern about the future of fishery stocks and whether they're overutilized, or fully utilized, or what have you. That's not to say that we should stop using fish, and I think sometimes we get confused conversations here. The issue, if we have challenges on how to conserve fishery habitat or fishery stock, is to do a better job of doing both—not to translate that as to being opposed to using fish. I think the industry, largely, is starting to carry a very responsible message in that regard. If you just track, for example, the editorial policy of the *National Fisherman* over the last decade, there's been an enormous call to say, "Let's stop denying the problems. Let's start finding ways to solve the problems."

Jim O'Malley

Jim O'Malley, East Coast Fisheries Foundation. One of the things that's happening here is a lot of people are getting bogged down in some very specific issues, and I'd like to try to broaden it a little bit.

Most of us are strangers in the room. We had very brief introductions to people sitting near us, and that reflects the ocean as we deal with it right now. Whether you're talking about port development, wetlands, or real estate, there are conflicting objectives. Even worse, there are enormous language barriers between science and commerce, commerce and tourism, and ports and fisheries. It's a drifting policy, as Roger [McManus] said, and it's also intensely political. None of these things will be resolved unless we create a department of the oceans at the Cabinet level.

If this conference has one real prize within reach, it's the fact that the gathering here has the political and commercial and scientific and environmental and academic power and visibility to come out with that call for a department at the Cabinet level with the equivalent of an ocean constitution, complete with a bill of rights for

U.S. consumers spent an estimated $4 billion for seafood and fish products in 1996. That same year, commercial landings by U.S. fishermen were 9.6 billion pounds, valued at $3.5 billion, making the U.S. the world's fifth largest seafood harvester.
Photo: William B. Folsom, NOAA

Success is as simple as that—partnerships.

– The Honorable Madeleine Z. Bordallo

everybody who is involved in the oceans and the ocean itself. I'd like to know if any of the political soothsayers—not all of them are in politics, some of the best are outside of politics—view that as any kind of real potential in this administration or in the near future.

The Honorable D. James Baker

Let me take that on, as head of the agency that was proposed originally as an independent agency, if you remember, in 1968 by the Stratton Commission. After all the politics had been concluded, it was decided that NOAA would have fewer of the agencies that had been proposed and that it would be put into the Department of Commerce. This is a continuing issue, and I think these are issues that are Cabinet-level issues. I think there's no question about that.

As we go forward with this proposal for an Oceans Act and a National Oceans Commission—and I have every belief that that National Oceans Commission is going to be formed this year, that Congress will agree to do that—I think this is a point that should be discussed by the Commission, because it is something that we all believe. These are Cabinet-level issues that need to be addressed in a coordinated way, and the federal government has to step up and find a way to do that. This is something that should be pushed hard by all the constituents as a topic to be taken up by the National Oceans Commission and a recommendation made about that.

Judy Kildow

I'm Judy Kildow. I'm on the faculty at MIT in the Department of Ocean Engineering.

Uncharacteristic of an academician, I'd like to ask a very practical question. Following on the tone of the last question, I'd like to broaden this a little bit. I think we have a unique opportunity today, with all of you sitting on a panel, to hear from you about your ideas about how we go forward after this unusual opportunity here. We have you here. I'd like to hear from you what you think we should do when we leave here to begin to start action, not just to talk.

All of the other parts of the infrastructure are important, but what do you think are the key elements in moving forward to address the needs you discussed and to create a robust ocean economy and American economy, of course, and a healthy ocean environment at the same time? What do we need to do now? What's missing?

Several of you mentioned maybe we need to create a business plan, literally look at this enormous territory that we gained a number of years ago—the EEZ—as an enormous amount of assets that we were given. How do we manage them properly? Do we do it in supporting a business plan? Is that an appropriate way to look at it? Are there better ways to look at the management of this?

I'd like to hear from any of you on the panel who have ideas about how we can better go forward now and actually do what we're all agreeing that we want to do.

Dr. M.R.C. Greenwood

I don't know that I have the solution for the business plan, Judy, but certainly before you can manage your resources, you have to know something about what they are. One of the areas we need to concentrate some effort on in the next decade is the national biodiversity initiative or variations on that, where we really do take the opportunity to selectively pick some good exemplars and pay attention to what is there and what's interacting with what.

I'd certainly say one way to go is to first find out what we've got as well as dealing with some of these very commercial aspects. I think you could say two things. One is a better integration of the already articulated today commercial concerns, such as managing coastal waterways and having better navigational aids. The other is taking the time—although it will be difficult and in some ways tedious—to find out what we really do have to be concerned about.

Philip Anderson

Fishery managers are desperately in need of better information on species in the ocean, particularly in the area of marine fish or groundfish. The National Marine Fisheries Service began doing stock assessment surveys in 1977 and did them every three years thereafter. It gives us very little and limited information on which to base management decisions. I think we need to make an investment in research and data collection that allows us to maintain and continue healthy coastal economies through fisheries, but do it in such a way that we're managing the resources in a responsive and responsible way.

Roger McManus

All of us should be in favor of more research. We don't know enough and we need more knowledge. But the fact of the matter is the most important thing that we have to do besides getting the Oceans Act passed is for this administration to take on ocean stewardship positively and as a priority. I'll give one example.

The National Marine Fisheries Service was fundamentally founded by the Congress in the 19th century to stop overfishing in New England. We had more than enough information for a hundred years to know we were on the wrong course, and we ignored it. My only add-on to this is that having research, while extremely good and extremely necessary, is not the total answer. The bottom line is you have to have a government that is willing to act on the existing knowledge conservatively to save the stocks.

Rolland A. Schmitten

I'm Rollie Schmitten, the Assistant Administrator of Fisheries, also known as the Director of the National Marine Fisheries Service. I probably could pick almost every one of the topics and respond. I'd like to summarize, though, and just pick two and respond very briefly, and we'll cover several of the issues that have been raised.

First, let me acknowledge Alaska's fisheries. It's the largest by volume and by dollar amount, in excess of a billion dollars, and it's paramount that we keep it healthy and stable. It appears to be, and that is our goal.

The gentleman raised two issues—bycatch and fisheries-dependent communities. Let me indicate that the new tools under the Magnuson–Stevens Act and our national standards specifically targeted those two areas as areas in which we now have new authorities, and we certainly intend to use those. Shifting quickly into bycatch, which was raised by the gentleman from Oregon, I was very pleased to see that through an innovative idea of industries, not just governments, we're going to use bycatch. We're going to bring it in, rather than discard it and waste it. We're going to apply it to research. I think that's a very good partnering with industry.

Number three, on the issue of the northern Right whales, just some specifics, because NOAA's responsibility for stewardship goes to Right whales. We're promoting in this July session of IMO that all international traffic into our waters before entering would have to call in or check in with the Coast Guard, which we will assist. They will receive the most recent sightings of right whales and take appropriate action. I think it's a very aggressive and meaningful move by NOAA and the Coast Guard, and we're proud to be a part of that. Thank you.

Cindy Zipf

My name is Cindy Zipf, and I come from a group called Clean Ocean Action in New Jersey.

First a general comment. I thought the panelists did an excellent job of describing the condition of our ocean, and I hope in the plenary we hear more of a sense of urgency that our oceans are in trouble. I was concerned earlier there wasn't a sense of urgency and that we can just go along and that sustainability is something that is equal to status quo. It is not, and I'm hopeful we will hear that as everyone reports back.

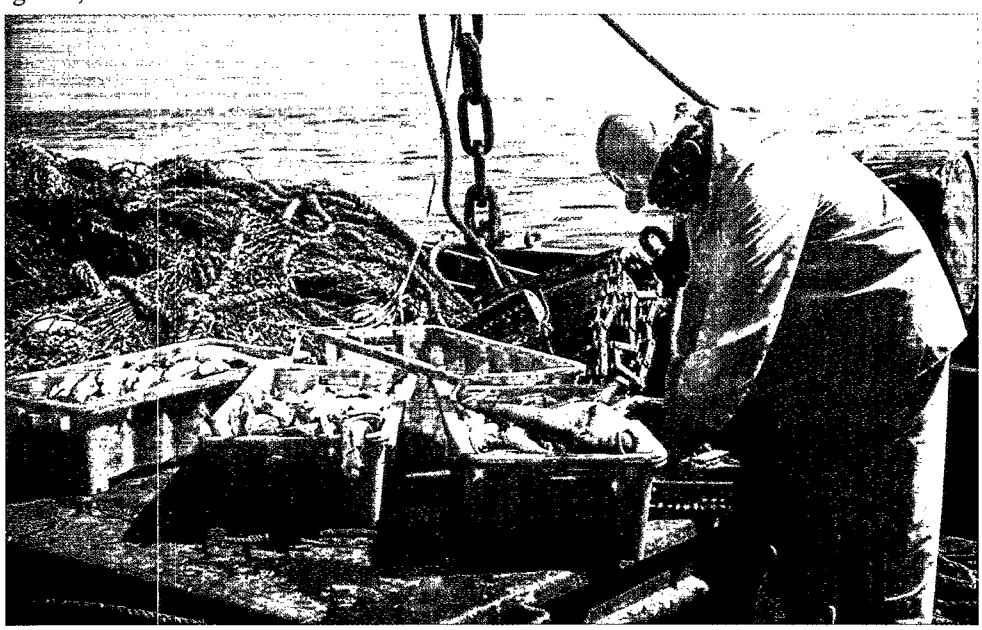
I'd like to spend a few moments talking about contaminated sediments, because contaminated sediments focus on two things we've been talking about—fisheries and ports. We're entering the 21st century with 2,100 fish advisories that we know of nationwide. Fish advisories are useful tools to tell people not to eat the fish. But they're really a statement of failure that we haven't done our job in protecting the quality of the environment and that we have to stop eating the fish. It's kind of an end point. These are statements of failures. We have to do a much better job, because if fish have so many contaminants in them that we can't eat them, the ability for them to reproduce has got to be under challenge.

At the same time, contaminated sediments are also affecting our ports and port management. I agree that shipping is the most environmentally sound way to move lots of cargo around. We should be doing more of it.

The Honorable John Graykowski

Cindy, we can't if our harbors silt up.

Investment in fisheries research and data collection will enhance the health of coastal economies and improve the ability of coastal communities to manage their resources responsibly.
Photo: NOAA



Cindy Zipf

I understand. I come from a port in New York and New Jersey where we were challenged by silting in harbors. We met that challenge with the administration's leadership of finding alternatives. But we have to have sediment quality criteria. We have clean water criteria, we have clean air criteria, but we have no clean sediment criteria that we can use to ensure that fish do improve. We need sediment quality criteria so that we can implement pollution prevention and clean up the sediment so that you don't have contaminated sediments in the port in the future.

With the contaminated sediments that we do have in the ports, wonderful technologies are being developed. As a case in point, in New Jersey, we're developing technologies. They're not the best, they're not the final answer, but we're moving in that direction. We're finding more alternatives now that we have dredge material to meet the need for those alternatives. I'm just here to say that the contaminated sediments issue is one that has to be focused on. We have to be proactive.

This Oceans Act that I'm hearing about, I hope it's not more study. I hope it is action and that we can move forward together. I do believe that contaminated sediments are crippling the ports of America. The answer is not to throw it in the nearest body of water or throw it downstream or throw it around. We must take aggressive action to pursue environmentally sound alternatives for sediment quality criteria.

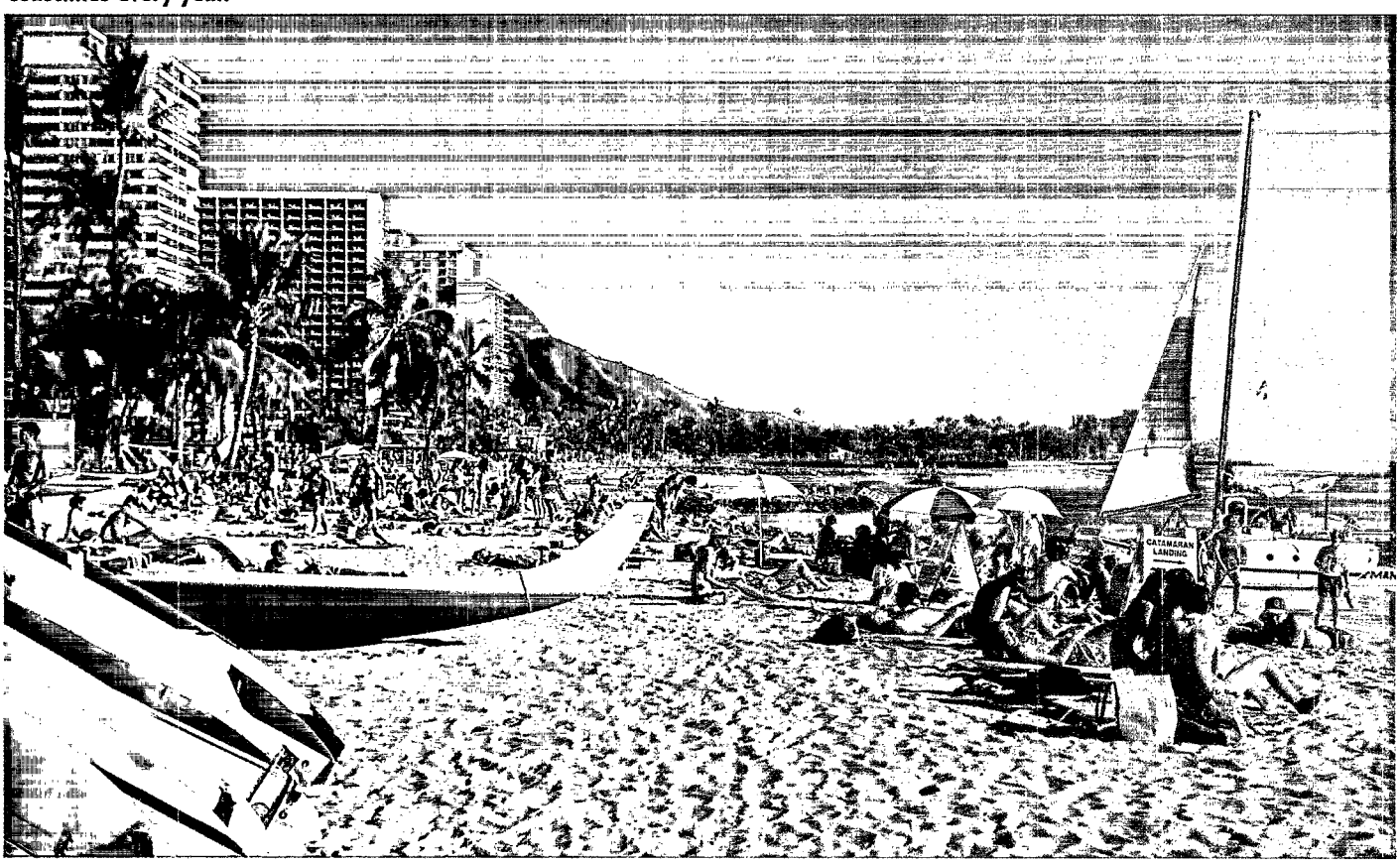
Ron Stone

My name is Ron Stone. I'm Director of the Boating Facilities Development Division of the National Marine Manufacturers Association. I also speak for the states' Organization for Boating Access and International Council of Marine Industry Associations.

Nobody yet has said anything about recreational boating, sport fishing, and allied tourism in the context of commerce and development of national ocean policy. Yet in the discussion papers for this conference, we did take note that these activities were identified as important contributors to the economies of ocean-side communities.

We're utterly water-dependent. We do need safe, convenient, environmentally friendly access to public waters, and one of our problems just now is with dredging policy. When it comes to dredging, recreational boating and allied interests are treated as second-class citizens. In times of budget constraint, we're typically the first to go, and our marina and yacht harbors suffer for that.

Travel and tourism is the largest industry, employer, and foreign-revenue earner in the United States. Coastal states earn 85 percent of all U.S. tourism revenues, derived from about 180 million people who visit U.S. coastlines every year.



We've gone on record in Congress asking for more money to be appropriated for the Corps of Engineers civil works budget, if that will help, but beyond that, we'd like a mandate for the Corps of Engineers policy to change to recognize us as part of commerce. We feel we're part of commerce. We're making a contribution, and I'd hope a recommendation might come out of this conference for direction to the Corps of Engineers to take cognizance of us as being part of commerce. Thank you.

The Honorable John Graykowski

Sir, just a quick one. The recreational boating industry is an incredible size and breadth in this country, and every state is filled with boaters. No one knows better than Bob North in terms of what your industry means to the waterway system, because it's just more things floating in already-congested channels and ports. Your comments are well taken.

Dean Misczynski

Dean Misczynski, California Research Bureau, Long Beach. Let me add the issue of watershed management to your list. The issue of contaminated sediments was raised, and as many of you realize, the ports didn't contaminate the sediments. Establishing criteria isn't going to fix the problem. You need to get the people upstream cleaning up what is going into the waters, because we're inheriting those things.

Co-chair Summaries

The Honorable D. James Baker

I'm not going to be able to summarize everything that we heard. But I think we can all say that there's an intense interest in the issues that we've discussed, and they are all very much interconnected.

We've heard about the connection between economic success and a healthy environment. We've seen that oceans are an indicator for the environment and they provide very critical services to our economy. We've seen that the coral reef partnership is a very good example of how one might move forward, and we can probably list 10 or 15 other partnerships that work very well as we look at those kinds of issues. The recent note about watershed management, I think, is one that is critical for us as we look at those issues.

We've also had a very good discussion of ports and shipping and the issues of management and governance, and the fact we have so many federal and state agencies involved in this, and we need better coordination and to simplify that process. We have heard that shipping companies face common problems—problems of global trade and global security. These all affect quality of life in the U.S. economy. Ocean and marine transport is not just an economic issue; it's very much an environmental issue. I think the ports issue is a key issue for the 21st century, and we're starting to address it.

We've also heard, I think, most sides of the fisheries issue. We're all here, and we all agree that we want to have sustainable fisheries. We want to have a healthy fishing industry. We want to have a healthy recreational fishery. We want to have a healthy environment. All of those things have to go together, and we have to find a way to make it work. We have many tools that we use. We apply these differently in different communities, but we're trying to find some solutions there.

It's very clear we need better coordination in our federal policy in all oceans issues. The call for a department of the oceans is an example of the need for better coordination, better government.

We see a very strong need for enhancing the state and local government role in ocean governance, and also finding a way to bring the private sector in is something that I think is very important.

We've talked about finding solutions. I think the primary purpose of the Oceans Act is to establish a National Oceans Commission that will take on these points and try to give us some answers that could be worked through all the processes. We've seen a strong call from many people: don't continue simply to study issues, let's have some action now. That's a point I think we'll deliver to the Vice President.

The Honorable John Graykowski

That was a terrific summary of "Oceans of Commerce, Oceans of Life." I think what I come away with—and I hope you all do—is:

- One, there's a common commitment. We're over the hump in terms of politics. We all recognize the fact that what we have is very precious.
- Two, I think all of the people here are very sincere and very well meaning and very genuine in their embracing of the concept of stewardship. All of us want to have what we have today to pass to the next generation.

I think also what I've seen from a political context is the energy that can be translated into appropriate and real forceful political action. And

We need to make an investment in research and data collection that allows us to maintain and continue healthy coastal economies through fisheries in a responsive and responsible way.

– Philip Anderson

that's what it's going to take because all of these comments about government resources have to be translated into political action, which has to be translated ultimately into appropriations. That means reordering priorities and resources in this country. That means getting a whole lot of people in this country to start saying, "Yes, that's where I want my dollars spent."

We're going to have spend more because that's not been the trend over the last few years, not just in the Congress. I'm not advocating the position. I'm talking as the head of an agency. It's great to say, "Spend more money." But for the last five, eight, ten years in this country, we've been hearing the federal government spends too much. That's the mind-set and the cultural change, I think, we need to accomplish that.

We have the seeds here, and we've planted a heck of a garden, I think, in all the seminars. All of us now have the responsibility for the watering and the weeding and the nurturing that it's going to take to translate this into the fruits of the labors and to give us a bounty well into the next century. Thank you very much for all of your participation.

Issue Forum Summary Report to the Vice President

(Presented during the Cross-Cutting Issues Plenary Session)

Vice President Al Gore

Jim Baker is going to give us a report from the commerce panel. I might just say, by way of transition, Dr. Baker, that what Mr. W. Thomas Mitchell told us in the Environment and Health issue forum really pointed to the strong need for partnerships among the federal government, academia, and industry. I want to echo that statement. We'll be able to accomplish a lot more if we can find ways to work together well. So I'd like to ask you to give us the report from your panel. As I'm sure you know, Dr. Baker is the Undersecretary for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Administration in the Commerce Department.

The Honorable D. James Baker

Mr. Vice President, thank you very much. My co-chairman was John Graykowski, head of MARAD, and we did have, in fact, a very lively discussion about partnerships. So that theme is picked up. We talked about the many diverse sectors of our economy that rely on the ocean and its resources.

We saw the oceans as indicators of our quality of life and environmental health. The panelists recognized the enormous capacity of human activities in all sectors to both use but also cause harm to the oceans. They further recognized the desirability of extracting the benefits of what the oceans have to offer. For example, the total economic value of coastal and ocean resources and activities has been estimated to be more than 30 percent of our GDP, but we need a more precise calculation.

We emphasized the need for new steps toward active stewardship, recognizing the privileges and responsibilities this implies. The time is right for a shared commitment to a cohesive and integrated U.S. ocean policy. Development and implementation of this policy will require involvement and coordination of all the players, this partnership you mentioned—government agencies, state and local level, communities, the private sector, academia, and public interest groups. The issues raised included the vital role the oceans play in both domestic and international trade and how modernized ports will facilitate our success in an increasingly global economy.

The future of our commercial fisheries was discussed, as was the importance of recreational fishing to the economies of many coastal communities. Tourism, including coastal tourism, is one of the fastest growing sectors of our economy. Many of our great cities are coastal communities and serve as major regional centers of commerce, and this is leading to explosive population growth in these cities, Mr. Vice President, as you have noted many times.

New and exciting opportunities for biotechnology and medicines from the ocean and reefs are experiencing growth in interest. For example, pharmaceutical products from the ocean could be the most important product from the oceans in the 21st century.

Let me quickly summarize our discussions. Our economy is dependent on international trade in an increasingly global marketplace. Maritime trade is expected to double or even triple within the next generation. It was noted in our session that there is no safer, more economical, or environmentally protective way to move goods than on the water. The infrastructure needed to support this must be modernized to keep pace with increasing demands. One of our panelists noted that it would take 28 miles of trucks to fill one large container ship—a good statistic. We must plan accordingly to ensure that commerce can move efficiently, safely, and with minimal impact on the environment, including introducing exotic species into the marine environment by exchange of ballast water.

It's also well understood that many of our commercial fisheries, once seen as limitless, now face serious declines due to a variety of causes, including overcapitalization of the fishing fleet, overfishing, and loss of habitat for young fish in our coastal estuaries and harbors. Better information is needed to support fishery management decisions.

New industries based on marine life forms also require a healthy environment and may play important roles in the future of our economy and well-being. More research is needed to reveal and better understand the benefits the sea can provide. New technologies being developed right now through public and private research will help us meet and overcome the challenges.

We also need more emphasis on the human factor. People need better information, better training. Fisheries managers need better data on stocks. Vessel operators need real-time and updated navigational information. Where we have the information, we need to act, especially when the information tells us there's a problem.

In a wide-ranging discussion on ocean management issues, participants noted the need to reduce the overlapping of jurisdictional responsibilities with respect to ocean management. Mr. Vice President, we thought this was a good issue for the National Performance Review to take up a special oceans emphasis.

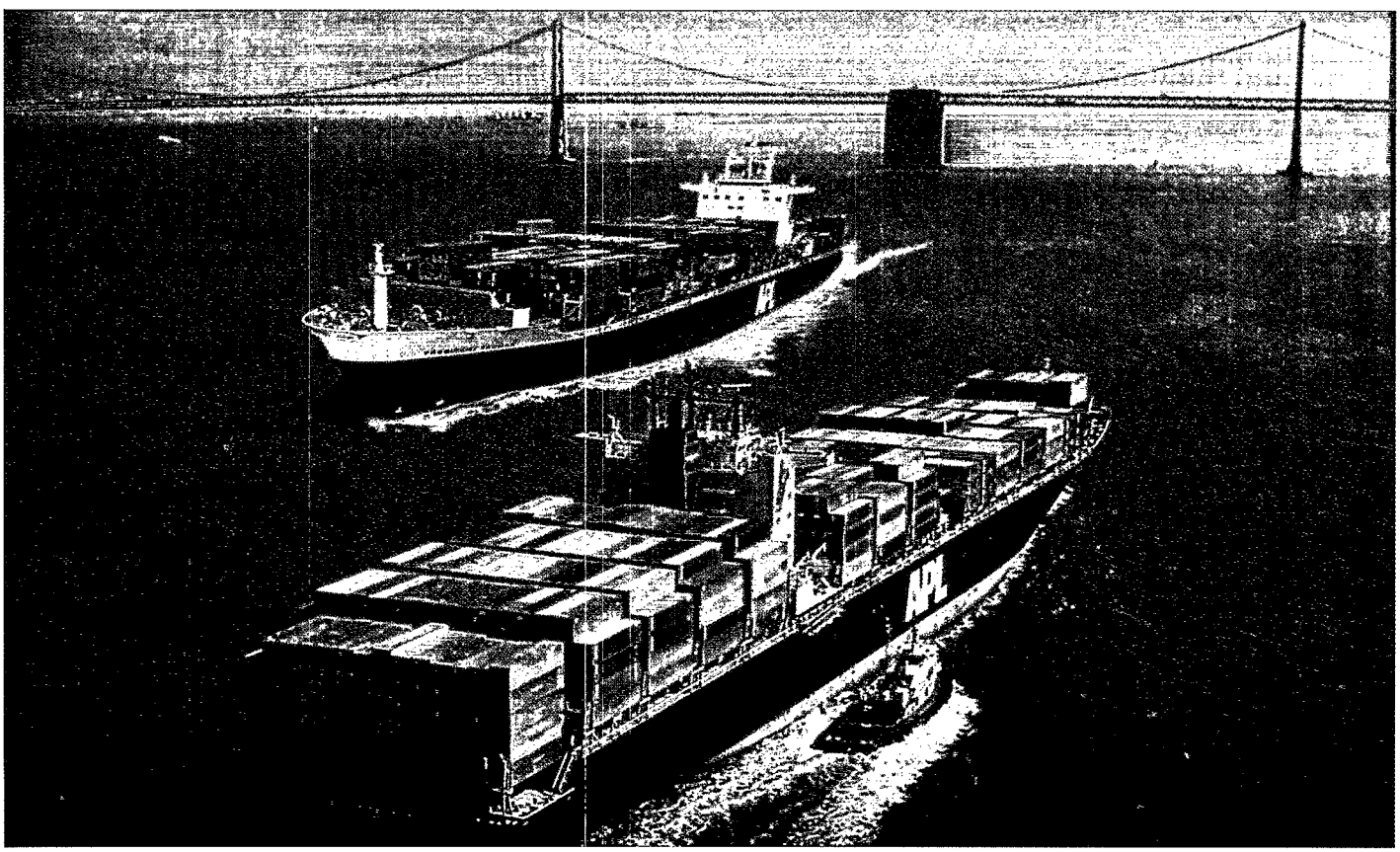
Some of our nation's largest cities are strategically located on the coast and are major centers of commerce and trade. Yet they're also major sources of coastal pollution, further contributing to loss of habitat. Polluted coastal waters also harm commercial fisheries and have significant negative impacts on recreational fishing and coastal tourism—all of which require clean, healthy waters to sustain the many coastal communities relying on these industries.

In general, there was agreement that the many important commercial uses of the ocean require a clean and healthy ocean and coastal environment. It was also agreed that in many cases, major threats to those uses come from land-based activities in the form of runoff and nonpoint sources of pollution throughout the watersheds flowing to our coasts. Mr. Vice President, the changing chemistry of the oceans is as important to society as the changing chemistry of the atmosphere that leads to global warning. We hope you'll take up this challenge.

There was acknowledgment in our session that we've come a long way in recognizing the issues related to maintaining a healthy and commercially productive marine environment. But the job isn't done. We must ensure our future investments continue to reduce environmental threats as they promote increased economic opportunity.

Maritime trade is expected to double—or even triple—within the next generation. Planning is required to ensure that commerce can move efficiently, safely, and with minimal impact on the environment.

Photo: American President Lines



Finally, picking up on the partnership point, there was tremendous agreement that the best way to address each challenge is to do so together. Whether it's public–private partnerships to fund research or stakeholder involvement in decision making, the key to success is our ability to work together. To put this in business plan terms, the ocean is a collective enterprise, and we need to develop a national ocean policy—or an ocean business plan—for the 21st century.

In conclusion, there are a variety of challenges and opportunities among the many commercial activities in the ocean that are vital to the economy. The members of the commerce panel look forward to discussing the issues with you and members of the other panels. Thank you.

Questions from the Vice President

(Presented during the Cross-Cutting Issues Plenary Session)

Vice President Al Gore

Thank you very much, Dr. Baker. That was a good report. Before I talk about your report, I want to make brief note of the fact that all of us saw the pictures of El Niño forming in the Pacific Ocean. I'm sure everybody here can call up a mental image of that big red spot growing across the Pacific. Well, Dr. Baker and his team were the ones who produced those pictures. Because of their scientific expertise, we were able to get a lot of warning about El Niño. As bad as it was here in California, particularly, and elsewhere, it could have been a whole lot worse without that warning. I want to thank you on behalf of a lot of people for the great work that your team did, Dr. Baker.

Now I'd like to pick up on some of the issues outlined in your panel's report, and call on Ron Sims. Ron Sims, as many of you know, is the County Executive of King County, which includes Seattle. Seattle is an example, in turn, of a great city on Puget Sound, where the ecosystem is facing challenges as we all try to conserve the environment in the face of urban population growth.

In your area, Ron, you have a busy and growing port, you have a booming economy, and at the same time, fish and birds are threatened by development that sometimes encroaches on their habitat. One of the reasons why Seattle is such a beautiful place and King County is such a gem is because of that great environment and natural beauty. How do you reconcile the competing demands for natural resources in King County?

The Honorable Ron Sims

Thank you, Mr. Vice President. Our citizens feel very strongly that we have a quality of life that's enviable and that we enjoy the economy. We know that our marine waters and our environment have been very attractive. We're growing very rapidly, but we have seen decisions that have impacted that and reduced the quality of life that we have and have harmed our environment.

Collaboratively, the business community, the educational community, public officials, and the tribal nations have organized in the three-county area and made a decision that we're going to respond to the challenges of a degraded environment which has harmed our fish, and that we're focused on recovering the salmonids that have been impacted and are now threatened. It has been a very collaborative process.

We realize—with the University of Washington, the National Marine Fisheries Service, the Corps of Engineers, the U.S. Fish and Wildlife Service, and our own state agencies—that if we don't work in a concerted and collaborative fashion, we won't recover the species. We're going to recover that species. We're going to rebalance so we can have our cake and eat it too. We're going to have a strong economy, and we're going to see fish return. We're going to have a strong environment, and we're going to have a strong commerce.

Vice President Al Gore

One of the points that comes out of this commerce panel is a point that President Clinton and I have made for almost six years now and before. And that is that cleaning up the environment and promoting business growth are goals that can be pursued simultaneously. That's true where the oceans are concerned as well.

I'd like to follow up on that by asking a question of Richard du Moulin. He's the Chairman and CEO of Marine Transport Lines and also serves as President of the Independent Tanker Owners Association. I understand that in your discussion this morning, it was clear that new technologies are now improving maritime safety and sharply reducing the risk of accidents. What new improvements in technology do you see being developed now, and what more needs to be done to further improve navigation safety at sea and in ports?

Richard du Moulin

Thank you, Mr. Vice President. To answer the question, I'd like to reference the past. For 20 years the emphasis on improving safety has

come from looking at the mechanical structure of ships and the equipment on board. Two items come to mind.

First, we've been able to reduce operating pollution by 90 percent by going to segregated ballast, where you don't mix the oil and the water ballast in the same compartment in the ship, and by also using crude oil washing—using the cargo itself to wash the tank, rather than introducing water.

The other has been the reduction of accidental pollution by 50 percent. One example of technology was inert gas, where an empty cargo tanker with fumes was filled with inert gas so there couldn't be an explosion. The maritime industry got on to that about 20 years ago. This is before OPA 90. This was implemented voluntarily.

OPA 90 raised awareness dramatically that there was a need to do a lot more. Since then, the reaction by industry and by the U.S. Coast Guard and other bodies around the world has been to look at the people factor. Hardware isn't the answer anymore, but working with the crew and navigational techniques and processes and discharging and loading ships at terminals is where improvement can be made. A ship going in and out of a port and operating in a port is like an airplane landing or taking off—that's the moment of greatest risk. I'd point to ISM—the International Safety Management process—which is now going on board ships and in the offices of ship operators. It wouldn't be possible without e-mail—live e-mail through the satellite. This communication revolution has totally changed how operators can run their ships, which by the nature of the business are a thousand miles away from the home office or even land.

Another example is in the navigational area, where we have a great navigational system, the GPS [Global Positioning System]—particularly since the government is going to allow the best of the GPS now to be available for commercial use, and combining that with electronic charting. To make that effective, we discussed this morning that ports have to be looked at as a system. It's not just a ship. It's navigational aids, the hydrography where we need better charts, vessel traffic, and information and control systems.

When you take the systems approach and you combine it with the technologies like GPS and electronic charting and then the ISM and the improved crewing and training, then you have the ability to improve the system. It's a systems approach to the problem that we think should be the priority in the future, not so much just hardware and ships, but the system the ship operates within.

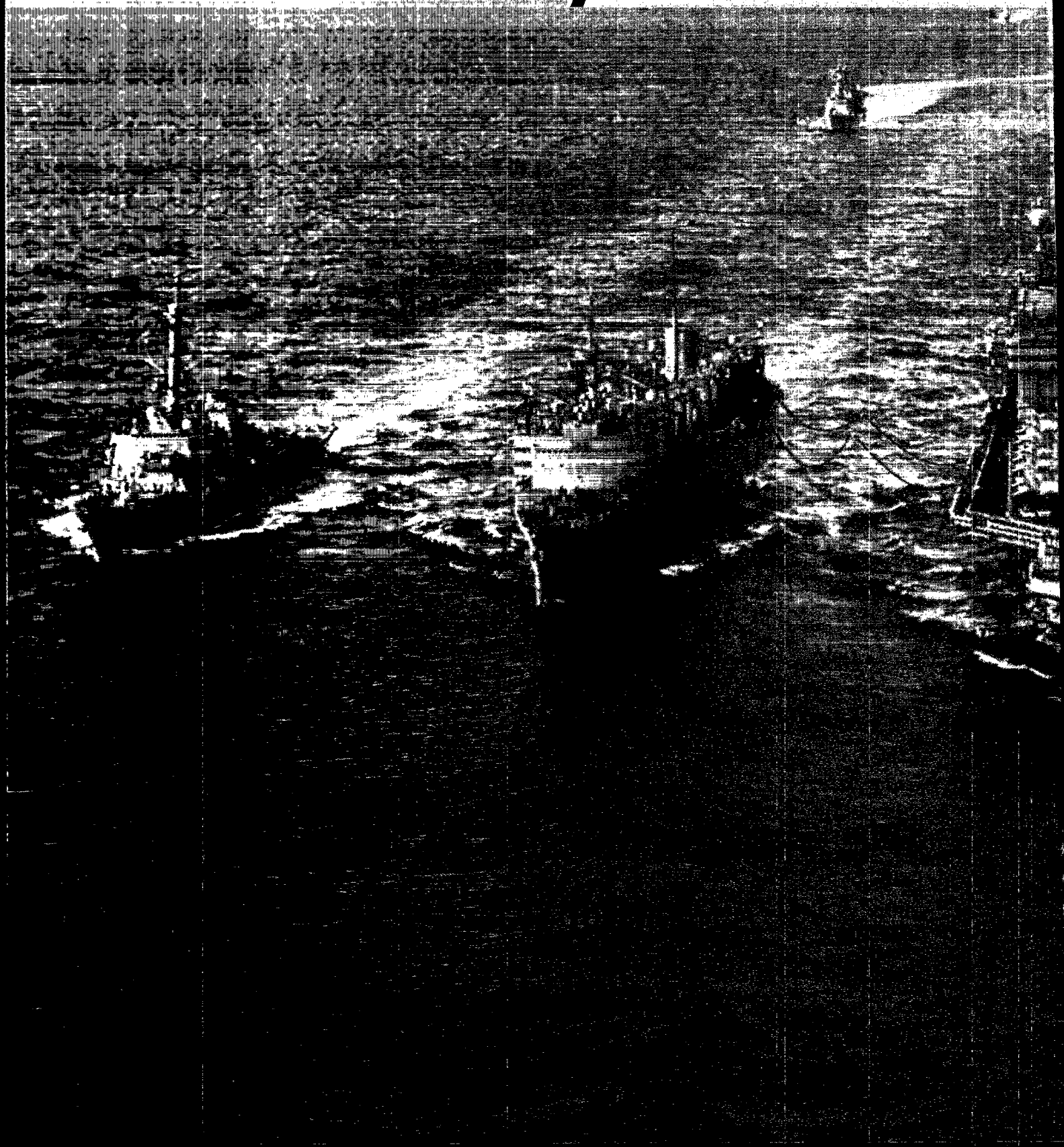
Vice President Al Gore

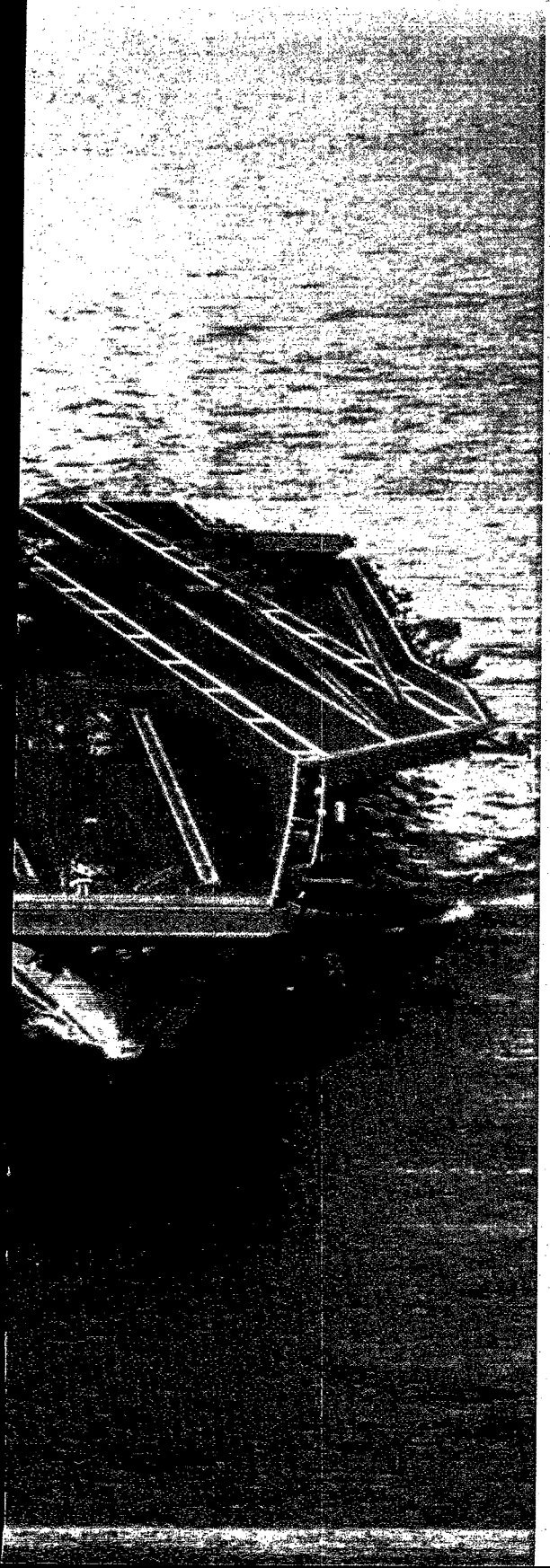
Thank you very much. I saw on the vessel I was on this morning a system that was amazing to me. They utilized the global positioning satellites, and it's almost like playing a video game. You could just pick a location on the digital map and select that location, and then the ship would steer itself to precisely that point. It really is very impressive. One of the announcements that I made this morning has to do with the Navy making available now those much more accurate mapping and navigational techniques.

We have no plan to take care of the largest territory of the United States of America [the 200-mile EEZ]. This area should be a stewardship priority for the nation.

– Roger McManus

Oceans and Global Security





With so much of *our security and* trade floating upon those dark-blue waters, freedom of the seas is in our clear national interest. We must work with other nations to safeguard it.

PANEL CO-CHAIRS

THE HONORABLE JOHN H. DALTON
Secretary of the Navy

MELINDA L. KIMBLE
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Vice President of Ocean Transportation Services
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FACILITATOR

REAR ADMIRAL WESLEY JORDAN

PHOTO: OFFICIAL U.S. NAVY PHOTO BY PHOTOGRAPHER'S MATE AIRMAN BRIAN FLESKE

Oceans and Global Security

Panel Co-chair Introductory Remarks

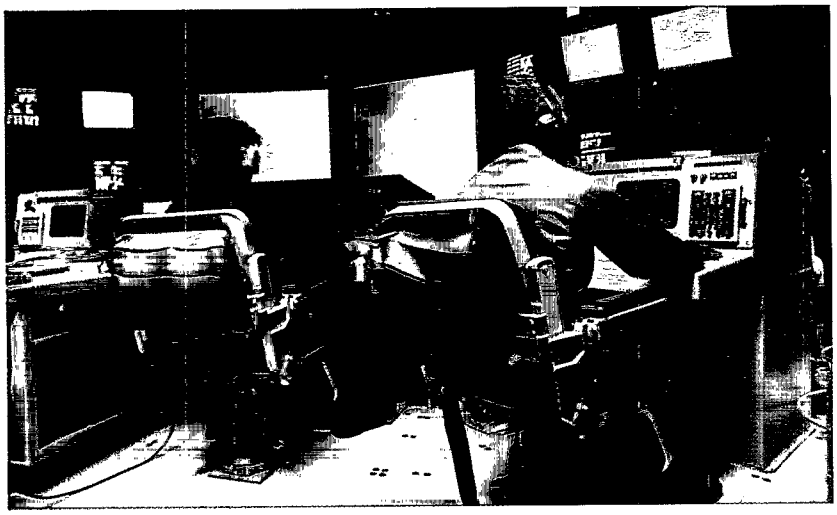
The Honorable John H. Dalton

Secretary of the Navy

I'm honored to be leading off this important forum for the National Ocean Conference. I know that each of you is already as energized as I am by the important agenda before us.

Let me begin by saying that our overall goal this morning is to raise awareness and help set the national agenda for the issues that face all aspects of our nation's use of the oceans. In that light, the vast knowledge that resides within this room on the many issues of global security is, of course, important by itself. But I remind this most distinguished group of the interconnection of our discussion with those of our colleagues meeting in the other three forums. I believe that the coherence of our message resides in the ability to clearly demonstrate the relevance of global security issues to the tremendous diversity of ocean interests in this country.

Having said that, I'll narrow my scope of remarks and use this opportunity to briefly discuss the Navy's priorities during the Year of the Ocean.



The Navy plays a major role in both ocean research and ocean operations, including oceanography, marine meteorology, and ocean optics and acoustics. The technologies and data developed by the Navy have numerous civilian as well as military applications.

Photo: Official U.S. Navy photo by Photographer's Mate James W. Olive

First, our national security depends upon the forward presence of our naval forces and the ability to get all of our military forces to the battlefield, should the need arise. That, in return, depends on maintaining freedom of the seas so that our Navy and Marine Corps can continue to operate anytime and anywhere to keep the sea lanes open and protect our interests.

Given that interest emphasis, I'm very concerned that the United States is not a party to the Law of the Sea treaty. This fact has potentially negative effects for the credibility of our overall national maritime policies. Our absence is noted by the world community, and our ability to influence global events demands that we have a seat at the table. The reservations that exist to ratification of the treaty no longer stand up under scrutiny. The treaty in its current form is a winning proposition for the United States, and I ask each of you to get actively involved and urge the Senate to ratify this treaty.

The Department of the Navy's secondary emphasis is to promote our need to exploit the national ocean and marine weather environments for tactical support of naval operations. Today's high-tech naval weapons increasingly need influence over environmental data to maximize efficiency and avoid collateral damage. New technologies are being fielded to collect and process air, ocean, and seafloor data for generating real-time technical support products for our war-fighting and peace-keeping efforts.

Third, the Department of the Navy has a significant role in improving and protecting the world's oceans. Our leadership in pollution prevention, compliance, species protection, and stewardship are integral to our worldwide naval operations on a daily basis. We will continue to protect and sustain a healthy ocean environment in all that we undertake.

The Navy also plays a major role in ocean research, ensuring access to the newest science and technology developments. These efforts, which include oceanography, marine meteorology, and ocean optics and acoustics, account for 25 percent of the national ocean science investment. The general public benefits from many civil applications of these Navy-developed ocean technologies and data.

That is where the Navy's emphasis lies for global security during the Year of the Ocean. I know that these issues are closely related to many of your own areas of concern. I look forward to aggressively attacking with each of you the cross-cutting issues of global security before us.

We are very, very fortunate to have such an outstanding group of experts, and it's my honor to serve with them on the panel today.

Melinda L. Kimble

Acting Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs

I'd like to say right up front that I'm speaking on behalf of the Secretary of State, and that the views I express are clearly held and fully supported by Madeleine Albright.

The oceans play a vital role in our national and global security, acting both as a buffer from foreign threats and as a means of projecting our power and influence throughout the world. As the preeminent maritime power and the country with the longest coastline, the United States has a paramount interest in ensuring order and stability on the oceans. We've fought two major wars to preserve navigational freedoms—the War of 1812 and World War I. Quite simply, we've always been in the forefront of promoting the rule of law in oceans and, when necessary, upholding that rule by force. To preserve our future security and prosperity we must continue to lead in that effort.

Wise and effective use of the oceans depends on internationally agreed-upon rules. All nations must work together to create these rules for military and commercial navigation, fishing, oil and gas development, offshore mining, scientific research, and recreation. These rules are, in fact, in place in the 1982 U.N. Convention on the Law of the Sea and the accompanying 1994 Seabed Mining Agreement.

When the Convention was concluded in 1982, you'll recall President Reagan decided the United States could not sign. While most of the Convention served U.S. interests, the deep seabed mining provisions were deeply flawed and needed to be fixed. Just as we had led the design of the navigation provisions, the United States also led the charge to correct and enhance the provisions on deep seabed mining. In 1994 we succeeded. Our U.N. permanent representative at the time, Madeleine Albright, signed that agreement for the United States. We had removed or modified the objectionable provisions, including transfer of technology, and the new provisions reflect our preference for sound market-based mechanisms.

The Law of the Sea Convention is now widely accepted. It is in force. Virtually all our NATO [North Atlantic Treaty Organization] allies and all OECD [Organization for Economic Cooperation and Development] countries are parties, except for the United States. It is the international legislative arena for the oceans, and the United States will lose its opportunity to participate if we don't join the Convention by November of this year.

The Convention in its revised form protects a full range of ocean interests:

- Secretary Dalton has clearly highlighted the importance of freedom of navigation. Commercially, 95 percent of U.S. import and export trade is transported by sea, and this represents 20 percent of our gross domestic product.
- Broad jurisdiction over fisheries and mineral resources off our coast is ensured under this treaty. As the nation, again, with the longest coastline and the most extensive areas of fisheries and continental shelf jurisdiction in the world, we benefit more than any other nation from these provisions.
- Protection for submarine cables that carry fiber-optic communication links critical to our telecommunications industry, again, is ensured by the Convention.
- The Convention's establishment of a framework for global and regional conservation agreements for the oceans and their resources also serves critical U.S. interests in fostering sustainable ocean management.

There's no question that the widely accepted Law of the Sea Convention will only be the ocean's gain. U.S. leadership, however, is at stake. Rules applicable to the use of the oceans will continue to be elaborated and applied in this forum. The United States must participate in developing and applying those rules if we are to protect our navigational and other freedoms from illegal jurisdictional claims of other nations.

The Convention has traditionally had bipartisan origins and support. And now that it meets our security and economic and environmental objectives, we're working with Congress to secure ratification this year. The Department of State's role in this agenda is to coordinate the international negotiating activities and to work cooperatively with the Navy—the Department of Defense, more broadly—and other U.S. agencies in elaborating and pursuing U.S. objectives on the oceans. Clearly, we'll be more successful in this endeavor if we're a party to the Law of the Sea Convention.

I am very concerned that the United States is not party to the Law of the Sea treaty. Our absence is noted by the world community, and our ability to influence global events demands that we have a seat at the table.

– The Honorable John H. Dalton

Panelists' Statements

Admiral Donald L. Pilling

Admiral Pilling is a distinguished career naval officer and is now serving in the Pentagon in Washington as Vice Chief of Naval Operations, the number-two ranking naval officer in the United States Navy.

Good morning. I'm in charge of discussing two very broad areas this morning: the importance of naval power to national security and global stability, and essential missions of the United States Navy.

Let me begin by stating that throughout history free access to the oceans has been key to the security of all nations. America is no different, and I believe that to a large degree the connection between our ability to command the sea and our national security is a widely accepted notion, given our nation's history. I believe, however, that familiarity has the potential to breed complacency, and we are well served by a concerted effort to raise awareness in three areas: (1) a deeper understanding of the role of naval forces; (2) continued and widened investment in sea power; and (3) pursuit of strong legal guarantees for continued principles of freedom of the seas.

First is the role of naval forces, which gives me the opportunity to discuss the essential missions of the U.S. naval service. America's dependence on the sea was seen originally in the context of maritime trade and fisheries, but in this century it has grown substantially. Not only has the need for a robust Navy increased during the century, but the nature and complexity of our missions have expanded, most notably since the early 1990s.

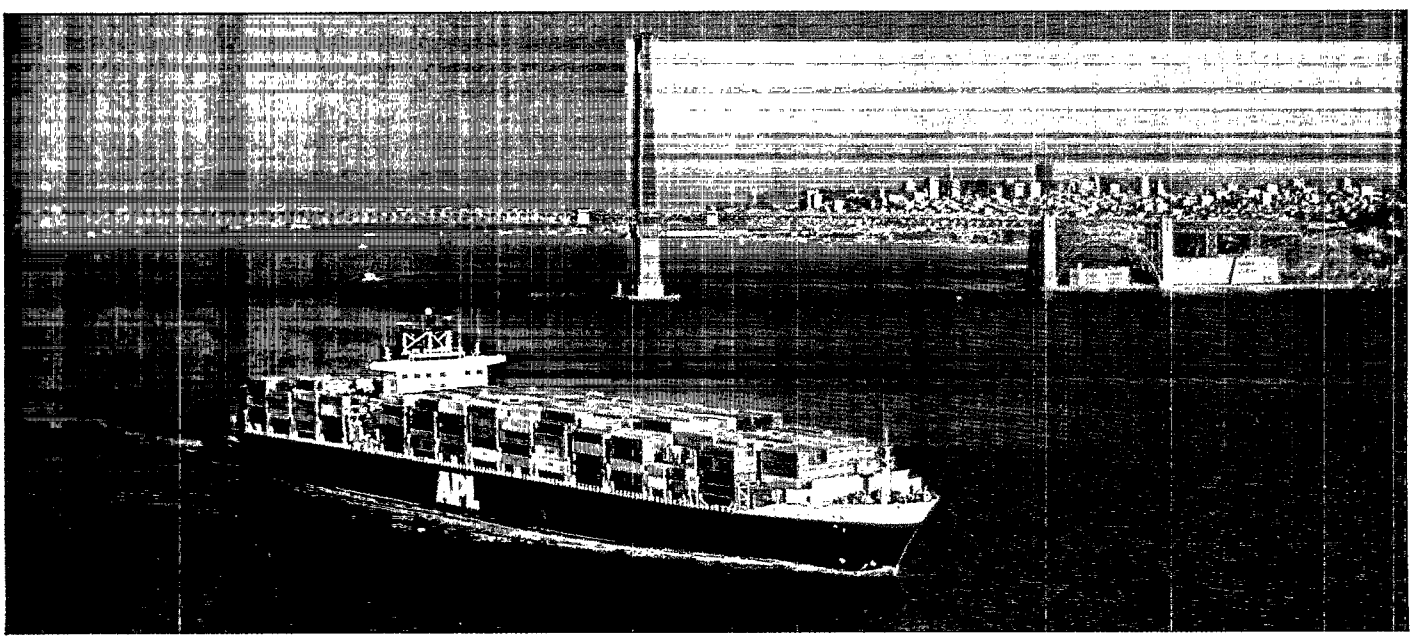
Even as a career naval officer I'm often amazed when I stop to think of the wide spectrum to which our forces are now applied. They're used in a variety of seagoing missions ranging from power or force projection; presence or deterrence patrols, like you saw recently in the Persian Gulf, where we had two carriers; maritime interdiction of illegal cargoes; humanitarian assistance; noncombatant evacuations, which you've seen recently off the coast of Africa, and possibly off Eritrea in Africa on the eastern coast; and disaster relief.

Our naval service is no longer predominantly 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. The President's national security policy of engagement is one that heavily depends on the versatile, agile, and multi-talented naval forces at the disposal of the national command authority.

The second area of concern that deserves a renewed focus is our investment in all aspects of sea power. The United States Navy's forward deployed strategy, which the Secretary referenced, is a strategy that, in peace and war, relies on multiple pillars, including a sound maritime infrastructure, access to ocean science and technology, and a renewed investment in the intellectual capital, which will drive the advances we foresee for our naval service and our maritime strategy.

Regarding infrastructure, a significant portion of the nation's industrial base is devoted to the sustenance of the U.S. maritime economy, which includes shipbuilding, ocean commerce, and

America's dependence on the sea has grown substantially in this century. One-fifth of our gross domestic product is transported by sea—a method of trade that relies on the maintenance of national and global security.
Photo: American President Lines



coastal development. Defense, the Coast Guard, and the Maritime Administration provide essential infrastructure support through a targeted program of shipbuilding, conversions, and charter hires. Defense continues to enjoy advances in ocean science and technology for cutting-edge military systems because of a sound U.S. industrial base, which operates under competitive principles. Continued investment in naval forces directly supports our national security strategy, supports our civil–military maritime infrastructure requirements, and indirectly supports our bilateral trade objectives.

Investment in high technology in the industrial base will be for naught without a similar investment and the intellectual capital to back it up. Our 21st-century forces and doctrine will be the beneficiaries of what we're calling the revolutions in military and business affairs—but only if we've built a generation of bright and engaged warriors and engineers to lead it.

Third, and finally, our continued free access to the oceans based on universal principles of international law is also essential to America's security. Free access enables the Commander-in-Chief to use the oceans as a superhighway to quickly send forces to areas of potential conflict to meet America's treaty obligations, preserve the peace, and demonstrate leadership. Our use of the sea for national security purposes is underprotected by the 1982 Law of the Sea Convention, which, as mentioned, has yet to be ratified by the United States.

The Law of the Sea for the Navy codifies essential rights and freedoms of navigation and overflight on the high seas and in foreign littoral areas. It also reaffirms the sovereign and immune character of our seagoing military forces. We don't have the luxury of having extra forces to fight our way through excessive maritime claims at navigational choke points. To the extent that the Law of the Sea Convention can keep open the sea lanes through the use of rules of law, it helps us operationally. To the extent that we can find explicit support for maritime operations in international law, it also makes it that much easier for us to garner support for our actions from our allies, the United States Congress, and the American public. In the broader context of a shrinking world, U.S. accession to the Law of the Sea Convention will help preserve and enhance U.S. sovereignty relative to control over all U.S. flag vessels in use of the seas. As more and more nations rely on the oceans for resources, commerce, and as a means to enhance their own security, America needs a seat at the international table. Ratification of the Law of the Sea Convention will bring us enhanced legitimacy and power on the world stage.

To sum up, let me say again that the naval forces have repeatedly demonstrated their effectiveness in responding to international crises and preserving and building peace. It was a former Secretary of the Navy, Paul Nietze, who once said: "Merely to face upon the oceans is not by itself to have maritime power, but only presents an opportunity. The test is what is done with that opportunity."

This conference for the Navy represents just such an opportunity. The U.S. naval forces, to remain effective in maintaining international peace and security, all must work together on our awareness for the applications of naval power, the need for investing all aspects of our maritime future, and for ratifying the Law of the Sea Convention. Our collective focus in these areas will serve us well. Thank you.

Rod Vulovic

Rod Vulovic is Vice President in charge of Ocean Transportation for Sea-Land Service, Incorporated. His impressive background in international shipping and marine engineering provides a unique perspective from industry's point of view.

Thank you. I'd like to emphasize a particular segment of the oceans in national security—namely, the role of the U.S. merchant fleet in maintaining a high level of sea-lift readiness and effectiveness. Due to other increasing budgetary constraints, the provision of an effective long-lasting sea lift supported by the U.S. merchant fleet is becoming more challenging. The steady decline of the U.S. flag fleet over the years has resulted not only in fewer vessels but, as important, an increase in the average age of the fleet, causing a lower level of state-of-the-art of the fleet as well—even more so for the Jones Act [Merchant Marine Act of 1920] portion of the fleet. During the last decade a number of commercial shipyards were closed. A number of marine equipment manufacturers ceased to exist, as well as a number of ocean shipping companies. It's no coincidence that the investment tax credit was abolished not too long prior to that.

In order to adequately support the nation's sea-lift needs, the U.S. intermodal industry has to achieve worldwide competitive levels and regain and maintain its leadership role, which won't be possible unless these necessary and timely steps are taken:

- Our ports need to develop and maintain their infrastructure in such a way that their role as the major and most important facilitator of the intermodal interchange is fully met. No fast, large, modern vessel is worthy of the

Above all, we need to work as a team to make the U.S. Merchant Marine healthy once again in order to support national security.

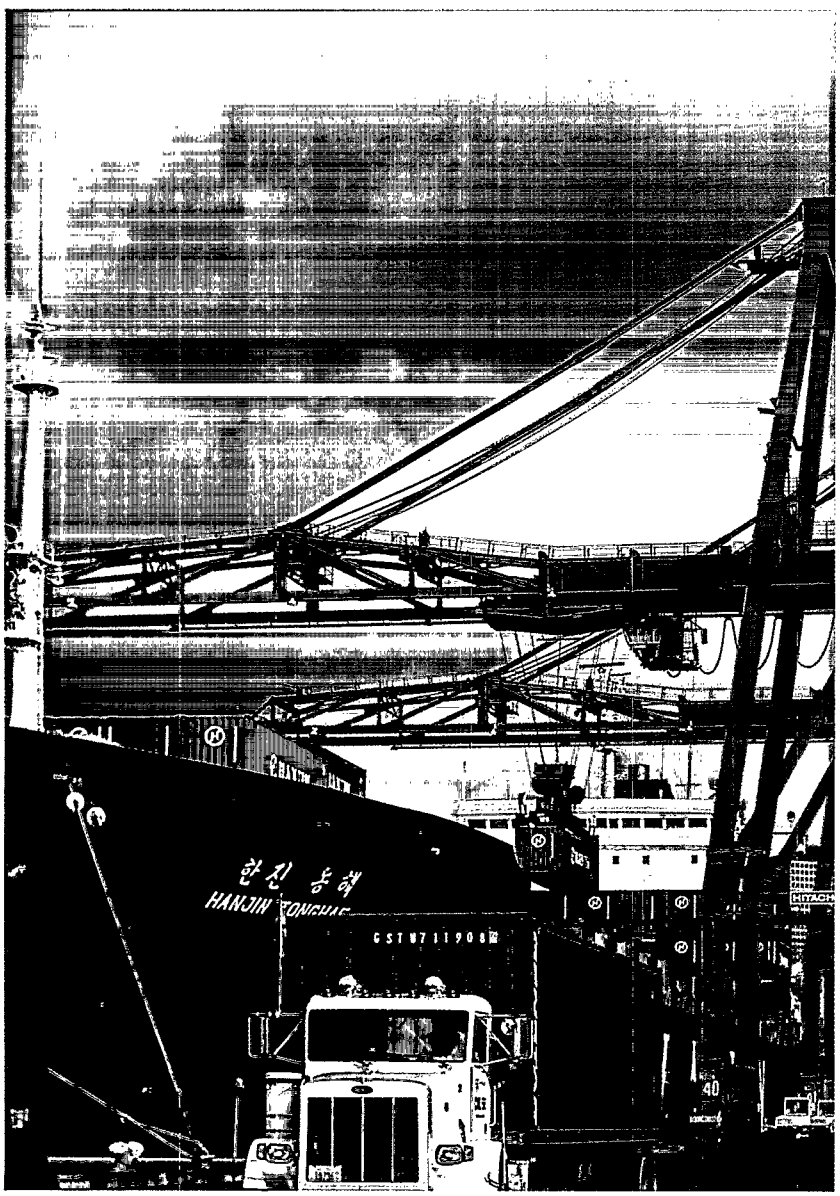
– Rod Volovic

investment in itself unless hosted by port at a short distance to and from the seaway affording easy and safe maneuvering and quick and safe docking and undocking. But these are just part of the whole system.

- Terminals that are well-designed, built, and manned need to be complemented by easy and efficient rail and highway connections. All federal, state, and local authorities that are part of the system have to work as teams.
- Also needed are well-coordinated, nonconflicting, and congruent laws and regulations. Although it varies by locality, the number of cognizant authorities is large, which inevitably leads to unnecessary bureaucracy.

The fact that the daily lives of all Americans are touched one way or the other by the nation's ability to effectively and without restrictions use all the oceans and other waterways isn't universally known or recognized. A farmer's wife in a small town in Kansas can buy bananas from Ecuador and grapes from Chile, and she can satisfy most of her household needs at a local Wal-Mart. Her husband can readily purchase for his farm machinery fuel refined from Alaskan or any far-away country's crude oil. The family's farm products can reach far-away countries and markets as well. All that, thanks to a functional global transportation system.

Well-designed, well-built, and properly manned terminals need to be complemented by easy and efficient rail and highway connections. Improved port infrastructure is essential to continued U.S. economic security, as well as to support traditional national security requirements.
Photo: Port of Seattle



However, for the national security point of view, this isn't enough. That reasonably well-functioning transportation system supporting the nation's commerce has to be national and be controlled by the nation. It has to be available, ready, and able to respond at all times. It has to be adaptive to the U.S. military needs, available at short notice, and commercially competitive at all times.

The recently implemented maritime security program, which supports a small number of qualified U.S. flag vessels, only covers a portion of the U.S. flag liner economic disparity between foreign flag and U.S. flag vessels. Similarly, U.S. cargo preference for U.S. flag vessels is an important element that adds value.

However, the two of these aren't enough. Additional action is needed to supplement the above, such as statutory and/or regulatory reforms, like reenactment of the investment tax credit, abolishment of the *ad valorem* duty for foreign repairs to the U.S. flag vessels, and achievement of full parity of the U.S. vessel construction and inspection standards with other IMO [International Maritime Organization] member construction standards.

Another important goal is preservation of the Jones Act as a vehicle for appropriate and steady training of U.S. merchant seamen, as well as for preservation of many American jobs. Sea-Land, as an example, has a significant commitment to the U.S. government of its assets, intermodal resources, terminal facilities in strategic areas of the world, management, and computer systems for use both in peace and in war. These resources are paid for by commercial customers on a day-to-day basis. However, they're available to the U.S. government in times of crisis and their military contingencies.

U.S. flag carriers and the Department of Defense should further extend their relationships, specifically in the areas of logistics, ship management, and the acquisition of maritime assets. As an example, fast sea-lift ships once were Sea-Land SO-7s some years ago. Combination of acquisition of existing commercial U.S. flag vessels with

the necessary modifications in U.S. shipyards would yield considerable savings in both money and time, as compared to new buildings.

What do we need to do in order to meet these challenges that our national security is facing when we look at the horizon over the vast oceans? We need to communicate. We need to educate. We need to engage. We need to compromise. Above all, we need to work as a team in order to make the U.S. Merchant Marine healthy once again in order to support national security. Thank you.

Paul L. Kelly

Paul Kelly is Senior Vice President of Rowan Companies, Inc. Mr. Kelly has represented the oil service and supply industry on a wide variety of committees and boards, including the Interior Department's Outer Continental Shelf Policy Committee and the Coast Guard's National Offshore Safety Advisory Committee. He has written widely on energy policy, and is a member of the Editorial Board of World Oil.

Another important component of global security is access to energy supplies. As we move into the next millennium, a larger percentage of oil and natural gas will come from the oceans. The United States has a significant opportunity to influence the future course of events, from both a private-sector and a government perspective, and guarantee that there will be secure access to this important source of energy in the years ahead.

Extraction of petroleum resources from beneath the seabed is a major maritime activity in the Gulf of Mexico, offshore southern California, and in some regions of Alaska. Petroleum production from offshore federal lands currently accounts for 20 percent of our domestic oil production and 27 percent of natural gas production. The offshore oil and gas industry, including the shore sector, provides Americans with approximately 85,000 well-paying jobs, the number of which is likely to more than double in the next two decades. Oil production in the Gulf of Mexico, where there is a high level of industry interest and activities in waters as deep as 8,000–10,000 feet, is expected to double by the year 2002. Revenues from OCS [Outer Continental Shelf] oil and gas development generate an average of $3–$4 billion a year in federal receipts and help fund the Land and Water Conservation Fund and the National Historic Preservation Fund.

Offshore petroleum production is a major technological triumph. New exploration, drilling, and production-related technologies have brought about world-record complex industrial projects in 3,000–5,000 feet of water, which would have been unimaginable a generation ago. Indeed, exploration wells have been drilled in close to 8,000 feet of water, and 10,000 feet seems within reach. Much of this technology may have application for the Navy, and it certainly can be used in other ocean exploration endeavors and in scientific research, as well as in non-ocean fields, such as communications and medicine.

Advances in technology and pace-setting safety-management systems have also contributed to an improved OCS safety and environmental record. Over the past 20 years, less than a thousandth of a percent of the oil produced from the OCS has been spilled from production facilities. Today, industry, the Department of the Interior's Mineral Management Service, and the U.S. Coast Guard are working in partnership to raise the bar for environmental and safety performance even higher.

At the same time, enlightened policies on the part of the current administration have helped move the OCS program beyond conflict to consensus and afford hope for even more exciting ocean exploration in the future. Certain OCS planning areas in the United States are currently under Presidential or congressional moratorium, which will expire by the year 2000. The Clinton Administration has committed itself to resolve conflicts raised in connection with OCS oil and gas development and build a consensus among stakeholders as to where, when, and how activities should proceed.

A parallel theme has been science-based decision making. This approach is being used in the current 1997–2002 five-year OCS leasing program. And our coastal state administrations seem to be much more satisfied with the degree of communication and consideration that now exists between the federal government and the states regarding OCS oil and gas policy. I think when we look for examples of what works and what doesn't work in terms of ocean policy, this is definitely a good example of what does work. For this reason, I believe it would be premature to extend OCS moratoria beyond the year 2000. We should let these consensus-building policies work, and evaluate their success before extending moratoria further.

In the meantime, we're not going to have new offshore leasing off California. The present program doesn't include any lease sales through the current program, which ends in the year 2001, and the petroleum industry itself doesn't want to invest in areas where there isn't local consensus. There are so many opportunities available today on a worldwide basis that they have plenty of other options. So there isn't a high level of interest in leasing in this area at the present time from an industry perspective, either.

The United States must participate in developing and applying those rules of ocean use if we are to protect our navigational and other freedoms from illegal jurisdictional claims of other nations.

– Melinda L. Kimble

Another consideration is the incredible advances in drilling technology made over the past decade, which make the extraction of oil and natural gas from the ocean much safer from an environmental standpoint and much less intrusive physically. A number of the areas in moratoria contain important reserves of natural gas, which cannot be spilled and is more and more the fuel of choice.

Moreover, the world will have a difficult enough time as it is supplying the energy needs of the 7 billion citizens who will inhabit our planet by the year 2010—at least a billion more than there are today—in effect, another China. Those involved in global security issues will recognize that we need to leave ourselves some flexibility to deal with changing international conditions—or even evolving domestic conditions and attitudes.

As exploration of the ocean for hydrocarbons globalizes, the U.S. private sector and government have an unparalleled opportunity to lead the world in terms of management technology and our ability to demonstrate how to extract these resources in an environmentally sound manner for the benefit of all mankind. In the first half of 1997 alone there were 176 offshore oil and gas concessions granted on a global basis. Every country in the world that has a continental shelf is looking for a way to explore for these resources. And they're looking at the United States for the technology that's been developed. And they are looking at us for our management system on how to go about this on the basis of sound management and safe environmental conditions.

As stated recently in a report of the National Research Council: "Ocean observations have always been the driver of new knowledge and predictive capabilities in the oceans and its basins." Ocean drilling has produced sediment cores that provide our best long-term records of natural climate fluctuations. Submersible observations, both piloted and robotic, opened our eyes to hydrothermal vents and unique life forms that surround them.

Many of the technological improvements enabling us to make these observations are driven by the needs of oil and gas explorers in the ocean. Seventy-five percent of the business being done by the underwater industry today is being done on behalf of the oil and gas industry, and certainly this is the case in terms of contributions being made to deep-water technology. This is the case with drilling, submersible vessels, and robotics. Technology used in the oil and gas industry was used in the recovery of *TWA 800*, for example.

Much of our knowledge of seabed geology and geomorphology is directly owing to the offshore oil and gas industry. This is an industry that basically over the years has been perceived as one of America's basic industries. But during the past decade, it's gone through an incredible transition to become a high-tech, knowledge-based industry.

For example, there's a partnership working in Houston today on the relay of highly technical, multifaceted data from remote locations on a real-time basis through satellites. This demand results from the need for offshore geophysical vessels to relay real-time data back to the Houston office so that it can be examined on a timely basis. Hearing about this project, the Texas Medical Center and the Johnson Space Center asked if they could join in. This is a good example of collaboration on this

The offshore oil and gas industry provides Americans with approximately 85,000 well-paying jobs—a number that is likely to more than double in the next two decades. Continued access to adequate and affordable oil and gas reserves also supports our economic and national security interests.

technology and the kind of potential we have in the future.

Today in Houston, we also have a large-screen interactive visualization center, which allows engineers and earth scientists to course through three-dimensional volumes of subsurface data worldwide. Also, companies are discussing the possibility of making available to the scientific community video film taken by various petroleum companies around wellheads in the ultra-deep water for purposes of examining marine ecosystems at these depths.

As all of these examples indicate, there's much potential for acquiring knowledge about the ocean environment through more joint efforts among industry, government, universities, and the scientific community at large. Today scientists are using offshore rigs and platforms to study everything from marine organisms, physical oceanography, and meteorological data to bird migration. The day is approaching when used offshore oil and gas platforms will be used for aquaculture projects.

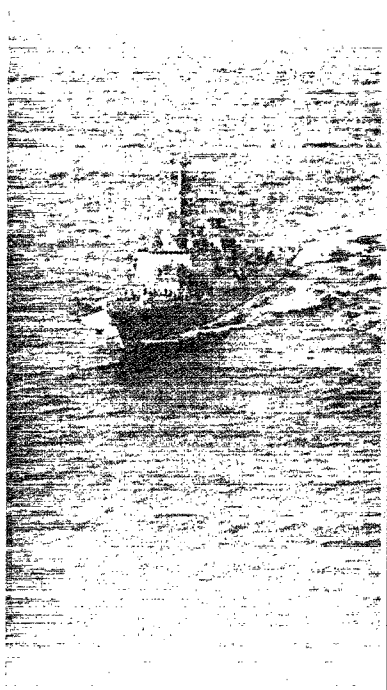
We have some of those projects under discussion now. A converted offshore drilling rig is preparing to leave Russia for Long Beach, California, where it will be stationed to begin its new life as a privately owned, commercial offshore launch platform. The co-owners of the project, Boeing and Hughes, have 17 satellite launches contracted to date. As can you see, opportunities for the use of this technology are diverse and just abound.

As petroleum exploration moves into deeper and deeper waters, I want to join my colleagues in stating that, from the perspective of our industry, it's important that the U.S. become a party to the Law of the Sea treaty. This would ensure the U.S. of a minimum of 200 nautical miles of OCS jurisdiction and establish rules and procedures for delineating the outer limits of the geological continental shelf, which in some areas extends considerably farther. The component of the treaty that protects the right of both commercial and military ships and aircraft to move freely through and over straits used for international navigation, to engage in innocent passage through states' territorial seas, and to enjoy high-seas freedom of passage through the exclusive economic zones also is important to U.S. energy security, as our sources of petroleum globalize and diversify in the years ahead and become even more dependent on secure ocean transportation.

This, indeed, may be an area where technology has moved out ahead of government policy-making. We're ready to explore in 10,000 feet of water from a technical standpoint. That goes beyond our Exclusive Economic Zone. We need to know what the rules are going to be. Thank you very much.

Admiral James M. Loy

Admiral James Loy is a career Coast Guard officer, who took the helm as the Commandant of the Coast Guard in May 1998. He is an expert on the Coast Guard's law enforcement responsibilities and how his service views the changing threats to national security, with emphasis on drug interdiction, immigration, and fishing.



Good morning. I'd like to take this moment midway down the panel to reinforce what Secretary Dalton opened for us. I think you've all heard already the connectivity between what we're supposed to be talking about here in the global security panel, and what obviously must be being discussed in Commerce, the Environment, and the Science and Education panels being conducted elsewhere on this campus this morning. At the root of it all is the balance that we're attempting to strike in the future between the use of our oceans and the conservation of our oceans. In many of the comments that you've already heard, you have the sense that both of those are well reflected, even within our focus on national security and global security.

President Clinton has stated: "The threat to our national security today comes not from those who control enemy silos but from the international criminals and drug traffickers who undermine the stability of new democracies and threaten the future of our children." This is one of many realizations that the phrase "national security" has taken on new dimensions since the fall of the Berlin Wall in 1989.

The immediate application of this observation to our panel is we're forced to recognize that the security threats mentioned by the President and many other burgeoning threats are fundamentally maritime issues. More specifically, they're maritime issues that aren't likely to be countered effectively by the military force projection thought processes of the past alone, although they certainly continue to play a role. Instead, they'll require effective interagency, interservice, and international cooperation.

The Office of Naval Intelligence recently published a document entitled *Worldwide Maritime Challenges.* It's a perfect fit as a textbook for our panel on global security. In it the authors itemize the array of security threats that we'll face in the future, and it's not about nation-state sponsored military threats. It's about everything from maritime environmental protection to arms trafficking. I've been asked to briefly discuss this morning just three of those challenges to our maritime security: drug smuggling, illegal immigration, and

the depletion of fisheries and other natural resources in our Exclusive Economic Zone—any one of which would offer an hour's debate for all of us this morning. Let me attempt to just capsulize those in brief comments.

In my mind, drug trafficking is the largest nonmilitary threat to national security that we now face as a nation. There are those who would certainly have other items that they'd offer in its place, but drug imports today, as we speak, cause violent crime and uncontrolled exports of national revenue. The Office of National Drug Control Policy estimates that the illicit drug trade drains our economy of over $67 billion per year. The United States has a habit of over 300 metric tons of cocaine on an annual basis. Although many people are aware of the Coast Guard's prominent role in maritime drug interdiction—seizing over 100,000 pounds of cocaine and a similar amount of marijuana just last year—drug interdiction is really an interagency, interservice, international effort. The debate last week and early this week at the United Nations, which we all read about in the press, acknowledges the harsh reality of this scourge as an international security issue.

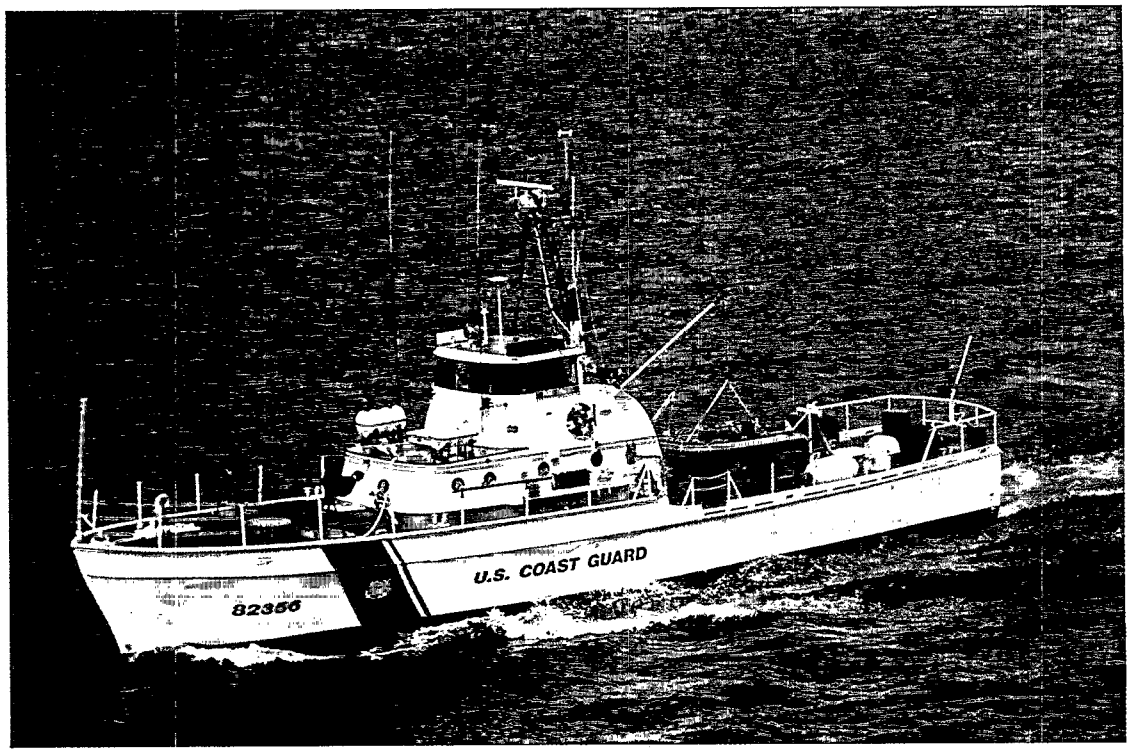
In addition to serving as the Commandant of the Coast Guard, I serve the President as his United States Interdiction Coordinator under the Director of the Office of National Drug Control Policy. In this capacity, I coordinate the drug interdiction efforts of the Department of Defense, the Coast Guard, the Customs Service, and 30 other law enforcement entities. The State Department leads interagency teams as well, to negotiate bilateral maritime counter-narcotics agreements with countries around the world. It's a $16-billion-a-year program in the budget of the United States of America. Our sea lanes remain the path of choice for these smugglers. As a result, it's clearly one of our maritime challenges.

With respect to illegal immigration, it presents its own set of unique challenges. Usually, because of the very unseaworthy conditions of vessels that carry illegal migrants, the Coast Guard actually rescues many of the illegal migrants that it interdicts. In fact, together with naval forces, we've rescued more than 62,000 Cuban and Haitian migrants in the Florida Straits and in the Windward Passage just since 1974.

Nevertheless, we must be very clear on the point that the humanitarian aspect of our migrant interdiction program doesn't alter the underlying fact that illegal immigration is essentially a national security issue. The first criterion for the security of any nation-state is its ability to control its own borders. The President has designated the Coast Guard as the lead U.S. government agency for maritime migrant interdiction, and in this role the Coast Guard works closely with many other agencies and with many other governments.

In a recent successful interdiction of a mother ship smuggling PRC [People's Republic of China] migrants, the U.S. Coast Guard coordinated its activities with INS [Immigration and Naturalization Service], with Justice, with the American Consul in Bermuda, with the government of the PRC, the government of Bermuda, and local law enforcement agencies. We routinely work with INS, the Customs Service, the Border Patrol, and the Department of State. As long as we have a gulf economically between "have" nations and "have-not" nations, illegal migrants will be on our oceans trying to find the "land of milk and honey."

With respect to fisheries, the depletion of fisheries and other natural resources in our Exclusive Economic Zone is also a security



The Coast Guard plays a prominent role in the interagency effort of maritime drug interdiction. In 1997 alone, it seized over 100,000 pounds of cocaine and a similar amount of marijuana. The Coast Guard is responsible for U.S. maritime security in response to nonmilitary threats, including smuggling of all kinds, illegal immigration, fisheries enforcements, and marine environmental protection.
Photo: United States Coast Guard

issue. Overfishing has seriously depleted many stocks and has even led to the extinction of some species. Our environmental stewardship responsibilities, as well as the economic impact of our $50-billion fishing industry, oblige us to treat this issue seriously.

The depletion of the Georges Bank treasure fish is a sad example. Although the biomass remains essentially the same on the Grand Banks, it no longer includes the cod and the haddock and the flounder of days past.

Over the past two weeks, Coast Guard operations against illegal high-seas drift netters in the north Pacific have demonstrated the environmental threat. And the attendant maritime law enforcement challenge extends well beyond our Exclusive Economic Zone. Effective measures require international cooperation. Again, the Coast Guard's successful interdiction of two of these vessels, and our assistance helping Russia seize a third, required cooperation from the Russian Federal Border Service, the Fisheries Agency of Japan, and the People's Republic of China, in addition to substantial coordination within the U.S. government as we prosecuted those cases.

These threats and many others that we face have three common factors:

- First, as I indicated in my opening comments, they essentially are maritime threats to the security of our nation.
- Second, because the threats are conveyed by unarmed or lightly armed vessels that often look like and mingle with legitimate commerce and recreational vessels, they must be challenged by capable offshore law enforcement capability.
- Third, the social, economic, and other implications of the threats afloat and ashore require case-by-case participation with many other governmental agencies.

How do we address these threats? The short answer is that we will do so together. The more complete answer is that we must deepen our cooperation at the interagency, interservice, and international levels. We must at the same time be serious about the business of procuring the capabilities for the United States to protect its maritime interests in the open ocean against these other-than-war maritime challenges.

Let me echo my colleagues on the panel that an important step toward deeper cooperation is obviously the ratification of the 1982 U.N. Convention on the Law of the Sea. This Convention preserves the right of U.S. military forces to use the world's oceans to meet national security requirements by stabilizing the breadth of territorial seas and by articulating such navigational freedoms, like innocent passage, transit passage, and archipelagic sea lane passage. In addition to allowing our Navy to project force anywhere in the world, these navigational freedoms allow your Coast Guard to concentrate its law enforcement forces in the transit zones favored by drug traffickers and illegal migrants. However, if we remain on the outside looking in, we jeopardize our nation's ability to promote international law and order on the world's oceans.

The oceans have long sustained—and even protected—us as an island nation. The maritime challenges of today and the future will test our capacity to both use and protect our oceans—that balance I spoke of at the beginning. Maritime security will continue as a vital concept to our way of life as a nation and of balanced use of those oceans we must both use and protect wisely. Thank you.

The oceans have long sustained and even protected us as an island nation. The maritime challenges of today and the future will test our capacity to both use and protect our oceans.

—Admiral James M. Loy

The Honorable David A. Colson

David Colson retired from the Department of State with more than 20 years of distinguished service and served as the Deputy Assistant Secretary of State for Oceans. He is now an attorney with LeBoeuf, Greene and MacRae, L.L.P. He has written widely about and is a recognized expert on many cross-cutting Law of the Sea issues.

Thank you. I've been asked to say a few words about international fisheries in the context of the subject of our panel's global security. First, I'd like to make a general remark.

Global security in its various aspects requires stable rules that everyone knows and understands and respects. It also requires leadership to maintain those rules—to see to their proper implementation, to promote compliance, and to halt the erosion of the rules. The establishment of such rules was an objective shared by all United States administrations since the Eisenhower Administration. The objective is now achieved in the now-amended 1982 Law of the Sea Convention.

It's ironic that the United States stands aside today and doesn't assume its natural leadership role to ensure the proper implementation of the rules that our country strove so long to achieve. If America doesn't take its proper leadership role, these rules aren't going to stand. Disagreement over the rules will affect global security in many ways. World trade, as we've heard, depends on those rules. World communication and transportation depend on those rules. Naval mobility—at the center of our national security—depends on those rules.

What about fisheries? Global security certainly implies sustainable fisheries on a worldwide basis. You can make a very strong case about how the world's population will continue to increase, how

the world is already overfishing its fisheries, and the importance of fisheries as a food resource—not only in the United States but even more so in many parts of the world, including the developing world.

You can also make a case that as far as maritime law and policy go, fisheries often tend to be flash-point issues. If you think about the incidents that have occurred around the world in the last five or ten years between governments, you'll indeed see that a fisheries dispute has been at the heart of what two governments have been scrapping about when they brought their gunboats together on some strange place that perhaps most Americans have never heard about.

You can also make a case that as a matter of law, it's been the fisheries issues that have often caused the stretch in international law. Over the last 40 or 50 years, as we've seen the Law of the Sea expand, as we've seen things change in the Law of the Sea, it's often been the fisheries issues that were at the forefront pushing the international Law of the Sea beyond current limits.

If we were today in The Hague, we'd be listening to the case before the World Court that Spain brought against Canada. You remember the Estai case a few years ago. Well, that case is now being heard in The Hague.

We ought to know by now that sustainable fisheries has less to do with the rules, per se, than with man's stewardship. The rule of the 200-nautical-mile zone, which emerged in the 1970s, wasn't the legal panacea for overfishing that it was thought to be. We know now that what's required is a full and proper implementation of the rules of sustainable fisheries management. For that, across the board in the international fisheries arena, you need United States leadership.

To have sustainable fisheries in the 21st century, I believe there are five requirements:

- First, coastal states are going to have to do a better job in managing their fisheries and in controlling their fishermen.
- Second, coastal states are going to have to do a better job in protecting their coastal environments. We're not going to have fisheries if we destroy our wetlands. It's quite simple.
- Third, high-seas fishermen must become responsible and become cooperative with international regulatory efforts.
- Fourth, international fishing institutions must be strengthened.
- Finally, technology must be used for management and control and the enhancement of

The depletion of fisheries in the U.S. Exclusive Economic Zone is a national security issue. The U.S. Coast Guard plays a vital role in protecting fisheries by patrolling restricted areas and interdicting and seizing vessels involved in illegal activities.
Photo: United States Coast Guard

selective fishing practices—not more efficient ways to kill fish. It's amazing, in the fisheries business today, you can't get up-to-date statistics with the kinds of technology that we have in this world. We're so far behind in bringing that technology into day-to-day fisheries management.

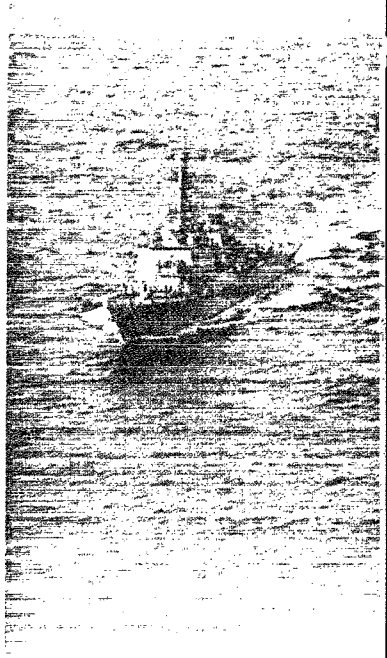
Accomplishing these objectives requires hard work in numerous domestic and international fora, including about a dozen major international fishing agreements. American moral authority to lead within these fishing agreements is problematic when we don't yet accept the basic rules for ocean use—the 1982 Law of the Sea Convention as it has been amended, and now which virtually every other country of importance in this world has accepted.

From the fisheries standpoint alone, the United States benefits from the Convention. The Convention confirms our 200-nautical-mile Exclusive Economic Zone. It confirms our right to demand that there be no high-seas fishing for salmon. It confirms the necessity of regional fishing organizations to manage highly migratory species, such as tuna and billfish. It confirms the predominant interest of the coastal states in straddling stocks, such as Bering Sea pollock, and the need for international agreements to control fishing on those stocks outside the 200-mile zone. The Convention's dispute settlement provisions provide a useful tool to enable responsible fishing countries to go after the bad actor.

I believe the cost to the United States in failing to approve the Law of the Sea Convention will be in the erosion of the rules of ocean use—those rules that we rely on for global security due to weakened United States leadership in international ocean institutions across the board. The cost to world fisheries of a U.S. failure to approve the Convention will be weakened United States leadership in the quest for sustainable fisheries management internationally.

Let me just give you one small example in closing. Since the United States hasn't approved the Law of the Sea Convention, we were unable to appoint or nominate for appointment a judge to the new Law of the Sea Tribunal, which came into being under the Convention. The first major case before the Tribunal concerns, in part, a legal issue of whether a vessel that brings supplies to a foreign vessel that is permitted to fish in another country's 200-mile zone is subject to that coastal state control. This may sound like a trivial issue to some of you who may not be conversant with the way we go about fisheries management internationally. But I guarantee you that most of the world's major fishing operations are dependent in one way or another on supply and transport vessels. It's essential to fisheries management, control, and conservation—I submit, to sustainable fisheries management worldwide—that such supply vessels be subject to coastal state permitting procedures.

The United States has a position on that question. You can find it in the Magnuson–Stevens Fishery Conservation and Management Act. We believe that such vessels be permitted, but now this critical legal issue that relates to fisheries conservation is before the Law of the Sea Tribunal for decision. There is a risk on this question that it could come out bad for sustainable fisheries management. It is too bad, I believe, that the United States doesn't have a judge today on the Law of the Sea Tribunal to exercise the leadership that's necessary to bring about the right decision on this important Law of the Sea fisheries conservation question. Thank you very much.



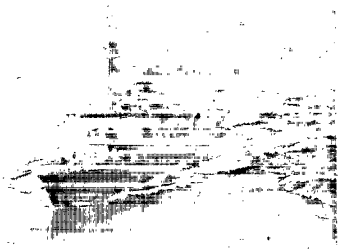
Lee A. Kimball

Lee Kimball, formerly the Executive Director of the Counsel on Ocean Law, is now a consultant on treaty development and international institutions. She performs analyses and offers advice on legal and institutional issues related to international environment, development, and ocean management.

Thank you. I want to touch briefly today on four points:

- First, to reaffirm what others have said, global security isn't just a matter of national defense, but also includes environmental and resource security, including food security.
- Second, international rules widely accepted by all states are the most cost-effective way to achieve global and national security.
- Third, the Law of the Sea Convention is a unique and essential vehicle to enhance global security broadly defined.
- Fourth, our major challenge today is to get that Law of the Sea Convention in place for the United States, as virtually every other speaker has said, and to use it as a vehicle to build further international commitment to address land-based sources of marine pollution and to conserve and restore marine fisheries worldwide.

It's clear that all of us as U.S. citizens are affected by events abroad. We're affected by conflicts abroad. We're also affected by resource scarcities abroad, and we're affected by resource degradation at home, when that may be caused in part by foreign actions. We're also affected through shipboard commerce in terms of access to commodities produced abroad and in terms



of market access for goods produced in the United States.

International rules have effectively balanced concern for navigation freedoms and marine environmental protection. International rules also allow us to set higher standards in terms of resource conservation and marine environmental protection for activities in the United States to set an example for others.

The rules governing ocean use are set out in the 1982 Law of the Sea Convention, which is a basic constitution for ocean use. Like any other constitutional document, it sets forth principles and parameters for all nations in using the oceans, and it lays a foundation for the development of more detailed rules.

The Law of the Sea Convention is unique in the way that it incorporates by reference more detailed rules developed in other international fora—be it for international shipping, for fisheries, or for marine and environmental protection—and extends those rules even to countries that aren't necessarily party to the more specialized agreements. This is a very effective way to upgrade the rules of international law. It takes into account new scientific information, technological innovations, new expert assessments, and other emerging issues very effectively.

This mechanism also protects U.S. interests by promoting harmonization of rules at global and regional levels. In doing so, it helps establish a level playing field for international competition—notably in the area of international shipping, where the international standards set for environmental safety and crew for vessels are developed in the International Maritime Organization.

We've made a lot of progress in protecting the marine environment from pollution from ships. But our major challenge today is land-based activity. Seventy-seven percent of marine pollution comes from activities based on land—industrial activities, agricultural activities, erosion, wastewater—pollution borne to the sea by rivers and airborne deposition.

We need to work cooperatively with other states in further developing the rules in this area and in developing cooperative initiatives to help all countries apply them. We need more regional agreements in this area, and, as has been said in other contexts, the U.S. needs to be a very active and influential participant in those fora. As long as we're not party to the basic instrument—the Law of the Sea Convention:

- First, we have to spend a lot of time and diplomatic capital trying to get other nations to implement the obligations in the Convention on marine environmental protection and resources conservation.
- Second, our ability to encourage other nations to take on further commitment—to develop further these other rules in the specialized fora—is undermined because we haven't bought those basic obligations in a formal sense in the Law of the Sea Convention.

Professor John Norton Moore

John Norton Moore is Director of the Center for Oceans Law & Policy at the University of Virginia. Professor Moore is an internationally recognized expert on ocean issues and is the author of numerous books and articles on the subject. He has served as chairman of the National Security Council Interagency Task Force on Law of the Sea and has had numerous Presidential appointments related to ocean affairs.

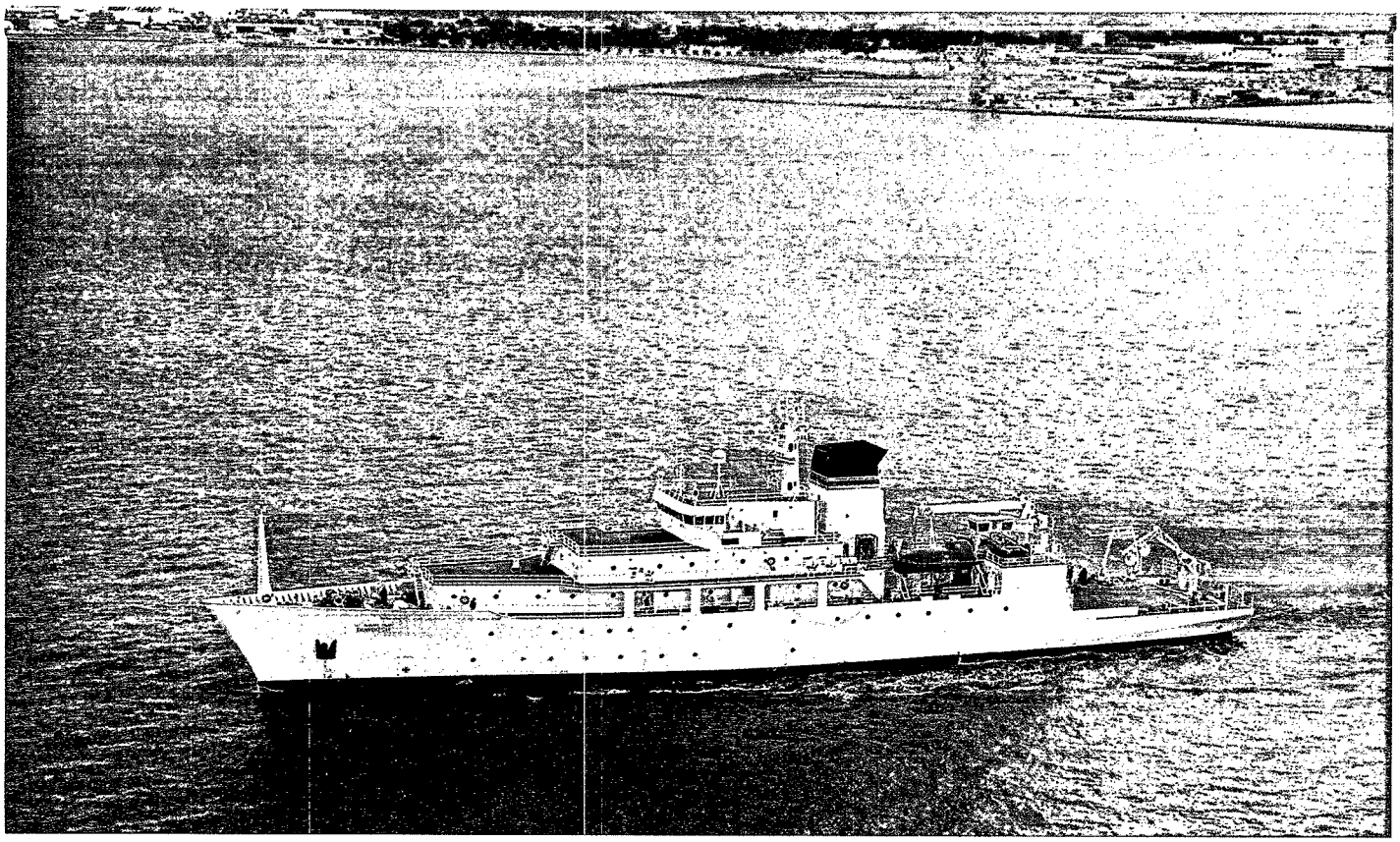
Thank you. I have an e-mail for America. The United States should adhere now to the 1982 Convention on the Law of the Sea. This is the most important immediate United States ocean interest. There are many reasons for United States adherence. Let's look at some of the major ones:

- Maintaining U.S. effectiveness in protecting navigational freedom.
- Enabling U.S. participation in important oceans institutions.
- Continuing U.S. leadership in promoting the rule of law in the world's oceans.
- Providing a vehicle to place critical U.S. interpretations of oceans law on the record.
- No U.S. interest is served by nonadherence.

Let's review each of these in somewhat greater detail. Navigational freedoms are the real core common heritage of mankind in the world's oceans. The U.S. has fought at least two major wars to preserve navigational freedoms, as the Secretary has indicated: the War of 1812 and World War I. You may recall that in Point 2 of his famous 14 Points at the end of World War I, Woodrow Wilson said we should secure "absolute freedom of navigation upon the seas, alike in peace and in war."

The UNCLOS [United Nations Convention on the Law of the Sea] treaty provisions strongly protect navigational freedoms. And those provisions meet all requirements of the United States Navy and of United States commerce. U.S. nonadherence handcuffs Uncle Sam in the continuing and critical struggle against illegal ocean claims.

This is a partial list of some of those illegal claims that Ambassador Colson was discussing. I won't go through all of them, but this partial list includes at least 141. There's a continuing and vital struggle for the rule of law in the world's oceans, and the U.S. must be a player. Let's also look at the



The ocean is the Navy's operating environment. U.S. Navy military survey ships, such as the *USNS Bowditch*, collect a wide range of ocean data that provide essential tactical support to military operations worldwide. ***Photo: Official U.S. Navy photograph***

importance of enabling U.S. participation in oceans institutions created by the Convention.

First is participation in the mechanisms for the settlement of ocean disputes set out in the Convention, and inclusion of Americans as judges. U.S. participation in the Commission on the Limits of the Continental Shelf would give us a voice in finalizing the criteria for the limitation of the shelf so critical for our oil and gas interests. To continue its participation in the International Seabed Authority, the U.S. must adhere by November 16, 1998. The U.S. must help shape the Authority to keep it limited and responsive to commercial realities.

Turning to the importance of U.S. leadership in promoting the rule of law in the world's oceans, the U.S. was a principal leader in promoting a basic constitution for the world's oceans, which would protect our common global heritage in navigational freedom, the ocean's environment, fish stocks, cetaceans, and other ocean interests. Today, U.S. leadership is still vital in protecting the important achievements embodied in that basic constitution. No other nation combines our global ocean interests and our potential for leadership. If not America in promoting the rule of law in the world's oceans, then who? The UNCLOS provides a vehicle to place critical U.S. interpretations of oceans law on the record.

Thomas Jefferson dreamed: "The day is within my time, as well as yours, when we may say by what laws other nations shall treat us on the sea." That day is now. America has had a vital say in developing the UNCLOS treaty, and was the most important player in the navigational and environmental provisions. While over 50 nations, in signing or adhering to the treaty, have made statements about its meaning, too many of these statements seek to curtail the common heritage for special interests. By itself adhering to the treaty, America will get its opportunity to attach vitally important interpretations that could be decisive in the ongoing struggle for oceans law.

Something that we frequently miss in looking at a cost–benefit equation: there is no United States interest that will be served by nonadherence at this time. The principal provisions of the Convention are already customary international law, accepted by the United States as binding. Part 11 on seabed mining was a problem, but that part was renegotiated successfully to meet all the conditions set by President Reagan for United States adherence. Moreover, since Part 11 has now been renegotiated, continued United States nonadherence will change nothing.

Over 120 states are parties, including most of our NATO allies and all permanent members of the United Nations Security Council, except the United States.

As exploration of the ocean for hydrocarbons globalizes, the U.S. private sector and government have an unparalleled opportunity to lead the world in terms of management, technology, and our ability to demonstrate how to extract these resources in an environmentally sound manner for the benefit of all mankind.

– Paul L. Kelly

In the broadest sense, what's really at stake here is the role of the United States as a leader in the world. Is America going to choose to continue to provide leadership to the whole world in oceans and in the rule of law? Or do we accept a reduction in our influence in the world that will make us the equivalent of an isolated, third-world country?

Thomas Jefferson also noted: "The ocean, like the air, is the common birthright of mankind." Let's keep it that way and adhere now to the Law of the Sea treaty. Thank you.

Comments from the Audience

Lance Alway

Lance Alway, with Ranier Ballistics. I don't know exactly what the objections would be, but I'd be interested in knowing what's different about November of 1998 from the last 15 Novembers when the treaty hasn't been ratified. Also, if it hasn't been ratified, there must be some strenuous objections in the Senate. What might those be?

Rear Admiral Wesley Jordan

That was something I was wondering as well. What's the problem? Beyond what Secretary Dalton suggested, that we all press our representatives, what can we do to move the ball?

The Honorable David A. Colson

Well, I think it's very clear that throughout the negotiation period of the Convention up until 1982, one part of that Convention was creating a lot of trouble. It was the part that related to the mining of the deep seabed beyond national jurisdiction—not the oil and gas issues, but the mining of hard minerals on the ocean floor. These were the manganese nodules that everybody thought were going to be something that, if the international community could just figure out a way to mine these manganese nodules, would provide enough money to take care of all of the developing countries around the world.

The negotiated solution that came out by the end of the Conference was one that was fundamentally flawed. It was one that the United States couldn't support. It was one that the Reagan Administration took a very firm stand against. I think we forget that Ambassador Elliot Richardson, in his last statement as the Carter Administration negotiator, in his last statement before the Congress, said that the solution that had been found to date wasn't something that the United States could live with.

President Reagan took the position forcefully that we wouldn't sign the Convention until it was fixed, and we outlined a set of numerous objectives that would be required. Our allies, particularly the Germans and the British, stood with us. They didn't sign the Convention. So, for a long period of time, the Convention wasn't in force. It required 60 countries to come into force.

Beginning in about 1987, 1988, somewhere in there, a very small effort began very quietly up in New York among a number of officials to see if there could be a deal made that would satisfy not only the United States' objections, but the objections of the major European countries and still satisfy the general requirements of the Convention. This negotiation took place behind closed doors. It was a negotiation that began in the Bush Administration, and it concluded during the first Clinton Administration.

At the outset, I think we can say we were skeptical that we were going to get as far as we thought we needed to go. But as somebody who participated in the drafting of virtually everything that was said about the Law of the Sea Convention by the Reagan Administration, I'm quite prepared to debate anybody who can stand today and say that the fixes that we got in the new deal are objectively inconsistent with what we said we needed in 1982. We can just go down the line, and we won.

When we won, instead of standing up and saying, "We won," we continued to hide our head in the sand. The Brits said we won. The Germans said they won, and they got immediately on board and ratified the Convention. Now, as has been said, all of the OECD countries have ratified. All of our NATO allies have ratified with the exception, I believe, of only Turkey for reasons that go to the Turkey–Greece problem. The major countries of the world are there, and that's where the leadership is going on international ocean institutions.

Why haven't we been able to do it? I think it's quite clear that there are certain members of the Senate who simply have been unwilling to take a hard look at the fact that this thing has changed. They think that all of us—people who have some past association with this problem—have simply had some kind of rebirth, and we're back out there advocating something that got rejected in 1982. They really don't want to hear about it. You can take your own conclusion from the fact that we haven't been able to get a hearing in the Foreign Relations Committee.

The reason this November is important is that when the deal was struck on this new deep seabed mining agreement, there was a mechanism set in

place because there were a bunch of legal problems. We had a bunch of countries that already ratified a Convention that provided for one set of rules, and we had negotiated a new set of rules relating to deep seabed mining. There were some legal tricks that had to be played in order to put everybody on the same footing. Those countries, like the United States, that haven't yet ratified the Convention were allowed to play. We were allowed to participate in the institutional framework that had been created for an interim period, and the interim period ends this November. Therefore, if we don't ratify by this November, we won't be able any longer to play in the game that was created in the rule making that's going on in the international ocean institutions.

Bertram Wolfe

Bertram Wolfe. Before retiring, I was a Vice President of General Electric and headed their nuclear energy organization. I'm a member of the National Academy of Engineering, Past President of the American Nuclear Society, and I'd like to hit on the subject that wasn't touched upon here, which I think is perhaps more vital to the welfare of the nation and world than what has been touched on here.

Let me start out by pointing out that Admiral Pilling mentioned that we were in the Persian Gulf. I'd ask why we were there, and why we fought Iraq, and why we have troops in Saudi Arabia, even though a number of men were killed. The answer is clear, and the answer is that we import oil. We import more than 50 percent of it, and we have to protect our oil. This raises the whole issue of energy, which, for our children, is going to be the major issue in my view.

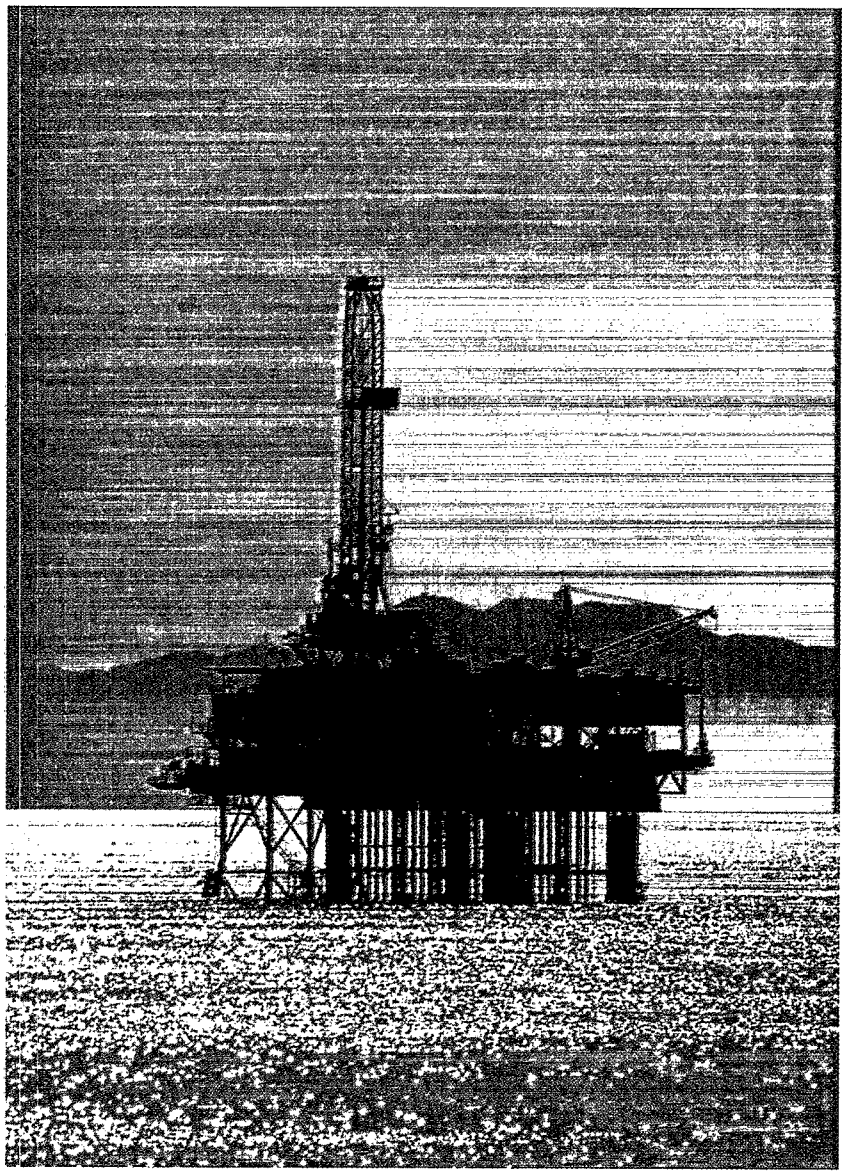
What we see coming is a population increase by a factor of two up to about 10 billion or so by 2050. If one just makes the assumption that by that time, people in the world on the average will use only a third of the energy that we use per capita in the United States, energy use around the world is going to triple. And that's going to lead us to a number of problems. One is fights over scarce energy. The people here in the Navy are going to have troubles with that, which is going to potentially increase the Persian Gulf problem. In addition, I might just point out that in the Second World War, one of the key reasons that Japan entered the war was their concern about the lack of energy.

I'd just then make the point that maybe we will, Mr. Kelly, find a lot more gas in the ocean. That raises questions that other people may raise about the environment in the ocean. They are fossil fuels, and that raises the other issue, which is global warming. In terms of global warming, there is only one solution. In my view, in terms of unlimited energy supply, there is only one issue, and that is nuclear energy.

In this country nuclear energy is dying. The Energy Information Agency projects that we'll lose half of our present nuclear plants in the next 20 years, and the rest thereafter. None will be built, and the reason we don't build them here has no technical issues involved. You can talk about waste and all of this stuff. There are no real technical issues. The problem here is institutional issues.

I've tried to converse with Vice President Gore and President Clinton, and the fact is they have written to me and say they are against the expansion of nuclear energy. I believe that they're being given very poor advice and don't understand the need.

In 1996, about 25 percent of U.S. natural gas production and about 17 percent of U.S. oil production came from the Outer Continental Shelf, which is estimated to contain more than 50 percent of the nation's remaining undiscovered gas and oil reserves.



I'd make the other point in terms of global issues. If, according to President Clinton and Vice President Gore, global warming is real, it will cause a rise in ocean depth by one to three feet in the next century. I think Secretary Dalton mentioned the number of people on the coast, that half of our people, or something like that, are on the coast. If you read the background document here on the problems that would ensue from global warming and the increase of ocean height along the coast, you get a feeling of the dangers.

The point I'm making is I think that the nation and the world are in danger from lack of needed energy. President Clinton has talked about whether his daughter's children will blame him and suffer from the lack of needed energy. I've left a paper on the desk out there, which is entitled "Global Warming—Will Chelsea's Children Blame Their Grandfather?" I think the point is that we have to get the Vice President and the President to understand that the vital need of this nation and the world for the future is nuclear energy.

Admiral Donald L. Pilling

Well, it's difficult to respond to the whole statement. There are two narrow Navy issues on nuclear energy. As you know, nuclear energy is the preferred propulsion plant for our carriers and for our submarines, which are major capital platforms for the Navy, and it offers us versatility. I don't think there's enough money in the federal budget to have all of our ships nuclear powered, but we certainly realize the value of nuclear energy in those two classes of ships—carriers and submarines.

The second issue is on competition for resources. I think energy resources and freshwater resources are going to be problems in the long term, which we should be addressing. I think we ought to come to some conclusions on that.

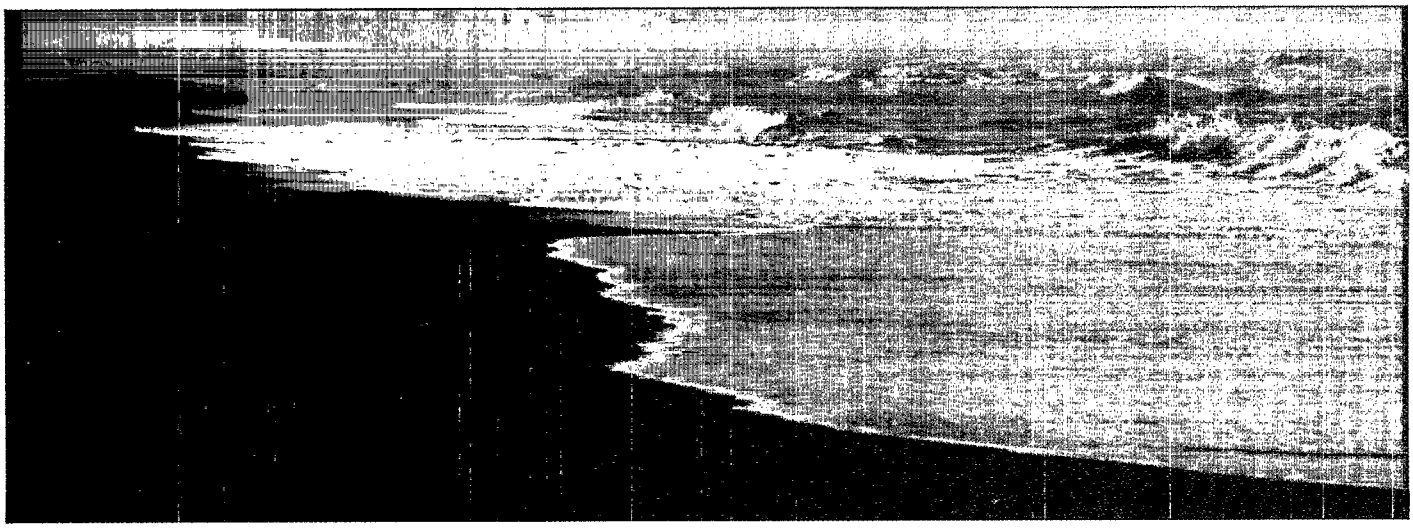
Paul L. Kelly

I'd just comment to Mr. Wolfe that I don't believe there needs to be competition between producers of fossil energy and the nuclear energy business. I'm not sure it does any good to raise the opportunities for one by explaining the disadvantages of the other, because I think it's the opinion of the petroleum industry that we need all we can get, whether it be fossil fuels, alternate sources, or nuclear energy.

When I spoke optimistically about the discoveries we've been making in the deep-water Gulf of Mexico, they are, indeed, exciting. But at the same time, if we look at the overall context of U.S. energy consumption, they're still a drop in the bucket. What the world fails to realize is the viciousness of depletion of hydrocarbon resources. For every barrel of oil that we produce that we think is going to add to the domestic supply, before we can add that we have to replace the barrel of oil that's being depleted. So the U.S. petroleum industry is on a treadmill. It's racing to keep up with depletion, as well as adding to supply. The outlook in terms of increasing our supply over and above 50 percent of the imports or so is not that good. We're having a hard enough time just keeping it at that level.

I think that one of the problems in this whole subject is that we can't get people to look long term. They think about next week or next month. For example, today there's an impression in the world that we're awash in crude oil and crude oil prices are low. But if you look at worldwide production, we're talking about a little difference in supply and demand that's a couple

The United States has more than 95,000 miles of coastline and more than 3.4 million square miles of ocean within its Exclusive Economic Zone. Jurisdiction over the living and nonliving resources in this zone adds substantially to our economic security.



of million barrels that can change very quickly. Supply and demand on a worldwide basis are very close to being in balance.

As we look out into the future we have no objection to nuclear moving ahead as well as fossil fuels. We think we're going to need all the energy sources we can get to supply this growing world.

Melinda L. Kimble

I think this is a very interesting debate, because what we see here is that we don't really have a good new political consensus around what global security in the next century will entail. That's why we haven't ratified the Law of the Sea treaty yet. That's why we're still looking at how to protect fossil fuel and hydrocarbon stocks, because we know those energy sources will serve a lot of our needs in the short term. But we haven't really addressed the broader question of what our new energy future is going to look like. That's a very important component of the whole global security and U.S. security debate. We hope this conference begins that discussion.

Norman Lemley

Norman Lemley, Center for Maritime Leadership. What's the prognosis of the treaty being acted on positively by the 18th of November? Second, the government and various Washington interests have aggressively supported it. What kind of industry support or elected support is the Senate hearing from home, which really is very telling to them, as opposed to all of us telling how wonderful it is?

The Honorable John H. Dalton

I'd say that the problem that we have today is that, by definition, we only have one chance to make a first impression, and the first impression of this Law of the Sea treaty was negative. There are those who said, "Look, I've already looked at that, I'm opposed to it." Clearly, we all agree that in 1982 the Law of the Sea was flawed. President Reagan made the right judgment, and Elliot Richardson offered good advice. By 1994, a significant major change took place, and now the treaty is no longer flawed.

We have a bigger job to do today than we would have had in 1982, but it is vitally important. I think you've heard from this panel this morning that we've had many voices, but we've had the same message. Now it's important that our elected leadership understand that. This democracy of ours is wonderful, but it's one that doesn't respond unless our elected leadership hears from their constituents. I think one of the great things that could come from this conference is for the people here who are true experts and have great credibility to recognize the role that each of us has to play and to get energized and make that happen.

Caitlyn Antrim

I'm Caitlyn Antrim, Council on Ocean Law. In order to take advantage of the Law of the Sea Convention, one of all the rules that we like, we need access to the dispute resolution provisions. First point.

Second, those are binding. There's not even the chance of a Connolly Reservation, as in the World Court, to let us defend those issues that we feel are essential and possibly domestic.

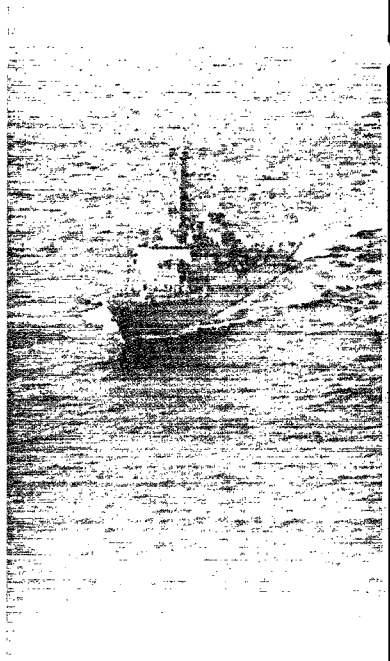
Third, one of the ways to deal with that is to have people on the various panels, as has been mentioned by several of the speakers—whether it's the Continental Shelf Commission, the Law of the Sea Tribunal, or the multitude of panels that would be established by the Seabed Authority.

The second point that I made—that this is binding and without an escape clause—is one of the things that can be an objection by people who oppose the treaty. Are we prepared to make good arguments that even without some type of escape clause these provisions are in the U.S. interest?

Professor John Norton Moore

First, the Convention does provide an opportunity for nations to opt out on certain of the most sensitive issues, and the United States has already indicated its intention in the President's letter sent to the Senate to opt out on some of those issues. For example, at the core of these are the security issues, the military security issues and defense, in which there will be an opt out. And I believe many nations, if not most nations in the world in the end, will also opt out of those provisions.

In the area of the environmental issues, for example, and many others, it is strongly in the interests of the United States to be able to go to compulsory dispute settlement. We don't want to permit others to opt out. That's the whole advantage. One of the great benefits of the Law of the Sea mechanism is that we do have compulsory dispute settlement to try to enforce the environmental provisions and the fishery provisions and other provisions, but particularly the environmental provisions. That was one of the objectives of the United States—and I might add the environmental community—in the negotiations that led to this Convention. I'd suggest that it is,



It's ironic that the United States stands aside today and doesn't assume its natural leadership role to ensure the proper implementation of the rules governing global security that our country strove so long to achieve. If America doesn't take its proper leadership role, these rules aren't going to stand.

– The Honorable David A. Colson

indeed, a very important argument for the United States' adherence to the Convention at this point.

Let me just also very briefly make a point on our earlier conversation. We should keep in mind that there are many different issues that are important issues for discussion and debate. The bottom line here is that, as far as I know, there is no United States interest that is served by continued nonadherence to the Law of the Sea treaty at the present time. That's remarkable. Almost every kind of major public policy issue, including treaty consideration, that you can think about has a serious cost–benefit kind of assessment and weight you have to make. This is one of the few that I'm aware of that actually has virtually no cost—and I believe none to any United States oceans interest—by adhering to the treaty at this point. There are overwhelming costs that we're paying every single day, and we're continuing to shoot Uncle Sam in the foot if we don't adhere.

William Hargis

My name is William Hargis. I'm Retired Professor Emeritus or Professor Emeritus from the Virginia Institute of Marine Science, the College of William and Mary, and I've participated in discussions of the Law of the Sea since before it was the Law of the Sea.

My question comes to a particular point. Is there anything that we can solemnly expect to do? Because I don't know how much influence these people have here. Scientists don't have much political influence; generally, they haven't had. I don't know how much influence there is. But what should this body do, assuming that it adopts the unanimous opinion of the panel that the Law of the Sea treaty should be accepted by the United States by November? What can we really expect to do? Pie-in-the-sky is neat, but I don't believe just a general call or more interaction with the legislature is going to do it. The question is, Who is the target? What do we have to do to blow the target out of the water? What can this body do to effect a participation by November?

Melinda L. Kimble

I think we need to talk to the logistical problem we have, which is very clear. The congressional elections will make the Senate calendar very tight in the remaining part of this year. We'll have a hard time meeting this treaty because of that. The Senate now, I think, maybe has 30 or 40 more days, if that, in session.

The first thing we need to do—and we've been working very closely with the Navy—is to get the Senate Foreign Relations Committee to hold a hearing. In fact, the Secretary of Defense and the Secretary of State will be writing shortly after this meeting to Senator Helms, the Chair of the Foreign Relations Committee, to try to force the pace of that. We're working with every single person on the Senate Foreign Relations Committee.

I want to stress very clearly that there is strong bipartisan support in the Senate. The irony is that not all of these people are on the Senate Foreign Relations Committee. So we need to bring to bear all of the interests out there on the Senate Foreign Relations Committee to move this. One of the problems is—and this is just the situation—there are a number of treaties pending. Senator Helms has priorities, too, and this isn't one of his priorities. We need a reprioritization.

William Hargis

Well, it would seem to me that this panel should address this issue. We know where the problem lies. The question is, What kind of leverage can we apply on that?

I have one other point, and it has to do with some points that several people, including Ambassador Colson, raised. That is, the importance of fisheries. Our own record in management of the fisheries in the EEZ is not good. Our own record of management of the fisheries in our own internal waters is not good. The fisheries issue is important to this global strategy business. We better make some careful statements relative to what ought to be done about our own management of fisheries before we really push a global position. We're not in a very good position. We haven't been leaders.

Rear Admiral Wesley Jordan

Have you got a suggestion?

William Hargis

Yes, and it's institutional. Most of the problems that we have are institutional. In reality the Magnuson Act, as it was initially promulgated and even now as it's been reenacted, has certain basic flaws. One of them is that the foxes are guarding the hen house, still. That's been a basic problem with state-by-state fisheries management and still is in Virginia. My own state is one of the worst. It's a basic problem with the regional fishery management. They aren't able to enact quotas that mean something and then make them stick.

Admiral James M. Loy

I'd tend to agree with your proposition. There are pockets of excellence. For example, what Maine is doing with lobsters in the aftermath of what they saw happen with respect to the Grand Banks.

We're still making the rough efforts management-wise, as opposed to being at the more enviable position of making the small tweaks on the margins that sometime in the future we might get to actually continue to make progress. We're still grossly dealing with high seas. For example, the enforceability protocols internationally are, to some degree, at the whim of each of the nations that are making the effort.

The simple difference here is in these last two weeks when we were running these high-seas drift-net cases off in the northwest Pacific. Use of force protocols on the part of the United States has never gotten to the point of warning fire and disabling fire associated with fisheries law enforcement. Yet, in the assistance process of dealing with that particular case, we watched the Russian border guard use a protocol that not only dealt with warning shots, but also their version of disabling fire—into the wheel house, killing the master and several crewmen on board that particular PRC fishing vessel. We're not on the margins yet. We're really grappling with the basic law enforcement structure.

That goes back, I think, to Ambassador Colson's point: if we don't have the framework of the Law of the Sea protocol behind us to set the constitutional realities of what we're going to attempt to do with respect to fisheries management and enforcement, then how can we grapple with the specific management issues that are within that constitutional framework at the beginning? First, steps must be taken to frame the issue; then one can get about the business of individual management and individual enforcement efforts.

The second point I'd make is that, in our own U.S. definition with respect to regional fishery councils, it has been a very difficult issue for enforcement representation to deal with policy generation. We try very hard to be at the table with the Fishery Management Council that is attempting to figure out what the policy management package is going to be. One can develop policy management packages, but if one can't enforce them, they're relatively moot to begin with. As you say, our own behavior is representative of that and very much visible to the international world. We have a long way to go with respect to this issue.

William Hargis

I agree with you on the high-seas fisheries. But again, having sat on the Fishery Management Council for three terms and having foreseen and predicted by scientists from Gloucester the failure of the Grand Banks fishery, we had clear warning 20 years before it happened. We haven't set a very good example. We threw the Russians off. We threw the Poles off. We threw the East Germans off. And then the inevitable rape continued.

Rear Admiral Wesley Jordan

Admiral [Loy], it would be very difficult to handle this issue at the national level. Something had to be done to beef up the local capability to deal with this issue, or it simply wouldn't be resolved—which I gather is along the lines of your point.

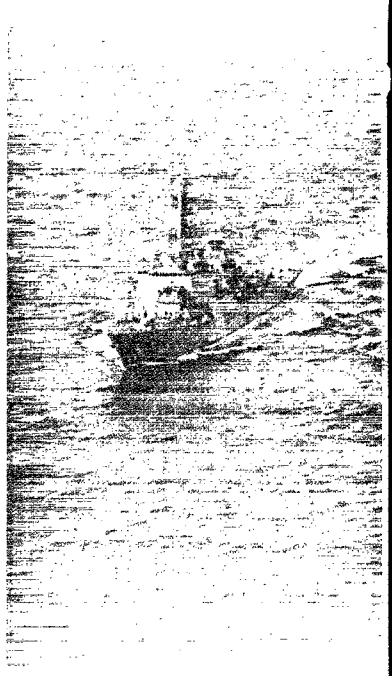
Robert Irvin

Robert Irvin with the Center for Marine Conservation. I'd like to follow up on the fisheries issue and then pose a question.

You're exactly right. There are flaws with the Fishery Management Council—serious flaws that have impeded the ability to effectively conserve fisheries in this country. However, there's a tremendous opportunity. In 1996 Congress reauthorized the Magnuson–Stevens Fishery Conservation and Management Act and adopted three basic reforms that directed the Fishery Management Councils and the National Marine Fisheries Service to eliminate overfishing, to minimize bycatch, and to identify and protect essential fish habitat. It set a deadline of October of this year for making that happen.

We're very concerned that that deadline isn't going to be met and that the steps that are going to be taken aren't going to adequately implement what Congress said to do. In fact, two weeks ago my organization and several other environmental organizations filed suit in federal district court in Seattle challenging the administration's interpretation of the law to make sure that the overfishing and bycatch provisions are effectively implemented.

Mr. Secretary, I was very pleased to hear you say that the Navy has a special role in protecting the ocean environment, particularly species protection. However, in recent months, as you know, there's been quite a controversy over steps to protect the endangered northern Right whale, one of the most endangered whale species in the world. There was quite a controversy within the administration over what information U.S. vessels,



including Navy vessels, would be required to provide to the International Maritime Organization in order to reduce the danger of ship strikes with northern Right whales. Fortunately, the President resolved that dispute in a way that will protect the whales. We are very pleased about that.

I thought that something that Admiral Loy said was particularly appropriate. He said that in looking at this issue of national security and global security in the oceans, we have to balance the need for use of the oceans against the need to conserve the oceans. My question is, How do we recognize the need that we have to strike this balance without allowing it to become a roadblock to conservation?

Admiral Donald L. Pilling

Life is a series of compromises. In that particular issue that you raised there was an issue on whether it should be mandatory reporting in international waters. We felt in the Navy that that was a path we didn't want to go down for a lot of reasons. It was going to be a unique reporting requirement in international waters, so we took a position that we didn't want to go down that path. There were others who thought that that was the only way this problem on the northern Right whales was going to be solved. The President had to make the call, and we're going to comply with it. That's what I mean. Life is a series of compromises. You have to rely on the administration in power, along with the Congress, to make the decisions on how you do that.

The Honorable John H. Dalton

On that subject, I think the Navy has an excellent record in terms of things we have done with regard to that. We thought we had a solution that would work. Obviously, the President made the decision. We know how to salute and march off and implement that decision, and we'll do that.

Let me call on Secretary Pirie, who is Assistant Secretary of the Navy for Installation and Environment. He also has worked on this issue.

The Honorable Robert Pirie

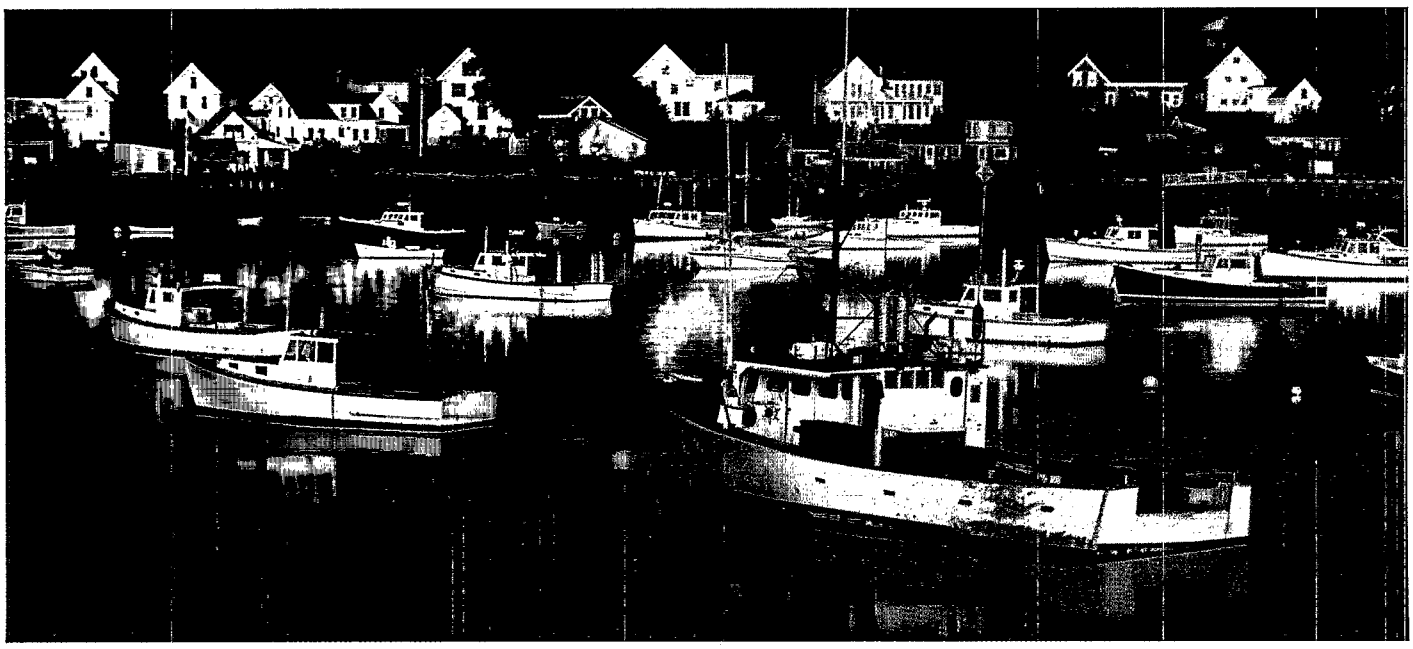
I want to elaborate on your point on law, which was to establish an exclusion zone and exclude traffic from particular areas, rather than going through it and have reporting. The objection to reporting was largely Presidential—that is, we didn't want the International Maritime Organization to influence reporting restrictions anywhere that they felt like imposing them. Our preferred solution wasn't accepted, and we'll live with what has been mandated.

Rod Vulovic

I'd like to add a little bit to that. I'm a member of the Marine Board of the National Research Council, and we had at least two meetings with many different people who have various degrees of interest in the subject.

I'm afraid that we have both times parted company with a great disagreement in the scientific community as to whether we really have collision of whales with ships or ships with whales,

The U.N. Convention on the Law of the Sea provides an opportunity for each nation to declare a 200-mile Exclusive Economic Zone in which it has jurisdiction over management of fisheries and other natural resources.



and what is attracting whales. I understand you can tell me more about it. A great degree of scientific research at this point in time wasn't able to distinguish what is attracting whales and how you can create an environment where there is a deterrent so that the whales stay away from ships. When you take a look at a ship that's going through the ocean at 35 knots, how can you react? Even if you see the whale, how can you react? The issue, it seems, is much more complicated than just, "Let's stop hitting the whales."

Professor John Norton Moore

Just by way of background, before going to the point I'd like to make about this, when I left as one of the U.S. ambassadors in negotiating the Law of the Sea treaty, there was no provision specifically for the protection of whales. When I left, one of my hobbies at that point became getting a provision in the Law of the Sea Convention that protected cetaceans. I worked closely with Senator Weicker, the Senator at that time from Connecticut; Robins Barstow, the head of the Connecticut Cetacean Society; etc. We eventually persuaded the United States delegation, which I had formerly been in, to add a provision protecting cetaceans and whales. Elliot Richardson and the delegation did a wonderful job in getting the whole world to endorse it. There is now a very important provision in the Law of the Sea in protecting whales called "Article 65," which has special provisions, particularly for cetaceans.

Now, having said that, the whales are very important, and something I have particular interest in. I believe the decision we've just made on this was wrong, and that the Navy was correct on this issue. It's extremely important to protect navigational freedom. If we begin to try to compromise on this and to say that the coastal states are able to have some kind of notice regime, they're going to use that regulatory power and abuse it in a variety of settings in ways that will be extremely harmful and pose the risk of war, in some settings. And that, in the end, will do more harm to cetaceans and marine mammals.

Above all, this is a little bit like the nuclear and the oil and gas issue. There's no reason for those supporting cetaceans to be on a different side than basically freedom of navigation. Because in the end, we're all served by working together to find the kinds of solutions—of which, I believe, there are many—that do protect whales in those settings, whatever we do find appropriately, scientifically, about it. I just want to say that I, for one, believe that on this one the Navy was correct, and we made the wrong decision.

Susan Jordan

Susan Jordan for the League of Coastal Protection, and I'm also working on behalf of the National Resources Defense Council.

There's a growing awareness among marine mammal scientists that one of the greatest threats that cetaceans face now is the cumulative effects of acoustic pollution, which is essentially noise in the ocean. The reason I'm here today is global security. Because one of the threats that we're concerned about is the advent of the new sonar technologies that utilize high-decibel, low-frequency sound. These sonars are capable of creating widespread habitat disruption about which we have little information or data on the long-term effects. People aren't so much concerned about a whale going deaf or being harmed by being too close to the sonar source. They're more concerned about what will happen in terms of breeding, migration, feeding—things like that.

The reason we're also concerned is because there has been, as we understand it, a growing interest in these more quiet submarines. They're relatively inexpensive in terms of military hardware, and our understanding is that the anticipated global deployment will reach about 80 percent of the world's oceans.

I'm hearing talk about U.S. leadership. There are no explicit federal standards limiting noise in the ocean. Not only do we need some federal standards here, we also need the U.S. to take the moral stand and increase awareness of this among the other countries who are looking to utilize this sonar for their own protection as well.

Admiral Donald L. Pilling

On the narrow issue of low-frequency active [sonar], we're in the midst of scientific research off the coast of Hawaii to conduct a series of experiments to determine if there is any long-term effect. I think I can tell you that there will be no unfettered use of low-frequency active by the United States Navy until we complete this environmental impact statement in fiscal year '99—about a year from now, actually.

Susan Jordan

Do you see any role for the Navy in promoting international awareness of this problem? Because there are tests going on in oceans across the world now with these types of sonars. And we really need the U.S. to take a leadership position informing them of the dangers for cetaceans.

Global security is not just a matter of national defense but includes environmental and resource security, including food security. International rules widely accepted by all states are the most cost-effective way to achieve global and national security.

– Lee A. Kimball

Admiral Donald L. Pilling

I'm not aware of any other tests, other than a potential test in the Mediterranean, on low-frequency active. And we're certainly not going to do anything until we see the results of the scientific research we'll have a year from now, to be perfectly honest. If it looks like it's going to be damaging to the environment, we'll have to make a judgment on the national security value of that a year from now. I think it's a fair answer on the narrow issue of low-frequency active.

Paul L. Kelly

From the standpoint of offshore industry use of this technology, I take it you're talking about its use in geophysical explorations. This industry has gone a long way from, for example, originally using explosive devices in terms of geophysical exploration to much more modern forms. But I don't hear that there's a large problem with this.

Geophysical exploration occurs in a limited phase of exploration. It's done usually at the beginning of the exploration process in a particular geographical area, and then the geophysical vessels go away and move to another area. I haven't heard of any specific cases where harm has been caused to cetaceans.

I'd say that with regard to cetaceans, the whole offshore oil and gas enterprise has involved a number of mitigation measures that don't go so much to low-frequency active, but to the noise that may emanate from our facilities offshore. For example, in the Beaufort Sea in Alaska we've worked closely with the Minerals Management Service to even shut down operations during migration periods for whales. I know that the Minerals Management Service has accumulated a number of studies on this subject, so they try to stay on top of it. And the industry collaborates to avoid any problems. Up to now, I haven't heard of any specific problems in specific areas.

Susan Jordan

The standards aren't uniform. In the Beaufort Sea you have stronger mitigation measures because you have an indigenous population that has an interest in survival whaling. You have different mitigations there than you have off the coast of Hawaii, and you have essentially none in the Gulf.

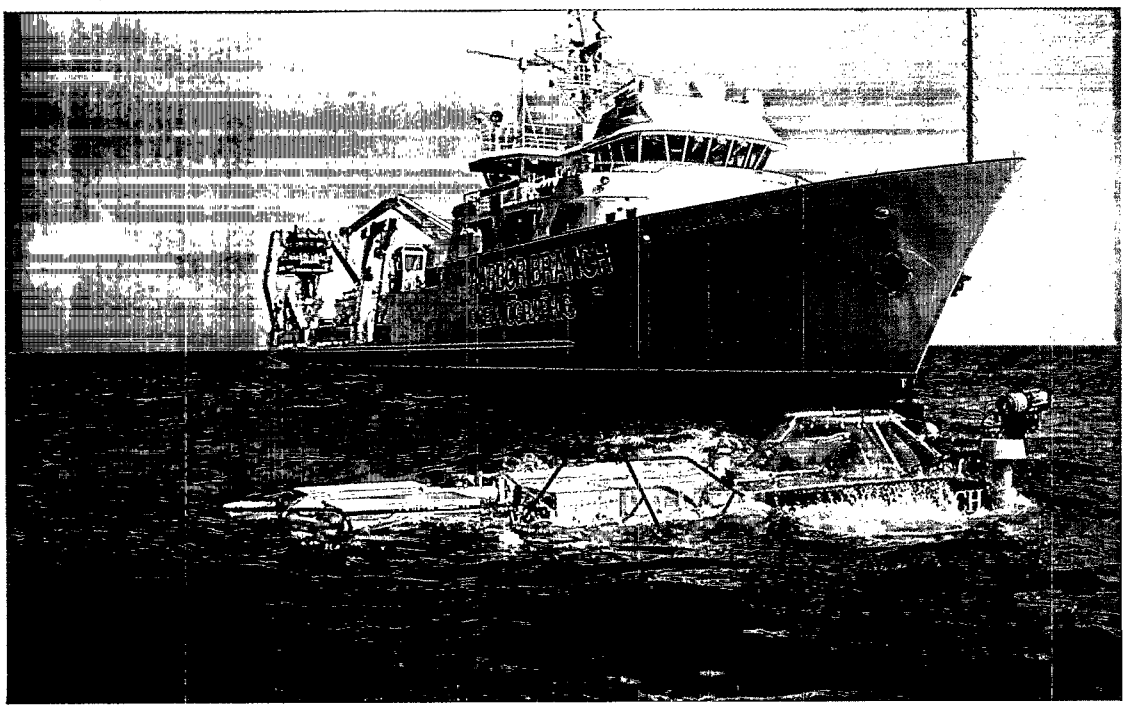
There are no uniform standards that are applied for mitigations regarding the impacts of seismic surveys, and that's one of the things that we'd like to see the industry move toward. It's going to be an increasing concern because of the expiration of the moratorium. So I'm just throwing it out there.

Norman Lemley

Coming back to the professor's point on the effective use of the regional Fishery Management Councils, several years ago the Marine Board Committee on Fishing Vessel Safety, in looking at safety and enforcement, made a recommendation that the Coast Guard District Commanders be made a voting member of those regional councils to enhance their importance with respect to the fishing vessel safety as well as enforcement. It was never addressed. It was never picked up. In fact, that was one that fell totally through the cracks in all areas. It might be appropriate to revisit that Marine Board recommendation to give the Coast Guard District Commanders, who are on the councils, a vote so that they have more meaning and more effect.

The U.N. Convention on the Law of the Sea plays an important role in guaranteeing access for research vessels to conduct basic research in the Exclusive Economic Zones of coastal states.

Photo: ©1998 Harbor Branch Oceanographic Institution, Inc.



Rear Admiral Wesley Jordan

I think that goes back to Mr. Mike Ham's point [via write-in question], Admiral, as to whether there was enough effort being applied to a technical solution and the sharing of new technologies and, particularly, data that could help mitigate that problem.

Admiral James M. Loy

Again, my comment would be that the sophistication level of where we are currently with respect to these kinds of issues isn't at the point where we're making finite, marginal tweaks to get to 100 percent. We're still grappling at the halfway point in terms of really understanding the challenges associated with management on one hand, and then the enforcement of whatever the management protocols are on the other.

Standards are wonderful things when you have them to go by in terms of being an enforcer of those standards or a creator of those standards by way of policy development. I agree with the commentary that I've heard, and it's something that, with respect to our goal here today, needs to find its way onto the national agenda.

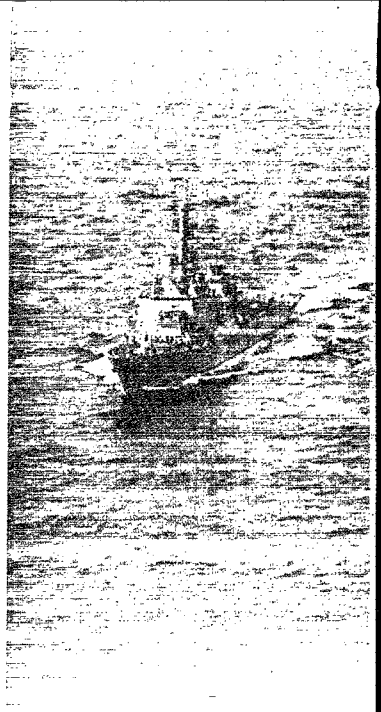
Mark Rosen

Mark Rosen [Captain, United States Navy]. I have a question for Mr. Vulovic. I was impressed by your quote that, with respect to the U.S. merchant fleet, it needs to be national and controlled by the nation. You outlined some specific things that perhaps could be done: reenactment of investment tax credit, abolishment of *ad valorem* taxation on foreign repairs, and preservation of the Jones Act. Do you believe that that is a Band-Aid, or would it be a shot of adrenaline to make the U.S. merchant fleet really competitive on a worldwide scale?

Rod Vulovic

My personal feeling is that when you take a look at the amount of cargo that is moving both ways as import and as export, which really describes the commerce in this country, the amount of cargo that is moving on U.S. flag bottoms is minuscule. Would this be a Band-Aid, or would it be a beginning of a permanent solution? I don't know. The only thing I know is that something has to be done. Status quo isn't going to help.

Maybe what we need to do is establish some kind of a national policy. Or at least establish a position where we're going to say that this country needs to be more involved, much more than this minuscule amount. And where is that level? I'm not propagating 100 percent protectionism, like it used to be with a Red China, saying that nothing that's leaving that country can be moved on a non-Chinese ship, and things of that nature. But we need to come up with something that's going to preserve the leadership of the country, that's going to give us adequate base, that's going to support the national security in case we need to do that. I'm not smart enough to say what that is. The only thing I know is that the current level is unacceptable.



Mark Schultz

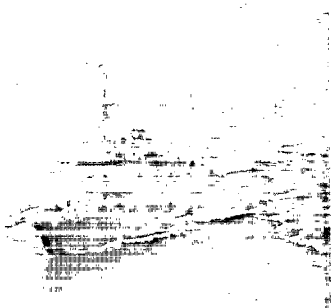
Mark Schultz, National Imagery and Mapping Agency. I'd like to take us back a moment, back to the Law of the Sea. As I'm sitting here thinking about this and thinking about the recommendation that this panel might make to the Vice President, it's clear to me that there's unanimous consent within the room that this is a good idea. It seems also clear to me that we don't have the support necessary to bring this to a conclusion, in that we don't have the support of Jesse Helms to get this through his committee. I think I heard from Ms. Kimble that we're about to lose the capacity to do that as well, in terms of the Senate schedule. I'm wondering if the two letters—one from State and one from Navy—are sufficient, and if we may, in fact, be offering up something to the Vice President that isn't plausible.

The question I'd like to propose is, How do we get a hearing? What is the recommendation that we can make to allow us to get a hearing? Because I believe it would give us the support—or at least the debate for the support and perhaps the capacity. But it seems to me that this is imperative—that a recommendation go forward with some element of a solution to it.

The Honorable John H. Dalton

I would agree with your analysis that getting a hearing is the key. I think if we can get a hearing, I'd be happy to have the Senate hear from all sides with respect to this issue. And I have great confidence in what the outcome would be, having studied the merits. I think they are indeed persuasive.

As Ms. Kimble said, the Chairman of the Foreign Relations Committee is the one who sets the agenda for when he's going to have hearings and on what those hearings will be. It's a matter of making this a priority for him to have a hearing, and we can influence that by



other members on the committee. There are trade-offs that go back and forth with these members in terms of something they want versus something that others want. If all of the members of the committee are saying, "Mr. Chairman, we'd like to have a hearing on this subject," I think that would have a significant influence. That's really our charge. I think the merits are clear. But we need to have that hearing, and I think we can have an impact on that.

There are going to be a number of congressmen who are going to be here tomorrow. And they, too, have voices with their colleagues on both sides of the aisle and in each body of the legislature. Granted, you can say politicians don't normally listen to scientists. But the politicians listen to their constituents, and if their constituents are telling them that they'd like to have this issue heard, we have an opportunity to make that happen.

Bernard Oxman

Bernard Oxman, University of Miami Law School. I fully agree with everybody's position of support for early ratification of the Convention, but you asked at the start for some dissent. I want to dissent a bit from some of the arguments that have been made.

Anytime you're trying to persuade someone to do something, there's always the problem of the second-best position. That is, as they say, "It's a little hard for me to go along with your first-best position, so let's go with your second-best position." That's very appealing, in particular, I think to members of the Senate and, indeed, the House, for that matter.

The first-best position, which is ratification of the Convention, requires that they say something and take a position and vote yes. The second-best position—to live in what I think is in the long run a fantasy world that we can stabilize the customary law of the sea as if we were part of the Sea Convention—is very easy for politicians. They can say: "President Reagan said it. President Bush said it. President Clinton said it. It's customary law. What are you worried about? We don't have to stick our necks out and cast a vote that some ill-informed constituent may be angry about, just as I'm getting ready to run for election."

I therefore would urge the Navy, in particular, to recognize that it has very little to gain from constantly emphasizing its second-best position, which is the customary law position. That position is essentially needed only now, so long as the United States isn't a party, and to deal with the few stragglers that would stay outside of the Convention. Thereafter, I think the stragglers would be very few, indeed. Canada, which has stayed out—I think notwithstanding its vaunted notions of independent foreign policy—would come running along once we did. Iran has publicly offered in a meeting in Miami a few months ago, in effect, to ratify and make a deal with us under the Convention on Straits if we go in.

I, therefore, think it's time for the Navy and, indeed, for my friend Professor Moore to become more candid about what we all know. And that is that we need the Law of the Sea Convention to influence other people's views of what our rights are, not our views of what our rights are. Customary law arguments made by the finest of lawyers aren't as effective in doing that as a treaty is that they've signed on to and that we've signed on to.

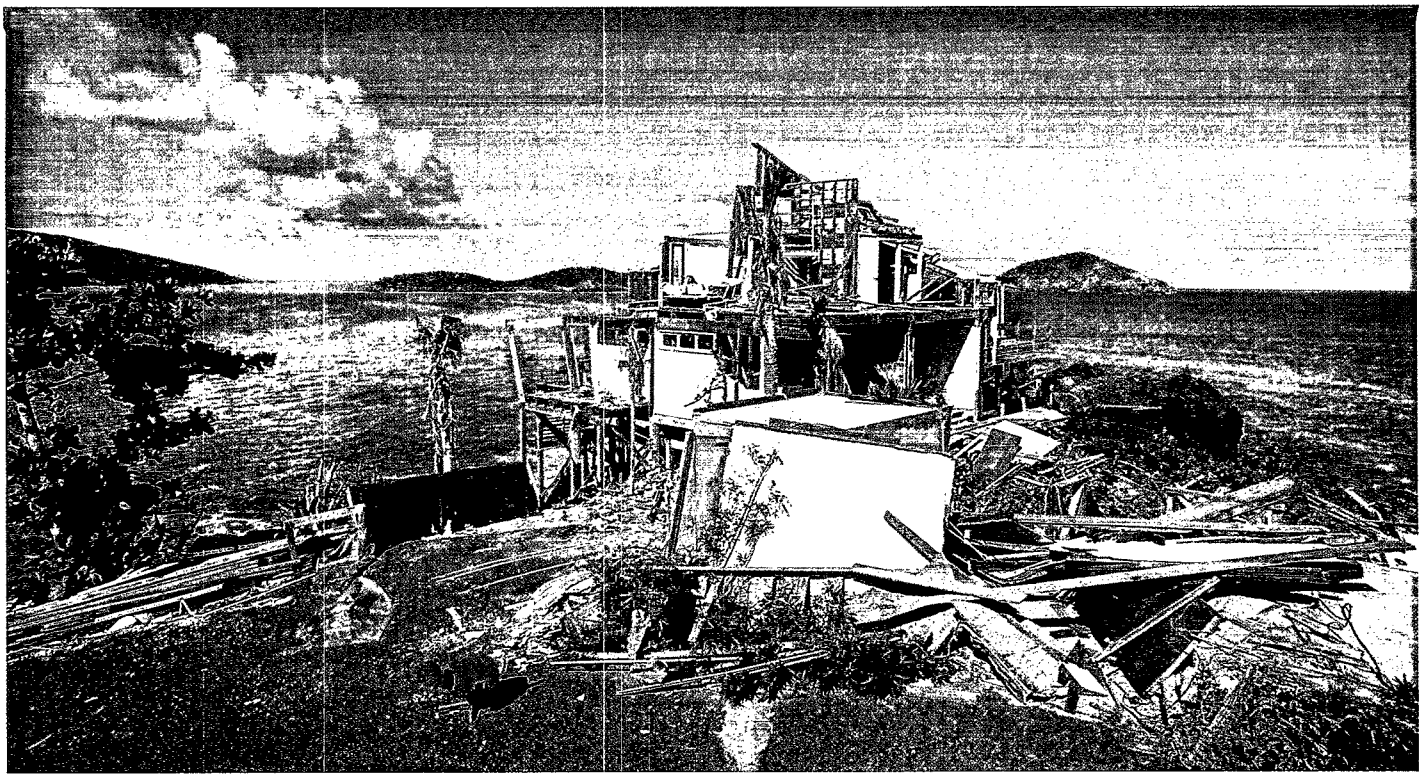
There's a quality I think we all recognize here of preaching to the choir. One of the problems is that the private constituency in the United States—industry and environmental and scientific groups—haven't done enough. I don't know how to turn this around. It's true that every major effective industry and constituent group in the United States has written to Senator Helms in support of ratification of the Convention. But they don't seem to be doing very much about it.

Two of the industries represented here—oil and shipping—worked very, very hard on numerous provisions of the Convention. The most important provisions of the Convention to the oil industry—the continental shelf, the removal of platforms, and navigation and assurance that oil tankers would not be subject to a patchwork of different and potentially punitive enforcement and standard measures around the world—were worked on very, very closely. The environmental provisions represent an unprecedented alliance in this negotiation between the oil industry and major environmental groups. And yet we don't hear enough about the fact that this was, in fact, a great success for both the industry and environmentalists.

We're a democracy. And if the Senate is going to move forward, it has to hear from the constituent groups that have sent letters. But I think that they have to do more. I think the fact that the telecommunications industry has lots of other issues before the House and the Senate shouldn't stop it from making the point that the entire future of the global information highway turns upon the cable provisions of the Convention.

Professor John Norton Moore

First, it's a very important point that Professor Oxman is agreeing, I think, with virtually everyone who's talked about the importance of immediate adherence to the Law of the Sea Convention.



Any big weather event, such as a hurricane, typhoon, flood, or drought, is generated by ocean conditions. Precipitous long-term changes in the global environment could destabilize economies and, therefore, pose a threat to national or regional security.

However, Bernie, I think you've missed one of the critical points in relation to customary international law. And that is that someone may feel—no matter how mistakenly—that by not adhering to the Law of the Sea treaty, somehow the United States is free to act in a different way than is prescribed by the treaty. The point is that those provisions are today customary international law. They're critical in being customary international law and establishing the point that there is, in fact, nothing to be gained by the United States at this point by staying out.

The last point I'd like to make is I think we should be very careful in assuming that any member of the Senate or elsewhere has a particular position at this point on the Law of the Sea treaty. This has been throughout a nonpartisan issue. It's still a nonpartisan issue. There are many things on the plate of the Senate, and I'm very optimistic and very hopeful that we'll see this Law of the Sea Convention moving forward. But I think it has a way of becoming a self-fulfilling prophecy if we begin to assume that people have positions on these things when they may not.

Margaret Leinen

Margaret Leinen of the Graduate School of Oceanography at the University of Rhode Island. I'd like to bring up another issue, which will probably be a cross-cut with all three of the other groups. And that has to do with the issue of developing and ensuring capability for ocean climate forecasting and prediction. I hope that this is something that could be a consensus position of this panel and of this group.

There are two aspects that I'd particularly like to highlight. About half of our panel is engaged in operational activities associated with the ocean. In your work—whether it's in the civilian sector or in the military sector—the ability to work in the ocean and the ability to understand short-term weather and climate change, current movement, and so forth associated with the ocean are critical to your operational ability and, as Mr. Kelly has pointed out, will be very critical to developing new capabilities and to saving money.

The world science community and the world operational oceanography community are engaged in trying to establish a global ocean observing system and a global climate observing system. While I'm sure that the group would endorse those ideals in principle, I think there are a couple of issues that are very important to highlight.

One of those is the ability of that global climate and global ocean observing system to identify the most economical set of observations that are necessary to make predictions and then, secondly, to operationalize that. We look at, for example, the benefits that NOAA has given us through its Pacific observations of predictions of El Niño. Looking at the ability to operationalize other such forecasts, whether they're climate or circulation, would be extremely important. But it's going to

There is no U.S. interest that is served by continued nonadherence to the Law of the Sea Treaty at the present time. The United States should adhere now to the 1982 Convention on the Law of the Sea. This is the most important immediate U.S. ocean interest.

– John Norton Moore

take both the observational capability that we have through satellites and also the observational capability through new moorings and new data sets. I think that's a very important recommendation that I hope this committee could endorse.

The second is the longer-term effects—and another group of this panel is associated with policy and management and global security in the State Department sense. I think that one of the most important problems that we may face in the future is long-term changes and precipitous long-term changes in the global environment that would destabilize economies and destabilize political situations. We've seen evidence of that—for example, in Africa, with the increased desertification and changes that have happened with El Niños and other decadal changes.

There are tremendous potentials that the scientific community has identified for even larger-scale and more important climate changes. And I'm not just saying global warming, but other kinds of environmental changes, precipitation changes, and so forth. Our ability to forecast those, and our ability to understand their implications, is very closely related to both our basic and our applied research in that area. I hope that this group would also feel comfortable endorsing the very strong research agenda in both basic and applied research associated with ocean climate forecasting.

Lee A. Kimball

I completely agree with you. I think part of the global ocean observing system is also the GCOS—the Global Coastal Observing System. Obviously, in looking at marine environmental protection and conservation of marine living resources, we're shifting more and more to an ecosystem basis for that conservation. And having the information to be able to make science-based and informed decisions in that kind of ocean management is absolutely essential.

I don't think this panel has yet made the point that the Law of the Sea Convention does have an important role to play in this as well, which is the guarantee of access for basic research in the Exclusive Economic Zones of coastal states. There's another justification for the ratification.

A third point I want to pick up on goes to something that Ambassador Colson said earlier as well—that we have a major ocean research capability. We also have a major technological capability in developing technologies for use in the oceans. One of the problems of information management to serve decision making in the oceans is making sure that that information is in a practical form—accessible and up to date for those who have to use it in ocean management.

David [Colson] mentioned that in collective fishing practices—also in the area of land-based pollution that I mentioned—the information management of technical solutions, ways to solve these problems, is something that's only beginning to be addressed at the international level and needs a lot more work.

Rear Admiral Ken Barbor

Rear Admiral Ken Barbor, Commander of the Naval Meteorology and Oceanography Command. As the operational side of the oceanography department, we're obviously very much supportive of any research that furthers our ability to measure the ocean. We're fully supportive within the constraints of national security in terms of having our data available so that we can derive those sources of long-term trends and understand what sort of global climate there is. Of course we're actively modeling the ocean and monitoring it from that standpoint.

Paul L. Kelly

From the standpoint of vessel operations, I wanted to express my support, too. For example, in the Gulf of Mexico on any given day, we have 10,000–13,000 people working out there, with hundreds of helicopter movements and supply vessel movements. Improved weather predictability has vastly increased the safety of our operations from both the standpoint of people and the environment—not only the predictability of the weather, but the ability to communicate it quickly, either over computers or on the fax machine. We constantly have weather data rolling into our office on an hourly basis, and I think it's extremely important as we all move more into the oceans that this research continue.

Terry Flannery

I'm Terry Flannery, of the DCI Environmental Center. The issue I wanted to raise is long-term security issues relative to the ocean. My question for the two chairs is: What are your views about the longer-term issues that we need to worry about in 20–25 years, and what, if anything, can we do about those now?

Robert Heming

Robert Heming, Chevron. My question is exactly the same. I'd like to hear the panelists talk about the long-term threats to security and where they might come from.

The Honorable David A. Colson

My response to that question is the world's population growth over the next 25 years. We double the world's population, and you can assume that the oceans are going to be under more stress 25 years from now than they are right now. I don't know what we're going to do about it unless we can find a real way to deal with that population growth. Because it's all going to come to the coast. Around the world, that new population is going to go into the coastal environment, and it's just going to put more and more stress on the oceans.

Pietro Parravano

My name is Pietro Parravano, President of the Pacific Coast Federation of Fishermen's Association. I'm a fisherman based in Half Moon Bay, and I represent the largest commercial fishing organization in the West Coast. I support the comments that Admiral Loy and Mr. Colson said regarding connecting fishery issues with global security. I think, agreeing with Mr. Colson, that a lot of these fishery issues create a lot of flash points between nations.

Currently, we've seen two events happen. One is the altercation between Canada and the United States on the salmon allocation. The second is that recently we've had a ruling by the World Trade Organization, which has struck down a U.S. law that forbids any shrimp imported into the United States from vessels that don't use turtle-excluder devices. These are examples of how the United States has to be very, very strong in the global environment of enforcing laws that have been brought together by fishermen and regulatory agencies. I'd like to offer working solutions that fishermen and regulatory agencies can provide, so that we can work together in the future.

Admiral Loy, we've had a very, very good working relationship with the 11th District in San Francisco under Admiral Card, and also under Retired Captain Hart, and currently Captain Larry Hall. It's all been brought out because of a crisis that happened a few years ago when the fishermen refused to board. Because of that, we stand side-by-side nowadays in understanding much more of what we're all about. We don't stand in each other's way of working out in the ocean. I'd like to offer to put this on the table that this panel support solutions like this, so that way nobody is put out of work, the environment is protected, and the people of this world can appreciate a renewable resource based on sustainable fisheries.

I'd also like to support Mr. Colson's five points, which were very refreshing. If overfishing continues to happen, we'll be out of work. Nobody will be out there to guard the fisheries like the fishermen and regulatory agencies are. We have to work together toward a renewable future.

Jacqueline Schaffer

Jacqueline Schaffer. I'm the Director of the California Department of Fish and Game. I'd like to throw some California big-time support in league with Rhode Island, that a recommendation from this committee to the Vice President and beyond be on the larger question of keeping our capability to do research on these larger ocean condition questions. I think that should be one of our recommendations.

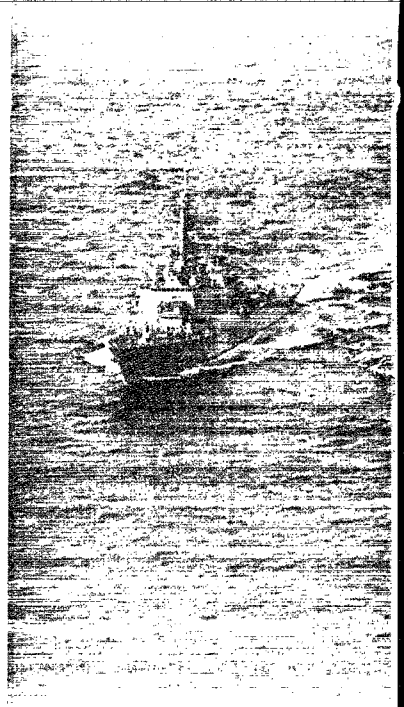
I participate on one of the Magnuson Pacific Fishery Management Councils, as well. What we do, for the most part, is to divvy up the shortfall. People have advised me that ocean conditions right now are just unfriendly to fish. There are some larger natural fluctuation questions we've got to get to the bottom of. If we're going to do a better job managing on the retail level, we need some of these wholesale questions.

Regarding the Navy capability in this area, the flip side of this is that as the Navy goes from 600 ships down to 300 ships, the tail is going to be reduced along with the tooth. I agree with the oceanographer that something else has to be increased, or maintain that level of R&D capability that the Navy has brought to the picture in the past, but that they may not have the capability of in the future. That is, to increase NOAA's role; fine, but I think that ought to be part of our recommendation out to the Vice President.

The Honorable John H. Dalton

I want to thank the panelists, who did a wonderful job, and to thank each of you for the level of questions. The one thing I've learned from this is that we need to schedule more than two hours next year. We had this forum together. We're just getting started. This really has been an enlightening forum this morning, and I appreciate your participation.

Someone once said that a conference like this is "a gathering of important people who singly can do nothing ... but who together can decide that nothing can be done." Well, I think we've gone a long way to disprove that today, and I appreciate each of your involvement. I think it's been a very valuable discussion, and I look forward to hearing from the other panelists and our



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

– Admiral Donald L. Pilling

report to the Vice President this afternoon, which will also be a very energetic discussion of all the panels. I know the Vice President is looking forward to that. So thank you very much for being here. I appreciate it.

Issue Forum Summary Report to the Vice President

(Presented during the Cross-Cutting Issues Plenary Session)

Vice President Al Gore

Thank you very much. I saw on the ship I was on this morning a system that was amazing to me. They utilized the global positioning satellites, and it's almost like playing a video game. You could just pick a location on the digital map and select that location, and then the ship would steer itself to precisely that point. It really is very impressive.

Of course, one of the announcements that I made this morning has to do with the Navy making available now those much more accurate mapping techniques and navigational techniques. Secretary Dalton, thank you for being here, and thanks for the great work that the Navy has done. There are quite a few representatives of the Navy here, and I appreciate all of you. I want to ask you to give us a summary of the discussion that you had on the global security panel and the issues that face ships on the high seas.

The Honorable John H. Dalton

Thank you very much, Mr. Vice President. We had a very rewarding and interesting discussion on global security this morning. I was most impressed with the cross-cutting nature of all the issues and their connection to the positive spin-offs from every segment of our national economy.

When you were introducing our panel earlier, you talked about freedom of the seas. Two of our panelists pointed out that we've had two wars—the War of 1812 and World War I—that resulted from violations of freedom of the seas. It was the unanimous view of this panel that we need to preserve our security and prosperity. In order to do that, there is a need for internationally agreed rules for multiple ocean uses, and those rules are contained in the Law of the Sea Convention. It was most interesting that the panel highlighted that our security in the current era has taken on new and broader meanings. In that light, the panel was unanimous in reaffirming that our national security depends on the enduring need to balance use and conservation of the oceans as our greatest resource.

The relevance of the sea services as a vital part of our overall national security is also clear. The forward presence of our naval forces is the guarantor of the freedom of the seas upon which our livelihood and that of our friends around the globe depend. It was clear from our discussions that the complex and diverse nature of the modern U.S. naval operations depends heavily upon the continued capital investment in the sea services. There are many important subsets of this continued investment, including military sea lift capability, the merchant marine, and national shipbuilding and repair infrastructure.

Also, we discussed the increased importance of oceanographic data to support modern naval operations and the maritime industry, and the nature and extent to which we obtained that data through national and international cooperation. Investment in our sea services has a tremendous payoff beyond the security issues by building the nation's technical and intellectual capital, by protecting the environment through marine research and pollution control measures, and—as you mentioned earlier—by encouraging efforts to declassify and make available to the public formerly sensitive defense information and databases.

The panel also highlighted other important issues vital to our security including drug interdiction, controlling illegal immigration, and maintaining sustainable fisheries, including effective enforcement.

We had a number of industry experts in our forum. In addition to their comments on the strategic importance of industries, such as marine transportation and offshore oil and gas developments, to national security, they raised a number of issues that were discussed on the commerce panel, including revitalization of the Merchant Marine and the development of alternative sources of energy, including nuclear power. The panel discussed the issues associated with balancing these industry concerns with the environmental protection efforts.

More than anything else, our panel addressed the importance of the Law of the Sea to different segments of our nation's ocean community—not just the critical interest in military and commercial aspects of the traditional freedom of navigation for those interests, but also the importance of the treaty as an international legal framework for supporting U.S. interests in offshore energy development, shipping, fishing, coastal law enforcement, and environmental protection. Mr. Vice President, we must have a seat at the international table to ensure continued leadership and interpretation and implementation of the convention in ways optimal to our national interest. The panel

unanimously found that all constituency groups, especially industry, would benefit from U.S. adherence to the Convention, and there were no downsides to ratification.

It was a great panel, Mr. Vice President. We appreciate your being here. We appreciate your leadership in making this National Ocean Conference a reality. Thank you, sir.

Questions from the Vice President

(Presented during the Cross-Cutting Issues Plenary Session)

Vice President Al Gore

Thanks for your report. I heard somebody say that Law of the Sea deal was a communist plot. What's your reaction to that?

The Honorable John H. Dalton

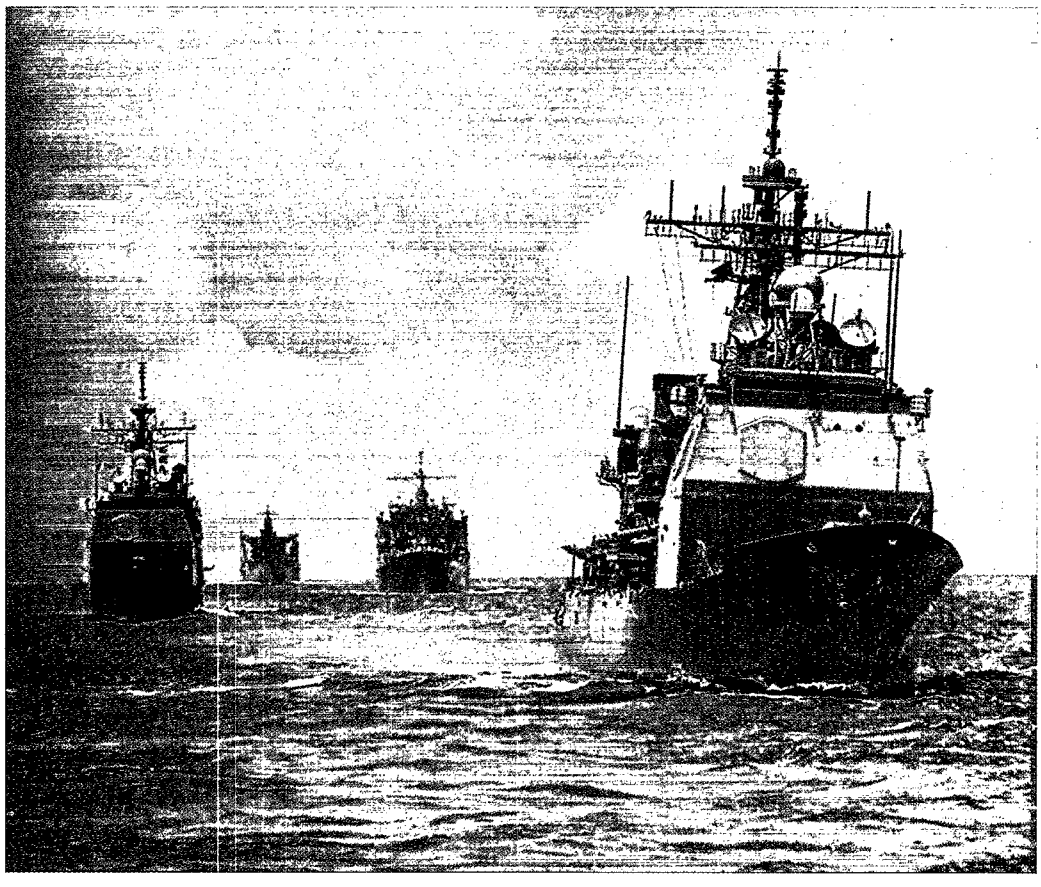
Mr. Vice President, we need to ratify that Convention.

Vice President Al Gore

I certainly agree. It's very impressive, all joking aside, that this distinguished panel representing so many different points of view and interests and having so much expertise would be unanimous on that point. I don't think it should be controversial at all, but, of course, with some, it is. I don't know why, but it is. Thank you. That's a very powerful recommendation, and the whole report was. Incidentally, thank you, Secretary Dalton, for your great service as Secretary of the Navy.

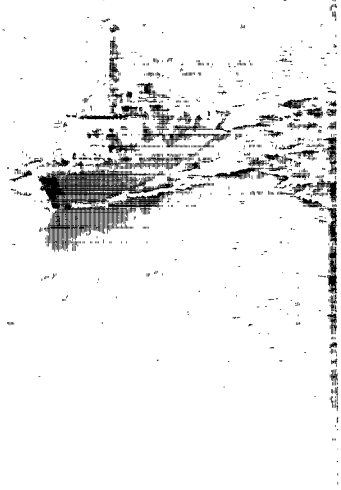
One of the other things I wanted to say in thanking the Navy is to point out that some years ago, back when I was in the Senate, I began an effort to try to declassify some of the classified information that's collected by our spy satellites and our submarines and the various tools of the intelligence community— some of the information that doesn't have to be safeguarded for national security reasons but is collected as a matter of routine. Actually, they collect in secret a million times as much information about the Earth's environment as the scientific community collects in the open. I tried to figure out a way to protect the national security absolutely and, in the process, release some of that information for use in understanding the global environment. The Navy was the one part of the federal establishment that took the lead in figuring out how to do that. Then the CIA followed, and others. And then, ultimately, the Russians and others jumped on board. It was really the Navy that took the lead, and I want to thank you for that. Your panel has been a great one.

Paul Kelly is Senior Vice President of Rowan Companies, Inc., and has represented the oil service and supply industry on a wide variety of issues, in dialogue with the public policy sector, helping to inform public policymakers about industry's viewpoints. Discussion about oil and gas development in the ocean most often centers around preventing negative environmental impacts. That's something that we're all concerned about, and the President will be saying more about that tomorrow. You only need to take one look at the beauty outside this place here to understand why everybody is so concerned about it. Less often discussed is oil and gas development in the context of ocean global security issues. Mr. Kelly, you've worked for over 10 years in the oil



U.S. naval forces have repeatedly demonstrated their effectiveness in responding to international crises and in protecting global peace and stability. Our continued free access to the oceans is essential to national and global security.

Photo: Official U.S. Navy photo by Photographer's Mate James W. Olive



industry. I'd like to ask you what you see as the emerging policy issues in that overlap between national security and oil and gas development.

Paul L. Kelly

Thank you, Mr. Vice President. There's definitely a strong link between access to energy within the United States and global security, as you indicated. As our panel discussed a somewhat expanded definition of global security, we recognize the fact that we could add a billion people to the world's population by the year 2010—virtually another China. Obviously, this is going to put a lot of stress on energy supplies.

As we have developed offshore areas at home, U.S. offshore oil and gas development has become a major technological triumph. In fact, we have world-record industrial developments in the Gulf of Mexico in 3,000–5,000 feet of water that are a reality today. We've drilled one exploratory well in 7,600 feet of water, and 10,000 feet seems within our reach from a technology standpoint.

At the same time, while U.S. industry has been meeting the challenge of this technology, we've recognized the concern of the American people to make sure we do it right. So, simultaneously working in partnership with the Department of the Interior's Minerals Management Service and the U.S. Coast Guard, we've developed pacesetting safety and environmental management programs for the industry that are now being implemented and have been showing tremendous success. I think our effort in this regard has been in many ways parallel to what Mr. du Moulin [Oceans and Commerce Issue Forum panelist] talked about happening in the tanker industry.

At the same time as it is important that we continue to develop our domestic resources, we must look internationally, too. Because in the long run, we just can't produce enough domestically to meet our own energy demand. Today, virtually every country in the world that has a continental shelf that isn't already developing its oil and gas is issuing licenses and inviting companies in to help them develop these resources in order to meet their rising population and to achieve their own sustainable growth.

With the leadership that we have both in our technology and in our abilities that we have developed in safety and environmental management, I think the private sector in the U.S., along with the government, has a tremendous opportunity to show leadership on a global basis. These countries want to develop their resources, but they're looking to us to a great extent to find out how they can do it right, as well. I'm encouraged in this regard. I think that by working with these countries, we can not only help them do it right, but we can ensure access to those resources ourselves.

Just adding to the comments that we've heard with regard to the Law of the Sea, I'd like to join my colleagues in supporting Senate ratification of the Law of the Sea treaty. As our energy sources diversify in the future, it's important that we have guaranteed freedom of the seas in order to deliver that energy to our shores. At the same time, the treaty provides for mechanisms to define the outer limits of our outer continental shelf, which have not been defined. It certainly is in our national interest to define those boundaries so that an industry that's now ready technologically to move into 10,000 feet of water will know what the rules of the game are. We think that this may be one area where technology has moved out in advance of policymaking, and that policymaking needs to be updated to match the technology.

Vice President Al Gore

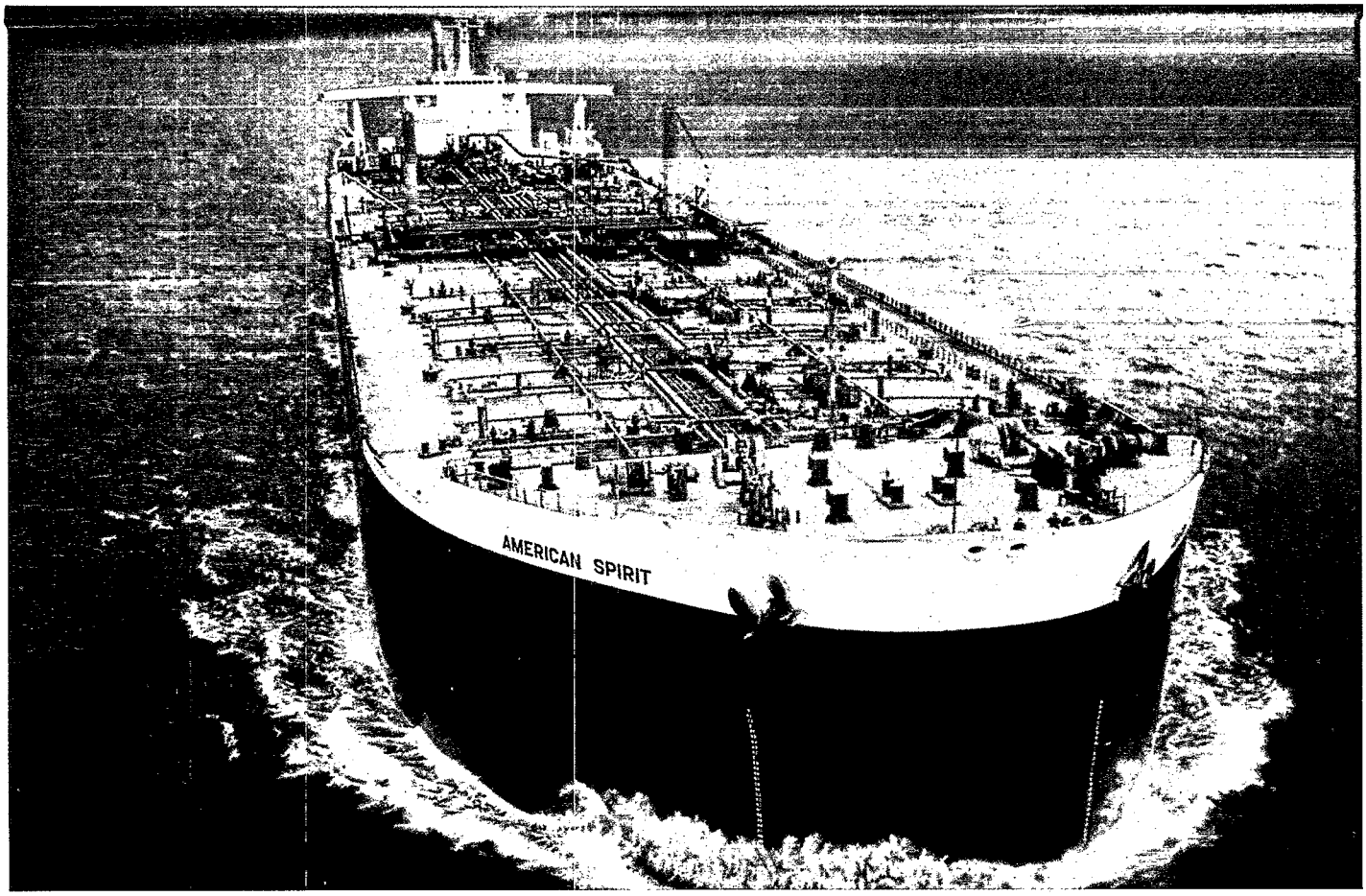
To follow up on your comments about the Law of the Sea, I want to ask Admiral James Loy to address some of the same questions. Admiral Loy, as you all know, is Commandant of the U.S. Coast Guard. What does this Law of the Sea Convention do, Admiral, and why are you talking about it on the global security panel? What significance does it have for U.S. national security interests?

Admiral James M. Loy

Thank you, Mr. Vice President. I think I'll put the onus immediately back on picking up Secretary Dalton's point about placing it in an international context and understanding that without a legal framework on the oceans—a constitution of the oceans, if you will—as the legal background against which many of our national security interests and activities are arrayed, we'll lose the understanding of what it means on the international spectrum.

The Coast Guard certainly believes that ratification of the convention is long overdue. For many of us, certainly the Navy and the Coast Guard on this particular panel, the oceans are our working environment. It's where we literally live and work and deliver our services to the American public. Today's proliferation of maritime security issues would be well served if there were a rule of law context behind all of those activities as we carried them out.

Countless U.S. activities and interests—from navigation rights to the maritime law enforcement activities of the Coast Guard and challenges like drug smuggling, illegal immigration, living



As our energy sources diversify in the future, it is important that we have guaranteed freedom of the seas in order to deliver that energy to our shores.
Photo: Gulf Corporation

marine resource enforcement and management—are the challenges that would demand the propriety of having a background of an ocean constitution against which to play. I think it's time for us to rise to the occasion. Again, I'd join other colleagues on this panel in calling for the ratification of the convention. The rest of the world has endorsed it. We were the ones who were very instrumental in the building process to begin with, and it seems to me to be time for us to join the world crowd.

Last, a comment on partnerships, which has become very much a word of exchange all around all of the panels you've heard from today. It's extremely important that we acknowledge that when we find stakeholders at the table, we find common solutions to the problems we're encountering. I've been pleased to hear the Coast Guard mentioned on all the panels we've heard so far as one of those least common denominators as a stakeholder at the table to produce solutions for America's challenges.

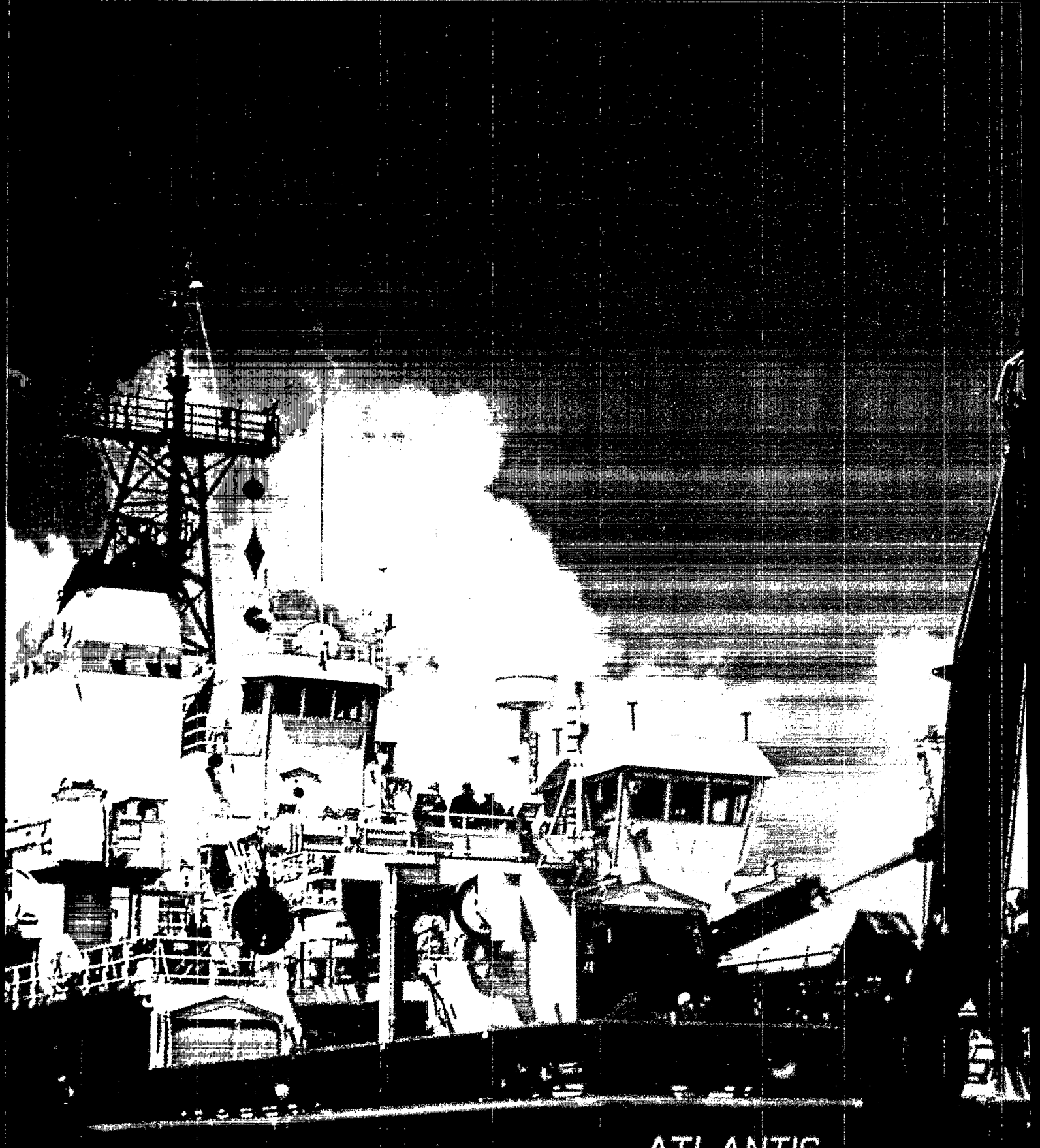
Vice President Al Gore

Thank you very much, Admiral. Just a quick follow-up on the issue of drug smuggling. When your folks are patrolling and trying to stop drug smuggling, what would the Law of the Sea Convention do in helping you there?

Admiral James M. Loy

Principally, it has to do with navigation rights, sir. We'd have a very clearly established set of exclusive economic zones. We'd have a very clearly established set of territorial seas.

With the assistance of the State Department over the course of the last three or four years, we've negotiated bilateral agreements with some 19 nations in the Caribbean area of operations with a view toward taking the territorial sea away as a safe haven for the smuggler when he's attempting to introduce his product either up the outer islands or into San Juan or the Virgin Islands. For us, as it relates to maritime law enforcement—and specifically smuggling of any contraband, but especially drugs—the Law of the Sea offers us an opportunity to engage other nations and expand our opportunities in terms of actually getting to the bad guy.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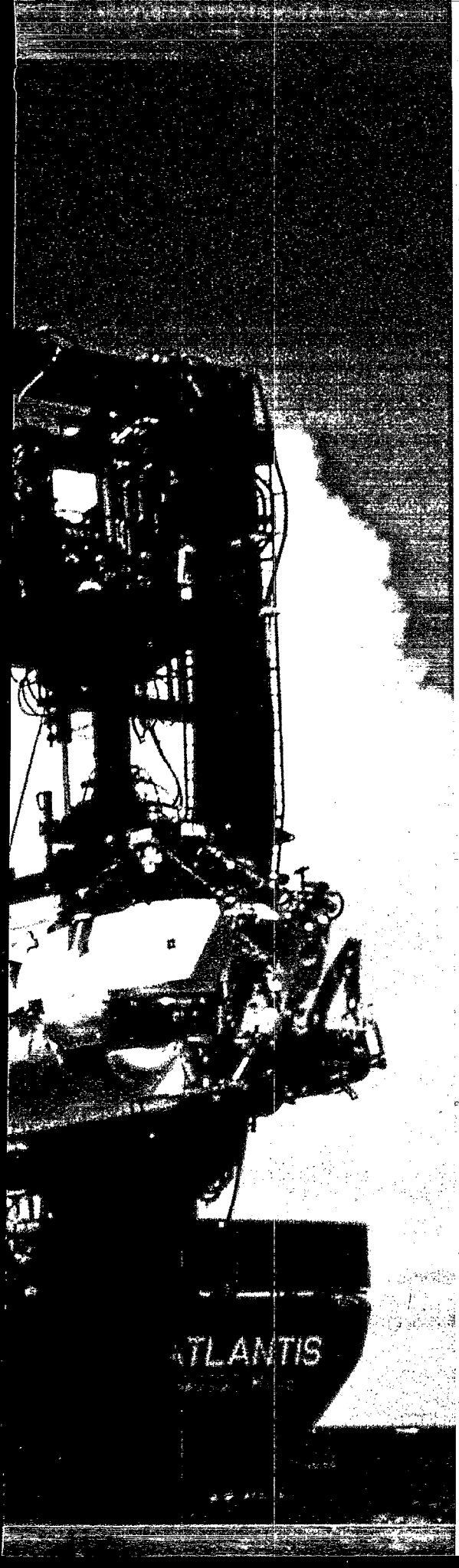

In the 21st century, the oceans will have an even greater potential to yield profound new scientific breakthroughs. We must seize these new opportunities now because we have no time to waste.

PANEL CO-CHAIRS

THE HONORABLE KATIE McGINTY
Chair, Council on Environmental Quality
White House

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FACILITATOR

MARCI DuPRAW

PHOTO: WOODS HOLE, MA 02543

Ocean Exploration, Education, and Research

Panel Co-chair Introductory Remarks

The Honorable Katie McGinty

I'm Katie McGinty, Chair of the White House Council on Environmental Quality. I serve as President Clinton's senior advisor on environmental policy matters. It is a pleasure, indeed, to be here.

I wanted to start first by acknowledging my very able co-host Dr. Neal Lane who—as with many of our other presenters this morning—has made a tremendous contribution to the research frontier as the Director of the National Science Foundation [NSF]. I am particularly pleased because he will become an even closer collaborator as he moves from NSF to the White House as the President's new advisor on science and technology matters.

I believe that what we're about to discuss here today is exactly the right place for starting this National Ocean Conference: exploration, education, and research. As I've come to know in preparing for this—but as our panelists certainly will elaborate and all of you know well—we know more about the dark side of the moon than the blue part of our planet. That is a situation that can change. It must change. I think with the momentum we've built leading up to this conference and now in our two days together, we have a hope that finally it will, indeed, change.

Yesterday, I was very pleased to be able to join Neal [Lane] and Dr. [D. James] Baker and M.R.C. Greenwood and others to launch a brand-new, state-of-the-art research facility for the National Marine Fisheries Service that will be right here in the Monterey Bay area to join with some of the other state-of-the-art research facilities that are being brought together in a powerful new partnership. We're off to a good start.

For all that we don't know about our oceans, there are some things that we're coming to know all too well. We know that there are very real stresses on our marine ecosystem, and those stresses are getting more intense all the time:

- Pollution in the water itself and running off the land into the water.
- Overharvesting of fisheries, overcapitalization of our fishing fleet, and on that fleet itself sometimes very aggressive new technologies that almost literally can vacuum the bottom of the seas.

Interdisciplinary, integrated science and partnerships are proving to be powerful tools in tackling some of our nation's greatest natural resource challenges, as evidenced by the ongoing restoration of the Kissimmee River, Lake Okeechobee, the Everglades, and the Florida Bay ecosystem.

- Population pressures—fish and marine resources are the primary source of protein for a huge percentage of the world's population. There are more of us all the time, and we're very hungry all the time. That pressure is building as well.
- The surge to the sea—we not only want to eat the fish, we want to see the waves as well. A huge percentage of us already live in coastal areas or are moving to those coastal areas—not just in the United States, but around the globe.
- The surge of the seas—we're beginning to know that greenhouse pollution is now potentially very dangerously threatening some of the most basic parts of our ocean world: the physics of the ocean, the chemistry of the ocean, and the biology of the ocean.

These things we know. We know that there are troubles. We know that there are challenges.

There are some other things we know about the seas as well. We know if we give ourselves half a second to reflect on it at all, we humans depend vitally on the seas, physically for food, for sustenance, and for protection from storms, but spiritually as well. We depend on it for excitement, the frontier yet to be explored. We depend on it for tranquillity, for perspective, for peace, a sense as you gaze at the ocean of being part of something that is truly vast, that is truly great, that is truly larger than any single one of ourselves.

How do we change this situation? How do we, in a word, begin to stem the tide? I think today, with the presentations we will hear, with your comments and reflections, we will begin to get an idea of how to take the job on.

Over the last five years, under the President's leadership and the leadership of Vice President Gore, we in the administration have begun to take on what have been some of our most nettlesome natural resource challenges, which are no doubt becoming more nettlesome because for years we either looked away or declined to take the action that was necessary. I want to share just a couple of those challenges briefly, because I think that there is some learning in them that maybe can be exported into our discussion today.

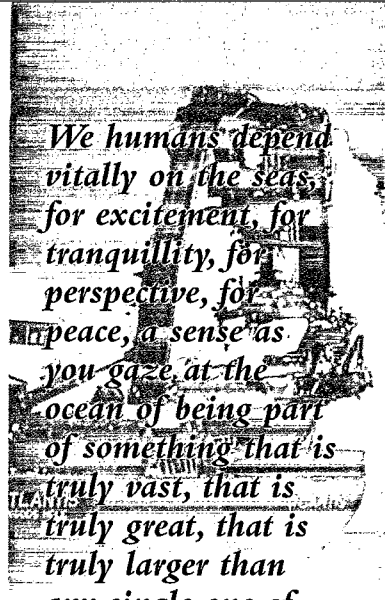
- California Bay Delta ecosystem—Breaking 20 years of deadlock and court battles, this ecosystem is finally bringing people together. Finally polarization is yielding to some progress in terms of managing this vital water resource.
- The Florida Everglades—What a tangled web we weave, or series of concrete channels we pour, or dams we build. Finally, here, too, is progress. The waters of the River of Grass are becoming restored. The connectedness of the Kissimmee [River], Lake Okeechobee, the Everglades, and Florida Bay is recognized and gradually being restored.
- The forests of the Pacific Northwest—Finally we're seeing the ecosystem as a whole. It's not just the Spotted Owl, stupid. It's the Spotted Owl as part of an intricate web of life, each piece of which is essential to restoring that habitat and that ecosystem.

What is the learning that may come from those challenges that we've at least begun to take on that we could bring into our discussion today? I'd say at least two major points.

First and foremost, the science—Every one of those issues demanded that we brought to bear the best science and the best learning that we have. Interdisciplinary, integrated science—the physical science as well as the social science. Bringing those varied and often—too often—conflicting data sets together. Changing apples into apples instead of apples into oranges. Enabling a conversation to be had across and based on our best information and data. Basic research as well as know-how as applied. New technologies, new ways of getting the job done.

The second essential piece, partnerships—Government working with industry, with academia, with environmentalists, with businesses, agriculture, and industry. Working with our seniors—the elders among us, as well as our children, who always keep us on the right track. All of those members of society called upon to be part of the solution to come out of their various trenches, to see beyond their special interests to the larger common interest for which we must work. All respected for the unique perspective and contribution they bring.

Today, as we look at our oceans, what is that science that needs to be done? What are those technologies that must be brought to bear? Who are those people and those partners who will enable progress instead of polarization to prevail? As I've said, I think we have some of the best people in the country to help us to wrestle with some of those questions—not only to see the challenges, but, hopefully, to seize the opportunities.

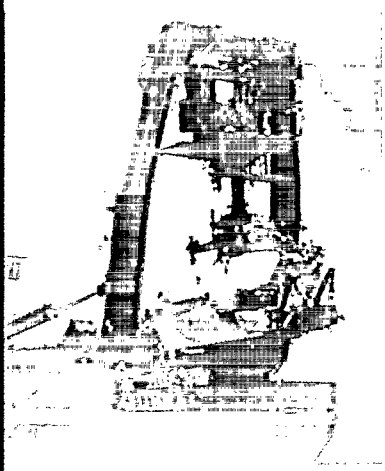


We humans depend vitally on the seas, for excitement, for tranquillity, for perspective, for peace, a sense as you gaze at the ocean of being part of something that is truly vast, that is truly great, that is truly larger than any single one of ourselves.

– The Honorable Katie McGinty

Dr. Neal Lane

Good morning, everyone. Katie McGinty has done an extraordinary job in the White House advising the President and Vice President and keeping all of the rest of us in government—and out of government—conscious of what needs to be done and what can be done. She has been most instrumental not just in telling us about it, but in helping us implement change.



We're often reminded that the oceans cover some two-thirds of our planet's surface. But there's another thing we can say. And that's that ocean sciences, even today, span many of the most exciting frontiers—some would argue the most exciting frontiers for exploration, education, and research in all of science and engineering. The future, indeed, is even brighter.

Just over two years ago, I got my first-hand sense of what lies on these frontiers. Congressman Jerry Lewis from California and I were able to take a dive off the southern California coast near Catalina Island in the submersible vessel *Alvin*. The dive was a highlight of my tenure at the National Science Foundation. We had a chance to view the life and the geology of the ocean floor at depths approaching a mile. In this world, a perpetual blackness was punctuated only by the strange luminescent aquatic animals all around us. We saw an amazing variety of life forms that don't exist anywhere else on the planet. The dive gave us a dramatic sense of the wealth, the resources, the mysteries, and the natural treasures that lie below the Earth's ocean surface. It changed both of us in how we think about the Earth and about the oceans.

As fascinating as it was for me to see the wonders through *Alvin*'s portholes, we should all recognize that in recent years, our observational powers have been magnified many times over. Our various observational tools—whether they're submersibles, buoys, or satellites—have coalesced with advances in communications and information technologies like the World Wide Web. This has already changed the very nature of how we explore the oceans, how we study them, and how we teach our children about them.

From my desk in Arlington, Virginia, a few clicks of the mouse can link me directly to the Monterey Aquarium's kelp cam. The kelp cam transmits real-time images over the Web of kelp fields growing just offshore here in Monterey Bay. It may not sound like an especially exciting use of technology, but I assure you, it is. It's easy to envision how these capabilities can result in more productive learning experiences for students at all levels, even if they never actually lay eyes on the rolling surf or set foot on the seashore.

A number of NSF-supported projects make this possible through the wonders of virtual reality and the real-time observations. Students and teachers can now take virtual field trips to places like the depths of the Monterey Canyon and thermal vents along the Juan de Fuca Ridge in the Central Pacific. These kinds of activities are invaluable for boosting understanding and appreciation for the role of the oceans in our lives.

The emerging capabilities in observation and data communication clearly open up new opportunities for research and exploration. Perhaps the most notable example of this comes from our improved ability to predict and monitor the formation of El Niño events. This past winter, El Niño went from being a scientific curiosity to becoming a true societal phenomenon. Even though we're still sorting out how much of the recent severe weather and its consequences can be blamed on El Niño, one thing is clear. We should give credit to the host of scientific and technological advances that have made it possible for to us predict the major El Niño events. It took better models of the relationship between oceanic and atmospheric phenomena, an understanding of the underlying physical processes, and a vastly improved network of buoys and other observational stations for monitoring the tropical oceans.

The foundation for these important advances rests upon years of investment and fundamental research in many fields of science and engineering, conducted at our nation's universities and our research laboratories across the country. Thanks to this combination of better insights and better data, we now, for the first time, have the ability to provide reliable seasonal forecasts. That, in my mind, is one of the most significant scientific accomplishments of recent decades. The seasonal forecasts may not always be to our liking, but they have enormous economic and societal value, and we're very pleased to have them.

We could all cite any number of other examples that speak to both the scientific and the societal benefits related to investments in oceanic exploration, education, and research. We've uncovered new life forms living in truly extreme environments—from Arctic Sea ice to deep within the Earth's sub-seafloor.

We're also making progress on—but just beginning to recognize, really, how much we have yet to learn about the influence of the oceans on our climate, our food supply, our health, and countless other factors that affect our lives. To help us address this vast array of challenges and opportunities, we're very fortunate today to be joined by a very distinguished and diverse group of expert panelists.

Panelists' Statements

Dr. Sylvia A. Earle

Dr. Sylvia A. Earle is one of the nation's most recognized marine explorers and oceanographers. She is Director and founder of Deep Ocean Exploration and Research, Inc., and Explorer in Residence at the National Geographic Society.

I've never seen the ocean community so energized. And it's no wonder after a dry spell spanning many decades.

There's an opportunity at last for the ocean frontier to be for the 21st century what space has been to the 20th. And why not? The technology is here, the need is here, and a sense of urgency is here. Now all that has to come is the commitment to go forward and downward.

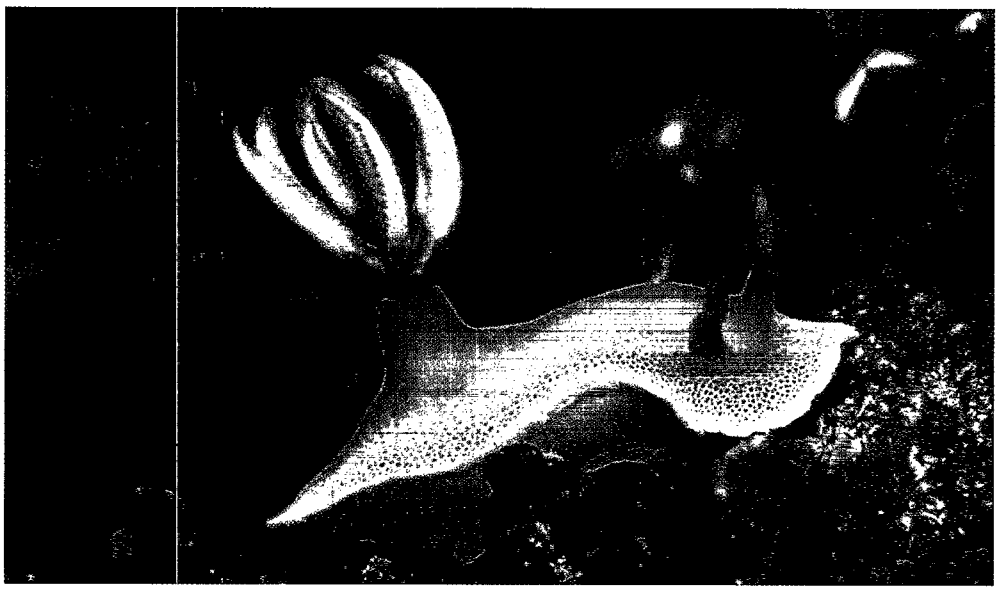
Two centuries ago, Thomas Jefferson commissioned Lewis and Clark to explore and document the nature of the American West. There's an opportunity now to explore further west and south and north and east and down, to understand the nature of our own aquatic backyard.

In recent times, we've come to see that the ocean powers climate and weather, shapes planetary chemistry, regulates temperature, contains 97 percent of this planet's water, and embraces about 97 percent of the biosphere. Yet, paradoxically, more men have traveled to the moon and back than have been to the deepest sea and back. It's a relatively short distance. It's only seven miles down, where two explorers—one of them is here in this room right now, Don Walsh—ventured for the first and only time in history in 1960. Only five manned submersibles operated by four countries are capable of going to half the ocean's depth, and this year, this nation will decommission *Sea Cliff*, the only such submersible supported by the United States. We really must not let our edge in the deep sea slip away.

There are new technologies, ranging from space-based sensors and superconductors to deep-sea robots, complemented, of course, by acoustics, lasers, and other highly sophisticated techniques. Yet crucial decisions about policies for fisheries are based largely on samples taken by remarkably crude methods—dragging nets or laying strings of baited hooks along the seafloor. What would aliens know of Monterey or Montana or Washington, D.C., or of you or me if they relied on such methods to sample our culture, our civilization?

More serious than the primitive techniques now in use for some aspects of ocean research is the stunning fact that there is no national plan for exploration of the vital natural systems that extend from the shore to the edge of the Exclusive Economic Zone and no comprehensive plan for cooperating with other nations to responsibly explore, research, and educate humankind about the critical natural ocean systems that sustain us.

We've grown up during this time of learning about plate tectonics; links among climate, weather, and the sea; the existence of these previously unknown ecosystems and new categories of life; and even clues to our own history captured in shipwrecks and ancient artifacts. These have revolutionized human understanding about the nature of the planet and our own past. But they also highlight the magnitude of our ignorance.



An amazing variety of life forms that don't exist anywhere else on the planet, such as this nudibranch, live below the ocean's surface.

Most of the ocean, including the submerged part of North America embraced by this nation's Exclusive Economic Zone, remains unknown, unexplored. Yet despite the unknowns, we've not hesitated to exploit the ocean. The collapse of once-thriving populations of marine species—cod, capelin, pollock, grouper, blue fin tuna, swordfish, shark, shrimp, turtles, abalone, urchins, and name the favorite critter of your choice—make it clear that we have not managed the use of the sea wisely and have handled it far from sustainably.

Moreover, the vital links between land-based actions and the ocean have not been recognized widely. The increasing size and abundance of toxic algal blooms in this country's coastal waters and the formation of the so-called dead zone near the mouth of the Mississippi River—larger than the 5,000-square-mile Monterey Bay sanctuary—appear to be correlated with growing domestic, agricultural, and industrial pollution. Last Friday, I flew out over that area a hundred miles offshore, and instead of seeing clear, blue water as normally would be the case, it was green all the way from the shore to a hundred miles out.

While problems relating to what we put into the sea and what we take out are real, the greatest threat to the future of the oceans and, thus, to our own future is ignorance. It's ignorance. An aggressive program of ocean exploration, research, and education comparable to this nation's investment and commitment to exploration and use of space is vital, an enduring legacy from our generation for all who follow. A Lewis and Clark era for the sea, coupled with 20th- and 21st-century insights that will inspire care of what's there.

Consider some of the opportunities available to us now. We've been asked to reflect on cross-cutting issues: ecosystem health, sustainable use of ocean and coastal resources, research, Law of the Sea, and ocean management. All of these topics and more are absolutely dependent on knowing what's out there, what's down there.

Our neglect of ocean exploration, research, and education has proven costly. And not just to fish, whose populations, some of them, have dropped to 10 percent of what they were in our lifetimes and, in some cases, less than 5 percent. Consider Chesapeake Bay oysters. Consider the case of the white abalone in California, whose population is less than one percent of what it was when you and I were kids.

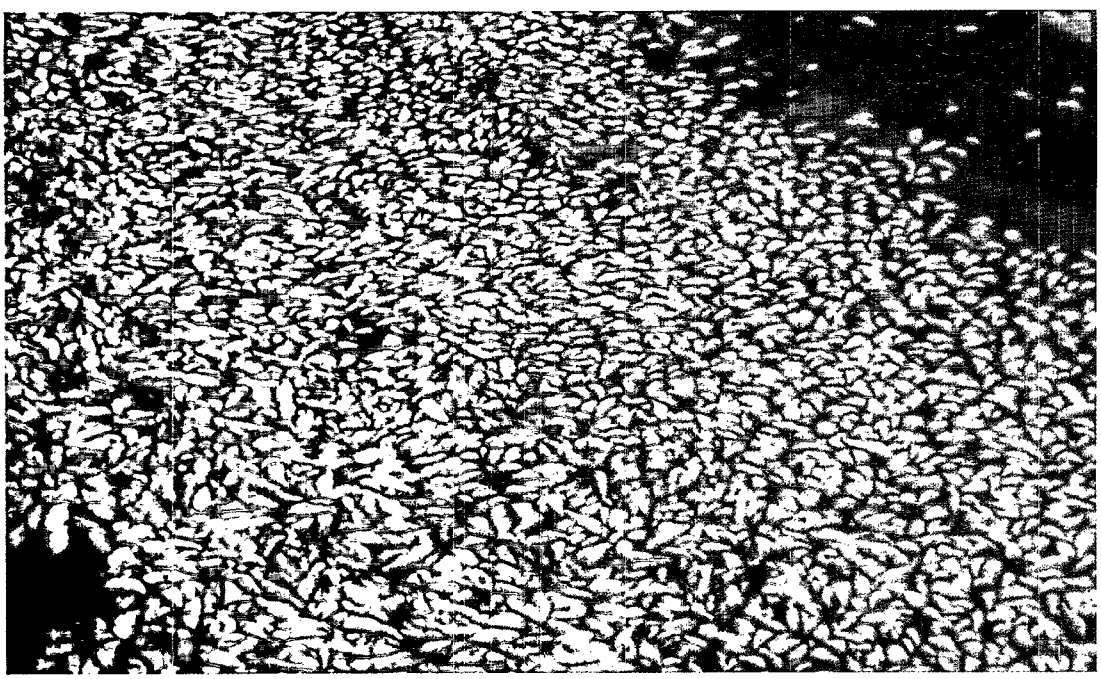
It isn't just to the fishermen, whose children can't contemplate lifestyles or livelihoods experienced by their elders. In ignorance, we are monkeying around with the vital underpinnings of Earth's life support system. We're finding that without really trying, we can destroy ancient ecosystems—from coral reefs to kelp forests and who knows what else in the deep sea—that developed over billions of years. But with all of our ingenuity and all of our technologies, we can't restore what's lost.

In 1872, the year made famous by the *Challenger* expedition—the first global oceanographic voyage in history—a plan was initiated that some call the best idea that America ever had. The first national park, Yellowstone, was established. A hundred years later, in 1972, legislation was enacted in this country to establish a system of marine sanctuaries. Now there are 12, including four here in California and, going further north, one on the Olympic coast of Washington—none in Alaska. They are significant, but overall, they comprise less than one percent of the total ocean under U.S. jurisdiction. These may be regarded as young national parks—an insurance policy against change.

How about this for a project: the National Geographic Society, NOAA [National Oceanic and Atmospheric Administration], The Goldman Fund, the U.S. Navy, NASA [National Aeronautics and Space Administration], MBARI [Monterey Bay Aquarium Research Institute], and a growing list of other institutions and agencies are setting about for a five-year sustainable seas expedition involving exploration, research, and education, with a focus on this nation's marine sanctuaries, aiming at exploration and research and education as well as cross-cutting issues, such as those that we've been asked to consider. This project is an example of what might be done to help do what good stewards ought to do—to take care of Earth's assets and try to leave the planet better than we found it.

An increase in domestic, agricultural, and industrial runoff can result in an increase in the occurrence of harmful algal blooms and associated fish kills.

Photo: News Office, Woods Hole Oceanographic Institution



In our lifetime, we've witnessed and been responsible for causing more change to the vital ocean ecosystems that sustain us—a sea change that has taken place before our very eyes. We have a chance, should we choose to accept the challenge, of eliciting during our time a sea change of attitude about the oceans. It isn't just our descendants who will be grateful if we get it right. If we hurry, perhaps we can stem the degradation that we've witnessed in our lifetime and live to enjoy the benefits ourselves. As never before, there is this sense of urgency. With all

due respect to Lewis and Clark and all those other great explorers of the past, the greatest era of exploration is just beginning. Let's go!

Dr. Robert Gagosian

As Director of the Woods Hole Oceanographic Institution, Dr. Robert Gagosian has a wealth of knowledge in the areas of ocean science and ocean science education. He has been with Woods Hole for over 25 years.

It's certainly a pleasure to participate in this forum. I think we have an exciting opportunity, and it's going to be up to all of us in the next couple of days to make this succeed.

As you all well know, the study of oceans is really a very difficult challenge. Oceanography is a young field, and it's still very much in the exploratory mode. We've mapped more of the planet of Venus than we have below our own ocean surface. I'm constantly amazed with the fact that hydrothermal vents were only discovered 20 years ago, and only 20 sites have been examined on this 40,000-mile mountain chain two and a half miles deep below the sea—the longest mountain chain on Earth.

We're just beginning to realize the significance of the discovery of the ecosystem that challenges the very foundation of knowledge about the origins of life on this planet, as well as the possibility of its existence on others in the universe. To quote microbiologist Holger Jannasch, "The vents are possibly the most significant biological discovery in the latter half of this century."

Oceanography is also an interdisciplinary field that requires knowledge from several other fields: physics, chemistry, biology, and geology. No single discipline can encompass the study of nature in such a grand form as the oceans.

The oceans are clearly one of the most hostile environments on Earth—changing temperatures, densities, pressures, and currents. Corrosion, severe weather, and the sheer vastness and depth of the sea make studying ocean processes and their dynamics one of the most challenging of all scientific endeavors. For these reasons, we're heavily dependent on progress in technology.

Advances in the last decade in mooring technology, buoy and float design, ocean profilers, autonomous vehicles, sensors, satellite technology, and data acquisition compression—and especially transmission—techniques enable us to ask questions today that we couldn't address only a decade ago. These answers—coupled with the scientific knowledge gained over the past decade from major field experiments, such as those in the global climate change program—afford us an unprecedented opportunity as we enter the next millennium to learn how the ocean works.

We're at a dawn of a new age of global ocean exploration and observation. To take advantage of this opportunity, a commitment is needed to the successful implementation of these new approaches in order to observe the oceans in time and space very differently from our past observations. Field programs creating ocean observatories worldwide will need to be mounted on an unprecedented scale.

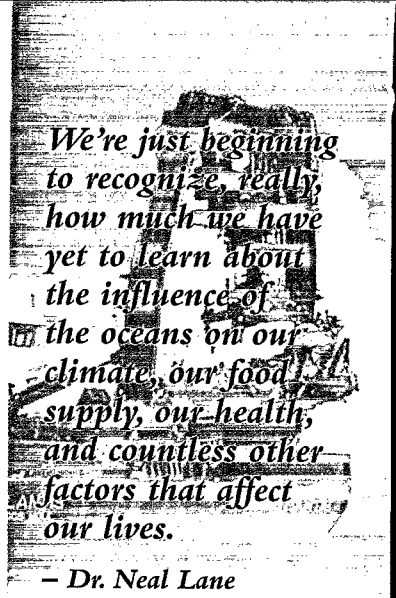
Let me give you an example. The oceans are the weather's flywheel. They contain a thousand times more heat than the atmosphere. Therefore, we have to understand the storage and transport of heat within the ocean and the transfer of heat across the ocean–atmosphere interface if we're going to understand our climate. If we want to predict the weather of the ocean as we have predicted the weather of the atmosphere, data collection observatories—such as the moored buoy and float systems that I've just described to you—will need to be established on a global scale.

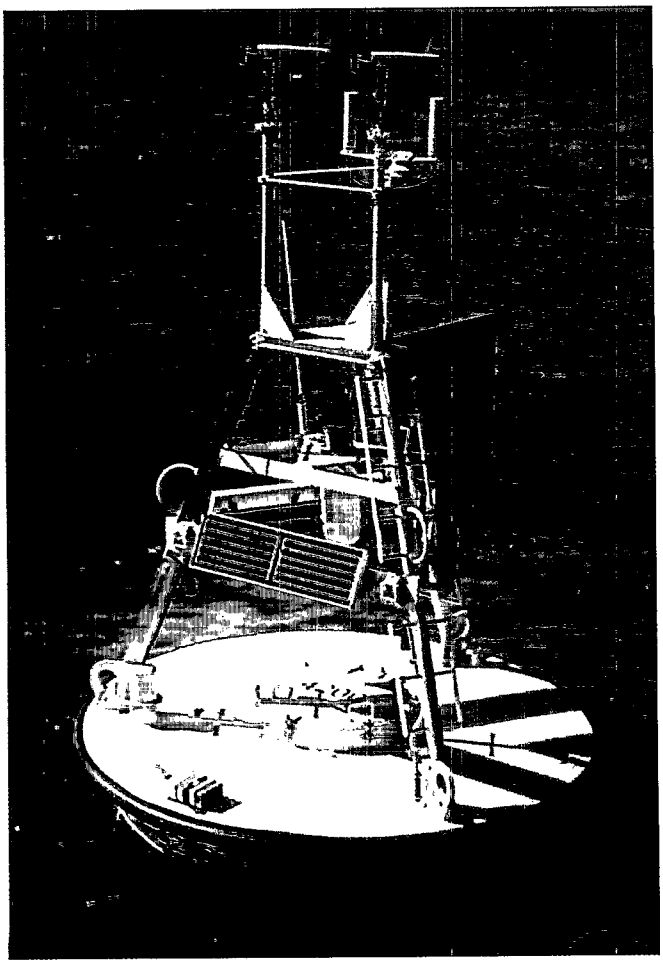
What's the benefit of making these extensive and expensive measurements? One payoff, of course, is the prediction of El Niño. Here in California, people know a lot about damage done to property and agriculture from the recent El Niño event. With advanced warning, we can mitigate the negative consequences of such events and maximize their societal benefits, making our economy more efficient, and allowing us to better manage our marine and mineral resources, the marine ones, of course, being the fisheries.

For success, I believe this is going to require a paradigm shift in how we do our science in this country. Not only will academic research-intensive institutions in the United States need to form new and stronger partnerships with each other and with the federal agencies, but new alliances with our international colleagues will also be essential for success. They're not in place now.

We must also do a better job of convincing the taxpayers and the congressional and executive branches of our government why this is such an important priority for this country. I believe it's very simple: if we can't explain why it's important, why should they support it?

We have a good start, and I personally am very excited and optimistic about the future of ocean sciences, research, and education. The reason is not just because of the exciting opportunities we face in our field. It goes deeper. We have an extraordinary opportunity and responsibility in educating the public that the oceans are not just the beaches that they walk on with their children and their grandchildren. They're much, much more. They cover 71 percent of the Earth, with an average depth of two and a half miles.





Advances in mooring technology, buoy and float design, ocean profilers, autonomous vehicles, sensors, satellite technology, and data acquisition compression—and especially transmission—techniques enable us to ask questions today that we couldn't address only a decade ago.
Photo: NOAA

These facts, coupled with the Earth's mounting population—which is expected to double by the middle of the next century—lead to the conclusion that the oceans cannot be ignored for using them wisely by society as well as their stewardship.

The oceans play a key role in this country's environmental security strategy. They'll become increasingly important to us as we move through the next century. Unlocking the key of how the oceans work will result in how well we as a species will survive in the next millennium. The dissemination and understanding of this message will lead to a very exciting era for oceanography.

There's another reason why I'm optimistic. Oceanographers are passionate about their mission. I don't know one who doesn't love the sea. The ideas are in place, the opportunities are real, the challenges are clear. How we all address them is the issue.

W. Thomas Mitchell

As President and CEO of Genencor International, W. Thomas Mitchell provides a perspective from the world of industrial biotechnology.

It is, indeed, a pleasure to participate in such an important conference. My job today is to explain how the biotechnology industry and, in particular, how Genencor International, hopes to employ the resources of the ocean for human progress.

First, I'd like to clear up a common misperception of many audiences. Most people think biotechnology is all about drug discovery. Indeed, many breakthroughs that come from modern biotechnology are applied to the diagnosis and treatment of human disease. But there are important applications of biotechnology that extend far beyond this dimension and affect all of our lives in the most mundane ways.

I'm referring to the industrial application of modern biotechnology—to everyday activities, like the weekly laundry, processing of blue jeans, producing high-fructose corn syrup for soft drinks, and developing fuel ethanol for vehicles. As mundane as they are, though, when biotechnology is used for industrial activities, energy is saved, renewable resources replace fossil-fuel feed stocks, and pollution is prevented or reduced. The goal of Genencor International is to lead the way forward in industrial biotechnology.

We stand on the threshold of a revolution in the way chemicals are produced. The next decades will see the greening of a number of industries. For example, with the support of the U.S. Department of Commerce's Advanced Technology Program, Genencor and its partners are working on basic technology to develop economically viable processes to produce a wide range of chemicals using renewable resources as feed stocks. With the aid of biotechnology, natural microbial processes will convert biomass into useful chemicals.

Since this might be a new concept, please allow me to expand briefly on the industry we're creating. Industrial biotechnology applies the techniques of modern molecular biology to improve the efficiency and reduce the environmental impact of process industries. As biotechnology companies in the health-care sector are transforming the pharmaceutical industry, many observers predict the same impact in the chemical industry. Industrial biotechnology companies develop biochemicals and biocatalysts, such as enzymes to be used in chemical synthesis and as active ingredients in consumer products, such as laundry detergent, dietary supplements, and animal feed.

Enzymes are catalytic proteins produced by all living organisms. In humans, enzymes help digest food, signal cells to turn on and off, and perform other complex functions. Enzymes are part of nature's chemical factories. As such, they're very efficient at their jobs, turning one chemical into another.

Since all living things produce them, we explore biodiversity to locate new enzymes. For a company like Genencor, we have certain search criteria. Since we're interested in enzymes that can operate in harsh industrial environments, we look in natural environments to find microorganisms that thrive under similar conditions. The extremophiles discovered in this way can lead to enzymes that operate at extremes of temperature, pressure, and acidity. These products can contribute significantly to industrial sustainability.

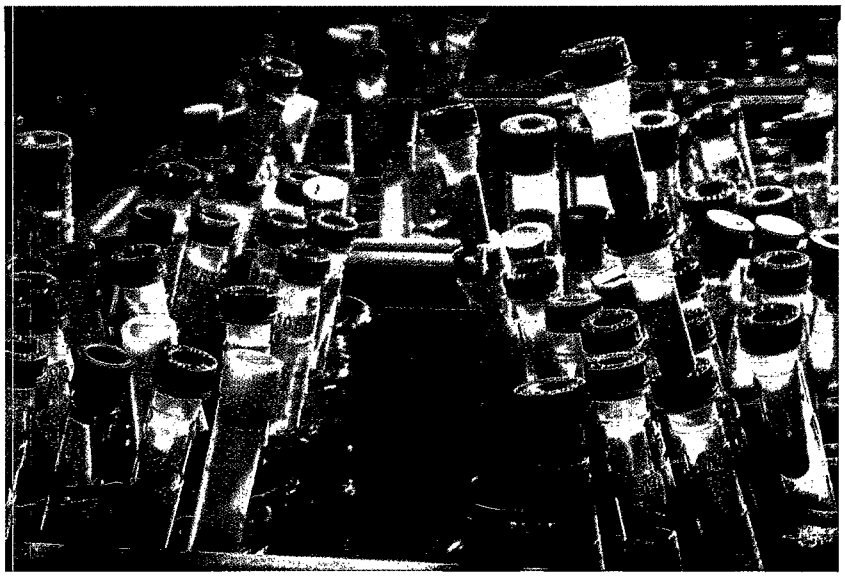
An extreme environment of particular interest to the biotechnology industry is the environment around deep-sea hydrothermal vents. From a biodiversity point of view, this is one of the most exciting places on Earth. At the bottom of the food chain, around these vents, are microorganisms that have evolved without photosynthesis. These organisms are able to find energy and nourishment from the oxidation of sulfur compounds, which are abundant in vent waters. We need to collect and study these microorganisms to understand their genetic make-up.

Before I conclude, I'd like to spend a few minutes speaking about how modern biotechnology exploits nature. Unlike mining for minerals, we only take from nature a small sample for development. Indeed, all we need to find is one microorganism with the desired characteristics to eventually produce tons of product. A spoonful of sand from a deep-sea hydrothermal vent may be all we ever need. Once we identify the microorganism of interest, we can grow it in our labs, sequence the DNA, and use that information to produce commercial quantities. This is truly sustainable development.

Unfortunately, it's not easy getting that sample. This is where government must play a critical role. Industry alone can't afford to explore space or the deep sea. We need to work in cooperation with government and universities to reach these inaccessible places to discover and understand the environments we find there. Speaking on behalf of the biotechnology industry, we support a substantial commitment by the United States government to explore the deep sea.

Earth's oceans are the common heritage of all its people. The biodiversity we find there could be the source of new drugs or new biocatalysts that could contribute significantly to human progress.

I'd like to close with the words of Teddy Roosevelt from a speech he made in 1910: "The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased—and not impaired—in value."



The biodiversity found in the oceans could be the source of new biochemicals and biocatalysts that will affect our lives in ways as diverse as producing a more effective laundry detergent and developing fuel ethanol for vehicles.

Dr. Rita R. Colwell

Dr. Rita R. Colwell is currently President of the University of Maryland Biotechnology Institute and has earned international recognition for her expertise in marine biotechnology and waterborne diseases. She has also been appointed as the next Director of the National Science Foundation.

As others have said this morning, it's clear that the oceans have captured the imagination of poets, explorers, and scholars for centuries. Long before missions into stellar space, exploration of the oceans led to discovery of new continents, new forms of marine life, and an appreciation of the complexity of planet Earth.

We're at the brink of the 21st century, with new opportunities for a vastly expanded exploration of the oceans, using the new tools of the engineering sciences, information technology, and molecular biology. We can retrace the footsteps of Charles Darwin, employing genome sequencing of the creatures he catalogued and described, and thereby link even more delicately the components of the complex web of biological diversity that comprises our biosphere. For example, DNA genome sequencing of the Galapagos animals and plants will allow a clear tracking of their linkages to the flora and fauna elsewhere on the continents and island communities of the Earth.

More immediate and practical is recognition of the oceans as a rich source of food. The world fisheries have seen annual harvests increase up to a level of about 80 or 90 million metric tons a few years ago. However, we're now seeing the results of overfishing and pollution of the oceans, with collapse of commercial fishing on the Grand Banks and in the North Sea. The increasing demand for fish, expected to approach about 135

million metric tons per year by 2015 or 2020—a conservative estimate—can't be met by capture fisheries. Fortunately, intensive land-based, environmentally sound, closed-system aquaculture is both feasible and necessary. Because of developments of marine biotechnology and biotechnology, these applications in aquaculture can provide the food we need.

Many commercially important species of marine fish have been induced to spawn in captivity. And their life cycle is regulated so that the potential of closed-system, environmentally sound aquaculture can double or triple our current annual output of about 20 million metric tons sometime in the 21st century.

Advances in molecular biology applied to aquaculture have brought salmon, trout, sea bream, striped bass, and other commercially important fish into culture, and advances in growth and reproductive biology through biotechnology of these fish will allow natural stocks to replenish. The growth hormone genes in several species of fish have already been cloned.

The oceans can then be a genetic stock of germ plasm—a genetic resource to be tapped for brood stocks, rather than overfished. Thus, fish won't become commercially extinct, as the cod has been declared in recent news reports, and exotic reef fish needn't be recaptured for aquarium and other uses. A marine genome program surely will be immediately beneficial to humankind.

These advances will require increased investment in marine biotechnology and collaboration at all levels—government, university, and industry—in a national initiative in aquaculture biotechnology and marine genomics. Expanded research and exploration of the oceans will bring better understanding of our planet and the intricate interweaving of biological diversity with climate, weather patterns, and, ultimately, human health.

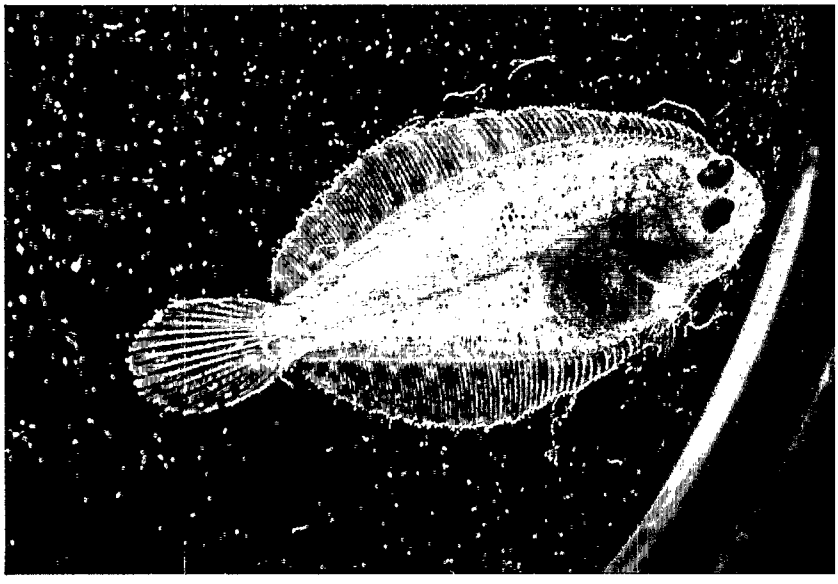
Compelling is the role of the oceans in human health and, notably, infectious diseases. An example is cholera, a disease that in epidemic form wreaks misery, economic hardship, and death to hundreds of thousands of people around the globe in its worst epidemic years. With the discovery of the linkage of the bacterium that causes cholera to plankton in rivers, ponds, coastal waters, and the oceans, it's now possible to monitor the Earth by satellite, using remote sensing as an early warning of detecting hot spots of environmental and climatic conditions associated with epidemics of cholera.

With the capacity to predict El Niño events, as occurred in Latin America—recently linked to the cholera outbreaks in Latin America and Bangladesh through the plankton, sea surface temperature, and sea surface height—we can build up an encyclopedia of data on ocean conditions. And that will help us seek those geographical areas where conditions are cholera-prone and thereby implement public health measures to prevent—or, at the least, to minimize—the tragedies of massive epidemics.

Intellectually exciting as well as potentially commercially useful are the new discoveries from expanded research and exploration of the oceans. An improved, more sophisticated, and more realistic understanding of our planet will be gained by the reinvigorated exploration of the deepest reaches of the world's oceans. A new generation of submersibles extending manned exploration of the sea can be extremely valuable.

With a program that includes manned submersibles, remotely operated vehicles, autonomous undersea vehicles, and seafloor observatories, we'll expand our knowledge of biological systems capable of existing in one of the most extreme environments on the planet—the cold, salty, high-pressure, and remote regions of the ocean trenches. The biology of these regions will provide a new dimension to the story of life on the blue planet and fresh clues to life on other planets.

In summary, the oceans are a rich resource. In fact, they're a security blanket for humankind. We're now able to tap this resource in environmentally sustainable ways, using the tools of modern science, engineering, technology, and biology. The biological discoveries are waiting to be made, and this will surely benefit humankind. Our gene pool is far richer than we've dreamed, and it will provide us with a new window on life on this planet.



Advances in aquaculture are bringing commercially important fish into culture and aiding in the development of commercial viability for other species, such as the southern flounder *(Paralichthys lethostigma)* shown below.

Photo: ©1998 Harbor Branch Oceanographic Institution Inc.

Dr. Warren M. Washington

Dr. Warren M. Washington has earned international recognition for his work as a meteorologist at the National Center for Atmospheric Research. Much of his work is focused on the major role oceans play in the world's weather patterns. He also serves on the National Science Board.

The federal government has been coordinating essentially a multiagency research program toward the goal of sustainable use and management of our natural resources. The ocean plays a role in such issues as climate change, biodiversity, natural hazards, and security concerns.

We've seen over this last year the effect of El Niño in terms of its extraordinary interactions with the atmosphere and the ocean, interacting in a very interesting way to have a major impact on the climate system. In fact, 1997 was the warmest year in recorded history, and the first part of 1998 continues to establish new warming records. Furthermore, it should be pointed out that this century is the warmest century in 600 years. These changes in the climate system are affecting our food supply, the economic system, and the personal safety of citizens who are affected by exceptional weather events.

The ocean needs to be included as a major and integral component of a national and international environmental monitoring system. Recent research has identified many major findings in how the climate system works, how the ocean and coastal systems work, and how the chemical and the biosystems work.

El Niño is only one of the very interesting and important interactions between the atmosphere and the ocean. For example, the North Atlantic oscillation is a very important regional factor that goes into changes in the climate system in various parts of the world. As we go down this path of trying to understand seasonal, interannual, decadal, and centennial time scales, they all have their own variability. Some of this variability is predictable, and some isn't.

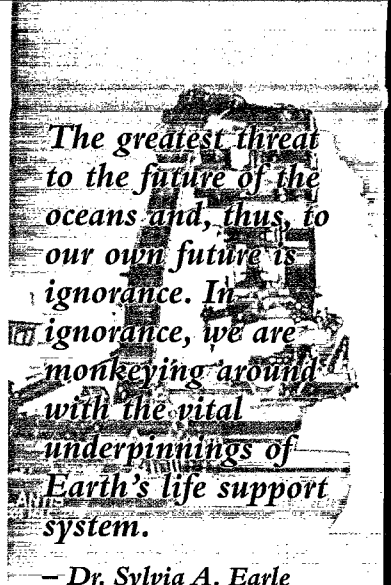
In the early days of the time I was involved in early climate modeling, the oceans were basically just a swamp—a very simple swamp, where there was no heat capacity and very little in the way of interactions. As we've advanced to modern, high-resolution climate models of the atmosphere and the ocean, we're trying to incorporate virtually all of the interactions in between the atmosphere and the ocean, including the sea ice.

One of the most major impediments to improving our climate models is the lack of a global observing system capable of capturing all of the important aspects of the oceans, including their major motions, temperatures, sea levels, and salinity. We need to monitor virtually all aspects of the oceans in cooperation with our international partners, because it's probably something we can't do on our own as a nation.

It's also important to measure the ocean chemistry in the biosphere, so that we can understand such things as the carbon cycle and the fish stocks. We also need to monitor ocean pollution and keep track of how much we're polluting and where the pollution is going and its effects.

Ocean science and engineering have devised many novel measurement systems, ranging from ships to drifting buoys to moored buoy arrays and vehicles that can go under the sea's surface temperature. During this last year, the tropical ocean buoy system has provided invaluable data on El Niño, enhancing our capability to forecast El Niño events and life cycles.

What do we need to do to succeed in the future? We're going to need to have a more sustained and a better observational system, and, if we have to, use novel techniques, such as acoustics. We need to make better use of satellite technology. The ocean research community needs to articulate its concerns, its needs, to the public and to the policymakers. We need to also be aware of the need of bringing in new generations of scientists who can work in a multidisciplinary way in the ocean area. Thank you very much.

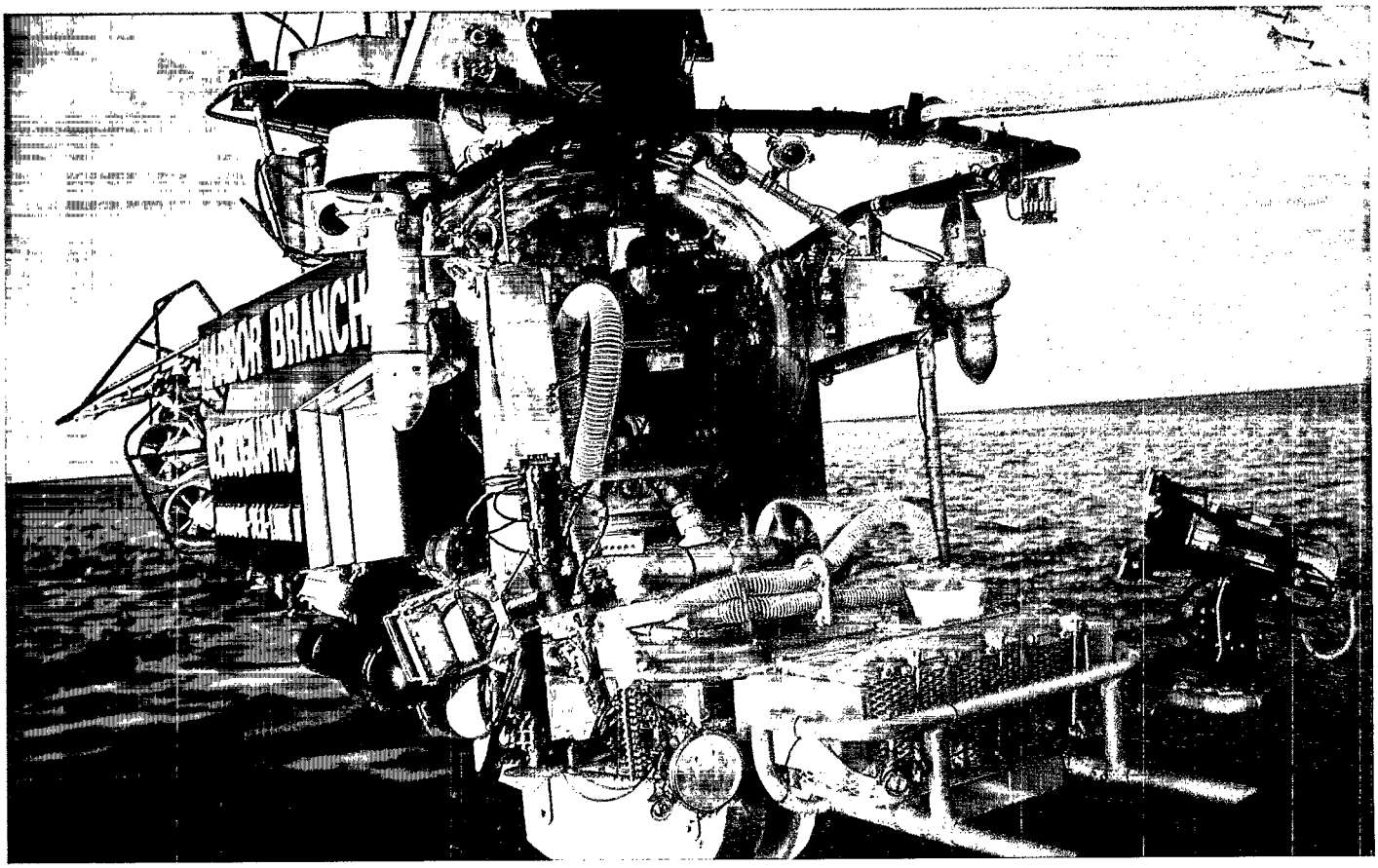


Admiral James D. Watkins

Admiral James D. Watkins served as the Secretary of Energy under President Bush and is also former Chief of Naval Operations. He is currently President of the Consortium for Oceanographic Research and Education. He has made extraordinary contributions to advancing understanding, awareness, and policy regarding the oceans.

The last several decades have brought changes in the way we utilize and value our oceans and coastal areas. Changes in world geopolitical structure, movement of populations to the coast, increasing reliance on the seas for food, and other material goods require a reexamination of our national interest in the ocean.

Development of new economic sectors, the need for new technological capabilities and educational methodologies, awareness of the links between atmosphere and the oceans, and the increasing concern about the impact of man's activities on the marine environment all now drive the ocean research agenda, which only a short time ago was dominated by Cold War concerns. This has resulted in the demand for new applications of ocean science and technology and has placed many new demands on the nation's investment in ocean research and development.



Advances in ocean science and engineering have resulted in remarkable ways to measure, model, and explore the ocean, including surface ships, moored and drifting buoys, and vehicles that can explore the ocean depths, such as the *Johnson-Sea Link* manned submersibles operated by Harbor Branch Oceanographic Institution.

Photo: ©1998 Harbor Branch Oceanographic Institution, Inc.

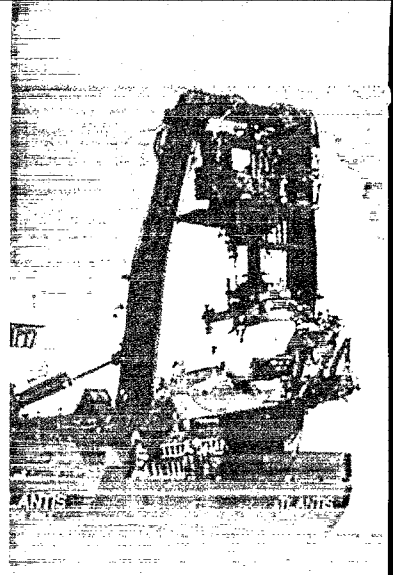
One exciting result has been the increased availability of formerly classified data sets and technology developed by the Defense Department and the intelligence agencies during the Cold War. Data sets processed through what we call the MEDEA [Measurements of Earth Data Environmental Analysis] Program, coupled with the possible availability of systems, such as the deep ocean acoustic arrays called SOSUS [Sound Surveillance System], can add tremendous value to our research endeavors if we make a serious commitment to their use for scientific purposes, while protecting legitimate national security information.

In fact, the discussion this morning focuses a great deal on the need for a variety of global ocean observing systems. It is my opinion that without these data from the Navy—not only from the U.S. Navy, but from the Russian Navy as well, particularly in the Arctic area—we cannot design an observational set of systems with the specificity that these data could bring to the table. Without this access to Navy data, we could at best be redundant, and at worst be grossly misguided and spend money unnecessarily.

You'll see a great pressure this year by our consortium to move aggressively in this area, to work with the Congress and with the White House and others to move expeditiously. I think one leader in this area has been the Vice President of the United States.

These major changes in our motivation for ocean science have taken place during an era when, since 1982, federal funding for basic ocean research has remained virtually constant, even as the total investment in basic research in the U.S. has doubled. As a result, ocean sciences now represent less than 4 percent of the total federal research budget—down from 7 percent 15 years ago. It appears that there was no conscious decision to reduce emphasis to this extent. Rather, it was just allowed to drift down without objection by responsible officials. So where do we go from here?

The 7 percent investment of 15 years ago gave us sufficient resources to generate the outstanding research products necessary to meet the nation's ocean science goals of that era. The decline of this level by one-half is simply not adequate to support new high-quality scientific research that's waiting in the wings, especially in light of the new broadening scope of applications for ocean research that you've heard outlined here today. Clearly, a stronger investment is needed for the broader set of challenges before us in the next millennium.



Many of the most exciting and high-potential research challenges have been identified in the new report by the Ocean Studies Board of the National Research Council, entitled *Opportunities in Ocean Sciences: Challenges on the Horizon*. It's an easy-to-read, very important document. I hope it will serve—from our most prestigious scientific entity, the National Academy of Sciences—as a baseline for setting the necessary priorities for advancing research in this area. These include improving the health and productivity of coastal oceans, sustaining ocean systems, predicting climate variations over the human lifetime, and modernizing ocean observational capability.

In preparation for these kinds of endeavors, the Congress and the administration have created and implemented a new National Oceanographic Partnership Program by law in 1996, which now provides a mechanism to undertake the complex multidisciplinary research that contributes to the missions of nine federal agencies with ocean responsibilities. The Partnership Program, coupled with the many new technologies and systems now available, gives us the means to address grand ocean science challenges and continue to deliver on our nation's investment.

This conference is a great opportunity to set the foundation for renewed attention to the oceans and an awareness that we must commit to an aggressive and proactive science and technology agenda. We know what we need to do. From academia to federal agencies to state laboratories to industry, we have the greatest scientific and technological capability on Earth to face any challenge. But we're mired in the status quo paradigm and a fear of stepping out that has relegated the oceans to the end of the soup line. It doesn't have to be this way. It shouldn't be this way. We need to commit a new paradigm of active partnership and engage the leadership at this conference for support.

Ursula M. Sexton

Ursula M. Sexton was named the National Science Teacher of the Year for 1998 by the National Science Teachers Association. She is based at the Green Valley Elementary School in Danville, California, and is a national leader in efforts to use ocean research and exploration to stimulate student interest in the sciences.

It is indeed an honor to represent educators among such distinguished panelists and guests. Thank you for the opportunity.

The eve of the new millennium and this forum give us an opportunity to reflect upon the crucial role educators play in our society. The young children we teach today will fulfill inventions and jobs that have yet to become reality in our own minds.

In the next decade, there will be a need for nearly two million new teachers for a growing nation. Our challenge as science educators, from kindergarten through college, is to be practitioners of facilitation and to have a working understanding of new technologies and their world applications. We need to work with the conceptual, in-depth, cohesive, up-to-date, developmental, and meaningful curriculum that utilizes the real world as its stage.

Our challenge for our society is to facilitate the involvement and understanding of the nature of science by a majority of our adult population. As children, we come already engaged and invigorated and involved, with innate curiosity about the world around us. Later on, when students ask what is, how something is, how it works, and why it is the way it is, they're exemplifying the simplicity of science.

In Einstein's view, the job as a scientist is nothing more than the systematic refinement of everyday thinking. However, within our approaches to curriculum and in our education history, we have affected the attitude toward science by allowing our society, including teachers, to think of science as a complex set of facts and formulas, an unattainable subject, or one reserved for a select few.

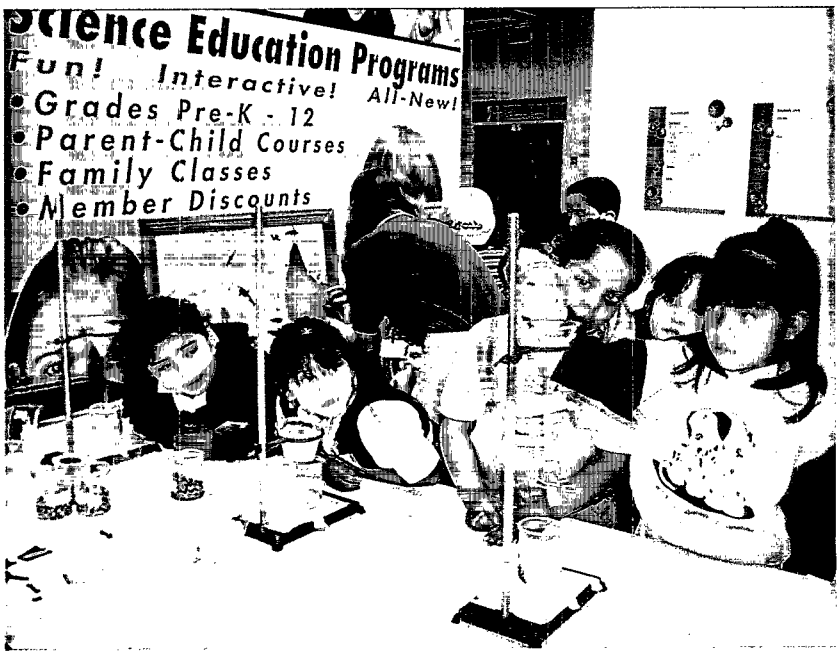
To embrace a new view of science and make it meaningful, we also need a scientifically literate teacher population who can understand the interdisciplinary nature of our oceans. Science needs to be the fourth "R" of instruction, with equal time, support, skill level, and accountability as the other subjects.

The national and state standards also need to include more marine education. The expertise, respect, and collaboration of educators, scientists, and the policy-making body that ultimately decides what our children should learn must be reflected in the yielding documents. In order to accomplish these goals, it's imperative that we focus on providing multiple professional development models and opportunities and to make them widely accessible to new and current teachers.

I urge you to consider the following ideas:

- Provide more access to real science applications for educators, students, and parents, using existing national and local human resources, facilities, technologies, and programs, such as the Virtual Canyon Project or Jason Project.
- Develop ongoing and permanent teacher–scientist partnerships, both on site and on line. Some of the greatest professional exchanges

I've encountered were while working with scientists in teaching and curriculum development cadres, visiting national laboratories, film projects, behind-the-scenes research and development institutions, and working on on-line access and having some support through the Internet. These opportunities need to be extended to elementary and middle school teachers who are building the foundation. Traditionally, they've only been available to high school teachers. During the 1998 National Science Teachers Association convention, Dr. Peña, the retiring Secretary of Energy, emphasized the need to start earlier than twelfth grade to do outreach and motivate students to enter the science field. Likewise, good role models and inspiration at an early age will carry them throughout their lives. The next decade of teachers will come from the population of students who are presently culminating the sixth through sixteenth grades.



Children are like a savings account: small amounts of money early on compound. The nation's future explorers, educators, and researchers are now at the K-through-12 level, where an interest in science is first developed.
Photo: California Science Center

- Recognize, support, and endorse professional development networks and effective systems reform at all levels. Teachers need to build leadership, science concepts, integration, pedagogy, and to have a positive attitude toward science and mathematics with a supportive network. Some exemplary ones are the California Systemic Initiatives, Urban Systemic Initiative, and the Bay Area Earth Science Institute.
- Support and provide service learning opportunities in marine school-to-work programs, innovating and involving communities and linking academics to real life, such as the Marine Advanced Technology Education, the San Francisco Estuary, and Adopt-a-Creek projects.
- We must also increase and motivate corporate sponsorship to supplement NSF, Eisenhower, and district funds for all teachers to participate in different models of professional development at national and state conferences, through case studies, and teacher action collaborative research.
- Ensure funding and resources for telecommunication technologies to exist as successful reproducible programs across the nation.
- Emphasize and maintain the need to provide inquiry-driven, meaningful hands-on education programs and curriculums that allow students to do the thinking, matched to assessment tools that adequately reflect students' understanding, bridging the gap between instructional practices and methods of assessment, such as the standard-based test developed by the California Systemic Initiative Assessment Collaborative, with over 50,000 students participating this spring in five states and Puerto Rico.

After all, our dearest hope is for all of our students to grow, to continue to be challenged, to question, and to find new paths in the vast space of possibilities to pursue their dreams, to harness each moment, and to put to use the best of their abilities for the benefit of humanity, the environment, knowledge, and life. Through our actions, we become examples. Together, we are building our future. Our children not only deserve—but need us to invest—the best of our abilities to facilitate their active part in the decision making and problem solving of today and of the future.

Through power and knowledge, insight and discovery, and wisdom and cooperation, the ocean can be the medium that reaches many of these goals. We all share our interdependence on the oceans, and we experience and appreciate its beauty, its vastness, its resources, and its diversity of life. It has relevance to our everyday lives and awakens the wonder in each one of us.

Comments from the Audience

Brian Baird

I'm Brian Baird, the ocean program manager for the state of California. I think we have an unprecedented opportunity here to talk to the Vice President and the President. I agree with what Dr. Earle said, and also Admiral Watkins, on the need for strategy. JFK [John Fitzgerald Kennedy] said we needed to put a man on the moon. I think we need to have a mantra, a strat-

egy. We need to put people on the bottom of Mariana's Trench, or elsewhere, so we can study these oceans.

I have two fundamental points that I'd like to put to the panel:

- I think we need to leave here today with a call to the President and the Vice President for development of a national research plan with a set percentage of the national research budget for the oceans. I think we need to have some kind of punch to come out of this conference.
- Also, you're hearing from all the other forums about the need for applied research for fisheries, for habitat management, for water quality, and for shoreline processes. Let's not forget, those of us who are on the ground trying to manage fisheries, manage water quality, manage ocean processes, and so forth need this kind of applied research so we can be out there and doing the real research.

We have panelists with a lot of academic expertise here. I want to be sure we don't lose that on-the-ground emphasis. I hope we see those two points emerge in the summary that goes to the Vice President this afternoon.

Admiral James D. Watkins

One of the things we don't do well in this country is to ask the users of scientific information to put demands on the researchers. It's one of the sad things, because we get into a Vannevar Bush mentality that was very good in the days when curiosity was what researchers were interested in addressing.

We have desperate human needs here that have to be met. If the communities across the country, the states, would levy demands on us—let's take just the El Niño event alone—to know things earlier and better on human health projections and coastal hazard mitigation, financiers for coastal development and insurers could make demands on us.

How heavy a pressure can you bring on your constituents in state and national governments to get going on a research strategy that builds us back up to where we ought to be—about a billion dollars a year instead of half a billion? In a $16 billion basic research budget for the federal government, we're at a half a billion for oceans. It's wrong. You have to put demands through the proper people to get these budgets back up over a five- to seven-year period. It can be done, and with the kinds of things going on in this nation today economically, there's no reason not to do it.

Let me flip it back to the users of science and technology to start levying demands on the researchers. "We need this information. Go get it faster and better." That way, the researchers will respond. They know how to do that.

We need help from the people on the ground, as you talked about, to put heavy pressure. Tell your representatives what you really have to know and why they have to work harder in Congress to get the monies.

Dr. Sylvia A. Earle

Just a quick comment to endorse the plea for getting people under water as well as all of our instruments. There's no substitute for being there. With all due respect to the great sensors and monitors that can do what we can't do, there's still a place for the human presence. I'm one of the lucky ducks who have had the fun of using the underwater equivalent of the space station, the *Aquarius,* and plan to go back again this summer.

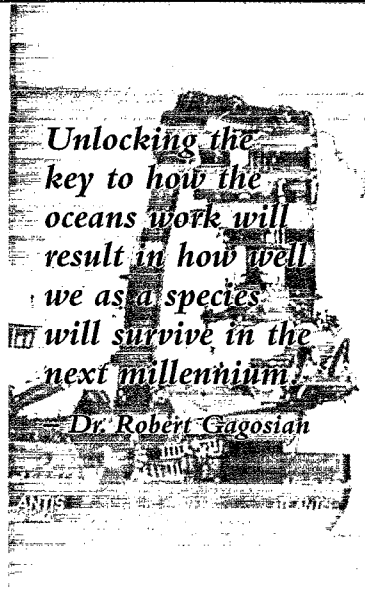
But who knows about *Aquarius*? It's only funded at the level of a million dollars a year out of a budget for the entire National Underwater Research Program, which embraces the unmanned as well as the manned technologies. It's a $12, $13, $14 million-a-year program. That's little "M," million dollars a year, for six regional laboratories. And it is really a part of the problem. It's also a real part of the solution. The new little subs that are on display at the Monterey Aquarium we'll be employing, I hope, in the next few years to help get us down to where the action is.

Fred McLaren

I'm Fred McLaren, president of The Explorers Club. The Cold War is over, and one of the things I think we're all going to have to be is more imaginative and entrepreneurial as far as using this past Cold War technology. There's a lot of interesting opportunities opening up, and I want to give you one example.

A year from August, Don Walsh, whom Sylvia mentioned, and I and several others are taking the Russian *Mir* submersibles on a nuclear ice breaker to the North Pole and diving into the North Pole in August. En route on the way back, we'll be looking for thermal vents on the Manson Cordillera. We're doing this commercially, with private funding, using former Cold War technology available from Russia and ourselves.

At the same time, we're losing assets from this Cold War dividend that concern me very much. We've mentioned *Sea Cliff* already. We're about to lose the last of the Sturgeon class nuclear attack



submarines, the only true Arctic submarine that can get in and operate anyplace in the Arctic, including shallow water. No submarine has ever been used in southern oceans to learn what we can there for global change research.

John Carlstroem

My name is John Carlstroem. I'm with Yosemite National Institutes. We're a private, nonprofit, residential, experiential, educational organization. We take students and adults into national parks. Two of our campuses are in national marine sanctuaries—one in the Golden Gate National Recreation Area in Marin Headlands, and the other one in Olympic National Park on the Peninsula.

I'm a big fan of Internet science. I was a fifth-grade science teacher for quite some time and used it a lot. But in my work, what I've come to realize, is that—as you said, Dr. Earle—there's no exception, there's nothing more exceptional, than being there. We've found that with students. I want to make sure that the idea that field work in marine science is as truly important as work within technology and using as many tools as we can to get students involved over multimedia ways is augmented by getting them outdoors and getting them down into tide pools.

There is no substitute for being in, on, or under the water. The importance of field work in marine science and of getting students and teachers outdoors cannot be underestimated.

I want to know how we can do that as more and more of our students are having a difficult time just being transported from wherever they live to an ocean environment. Because I think, for so many of us here, the way we got hooked is we went and we heard it and we saw it. I'd like to just pose that to the panel.

Ursula M. Sexton

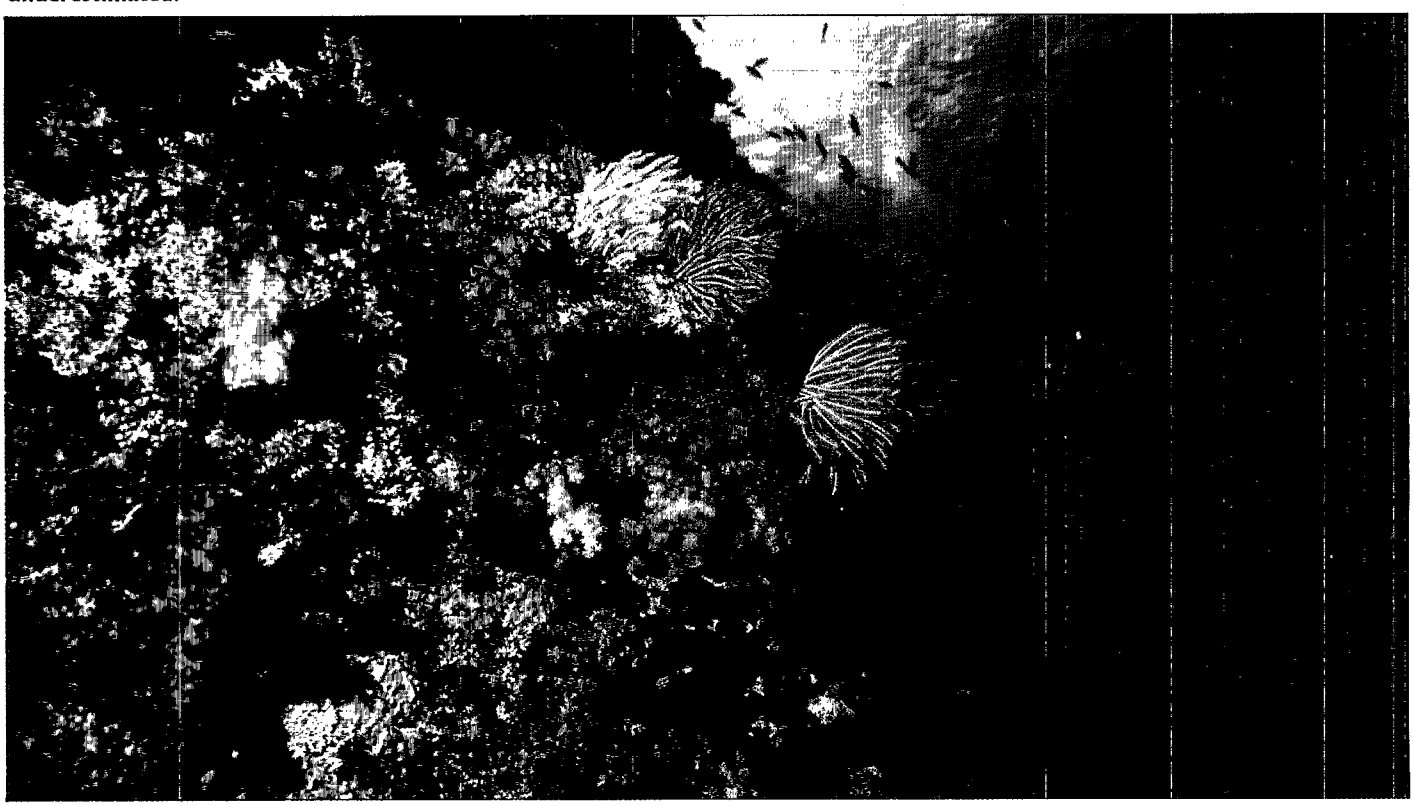
That's one of my pleas—to have perhaps corporate sponsorships to be able to go beyond the limited funding that's already available to be able to make it accessible for all students. Keep it up. Keep sending the monies.

Dr. Robert Gagosian

I think, clearly, one way that you've already mentioned is the Web. We're in the process of putting together a program where children can actually hear from the captains on the ships and then talk with the pilots in *Alvin* as to what they're seeing. There's been a lot of support for this. I think having children actually observe with the scientists themselves is going to have an enormous effect on the future.

Dr. Sylvia A. Earle

One picture is worth a thousand words, but one experience is worth a thousand pictures. This concept of going out and getting our feet wet



and taking a kid along—or taking 10 or 20—is one of the best things we can do to help turn things around about our attitude concerning not only the oceans, but all of nature.

Peter Green

I'm the mayor *pro tem* of the City of Huntington Beach in Southern California. We have nine miles of beach and two wetlands, and we're on the Santa Ana River floodplain.

I'd like to turn to Mr. Washington for a question. Last August, some of us visited your Web site, and we saw El Niño as a possibility. In our city, we appropriated emergency appropriations to clean up all of our flood-control channels, to buy sandbag-filling machines, and have volunteers bring in the sandbags to senior citizens. We bought emergency pumps for flood control. As a result, the property damage was minimal, and no lives were lost. We appreciate the knowledge that you disseminated.

However, during the fall of the year, we were ridiculed. They said "El No-Show," or El Niño has become "El Viejo"—the child has become the old man. But once it came along, we saw your Web site and took appropriate action.

I don't think there's enough communication between the people on the panel and the local elected officials, regarding very practical knowledge of what they need to do because of weather conditions. Can you help us with that?

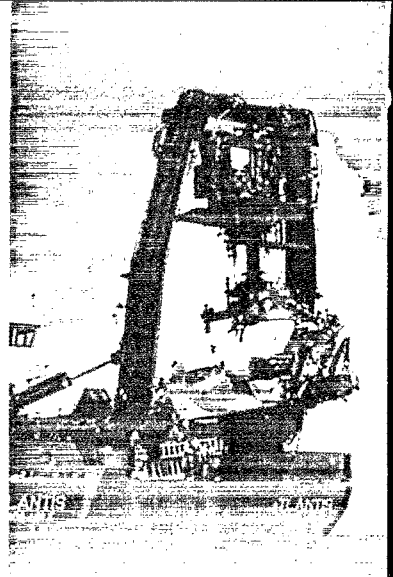
Dr. Warren M. Washington

You bring up a very important point, and I believe that the research community needs to be able to communicate better. There are a lot of very useful things that are coming out. For example, the capability of predicting El Niño and its impacts on various parts of the climate system.

In the area of climate prediction, however, there are limits. Even if we had perfect models, perfect data, they aren't going to be able to say it's going to start raining in Huntington Beach on a certain day. All that we're essentially capable of doing at this point is to give you better information so that you can plan better. But we probably won't be able to pinpoint exactly when some unusual sort of weather event will happen.

Susan Hansch

I'm deputy director of the California Coastal Commission, and I'm here today representing a very good partnership of the academic community in this area, the private industry. What we'd like to propose for you is Sea Camp Monterey Bay as a site for a national association for sea camps, residential camps. We have all the universities in this entire area. We're hoping to get Dr. Earle there the first summer of the year 2000. We have lots of information. It brings together all the themes that all of you were bringing up today: science, education, partnership, commerce, technology, training the scientists for tomorrow, training the teachers for tomorrow, and bringing families together so we have a multigenerational approach to science training.



Dr. Sylvia A. Earle

You're on.

Bonnie MacGregor

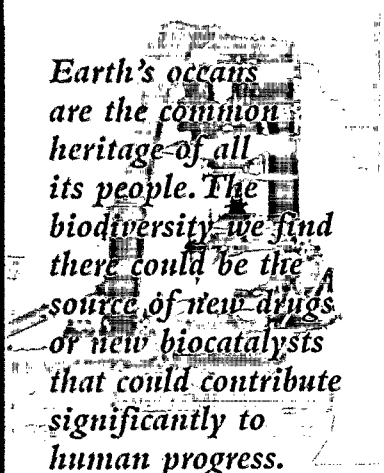
I'm Bonnie MacGregor. I'm with the U.S. Geological Survey, and I have two challenges for the panel.

We started off this morning with Katie McGinty's challenge to us about integrating science. I've always felt we, as oceanographers, have a true advantage, because we share the same field vehicles. We go out and we look at processes as geologists and as oceanographers—physical oceanographers or chemical oceanographers or biologists. I don't think we're utilizing that field vehicle of bringing our disciplines together. True integrated science is looking at the boundaries, the interfaces.

We heard about the interface of energy between the oceans and the atmosphere. There's an interface of the oceans with the ocean floor. We heard a little bit about the vents and what that means, but there's a whole record in the ocean floor. We talk about cholera and waterborne diseases. Those things are recorded in those ocean sediments. We can go back and look in estuaries for the past record of those sorts of events.

There are also the challenges we heard of the interface of the oceans and the land surface—whether it's nutrients for the dead zone, or whether it's El Niño or coastal erosion. All of those processes take place. It's not just doing global observing systems to look at parameters. It's looking at the processes that occur at that interface. That, I think, is the challenge for the ocean community. Let's bring the disciplines together, use them, and create really robust models of what's happening at the interface.

My second challenge goes back to the comment that the mayor made. As scientists, we're not using the socioeconomic capabilities of the research community. If we're going to communicate El Niño to users of our information, we



Earth's oceans are the common heritage of all its people. The biodiversity we find there could be the source of new drugs or new biocatalysts that could contribute significantly to human progress.

– W. Thomas Mitchell

have to understand how to communicate risk and how to communicate probability.

Ants Leetmaa from NOAA led us in trying to understand what El Niño meant to all of us as federal agencies, as state and local people. But when one communicates information, there's a probability factor. We're not real good at how you make the average person understand there's a 50 percent probability of an earthquake or an El Niño. What does that mean to me on the ground as a citizen?

Dr. Robert Gagosian

Let me address the first question. The issue of observatories is to actually go out and understand processes, and that's the whole point. Right now, the problem, as you know, is whether it's a seafloor observatory or observatories in the midwaters of the surface of the ocean or in the atmosphere, we end up going out and getting some data in one place at one time and sort of try to understand a process over time. And the influence horizontally and vertically is really not there. That's really what I was mentioning and pushing for with respect to observatories.

The second issue is a cultural issue in scientists' getting involved in this. It certainly has been with me. The 1970s and 1980s were pretty good. We had 10 percent increases every year, and we had to worry about how to spend the money. Then the wall came down, and we won the war, and everything changed. National security changed from just defense being the component to economic security, environmental security, and educational security as being partners in that. My sense is that we're just beginning to get into that, and that's really where the exciting opportunities lie.

Dr. Rita R. Colwell

I'd like to say that one of the very useful aspects of biological oceanographers has been that they save everything. We've been able to go back to the collections of plankton and the data from the '80s, the '90s, and the present, to be able to very excitingly put together the pattern of human diseases that are associated with climate events. The aspect of climate and health is turning out to be extraordinarily interesting.

I think, Bonnie, you've brought up some very important points—to maintain databases and to have them available. I'd like to make another point. The basic and applied research discussion has really become a little bit outmoded, because research findings are moving so quickly into application that it's very hard to discern what is applied and what is basic. I think we need to focus on research and focus on making the information available as soon as possible.

The Honorable Katie McGinty

Both of your points were really well taken, and I thank you for them. I want to start with the second, if I might.

To underscore and reinforce what you're saying, from a policy point of view, we depend so much on a crisp and clear-as-possible articulation of what the state of the science is and what we do and don't know. I appreciate that that is sometimes a challenge for scientists, because we in the political and policy realm look for perhaps clearer, more definitive statements than you're in a position to be able to make.

I think one success story in that regard has been on the issue of climate change—the coming together of the Intergovernmental Panel on Climate Change succinctly summarizing in very clear terms, "Here's what we know, here's what we don't know, and here are the things we don't quite understand yet." That clarity has been tremendously important to us.

On your first point, I wanted to turn to one of my panel members here, Dr. Colwell. When I was on the Hill, we would put together various hearings. We quickly moved away from the traditional hearing format because we came to realize that it was very artificial to have one presenter, one series of questions. So we moved instead to round-table discussions. One of the things that was most compelling in those discussions was that no matter what the scientific question we were pursuing, various disciplines had an angle and an insight on that issue. But those various disciplines almost never had been brought together around that same table for a discussion.

As we reflected on that, some of the scientists commented, "But the reward structure just isn't there for those who are in the business of synthesizing," or "The opportunity isn't there to take time from pushing the envelope in the frontier on your particular discipline to looking across the disciplines." I just wonder, as you're putting your NSF hat on, if maybe some reflection could be given to support for that kind of interdisciplinary work and those who want not necessarily to pursue one discipline, but maybe to synthesize the disciplines that are there.

Dr. Rita R. Colwell

The challenge, I think, is going to be to foster and nurture interfacial science, interdisciplinary science, but at the same time maintaining our

leadership and strength in the basic disciplines. I think this is going to be very critical in the years ahead.

There's no doubt that the excitement is coming between bioengineering, biology, and engineering; between oceanography, biology, atmospheric sciences, etc. That is where we have the capacity, because of the developments in computer science and information science, to bring those together and to share the data not only among the disciplines, but internationally. That's another point I'd like to emphasize—the need to make sure that we have international cooperation in these major global questions.

Ursula M. Sexton

I wholeheartedly agree with the need to disseminate the information, especially to make it trickle down to the teaching profession and in the classrooms as well. There has to be some kind of structure to be able to facilitate that. And I really encourage all scientists to get involved in the process of standards development, as well as curriculum development, because without your help it just doesn't get taught in the classroom.

I think that also for the dissemination aspect of it, maybe perhaps even our children will be the ambassadors of that by the use of telecommunications and having them use real-time data, as well and collect and exchange data across schools and build databases, such as Adopt-a-Creek projects in the Bay Area, and then, finally, merge to the San Francisco Estuary Project. Even in that model, the children would be able to emulate what the real scientists do in the real world. So there are possibilities there as well.

Admiral James D. Watkins

Bonnie MacGregor brought up one thing we haven't addressed directly, and that's how to communicate risk.

Let me give you an example. It deals with an illiterate society in science and math. The nation has a serious problem there. Unless we deal with it in the long range, we're never going to get there from here. We spilled 20,000 gallons of tritium-containing fluid at Savannah River in a reactor. It goes into the river, and the press says, "This is five times the EPA [Environmental Protection Agency] standard."

Well, what's the EPA standard? Well, it's 60,000 picocuries per liter. But who knows what a pico is? Who knows what a curie is? And who knows what a liter is? That wasn't even the standard. The standard was you had to consume two liters of that every day for 365 days a year to get a dose equivalent of one ski trip to Aspen. Now, that was the real risk. The risk to the politicians was tether your elephants, bamboo your huts, close out the oyster beds, and everything else.

With advanced warning, the negative consequences of natural disasters can be mitigated and their societal benefits maximized, making the U.S. economy more efficient and allowing for better management of marine resources.
Photo: NOAA

How do you communicate risk? For example, if we decide to put more money into one form of medical remediation, have we compared that with the need, say, for breast cancer research? No. So we don't even compare risks.

How do you communicate to the public? You start with the next generation and hopefully start today with science education, with preschool, K to 12. Teach fundamentals in what is going on in the life around us. But that's the long-range fix. I don't know how to communicate it in the near term.

Tony Fowler

I'm Tony Fowler, with the U.S. Department of Education. I'd like to thank Ms. Sexton for her presentation. But I'd like the rest of the panel to address the idea of the future scientist.

As you're well aware, there have been discussions on Capitol Hill about raising immigration levels so that we can, in essence, import scientists, because we're not producing enough scientists in this country. It's my personal belief that changes need to be made at the K-to-12 level, just like

Ms. Sexton has been saying. I think it would be important for the panel to discuss, for one thing, the demand for new scientists and what the future demand is going to be, and also the changes that need to be made in the curriculum in the K-to-12 level in order to produce the kind of scientists that are going to be needed to do the kind of work you're discussing here today.

Dr. Sylvia A. Earle

In response to this and also harking back to something that Admiral Watkins said, in terms of investing in the long term, when you think about it, the people who are going to be running things 30 years from now are kids. They're K through 12, or even younger. It's not such a long time to wait. We think of it as a long-term investment. But 30 years goes by pretty fast. We've really got to think in terms of 30 years being like a short-term, necessary commitment. We've got to do it now.

Dr. Rita R. Colwell

I think that graduate education that's focused entirely on replicating faculty needs to be really readdressed. We need scientists and engineers and technologists in all aspects of society, and there are many, many jobs that they will fill.

I'd also like to see us bring our graduate students closer to teaching in our K through 12 levels. It might be very nice to have a program whereby graduate students would get their education tuition covered and their stipend, but they would have an opportunity to do those 20 hours a week not in the undergraduate laboratories, but out in the school systems, working with the teachers. I think this kind of bringing together the tremendously exciting views of the graduate students who are doing their research with the students before they become "Joe Cool" about science would create a combustible mixture. We might be able to do something very exciting through these kinds of innovations.

Dr. Neal Lane

I very much agree with Rita's comments. I'd like to add that one of the problems we've had for a very long time and haven't made much progress with is that of making all this excitement that has drawn us into science available, known, and accessible to most people in this country. That has something to do—a very big thing to do—with our educational system.

The biology of the remote regions of the ocean, including these tube worms, may provide a new dimension to the story of life on the Earth and fresh clues to life on other planets.
Photo: Woods Hole Oceanographic Institution

We've been importing scientists for a very long time. Think what would have happened to our nation's research capability if we hadn't been attractive to so many bright young people from other parts of the world. They came here to study because we have the greatest system of higher education in the world. We must ensure that we continue to do so.

But why haven't we been able to attract in our own country more women, more people from minority communities—in fact, more Americans of all walks of life and from all different backgrounds? This isn't a new phenomenon. We, for decades, in a real way, have been unsuccessful in attracting from within our own country the best and the brightest—or, if you like, enough of the best and brightest of our own people—to work in science. The challenge is huge, and it relates to many of the things the panelists have already said.

We don't have much longer to address that, because, increasingly, these young people who were attracted to our shores to study science in America aren't coming or are going back once they finish their education. To the extent that those human resources were valuable to our enterprise—and I believe they were—we mustn't assume that they'll continue to be there. Besides that, we owe it to our own people to do a better job of including them in what is arguably the most exciting and rewarding professional career one can imagine.

Ursula M. Sexton

I think that one of the underlying problems or opportunities is the fact that there are several levels of intervention at which we need to work. When you actually get into the classroom or the schools and you see the different levels of comfort at which teachers are for teaching the different subject areas that they have, there have to be multiple ways of approaching them. There might be the one-on-one approach, or there might be a collaborative team approach. It can't be just one shoe fits all. Whatever outcome of whatever is decided needs to be grounded all the way down to the local level as well, so that it affects the teachers and they have a say in it. That way, they have a buy-in. Otherwise, it's not productive.

Dr. Robert Gagosian

I'd like to look at the other half of it—the first half being the pipeline, the second half being the money. I don't know many of my colleagues in research institutions in this country—or for that matter, undergraduate schools—who have had a problem with the applicant pool. The problem is the resources aren't there. There are plenty of extremely bright people who apply for graduate school and undergraduate school in this country who want to get into science. But the resources aren't there. Until we change that formula, we can excite all the kids we want, but they're not going to get to be scientists, because they're not going to be trained, because the resources aren't there.

Admiral James D. Watkins

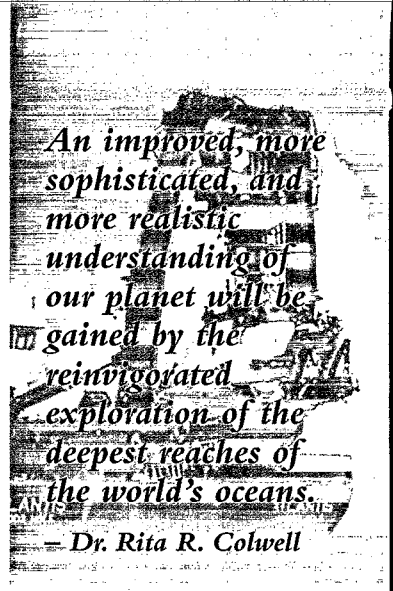
I want to follow up on what Rita Colwell said. We don't have a good relationship between researchers and the teachers. That needs to be changed.

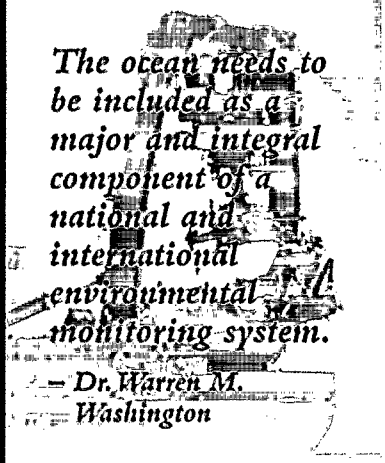
One of the ways to do that is to think of science education up front, along with, in this case, say, ocean-observing systems. If we make it an afterthought, we never get there. We've got to put education right up there on the front burner. It would go something like this. In the Year of the Ocean, there are several hundred drifter buoys that are being put out there that will drift along the Gulf Stream and in the equatorial latitudes, and so forth. The data aren't only good for researchers; they're wonderful in the classroom for kids to be able to plot currents, salinity, and temperature as it moves along. If we get into this observational system development, then in that process, because of the Internet and the Web, we can bring large data sets ashore. And from that, we can make available from various centers in this country data access for teachers at various levels. That can be done. We haven't done it in this country, and we need to do it.

There are ways to couple researchers and educators together through the researchers' systems themselves. There are many universities today that are working, say, in the Human Genome Project, up at the University of Washington, where kids are working alongside the scientists in gathering the voluminous data needed to work human genome. We need to keep pushing the researchers and the teachers together through the same instruments, but read out differently for different purposes. I think this needs to be part of our long-range goal to bring science education up in the country.

Dr. Sylvia A. Earle

I want to endorse this concept of engaging youngsters and everybody—to bring out the kid in all of us—in using these techniques of actively looking over the shoulder of people who are out in the field or instruments that are drifting around in the ocean.





I also want to put in a good word for aquariums as institutions that have not just the potential, but the reality, of communicating in ways that transcend textbooks. Aquariums are a halfway house for the ocean, in a way, both for the fish and for us.

There are other very creative ways to get at the education issue that we didn't have 50 or 20 or even 10 years ago. A new era is opening, and certainly this new kind of communication, such as the Jason Project takes advantage of, linking to some of the institutions that are represented here, is just one of the great tools that are now available.

Joe Clark

Joe Clark from Videodiscovery in Seattle. That's a company that makes multimedia products for science education. I've been in education for a long, long time, and I'm interested in this.

I wanted to extend, I hope, what Dr. Washington said about trying to teach the next generation about working in a multidisciplinary world. The suggestion is that we develop a national institute for integrated learning and research. I think that this could be really a marvelous thing, because teaching in a multidisciplinary way in high school or in the university is not done at this point at all.

You can get experts to collaborate on that sort of thing much easier at a university level than you can at the high school level. But it strikes me that an institute that was serious about implementation of the multidisciplinary approach of doing actual research on what works and what doesn't—so it's not just ad hoc in one location and not some kind of central depository for the experience—to collaborate that way would be a very, very useful thing. I also think that the oceanographers have an absolutely wonderful opportunity to take charge of this thing in this way.

I would suggest that the institute focus on a small thing—I don't consider oceanography small, but it's smaller than environmental sciences and space sciences—until we get it right, until we get some momentum going within the institute. And then expand it like a spiral, and start to work and think in a multidisciplinary way for a multidisciplinary world.

Peter Eisenberger

Peter Eisenberger from Lamont–Doherty Earth Observatory. I'd like to return to the comment that Admiral Watkins made earlier. You all should recognize that in this post–Cold War era, that a lot of groups like this have exciting opportunities. We're not alone. The problem is that there's a competition for a finite amount of resources, and in the post–Cold War era, one important component in getting claim of that resource besides the excitement of your work is the social value that you return to society for that investment.

Therefore, what Admiral Watkins was saying earlier, how do we close the gap that exists between what we all believe is the potential and the fact that at this conference there are only 3 percent representing the private sector, who are benefiting potentially from the ocean in many of these ways. I think it would be very useful if we could think of a process that would bring those communities together and accomplish what Admiral Watkins wanted to do—that is, to find a way to get the information transfer occurring so that they can in turn respond and say, "This is what we need. This is why it's important." Only then can you really compete with the many other exciting opportunities that exist, in their own communities finding ways that they can communicate to the Congress and others and the people why an investment in them is valuable.

I'd like to turn it into a question and not a speech. What is the process that this community could go through that would help define in concrete terms and involve the statement of who would benefit, so that we can have a very clear document that describes the value to society not by ourselves, but by the people who benefit from it?

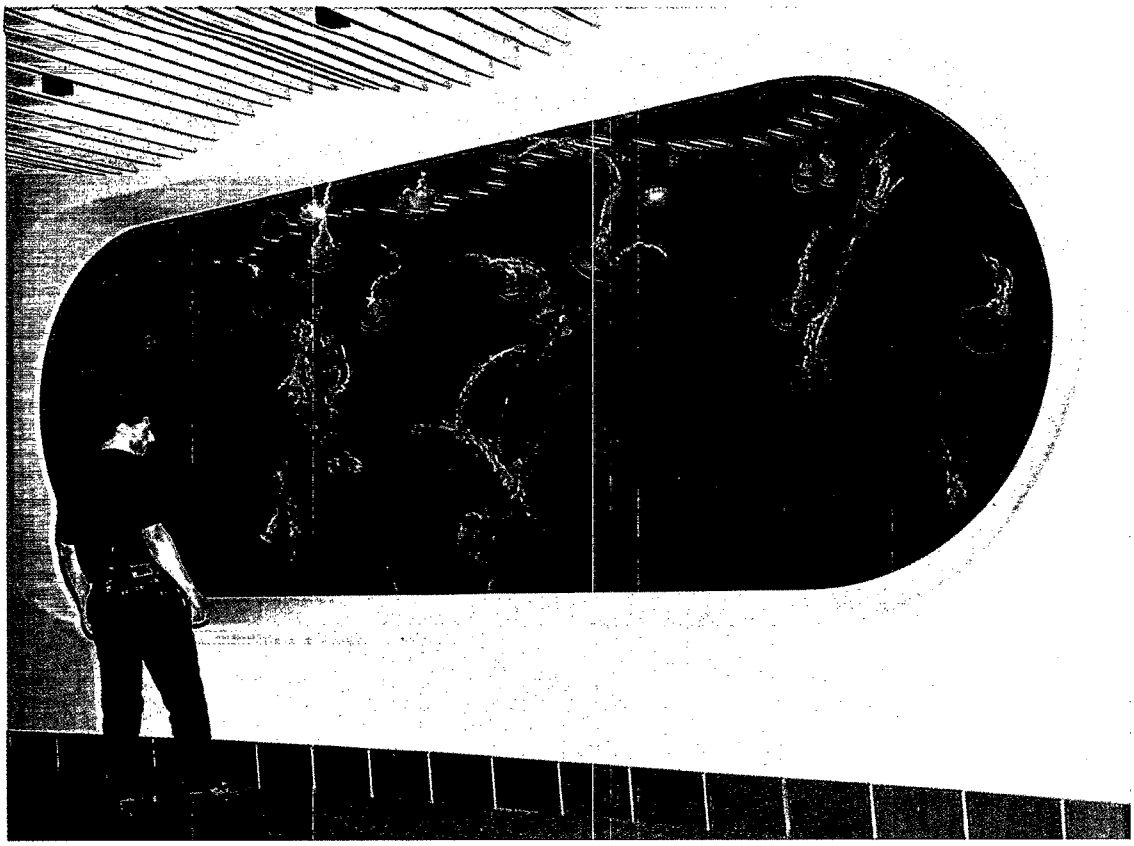
Admiral James D. Watkins

That's an incredible question. I think what I mentioned earlier was the need for some kind of a strategic document that we're going to follow here in this very complicated area of the oceans. We don't have such a document.

If you just take the Arctic alone, there are many people in this country who think that the Arctic is a continent. We talk about "polar." Because they're both cold, we say it's all the same. Well, of course, it's not the same.

The Arctic is an incredibly valuable resource for the world. It's the heart pump. The declassification of data coming out of the Russian and U.S. classification program under the Gore–Chernomyrdin agreement has been incredible. It's opened up our eyes as to what the gateway is as to the cold water going south and the belt of water coming back to the Arctic and how it drives the climate of the world. We know so little about it.

How do we get processes like that going at all levels that affect the entire world? One of the things we tried to do when we established the Partnership Act of 1996 and developed a council



***As institutions, aquaria* have not only the potential, but also the reality, of communicating in ways that transcend textbooks. Aquaria are a halfway house for the ocean, both for marine organisms and for humans.**
Photo: Ronald Bell, U.S. Department of Commerce

at the top levels of government was, for the first time, bring people together. Nine federal agencies who today go before 47 different committees of the Congress, and you want to have a cohesive ocean policy? It's impossible.

We have to change our way. That's why I talked about the paradigm change. It's necessary to set up a new process of doing business, not just in the ocean area, but in all areas of science, where you take broad cross-cutting areas, such as the ocean, the atmosphere, and so forth—health, for example, human health—and cut across the agencies that work these problems. Sometimes there are as many as 15 agencies. For example, in climate change there are huge numbers of people involved. States have to be involved when you get into estuarine and coastal areas.

We're trying to set up that process now for the first time. The nation doesn't have such a paradigm for integrating research and development information where we use common data. And so in the Partnership Program, for example, one of the elements that's been funded by the Congress is a virtual common data center. We don't want it in one place. We just want it coordinated—regional, national, international information where teachers and everybody can have access to the same modern, up-to-date data flowing in. It has to be peer-reviewed, quality-assured data, we know that, so that we can use the data properly.

The process, I think, is beginning to grow. But it needs an impulse from the output of this conference to say, "Let's get on with it and work together on this thing." In the design of the congressional bill, state governments are in there. NGOs [nongovernmental organizations] are in there. They're all stakeholders in the game, and we think we know how to pull that together eventually in a very complicated area that cuts across all lines in the country and affects our daily lives.

The process needs to be set up. It's not there today, and we won't get it until we all decide that we can work together. The researchers themselves have to be willing to support other disciplines and not run them down, which they do sometimes when they're fighting for the same research grant dollars. The researchers themselves have to come alive and say, "High-energy physics is okay, even though I'm an oceanographer." We have some major cultural changes to take place. The answer, Peter, to your question is extremely complicated. You're asking for a major cultural change to take place, and I think we have to push it from this conference.

The Honorable Katie McGinty

I wanted to come back to the element of your point also, which was about communicating in real-world, real-life terms what the benefits are of

some of the research that's being done. I have to say, being on the front lines and fighting for a lot of these budgets, it is essential and extraordinarily helpful when you've got the real-world example of what might sound to be quite abstract or quite difficult to get your arms around. I was just thinking, as Tom Mitchell was speaking, about going back and talking about the excitement we now have with "extremophiles." I, for one, will use the mayor's story over and over and over again, as just the kind of example we need to show the tremendous benefit that comes from the labor in the laboratory that many of you engage in. It's very, very helpful.

Dr. Neal Lane

That is a very important question, and certainly I'd like to identify myself with the excellent responses already given.

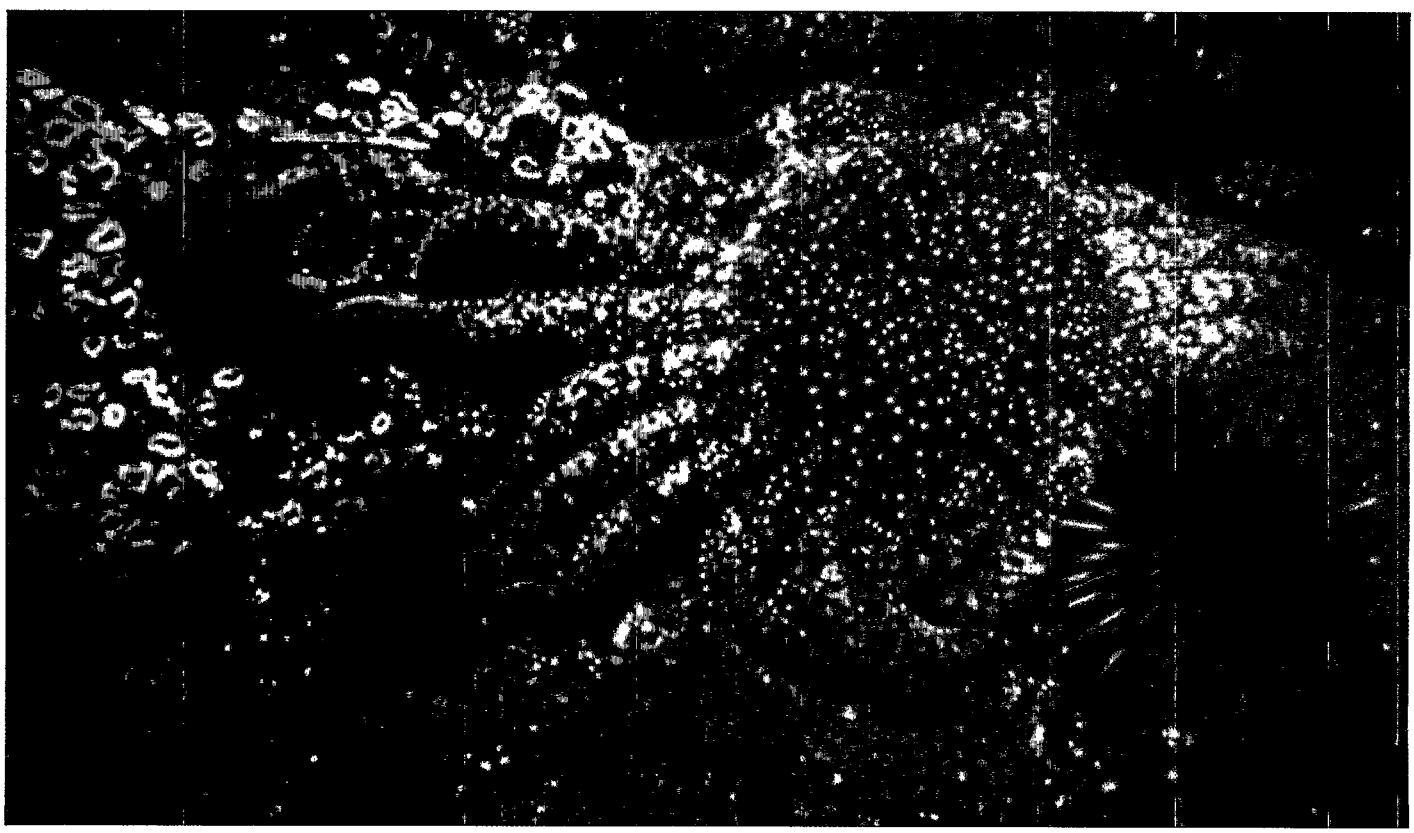
There are some real dangers in this. On the positive side, I'd like to suggest that we don't continue to think in terms of a pie and how we divide it up and who gets what—particularly commenting on Admiral Watkins' warning—because there's a tendency to hunker down when times are tough. I think, on the whole, during my experience in Washington, I've seen less of that from the community than I might have expected, given the times that we've been going through in terms of budgets. That has helped us, but it's still there.

I worry about two kinds of things in approaching this challenge that's been laid out to us. One is that there is no reason why, if the case is properly made, our investment—even in tight times—in research and development and in education cannot be larger than it is. The problem is, there is no simple way to explain to the public and the policymakers just how large it ought to be. What is it for? How does it benefit society?

In the ocean sciences we have one of the most terrific opportunities to make that very clear, through examples like we have just heard. One must think boldly—not in terms of we need more, we have to have more, we want to do more of the same so that we can then do more of something else. That's not the argument. The argument has to do with why this investment is so important to people's lives that we must make a larger investment. That's the kind of argument to make.

The second piece of this that always troubles me is when I become a part of a community trying to grapple with a complex science/technology issue like this one, there's a tendency to form a new thing. Government should form a new agency or something else. Please don't do that. Please think about all of what government is, the way our government works, and just come to grips with the fact that the agencies,

Estimates suggest that 25–50 percent of all species on earth live in the ocean, yet these vast resources are largely unexplored. Of the ocean's potential 15 million species, scientists have only described 250,000.



with all their missions, are going to have different approaches and different priorities. And help us see how to do a better job of coordinating all of that on behalf of addressing the challenges that you give us. I think if you can help us with that, then maybe we can do a better job inside government.

Dr. Rita R. Colwell

I'd like to be a little bit more pragmatic. I think all of the points that have been made are very, very important, but I'd like to get down to what the scientists can do right now.

I discovered by trying to bring together oceanographers, meteorologists, ecologists, physicians, clinicians, computer scientists, and microbiologists, they couldn't talk to each other. In their language, literally, the terms mean different things in different disciplines. Furthermore, it was really incredible to try to bring meteorological data, climatological data, oceanographic data, and epidemiological data together so that they could be interpreted—so that I could actually take hospital admissions and clinical cases and tie them to weather patterns and to the kinds of meteorological data that are available.

This comes back to Admiral Watkins' point. We've got to, among scientists and engineers, figure out a way of not putting all these data in one database, but making them accessible and interpretable so that we can utilize this tremendous information that we already have. Peter, that's a challenge for you that you might want to undertake.

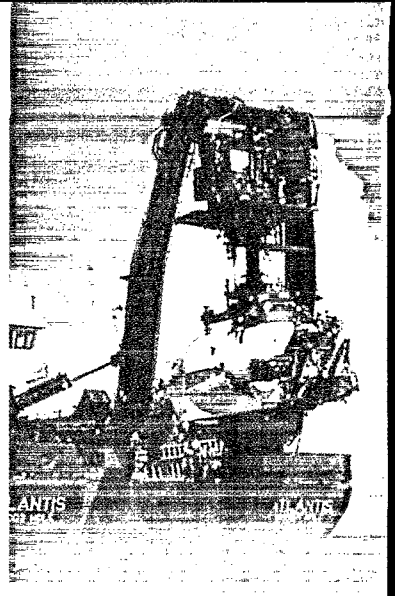
Dr. Robert Gagosian

Peter, I want to address the "Who cares?" part of your question. I'd like to break it down in two parts.

The education and the environmental part is sometimes very hard to quantify on a short-term basis, and I think that's part of the question that you're getting at. It's sort of like looking at your health insurance every year and saying, "Well, they just raised the coronary part by 30 percent. I wonder if I should take it next year." What we're talking about are priorities, and we're talking about probabilities.

On the economic side, being the second part, I think we can do a better job. There are some models out there that have shown how much money can be saved with respect to agriculture in planting in this country—when to plant and when to bring the crops in for a number of different parts of the country. For instance, the Southeast is somewhere around a quarter of a billion dollars a year. You can take the amount of investment that one put into the TOGA [Tropical Ocean-Global Atmosphere] TAO [Tropical Atmosphere Ocean] Array, and take a look at how much money the NSF and NOAA and the Navy have put into other sensor systems that have helped us put together the models for El Niño. Presumably, one can match those together. It turns out that you recover your investment in somewhere around five to ten years, and then every year thereafter, you're "making money."

I think that's an example of what we need to try to help do a better job of. I'm certainly not claiming to be an economist myself, but I think getting together with those other disciplines and bringing those other disciplines in to try to solve some of these problems is the way to go, to quantify it.



Dr. Warren M. Washington

I was just going to add that the establishment of the priorities is very difficult, as we all know.

The success story, I think, in terms of these issues dealing with the environment and climate change, is the U.S. Global Change Program. I think it's working. It struggles because each agency goes through various agencies. Each agency goes through different committees in Congress and, therefore, has lots of difficulty coordinating with other agencies.

I do think that we need to be careful of two aspects. One is that we have a program that is a certain amount of top-down as well as bottom-up, and that we have to try to find ways to maintain a reasonable balance, because we don't want everything to be in the Soviet Union style, where the big committees decide everything. The small science has given us tremendous breakthroughs, and we need to still encourage that. I think several of us who have served on the National Science Board have found that judging multidisciplinary, interdisciplinary research has always been extremely difficult. We have to do a better job of that in the future.

The Honorable Katie McGinty

I just wanted to go back again to the point about the real-world benefits. I was curious and actually wanted to ask Tom Mitchell, from an industry point of view, your own perspective in terms of how good—or not so good—government is doing right now in getting the breakthroughs we come up with in our research, in our science, in our laboratories out to the private sector so the private sector can turn them into real success stories.

W. Thomas Mitchell

I don't know exactly where the problem is, but I can tell you that it's not a very efficient process. In fact, speaking from a middle-sized company, we find that dealing with the federal government is more challenging than dealing with regular customers. The government is arbitrary, and there are as many agencies as there are customers in the U.S., so that's a difficult problem for us. For large companies, the Fortune 500, maybe that's not so much a problem, because they have large government relations departments to make that connect. For what I think is the key to America's success, which is the small- and medium-sized companies, we just have a hard time doing that. We wind up with one agency or two agencies, and we don't know the rest of them exist. It's just hard to figure that out.

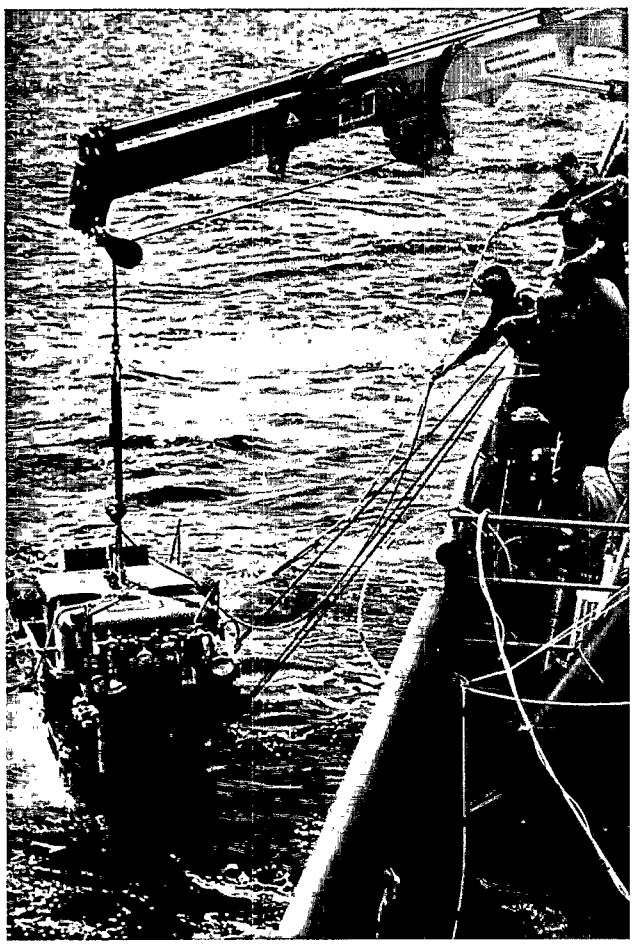
Kym Murphy

My name is Kym Murphy, and I'm with the Walt Disney Company, a small 501(c)(3). First, I'd like to compliment whoever put the panel together—especially having Ursula on it—because this is so refreshing coming at these problems from an educational perspective.

I sit on the Climate Change Subcommittee, and I listen to days and days of dialogue of scientists talking to industry. Public education is virtually just an afterthought, and children are never mentioned at all. Our company has tried to work with government agencies and create partnerships, and so forth, which we have.

One of the points I'd make is that children are like a savings account. Small amounts of money early on compound. And it really becomes startling what can occur when you take children seriously. I think that's maybe one of the most important things that we need to concentrate on.

Certainly science and technology are critical. Just to second Tom's comment, we have a program called the Environmentally Challenged, which is for fifth graders in Florida and California. It took two and a half years just to get the state agencies involved. I thought they all talked with one another and dealt with one another, but they didn't. They didn't even know each other in many instances. I think that's a problem for corporate America trying to get in there and be partners, just because the dialogue and the culture and the competition between agencies—state and federal—make it difficult. There are companies out there who are willing to help and to get involved creatively. So I think this is wonderful. It's entirely different from any of the meetings I've attended previously. So congratulations!



Expanded research and exploration of the oceans will bring better understanding of our planet and the intricate interweaving of biological diversity with climate, weather patterns, and, ultimately, human health. This photo shows the deployment of the remotely operated vehicle *Jason*, operated by Woods Hole Oceanographic Institution.

Photo: Robert Ballard, Woods Hole Oceanographic Institution

Ursula M. Sexton

If I might catch a little bit of your idea on investment and keeping track also of your accounts and thinking of teachers and the different levels of expertise or the investment that we need to make in them.

We can't quite afford to wait until the fourth graders who perform above average get to be the next teachers. We need to work with the ones who are presently working. We keep going at the idea of where is this gap, how do we build the scientists and explorers of the future. We need to work with the present population. Otherwise, we're just going to have the cumulative effect of scientific illiteracy passed on just because "I didn't feel comfortable enough to choose science."

What right do we have to take away that learning from our students? We need to work with the present population and make it cumulative. As I've said, sixth graders through sixteenth graders will be the next decade of teaching population. We need to work with them now—the current as well as the ones to come.

Kym Murphy

The kids and the grammar school teachers are the ones who recognize this more than most folks. When we get into a room like this and we talk tech talk, it's kind of overwhelming—especially for the CEO of a company—to try to get into all this new language. But children are the language learners. It doesn't intimidate them at all. They're also the adventurers. Their imaginations are just going a mile a minute. So they're not jaded and cynical and pessimistic—they're ready to go. There's this great resource, and we just sort of say, "Oh, isn't that sweet." We really need to go after it in a big way.

Ursula M. Sexton

We do need to capture the momentum.

W. Thomas Mitchell

I'd just like to make a comment, too, on the education. From the private industry standpoint, our view of our responsibility is changing—and changing rapidly. As a representative of the high-tech industry, we used to believe that our responsibility was to provide post-docs and fellowships and outreach programs to college-level people. But recently, and especially in our company, we've realized that you have to start at the K-through-12 level, because that's where you get the children interested. And there's nothing like your own children to convince you of that.

When we started to look around at our scientists and found out that a lot of their children didn't really know what science was all about, we got very active in the bring-your-child-to-work programs and also very active with our local high schools because, as Dr. Earle said, a picture's worth a thousand words. But an experience is worth a thousand pictures. Bringing them in to work and letting them work with you for a day or two gets kids excited, because there isn't anything more exciting than science, if you know what it's all about.

The Honorable Katie McGinty

I thought I'd just briefly be impolitic again and introduce our friends from Walt Disney to our friends up there who are looking for support for a new sea camp.

Jerry Tuft

I'm Jerry Tuft, CEO of Westlund & Tuft Technology. I think I represent the smallest of small companies. We're a two-man research operation, and we know a tremendous amount of American technology and investment comes from companies of this size.

We've developed some technology that stretches a lot of the benefits of scientific research, and we've been able to develop electric mechanical power, using dipole attraction forces out of the ocean, using the ocean temperature differential. If this comes to fruition, it could be replacement for all electricity in a nonpolluting way, because there's so much electricity available in the ocean.

As Mr. Mitchell said, we at this point, being our size, are looking for grants or help from the government. I've spent so much time filling out forms, trying to prove that I'll hire disabled veterans. I don't intend to hire anybody immediately. To get small companies that have the guts and the ideas some support to go ahead, we need to make the application process much simpler, easier, and probably take some risks. Admiral, you were in the Department of Energy. What's your feeling about how you can help a small, small business?

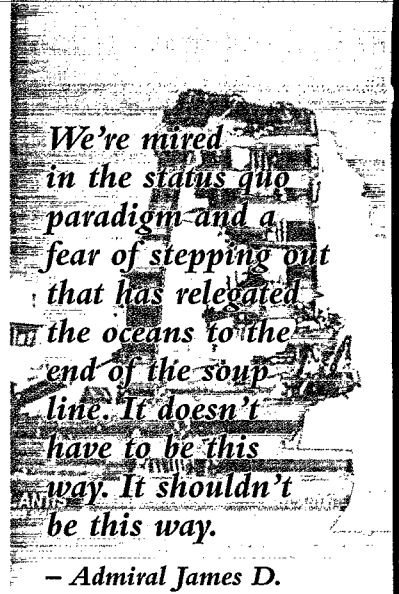
Admiral James D. Watkins

I probably should refer this to Neal Lane, who's in the business of responding to requests to unsolicited proposals for grants to do various kinds of work. I know it's tough and laborious to go through, but it's a process that we have to have in this country to compete.

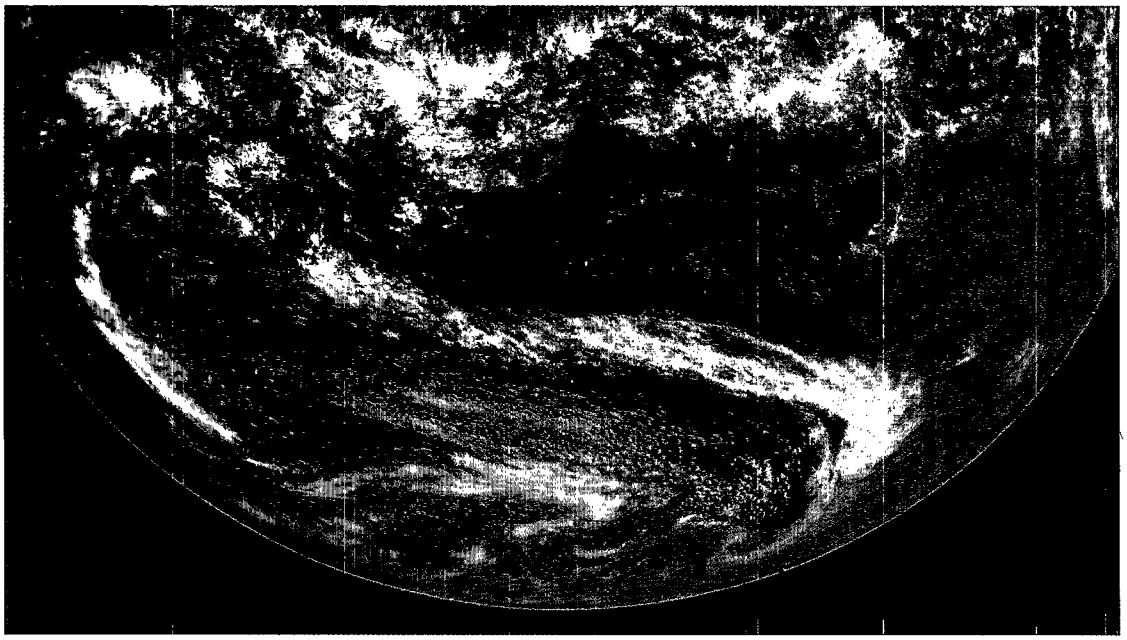
I know that 53 percent or more of what comes out of research comes from the small entrepreneurs in this country, and has for many, many years. When I was in the Department of Energy, what I tried to do was engage for the first time the small mom-and-pop drillers for gas in the southern part of the country, for the most part, and bring them into a world of help.

I do think that there are opportunities for the federal government to host seminars and to provide the kind of information you need where you can engage the small entrepreneur or researcher to do the wonderful work that's done in this country. I don't know what the opportunities are, but I don't think you should be discouraged by the fact that you have this difficulty in a small organization to compete in the large world of research. There are ways to help you.

We tried it in the Department of Energy to make sure that we were focusing on the little entrepreneur, because they were doing, frankly, most of the work. The big oil-and-gas people have gone overseas, because of the complexity of the environmental impact statements and the like.



– Admiral James D. Watkins



Satellites give us a unique global view of the sea surface, temperatures, wind speeds, biological productivity, and numerous other factors.
Photo: NOAA

This does expose the much larger base of small businesses. Maybe that's something that we need to take a special look at in the federal government. I certainly felt it was important in the Department of Energy.

Dr. Neal Lane

Let me mention a couple of programs, but I think they're programs you know about.

The Small Business Innovation Research Program is specifically aimed at small businesses, and all agencies that have extramural R&D programs participate. By Congress, it is mandated to be a certain percentage. I think it's now 2.5 percent of the total extramural R&D budget of the federal government.

A second program of several is the Advanced Technology Program, which the Department of Commerce runs. Increasingly, there is interest in focusing that also on smaller enterprises.

Applying for these programs is torturous. They use peer review. We've all suffered peer review. Nobody has come up with a better way—if we're talking about research funding—than peer review. It just takes time. It takes time for the person proposing the work, and it takes an enormous amount of time for the people evaluating it.

What we can do in the federal government is try to make our procedures more uniform. Get out of paper as quickly as we can and onto the Internet, so that we can try to reduce some of that overhead that small companies particularly can't afford to put money into. Our researchers and universities and laboratories also have serious overhead problems, sometimes caused by our own bureaucratic way of dealing with these things in Washington.

Co-chair Summaries

Dr. Neal Lane

This was an incredibly rich discussion. This is, without doubt, the most exciting time for all facets of learning about and exploring the ocean frontiers. Let me comment on three points—and I'll add a fourth because it's so important—that pull together some of the challenges and opportunities.

- First, we have more powerful means of gaining access to the oceans—and I define "access" very broadly in this context. Observation technologies are advancing virtually as we speak. Submersible robots give us the ability to explore the interior of the ocean and seafloor, and advanced human-occupied vehicles will also let us go where we've not gone before. Satellites give us the unique global view of the sea surface, temperatures, wind speeds, biological productivity, and numerous other factors.

  The advances in observational technologies are proceeding at pace with advances in information technology. Supercomputers give us the ability to develop robust and reliable models of complex ocean–atmosphere interactions and other physical and biological processes.

  Improvements in data storage and transfer systems have given us the means to develop and manipulate terabyte-sized databases. It's a big

challenge there. There are fundamental research questions in information science we've not cracked yet that will enable us to access enormous amounts of data coming in at an incredible rate in ways that are friendly to the researchers who need to get at them and to others who need to make use of the data for other means. The Internet and the World Wide Web have made these advances widely available to researchers and to students and classrooms at all educational levels. But we have a long way to go.

- This improved access leads directly to a second thematic thread that I'd like to mention. We're still exploring. We must continue to explore. But our explorations have taken on a new dimension. We're no longer restricted to exploring in the spatial sense—meaning going to new places and finding new things. That remains important, but we can now also embark on explorations that include the time dimension as well.

  Recent developments and discoveries show how dynamic the planet is. All aspects of the systems are under constant change on all kinds of time scales, and we have to understand those. Hydrothermal ecosystems get wiped out and then return in a matter of months. Other systems—from fish stocks to weather patterns to parasitic outbreaks—fluctuate wildly over seasons and sometimes years and decades for reasons we don't yet fully understand. All of this places priority on obtaining long-term observations that probe the temporal variations we see and a whole host of physical, biological, and chemical processes.

- A third theme that emerged from our discussion was that of partnerships. All of the advances and breakthroughs we've discussed emerged from cooperative arrangements of one form or another—interagency, intergovernmental, intersectoral, and so forth. Many of these include an international dimension. Increasingly so it has been emphasized, our international activities, collaborations, and agreements are going to be important in this field. Suffice it to say, these partnerships come in many shapes and sizes and are very important to our efforts.

- Finally, I want to add the fourth theme, and that's educating our children, as well as public outreach. We tended to focus on our children—children from all backgrounds, all parts of the country, all cultures. Ocean science is an extraordinary way to reach these curious and capable minds.

To recap, while it's impossible to capture all of the issues and opportunities we covered in just a few sentences here, these themes—access, exploring in time, partnerships, and education—resonated throughout much of our discussion. I've found in every forum like this I go to, education ends up taking a much larger fraction of the discussion time—appropriately so—than we might have thought walking into the room. It's clearly not only a major challenge, but a very important one for our country.

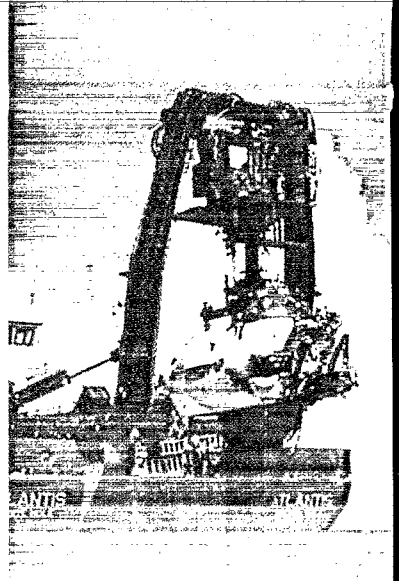
Though there's little doubt that exploration, education, and research—the general words that capture all of what we're about today here in this session in ocean sciences—will provide us and our children and our grandchildren with the economic benefits that result from sustainable fisheries and biotechnological developments, with security of a known and predictable environmental system, and improved education in all of the natural sciences at all levels and to all children in our society.

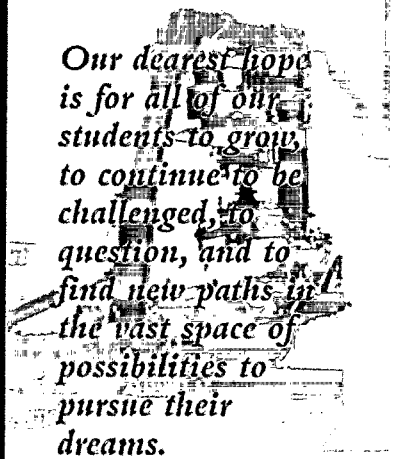
New technologies—particularly information technology I mentioned earlier—provide us with a mechanism to reach all children. But it has been emphasized here that there is no substitute for hands-on, being-there research experiences. It takes both approaches. They have to be viewed as complementary to one another. It should be clear to everyone that there's a very bright future for ocean sciences in the next decade.

The Honorable Katie McGinty

I'd just add two ideas. One is the as-applied benefits—the real-world kinds of fruits that we see from the research and the exploration that we have under way, and the investments we're making. Whether it's industrial and commercial in the biotechnology sector—or the other kinds of commercial applications we've talked about or could think about—or when it comes to preparing our communities, as the mayor spoke about. Real-world, real-time benefits, as applied benefits from the research and the exploration that's being done.

Second, something I've found quite refreshing and didn't necessarily expect coming into this discussion, is that I think it led all of us—no matter what institutional hat we wear—to do a little bit of introspection and to recognize that there are barriers we're part of putting up that have broken down communication, that haven't been very helpful to facilitating interaction among us as we've been able to have today. I've found that to be very healthy and interesting and, hopefully, something that can open the doors to even further and more productive dialogue in the days and years ahead.





Our dearest hope is for all of our students to grow, to continue to be challenged, to question, and to find new paths in the vast space of possibilities to pursue their dreams.

– Ursula M. Sexton

I just want to add my thanks to my co-host, to our facilitator, to our panelists, and especially to all of you. This has been a very rich and engaging discussion, and I'm tremendously appreciative of all of you.

Issue Forum Summary Report to the Vice President

(Presented during the Cross-Cutting Issues Plenary Session)

The Honorable Katie McGinty

We had a very engaged and engaging discussion. None of our panelists was shy about the ideas that they had to express, which were expressed forcefully and effectively. I have to say we started our discussion at a dangerous place, because we started by discussing what we acknowledged we don't know. You referred to it yourself. In fact, we know more about the dark side of the moon than we know about the blue part of our planet.

What we do know about the oceans, Mr. Vice President, includes some disturbing things. We know that our ocean resources face myriad and growing stresses. Again, you've referred to some: pollution, overharvesting, population growth, life as that population moves to our coastal communities, and now a new stress on the oceans in the form of climate change.

In this regard, all of our passionate panelists agreed that education plays simply an essential, vital role in all ocean issues in preparing us and, importantly, our children for informed policy-making and for life in a technologically advanced society. Ocean education is a wonderful asset to us because it provides an exciting means to engage our children in a truly inspiring way, and to draw them in to science, to technology, and to commitment to the stewardship of our planet. That was the first point.

Second is progress. We've had a recent success story. Our vastly improved ability to predict this year's El Niño allowed us to significantly reduce the loss of life and property that otherwise would have occurred. It's important to point to the successes because as we fight for tight budgets, etc., these things demonstrate the benefits we derive from our investment in ocean research.

Third is the excitement. Recent discoveries have revolutionized our understanding of the ocean, the seafloor, and marine life. We were told today that actually some brand-new forms of life have been discovered around thermal vents. Nonetheless, even with these recent discoveries, less than 5 percent of the ocean has been explored.

The fourth point is that to facilitate exploration, we need increased investment in technology, such as deep-diving submersibles, autonomous vehicles, and ocean observing systems. Now, priorities need to be established there, too. A global network of ocean and seafloor observation is a top priority. Inventorying our marine species, integrating the data that we do have and the prodigious modeling efforts that have been underway, and taking on the challenge of climate change and ocean-related human health issues as a better way of understanding the human impact on coastal environments and marine resources are also priorities. There are some new and promising technologies. Biotechnology offers us an opportunity to use our marine resources but in a much more sustainable way.

Finally, and most important to all who spoke today, partnerships—in the face of the prodigious challenges that we look to here—are absolutely essential. In all of this, there's an emphasis on international partnerships, as well as a new thrust to try to break down previous institutional walls—so that the disciplines can speak among themselves, so that our advanced researchers can speak to our youngest researchers, and so that we in government can speak to those in the private sector, in the academic community, and in the nongovernmental sector. Partnerships between government, industry, academia, the military as an important player in all of this, and everyone with unique capabilities and resources to bring to the table are essential in enriching the dialogue and in fueling the effort that must proceed from here.

The effort all would like to see is the development of an integrated and comprehensive national ocean strategy and agenda. Thank you very much.

Questions from the Vice President

(Presented during the Cross-Cutting Issues Plenary Session)

Vice President Al Gore

It sounds like your forum was very, very productive. I'd like to ask a couple of questions of other members of the panel briefly before we go on to the next forum. Since you're covering exploration, education, and research, I'd like to ask the science teacher on your panel a question. Ursula Sexton is a science teacher with Green Valley Elementary School. You motivate children every single day to study science. How can we use interest in the oceans in a way that excites young people in this country to spend more time learning about science?

As more and more people move to coastal communities, our ocean resources face myriad and growing stresses. Ocean education plays an essential, vital role in preparing us and our children for informed policymaking and for life in a technologically advanced society.

Ursula Sexton

We need more teachers who are well prepared to be able to excite and bring that wonder and maintain it. We need to take into consideration that lifelong learning is a journey for all.

Part of the answer to this question hopefully resides with each of us here today in the form of one of those teachers who made a difference in our lives, the Mrs. Southerlands who taught us how to read, those who simply encouraged us to justify responses, or the professor who changed our career path.

To do so, we need to instill the wonder and understand that the focus of science is: "I think, I wonder, I understand." We need to capitalize on that to bring a new view of science to our society.

We also need to approach our goals in science education with equal access for all and realize that not all the children will become scientists or researchers, but they will be part of a scientifically literate citizenry capable of leading and collaborating, making informed decisions about the ocean, about the environment, and about their lives—and, in turn, inspiring the next generation.

Vice President Al Gore

Thank you and thanks for what you do every day as a great, great science teacher.

Let me ask a question of Thomas Mitchell, who is President and CEO of Genencor International. Mr. Mitchell, you represent the industrial biotechnology sector, which screens nature for useful compounds and microorganisms, for example, that are found in the ocean that can be commercially valuable enzymes, proteins, and the like. I understand that you were discussing the commercial and industrial applications found in and around those deep-sea geothermal vents that Katie McGinty was referring to earlier. What are the challenges facing your ability to access those vents, and how can the government and universities work in partnership with industry in meeting those challenges?

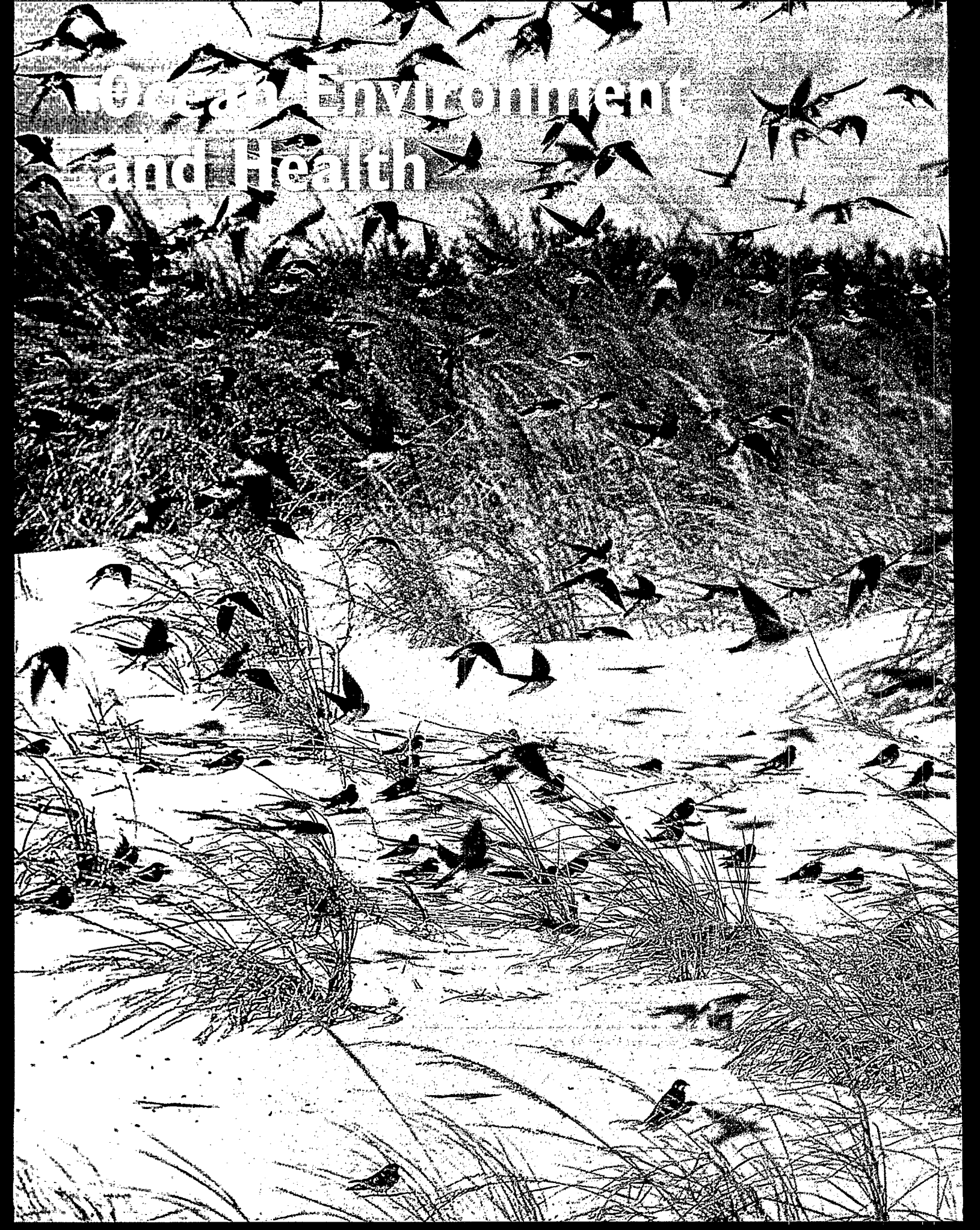
W. Thomas Mitchell

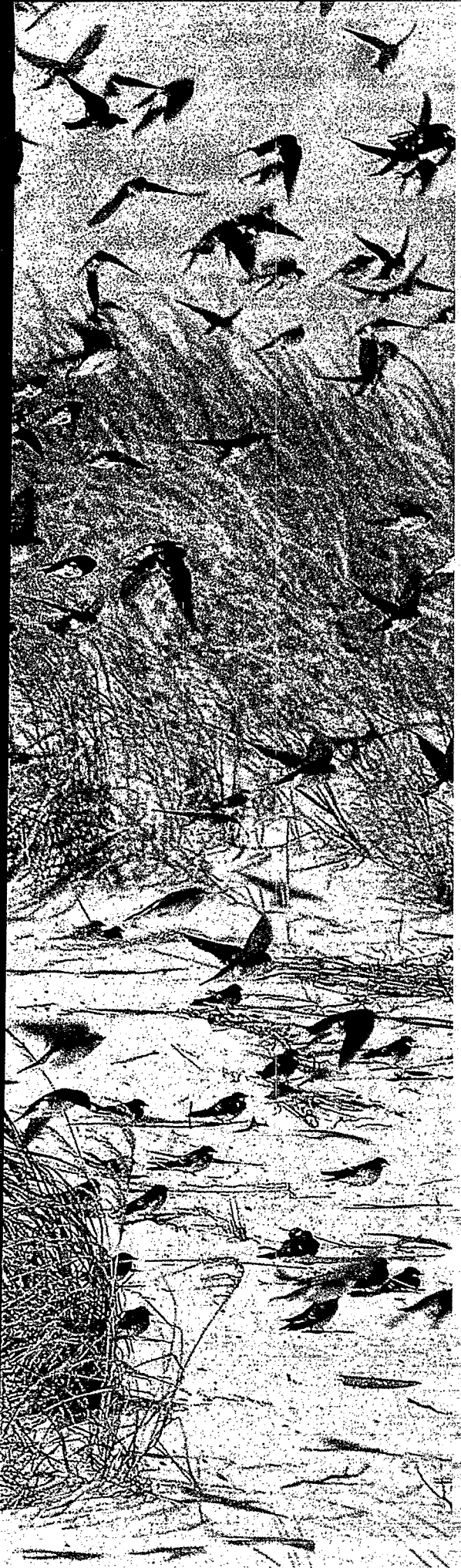
Well, Mr. Vice President, the challenge is one of complexity—just the number of places in the world and in the oceans where one can find the kind of biodiversity that would yield the new microorganisms to give us the new opportunities. I think the key thing for us is to forge cooperation and partnerships among industry, government, and academia, not only to share resources but to share data, because the information that we gather might be of more interest to government or academia or vice versa. It's not only a sharing of the costs and the logistics of making that kind of an exploration, but also the data.

Vice President Al Gore

Okay. Very good.

Korean Environment and Health





We must balance the economic growth that comes from our seas with the protection and preservation of the fragile and unique ecosystems that thrive in them.

PANEL CO-CHAIRS

THE HONORABLE BRUCE BABBITT
Secretary, U.S. Department of the Interior

FRED HANSEN
Deputy Administrator, U.S. Environmental Protection Agency

PANELISTS

CAPTAIN BILL AMARU
Commercial Fisherman
Member, New England Fishery Management Council

DR. DANIEL BADEN
Director, NIEHS Marine and Freshwater Biomedical Sciences Center
Professor of Marine Biology and Fisheries, University of Miami

BILLY D. CAUSEY
Superintendent, Florida Keys National Marine Sanctuary

SARAH CHASIS
Senior Attorney, Natural Resources Defense Council

ALLEN GARCIA
Farmer Director, Center for Sustainable Agriculture

DR. JANE LUBCHENCO
Wayne and Gladys Valley Professor of Marine Biology
Distinguished Professor of Zoology, Oregon State University

LARRY MERCULIEFF
Coordinator, Bering Sea Coalition

THE HONORABLE LEON PANETTA
Former Director, Office of Management and Budget
Former Congressman
Former Chief of Staff, President William Jefferson Clinton
Consultant

FACILITATOR

DEBRA NUDELMAN

PHOTO: S.C. DELANEY, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ocean Environment and Health

Panel Co-chair Introductory Remarks

The Honorable Bruce Babbitt

Secretary of the Interior

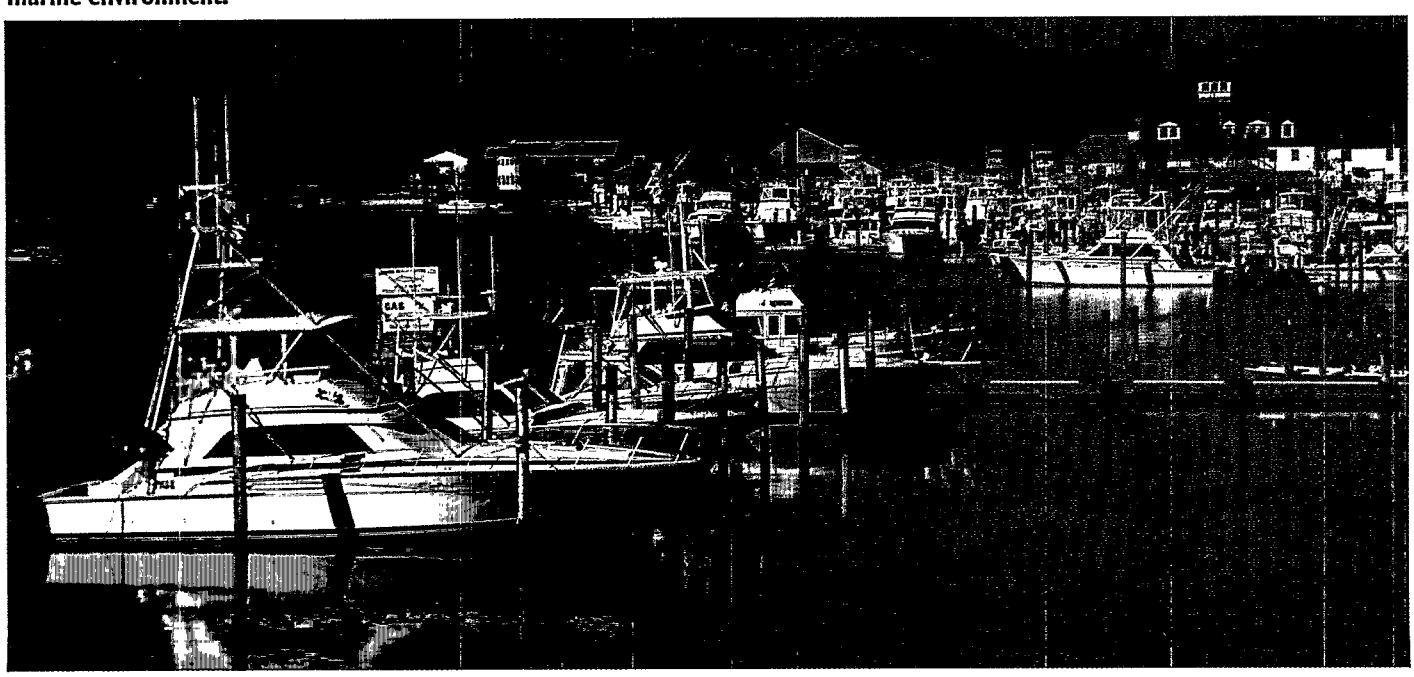
Good morning. I suspect I reflect the feelings of many of you here today that we are at the threshold of an historic opportunity. President Clinton and Vice President Gore—together with Sam Farr, the Navy, and the Commerce Department—have brought us together and are providing an opportunity to begin to write a new chapter in the history of marine resources and conservation on our planet.

I think we all understand, and the world increasingly understands, that the ocean commons is now being pressed to its limits. It's a difficult concept because for centuries, cultures around this world have viewed the ocean as a commons without limit, available for use without restraint. Worldwide, we now see the warning flags of collapse and decline of this resource.

We've been through this before, and I would offer just a brief analogy. In the 19th century, as we moved west in this country, we viewed the great western lands beyond the Mississippi—the American land commons—as a limitless resource. We moved west and began to utilize the terrestrial commons with an attitude very similar to the perception of oceans today. That is, that we can move out across this land; it will yield its bounty without limit; it will sustain any level of abuse.

Beginning in the late 19th century we began to see limits. And for the last century, we have been struggling to build institutions to manage the terrestrial commons. Frankly, we've not done a very adequate job, because we've always been behind the curve, putting together piecemeal responses to specific crises, and evolving a jumbled set of institutions that lack overall coherence. It seems to me our challenge is to learn from this century of history with the terrestrial commons and, at the beginning of our effort in a serious, sustained way with the ocean commons, to say this time we can do better. This time we can anticipate. We can understand the urgent need for comprehensive, broad, imaginative solutions; intensive use of science; recognition of those limits; and the need for a comprehensive plan for management. That is our task, because we today are present at the beginning—present, if you will, at something that we can look back upon and say it began there.

In 1995, the U.S. fishing industry added more than $20 billion to the economy, and coastal tourism generated more than $54 billion. One out of every six jobs is linked in some fashion to our oceans—in tourism, fishing, shipping, research, and other sectors. These revenues and jobs depend on a healthy marine environment.



Fred Hansen

Deputy Administrator
U.S. Environmental Protection Agency

Welcome. Our purpose here today is to be able to hear from a very distinguished group of panelists. And although their charge may well be to be brilliant, let me assure you that they are, in their own right, brilliant. What we're looking for is to be able to hear not only from the panel as a way to stimulate discussion, but to be able to then hear from all of you about what we should be recommending to the Vice President and the President in terms of the what this group thinks we need to do more of, differently, or fundamentally continuing on the course.

We've made great strides in addressing environmental issues. Yet we've found that over 40 percent of the coastal waters and estuaries that are surveyed don't meet water quality standards. And over the last decade, almost 19,000 of our beaches have been closed because of health advisories. This is simply not acceptable.

Scientists, by and large, have linked excess phosphorus and nitrogen to last summer's outbreak of *Pfiesteria,* a toxic microorganism that killed fish in Maryland, Virginia, and North Carolina. We've noticed that these outbreaks, needless to say, are occurring more and more. We cannot, as a nation, afford this.

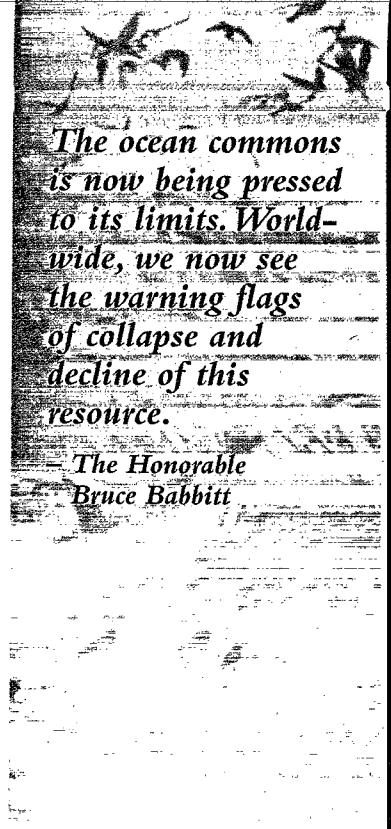
In 1995, the U.S. fishing industry added more than $20 billion to the economy, and coastal tourism generated more than $54 billion. One out of every six jobs is linked in some fashion to our oceans—in tourism, fishing, shipping, research, and other sectors.

President Clinton is taking action to clean up the nation's waters. In February, he and the Vice President announced the Clean Water Action Plan, our national blueprint to be able to deal with environmental issues. It has over 100 specific actions that we need to take, and we're certainly hoping that today and through tomorrow we'll come up with new actions—additional actions—that we must take.

The President and Vice President have also put their money where their mouths are. They have committed over $2.3 billion over five years to be able to address these issues. Unfortunately, as the President is moving this effort forward, the Congress isn't stepping up to the mark. The Senate Appropriations Committee just earlier this week cut funding for our administration's efforts to clean up the country's waters, as well as address the nation's most urgent other public health and environmental challenges. This action by the Congress sends the wrong message to the American people. It tells them that the American government isn't behind public health and environmental protections. This is not the time to let down our guard.

This administration—the Clinton Administration—is committed to protecting all of our ecosystems, and we must take steps to be able to move that forward. We have moved in a number of important ways to be able to identify better science so that we can, in fact, test our ocean waters and more quickly tell the American public whether the water is safe for their contact, their children's contact. In addition, we have put in over $85 million into our national estuary program and have made great progress in being able to address those high national priority estuaries. Everywhere—from the Florida Keys, San Francisco Bay, the Everglades, the Chesapeake, and the Gulf of Mexico—more needs to be done.

It is with great pleasure that we will hear from each of the panelists.



The ocean commons is now being pressed to its limits. Worldwide, we now see the warning flags of collapse and decline of this resource.

– The Honorable Bruce Babbitt

Panelists' Statements

Sarah Chasis

Sarah Chasis is an attorney with the Natural Resources Defense Council. Throughout her career, she has been committed to reversing the declines in fisheries and arresting coastal habitat degradation. She has also been a very strong supporter of the public's right to know about beach water safety and fish contamination. It's through her pressure on the Environmental Protection Agency [EPA] and others that additional steps are being taken to provide community "right-to-know" provisions. Her expertise ranges from fisheries and coastal management to the Coastal Zone Management Act and others.

Good morning. It's wonderful to see so many familiar faces in the audience of people who have worked on these issues with me for 20 and more years.

There are a number of important steps that have been taken in recent years to protect the ocean environment and public health. These include:

- passage of the Sustainable Fisheries Act;
- U.S. ratification of the Straddling and Highly Migratory Fish Stocks Agreement;
- the Clean Water Action Plan;
- moratoria that have existed on offshore drilling off sensitive areas;
- the recent International Whaling Commission expansion of whale conservation measures to address habitat degradation and pollution;
- the interim final rule on essential fish habitat; and

A network of marine and estuarine reserves, such as Elkhorn Slough National Estuarine Research Reserve shown here, established in every region of the country could protect the diversity of ocean wildlife and habitats unique to North America and serve as testing grounds for new sustainable management techniques.
Photo: Ronald Bell, U.S. Department of Commerce

- the administration's decision to appeal the World Trade Organization panel decision against the U.S. embargo on shrimp imports from countries that do not require the use of turtle excluder devices.

These steps represent progress, but a great deal more needs to be done. Laws need to be implemented, treaties need to be applied, rules need to be promulgated, and funds need to be appropriated.

There are three areas to which we must direct our attention as priorities: water quality, marine fisheries, and ocean habitat. People should be able to enjoy a swim at the beach or a day fishing without worrying about whether the ocean water they swim in is contaminated or the fish they catch is contaminated. Yet in 1996, there were thousands of beach closings and fish advisories because of pollution. Harvest is limited in over 30 percent of our nation's shellfish beds, and toxic algal blooms, such as *Pfiesteria,* are increasing along our coasts. There is a dead zone in the Gulf of Mexico the size of New Jersey. The picture is not pretty.

The primary pollutants of concern are disease-causing bacteria, viruses, and other pathogens in poorly treated or untreated sewage and polluted stormwater; toxic organic chemicals, metals, and persistent pesticides in air and water emissions and in contaminated bottom sediments; fertilizers, manure, and other nutrients in agricultural runoff; and air emissions. We need to clean up these sources of pollution and in the meantime ensure that swimming waters and fish are carefully monitored and the public warned when there are pollution problems.

To accomplish these goals, we urge the following:

- speedy implementation and full funding for the President's Clean Water Action Plan;
- water-quality criteria for the nutrients nitrogen and phosphorus—a necessary step in curbing the increasing problem of nutrient enrichment of coastal and ocean waters;
- sediment-quality criteria—a necessary step in protecting the food chain from contamination;
- national health standards for beach water quality and fish safety and for state monitoring and public notification programs;
- strengthening of the Clean Water Act to provide enforceable tools to deal with polluted runoff from agriculture and other activities; and
- adoption of a strong global treaty to restrict and phase out the use of toxic chemicals, such as DDT [Dichlorophenyl trichloroethane].

Sixty to 70 percent of the world's marine fisheries are classified as either fully fished or overfished. To reverse this decline in global fisheries, the U.S. needs to press other fishing nations to ratify and regional fishing organizations to implement the U.N. Agreement on Straddling and Highly Migratory Fish Stocks. In addition, steps need to be taken to reduce the size of the world's fishing fleet.

For U.S. waters, we need prompt and effective implementation of the Magnuson–Stevens Fishery Conservation and Management Act. Recent problems have arisen with implementation of the overfishing and bycatch requirements

of this act. These problems need to be satisfactorily addressed if marine fish populations that are depleted—such as red snapper, swordfish, black sea bass, and the many other species that are overfished—are to be rebuilt.

Healthy ecosystems are the foundation of the benefits we receive from the ocean's living resources. Yet the U.S. protects less than 1 percent of the total marine waters under its jurisdiction. To remedy this situation, we urge the following:

- First, a network of marine reserves should be established in every region of the United States. These areas should be set aside as testing grounds for new sustainable management techniques and as refuges where the diversity of ocean wildlife and habitats unique to North America can be protected.
- Second, the essential fish habitat provisions of the Magnuson–Stevens Act must be faithfully implemented. Current pressure to weaken or delay implementation must be resisted by the administration and by Congress.
- Third, measures must be taken to protect whales from noise, salt projects, and ship strikes.
- Finally, the Oil Pollution Act must be fully implemented, and permanent protection should be given moratoria areas around the country from oil drilling in order to protect ocean habitats from oil spills and our coastal zones.

The agenda is ambitious, but the resources and the people depending on them demand no less. Thank you.

Dr. Daniel Baden

Dr. Daniel Baden is a professor of marine biology and fisheries at the University of Miami and Director of the National Institute of Environmental Health Sciences' Marine and Freshwater Biomedical Sciences Center. His expertise is marine toxicology.

Thank you. Human health and human disease result from three interactive elements: environmental factors, individual susceptibility, and age. I direct one of five marine and freshwater biomedical sciences centers that are sponsored by the National Institute of Environmental Health Sciences [NIEHS]. The mission of our center and of NIEHS is to reduce the burden of human illness and dysfunction from environmental causes by understanding each of these elements and how they interrelate.

All living creatures are affected by foreign substances from their environment in similar ways. Studies utilizing animal systems provide essential information for both animal and human episodes of intoxication. Human environmental health studies provide information relevant to animal environmental health.

The ocean environment affects humans through several routes of exposure and from many sources, both man-made and natural. Of the natural environmental contaminants that are health risks, harmful algal blooms are the most prominent. The toxic materials produced by harmful algae are environmental chemicals—toxins that interfere with human and animal metabolism, nerve conduction, and central nervous system processing of information. The highly toxic materials produced by harmful algal blooms are present in our seafood, in water. And some types can become airborne in sea spray.

Harmful algal blooms are responsible for five different types of seafood poisoning, some which can be lethal. North America experiences all five types of seafood poisoning known. It has been estimated that over half of all seafood intoxication is the result of harmful algal bloom toxins.

- Paralytic shellfish poisoning occurs from Alaska to Mexico and from Prince Edward Island to Massachusetts.
- Neurotoxic shellfish poisoning is a hazard in all coastal regions of the Gulf of Mexico and, at times, on the Atlantic Coast as far northward as the Carolinas.
- Amnesic shellfish poisoning causes human illness from Washington State to southern California and on Prince Edward Island.
- Diarrheic shellfish poisoning has been documented in Nova Scotia and may be an emerging syndrome in the United States.
- Ciguatera fish poisoning is the most common type of seafood poisoning and occurs in virtually all tropical reef regions.

This is not the time to let down our guard. Everywhere—from the Florida Keys, San Francisco Bay, the Everglades, the Chesapeake, and the Gulf of Mexico—more needs to be done.

—Fred Hansen

Natural toxins in seafood, water, and air affect human and animal life alike. Sentinel species like marine mammals, fish, and birds provide initial indicators of declining environmental conditions.

Photo: Florida Department of Natural Resources

Healthy ecosystems are the foundation of the benefits we receive from the ocean's living resources. Yet the U.S. protects less than 1 percent of the total marine waters under its jurisdiction.

– Sarah Chasis

Airborne harmful algal blooms can produce illness when inhaled. Respiratory distress encountered during red tides in the Gulf of Mexico is well documented as far back as 1844, and the mental confusion experienced by people exposed to *Pfiesteria* blooms is an environmental phenomenon we are only now recognizing. Both types of hazard are poorly understood from a toxicology point of view, and there is very little quantitative information on how much toxin it takes to intoxicate, how long the toxic symptoms last, and whether there are long-lasting residual effects from either single or multiple exposures.

The detailed mechanism of toxicity is known for only one of the harmful algal bloom toxins. This information is essential for development of any therapeutic strategies. Thus, although we know that harmful algal blooms produce chemicals of high toxicity, we need more information on exactly how they work at the cellular and molecular levels. Success in this area will lead to diagnostics for people who become ill, development of potential therapies, and early warning systems for prevention and monitoring purposes.

The work undertaken to define the human toxicology of harmful algal blooms—in addition to its value to public health in general—provides synergistic support to other agencies and departments of the federal government concerned with animal health. Tests to detect Florida red tide and ciguatera, developed for emergency room use, were used to identify red tide brevitoxin as the reason for manatee deaths in 1996. The cause of gannet and other seabird deaths in 1995 was linked to paralytic shellfish poison, using techniques developed to study human nerve function. One lethal agent in the current sea lion epizootic in Monterey Bay has been identified as amnesic shellfish poison using tests developed for molecular brain research.

Animal model work funded by NIH [National Institutes of Health] has provided answers to how toxins are accumulated and the effects these toxins have on nerves and metabolism. Clues to potential antidotes, therapies, and treatments result from this knowledge. Current work in this area of oceans and human health should continue to focus on developing specific tests for each hazard, on deciphering their lethal mechanism of action, and on developing science-based strategies for prevention of human illness.

In conclusion, it has become increasingly evident that natural toxins in seafood, water, and air impact human and animal life alike. Sentinel species like marine mammals, fish, and birds provide initial indicators of declining environmental conditions. Mechanisms of disease in animals and man share common elements. In the biosphere, man is but one of the sentinels of environmental health. Thank you.

Larry Merculieff

Larry Merculieff is an Aleut native from Alaska and Coordinator of the Bering Sea Coalition. He is and has been an activist intent on preventing a collapse of the Bering Sea ecosystem and the world's largest commercial fisheries. He promotes holistic senses of how to deal with these problems and has extensive experience as a community leader in both private and public sectors.

Thank you. *[Speaking in Aleut.]* In the Aleut language, "the morning tastes good." That's a different perspective.

Mr. Secretary, I'd like to thank you and your staff who have been largely responsible for my being here and the attention being called to the area where I come from, which is the Bering Sea.

In aboriginal cultures, it's understood that ecosystems are chaotic, complex, organic, in a constant state of flux and filled with diversity—although such cultures would not choose to use or do not use that terminology. It's our understanding that no one part of an ecosystem can be considered more important than any other part, because the whole is greater than the sum of its parts, and the parts act synergistically to make up the whole.

Cartesian-based environmental science and research systems are centered around the paradigm that studying the parts will lead to understanding—or enough understanding—of the whole to guide critical environmental restoration and protection decisions. The science can generally be characterized as linear, mechanistic, reductionist, and numerically based.

Given the serious and daunting environmental problems and challenges that we face, it behooves us, I believe, to understand our limitations in order to construct better solutions. And Cartesian-based science does have its limitations, like any other system. Singular ways of thinking and singular ways of viewing the world can be significant limitations in addressing environmental issues if such ways and views are the only source we use to find solutions.

Our wisdom keepers teach that there are many truths, and every person's truth is as equally valid as every other person's truth. This wisdom has direct application to this singular way of thinking and viewing the world. We, in fact, do see things differently. That's the beauty of the human being. Allowing this kind of diversity, I believe, is the cornerstone of America's strength and ingenuity.

Consider how much more different the perspectives can be with indigenous cultures whose

characteristics are circular, organic, holistic, qualitative in their ways of knowing—which, by the way, is also generally the way that women view the world. I maintain that a global monoculture may not be wise if we're seeking better solutions to environmental problems.

Our people have identified 16 higher trophic species in a state of severe and sustained decline in both the Russian and the U.S. sides of the Bering Sea. The magnitude of these declines now threatens to fundamentally restructure the Bering Sea as we know it. It threatens the viability of the cultures that depend on it—very similar to what's happening to South American rainforest cultures.

However, in all the adversity, I believe there is an opportunity. The Bering Sea people have had a symbiotic relationship with the Bering Sea for at least 500 generations. They have traditional knowledge and wisdom passed down to each new generation. As such, I know we can provide different but critical insights to understanding the causes and providing the solutions to the significant wildlife population declines and to understanding marine ecosystems in general.

For example, wildlife biologists, as a different perspective, study energetics as part of the food web. But they don't analyze with these energetics the food budgets required by the wildlife that's out there. We do make allocations in budgets for fisheries, but we don't make similar allocations or calculations for the wildlife that's out there.

I also believe we have a globally unique opportunity in the Bering Sea to develop precedent-setting partnerships to explore these ideas. And it may fundamentally and positively change the way we conduct our marine science and our understanding of the human being's role in the environment. Thank you.

Billy D. Causey

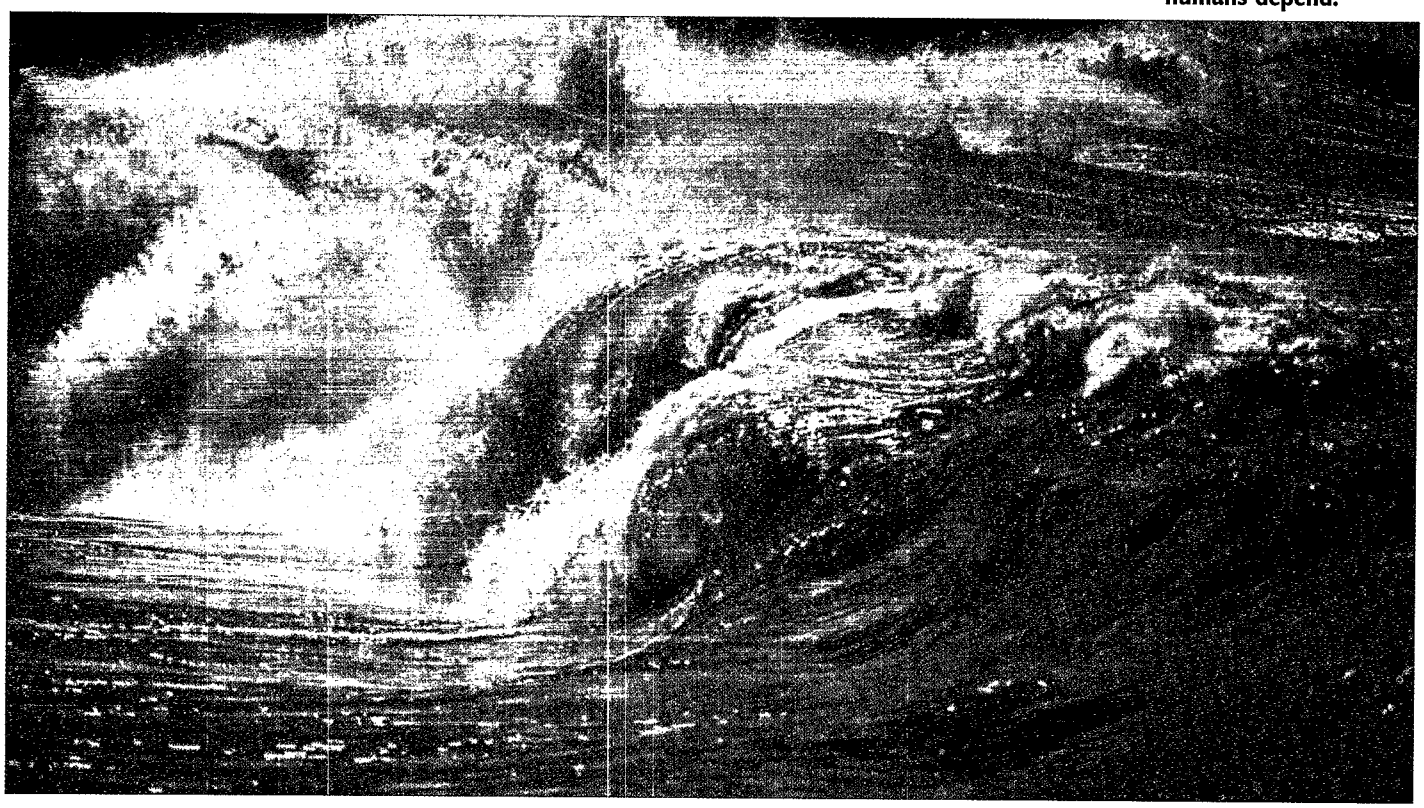
Billy D. Causey is the Superintendent of the Florida Keys National Marine Sanctuary. He has first-hand knowledge of and expertise in issues affecting marine protected areas, including the link between a healthy environment and a healthy economy and the balance between use and conservation.

Good morning. Every day scientists and resource managers are documenting the decline in the health of the ocean. As a result of this decline, the economies that are dependent upon a healthy ocean environment are being affected on local, regional, and global scales.

The health of the ocean environment is economically important to the United States.

- One of every six jobs in the U.S. is related to the ocean. Coastal and marine waters support 28.3 million jobs in the U.S.
- In 1995, the U.S. commercial fishing industry generated $20 billion, the recreational fishing industry generated $30 billion, and coastal tourism generated $54 billion.

Human activities are inadvertently changing the chemistry, physical structure, and biological composition of the oceans, resulting in degraded ecosystems that cannot continue to supply the goods and services on which humans depend.



Mechanisms of disease in animals and man share common elements. In the biosphere, man is but one of the sentinels of environmental health.

– Dr. Daniel Baden

- U.S. coastal areas are the destination for 180 million visitors yearly. For example, in the Florida Keys National Marine Sanctuary, we get two and a half million visitors every year who spend 13.3 visitor days and $1.2 billion in the area. Coastal tourism and recreation are the largest and fastest-growing economic segments of the U.S. service industry, and beaches are the leading destination in the country.

Now we're witnessing a decline in the health of our ocean by way of polluted waters; collapsing fisheries; loss of critical coastal and marine habitats; harmful algal blooms; fish, bird, and marine mammal die-offs; hazardous stormwater runoff; introduction of exotic marine species; and continued ocean dumping. Among our mistakes has been to treat our oceans as an infinite resource. Our success in addressing these declines in the ocean depends partly on our collective recognition that the ocean is finite. We must apply the concept of sustainability and recognize that the environment and the economy are linked.

The ocean, and its associated coastal and marine environments, are resilient and can rebound to a healthy state through good management, improved water quality, and habitat protection and conservation. In order to be successful, we must apply an ecosystem management approach and recognize that the spatial extent of a functional ecosystem includes all the watershed and drainage system from its source to the ocean. We must implement the principles of ecosystem management through an integrated process that brings all the stakeholders and affected parties to the table. We need to manage the ecosystem in a seamless way and eliminate barriers to establishing ecosystem function.

For example, in 1993, Secretary Babbitt initiated the South Florida Ecosystem Restoration Task Force, which today has federal, state, local, and tribal representatives working together to restore and sustain the Everglades and the South Florida ecosystem. In addition, Governor [Lawton] Chiles [of Florida] has formed the Governor's Commission for a Sustainable South Florida, which has 47 members including federal, state, local, and tribal representatives, along with a wide variety of stakeholders in South Florida. These two efforts serve as models for ecosystem management and provide an excellent forum for integrated management and policy development.

We must explore new ways to manage our oceans and turn to innovative, effective methods of ocean governance that will lead to better integrated ocean policy development. One suggestion is to consider regional ocean committees. We must start utilizing the principles of adaptive management and make the best management decisions possible based on the best science available.

Another key to success is through the support of integrated coastal zone management programs and setting aside critical estuaries and marine areas for special management, such as the National Estuarine Research Reserve Program, the National Marine Sanctuary Program, or EPA's National Estuary Program. For example, in the United States, the U.S. has a system of 12 national marine sanctuaries that have been set aside as treasured places protected for future generations. These areas protect some of this nation's most important marine resources. Through education, research and monitoring, enforcement, and marine zoning, these areas serve as models for marine protected-area management. Marine sanctuaries provide the place and opportunities for interagency partnerships to focus on major problems. An example is the EPA, which has taken a leadership role in Florida to address water-quality problems within the sanctuary.

In the area of improving fisheries, we have to depart from traditional means of fisheries management. A first step has been initiated with the passage of the Sustainable Fisheries Act of 1996 and NOAA's [National Oceanic and Atmospheric Administration's] implementation of the Essential Fish Habitat Program. A major step is through the use of marine reserves, or "no-take areas," where marine life is fully protected in critical marine environments. This strategy has been implemented in the Florida Keys National Marine Sanctuary. The sanctuary has set aside no-take areas where the natural coral reef populations can reestablish themselves to what they were before man intervened.

Reaching sustainability for our natural environment will require a balance between protection and use, erring on the side of conservation. The ocean is a common resource and we must all be concerned about its survival. Thank you.

Captain Bill Amaru

Captain Bill Amaru is a New England commercial fisherman and a member of the New England Fishery Management Council. He is a lifelong fisherman from perhaps one of the nation's best-remembered fishery resources and one that has experienced decline in very dramatic ways.

Thank you very much. I called my five-minute presentation "An Issue for the Ages in Five Minutes or Less."

Secretary Babbitt, Administrators Browner and Hansen, fellow panelists, and guests and friends, in a time when environmentalists, farmers and

fishermen rarely have the opportunity to discuss relevant conservation issues and their oftentimes surprisingly similar goals, it is with genuine gratitude I speak to you today. The opportunity and challenge of working toward sustainable harvest of our seas, protecting their habitats and learning to live beside it will, indeed, be rewarding. I thank my government for embracing the remarkable value of the oceans that surround us, and I sincerely hope this conference will result in a national movement to learn more about our marine environment, to involve far more people, and to use it wisely for many, many years to come.

I know you realize and appreciate that folk and fish, like F. Scott Fitzgerald almost said, are different from you and me. Fitzgerald was talking about the rich being different from the rest of us, but if he had written that about people who fish for a living, he would have really hit on something.

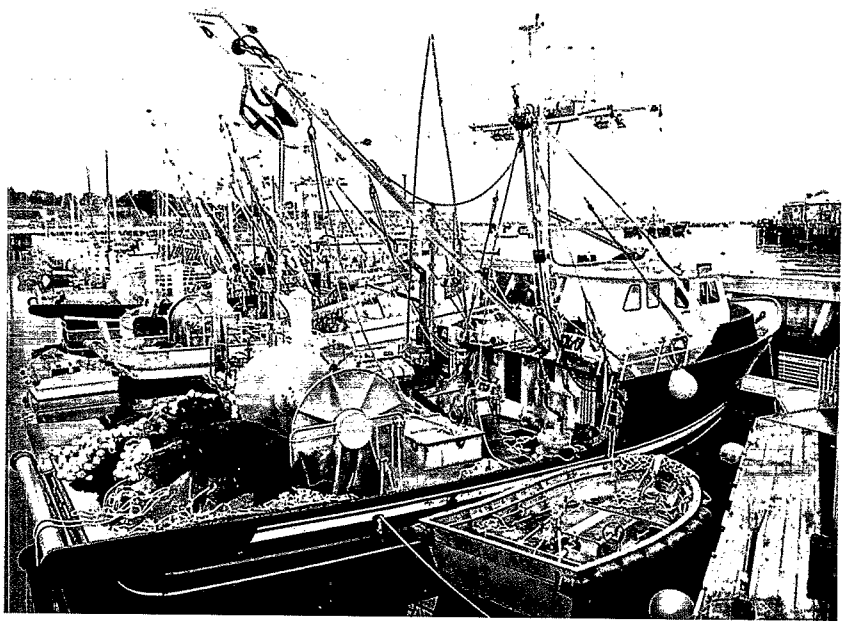
I'm a little reluctant to get too serious in a place as beautiful as Monterey, but I have to say this sooner or later. Commercial fishing people have taken a real beating in recent years. We've taken the rap for overfishing, stock depletions, and, most recently, habitat degradation. I'm not going to lecture about unsustainable fishing practices. We still have plenty of them going on, and I hope we can talk about how to eliminate them during this conference. In the final analysis, people who fish for a living are no different from you or me. We have dreams of success, children to educate, schedules to meet, and pride in what we do.

The present generation—myself included—came along at the same time a revolution in harvesting techniques was developing and, along with it, an awareness of what some of us already knew: fish is great food, and catching it in the late 20th century can be very, very profitable. Not slowly, not gradually, so that resource planning could take place. But rapidly, growth spurred by demand and good old American entrepreneurship drove our lifestyle-rich industry into an unprecedented growth spiral. I'm sorry it happened the way it did, but it did happen.

Everyone in this room, I believe, knows or should know that that spiral is over. Today, more and more commercial fishing interests are becoming aware of the need to balance between the exploitation of the resource they depend on and the resource itself. We're rising to the challenge, looking for ways to become more involved in setting a course for our futures.

Toward that end, I'm proud to be a member of the New England Fishery Management Council. I'm more proud to say that because of strong new initiatives enacted through the Sustainable Fisheries Act, we're seeing the end of overfishing and the rebuilding of virtually all commercially exploited stocks. In New England where I live and work, we're experiencing the best fishing in a decade and a strong reversal of stock declines unprecedented in the late 20th century.

I want to thank Congress and those who work to strengthen the Sustainable Fisheries Act. Your goals, the nation's goals, are being met. More than that, I want to thank the real fishermen and real fisherwomen and their families who have sacrificed, who have attended meetings, who have given up half of their traditional days at sea and substantial portions of their fishing grounds, who improved their ways of fishing to save immature fish, who have developed alternative markets, and who have waited for people like me, managers like myself, to make the hard decisions that are resulting in better fishing. Your patience and willingness to hold on is admirable, and we'll not let you down.



Today, more and more commercial fishing interests are becoming aware of the need for balance between the exploitation and preservation of the resource on which they depend.

Photo: Ronald Bell, U.S. Department of Commerce

At the very start of my talk I mentioned the surprisingly similar goals environmentalists and fishermen have. I'm going to end by saying again, we all depend—real fishing people and real environmentalists—on a healthy, sustainably managed resource. We have far more in common than is commonly written or discussed. Please, let's work together for our common good so all Americans who together own the national marine resource and benefit from that resource will do so with a sense of living within reasonable limits. For people who value the fish, the environment from which they come, and those who harvest it with dignity and respect, this is the only way we can afford to go. Thanks.

Allen Garcia

Allen Garcia is a third-generation farmer from California's Central Valley and a specialist in organic farming. As Farmer Director for the Center for Sustainable Agriculture, he provides a perspective on the relationship of agriculture to coastal ocean health, including agricultural-related pollution, nutrient enrichment, and related consequences of farm runoff.

Thank you very much for this opportunity, Secretary Babbitt. I'm a third-generation California farmer, and I'm also a 10-year veteran as a member of the Board of Directors of the Glenn County Resources Conservation District. Actually, I've been up since 3:30 this morning. I'm still on my planting schedule. I've been spreading compost and planting seed for six weeks. I think that was really appropriate for a conference like this, since I think that's what we're really up to here.

I operate a farm. We call it a bed and breakfast for ducks. We also have another saying on our farm, and that is, "We can have our environment and eat it, too." I get to teach this message to school children because my farm happens to be on the Cosumnes River Preserve outside of Sacramento. We have 5,000 school children visit us every year at the preserve and come through our Sustainable Agriculture Center.

A very interesting student walked up to me the other day, and he asked me, "Well, how does the land lie around here?" I said, "It's not the land that does the lying around here. It's those people on television telling you to eat all their junk food." These children teach me a lot out there. They teach me that we have a legacy that we need to pass on to future generations, and that's why I've become a leader in this area of agriculture called sustainable agriculture.

When I first got on as a Resource Conservation District director about 10 years ago, I picked up this *Bulletin '99*, "Conquest of the Land for 7,000 Years." We had a conservation service chief go around the entire world, and he looked at civilizations and how they managed resources in time. Well, there were more failures than successes, and the message that he brought back was that civilizations disappear off the face of the Earth if they fail to manage their natural resources sustainably.

My mission as an agricultural leader was to make sure that there is a legacy here in America—that we do pass on a very healthy, sustainable agriculture system to the next generation. How we are accomplishing this in California is that there are numerous demonstration-type projects. One of them I've been familiar with is in our

Innovative sustainable management techniques being used on cropland in California and elsewhere are enhancing productivity while reducing nutrient loads in nearby rivers and streams.

conservation district in Glenn County's upper Stony Creek watershed project, one of the first of 566 land-treatment projects in the nation. It was actually begun in the '70s when farmers were looking at land treatment, management of their grazing lands, in order to improve water quality, sediment loads in rivers and streams, and to make the land sustainable and more productive.

I invite everybody here, if you ever have an opportunity to come and see this project in full bloom. It is very magnificent. What they do is use fencing. And they manage these little creatures—I call them mobile solar energy units—but they're actually cattle. The cattle harvest the grasses, which is the sun's energy placed upon the Earth, and they turn it into protein so they can fuel human beings. Very interesting process.

Another project that I've been working on is called the rice habitat partnership. All of us rice farmers in California opened up a bed and breakfast for ducks in the wintertime. It's very successful. We have partnerships with Ducks Unlimited, the Nature Conservancy, and the Department of the Interior. What we're doing is actually managing our rice fields for wildlife habitat in the wintertime. The wildlife come in, and we put them to work. I call them my migratory farm workers. They come all the way from Asia, some of them, to help me dispose of my rice straw and help me with the nutrient cycles. They work that rice straw right into the soil, and they manure it. It's about 50 percent of my fertilizer now.

We've forgotten how to really use some of the natural systems that we're very, very dependent on. A real good example of the dependence on our natural system is a little high-pressure ridge off the coast of California that basically keeps the great Central Valley a hot, dry Mediterranean environment. When we lose that high pressure, we become semi-tropical. Most of the things that we have growing there won't grow in that environment. We're definitely right here on the balance of nature being farmers.

Another thing I teach the kids out at the preserve farm is that when we really commune with nature, it's not when they're walking our beautiful trails through the riparian forests or canoeing down the Cosumnes River like Secretary Babbitt has just done a few days ago, but actually when they sit down at the table three times a day and they participate in the bounty of our beautiful Earth. That is the connection with nature we all have and cannot lose.

What we're doing at the preserve is a very, very complex partnership. There are over 15 different organizations that are now involved with the preserve. I'm a partner in the preserve. We're actually a Hammer Award recipient from the National Performance Review of Al Gore. I have a little plaque with Al Gore's signature in my office for actually building partnerships to make the government work better. That's the key—the partnership coming together, diverse groups fulfilling common goals.

The true goal that we have is to try to manage our resources in an integrated resource management framework. We try to accomplish economic, community, and environmental goals with the same dollar. We used to have a dollar for the environment, a dollar for the farmer, and a dollar for our communities. Well, we only have one dollar to squeeze out of Congress now, and those dollars should be spent to accomplish multiple goals, not one goal at the expense of another. It's really a simple formula, but come and see how it works out there on the land. Thank you very much.

Fred Hansen

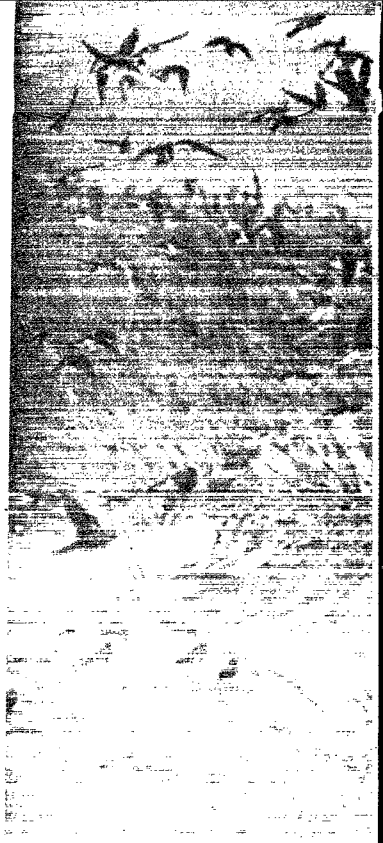
Thanks, Allen. I think it was particularly important, your perspective that from the farmers' standpoint, it's not just the pollution that may be coming from the farm but, rather, also how the whole environment—controlled obviously by weather patterns and others affecting the ocean—affects you as well. Thank you very much.

Dr. Jane Lubchenco

Dr. Jane Lubchenco is a Wayne and Gladys Valley Professor of Marine Biology and a distinguished professor of zoology at Oregon State University. Her scientific background and expertise are balanced by active involvement in numerous professional organizations and other efforts. She is by training a marine ecologist and has been one of the strongest and most consistent voices about the threats to our marine environment.

Thank you. Mr. Secretary, Mr. Deputy Administrator, distinguished panelists, and distinguished members of the audience, our global environment has changed dramatically. We now live on a human-dominated planet. Even the vast ocean is being significantly altered by human activity. These changes are more serious than is generally known or appreciated. These changes are being insufficiently addressed. If you haven't had the opportunity to read Carl Safina's new book, *Song for the Blue Ocean,* I strongly recommend it as an eloquent and accurate portrayal of some of the changes in our oceans today.

My focus this morning will be on systemic changes in the oceans. We are inadvertently changing the chemistry, the physical structure, and the biological composition of oceans. The scale and magnitude of these changes were



unimaginable a few decades ago. The consequences are degraded ocean ecosystems that cannot continue to provide the goods and services that we need.

We're changing the very chemistry of our oceans, especially in coastal waters. Particularly problematic are the increases in nitrogen and phosphorus. Over the last century, human activities have now more than doubled the amount of nitrogen that is coming into the nitrogen cycle each year. Excess fertilizers are applied to crops, human and livestock wastes are washed down coastal streams and rivers, and many of these compounds end up in our coastal waters. Some 30–40 percent of the nitrogen entering our oceans is airborne—exhaust from burning of fossil fuels, from our tailpipes, and our smokestacks—yet another reason to wean ourselves off fossil fuels. Increases in this nutrient pollution are strongly correlated with increases in the frequency, intensity, and spatial extent of harmful algal blooms, with the attendant fish kills, poisoning of marine mammals, and human health consequences.

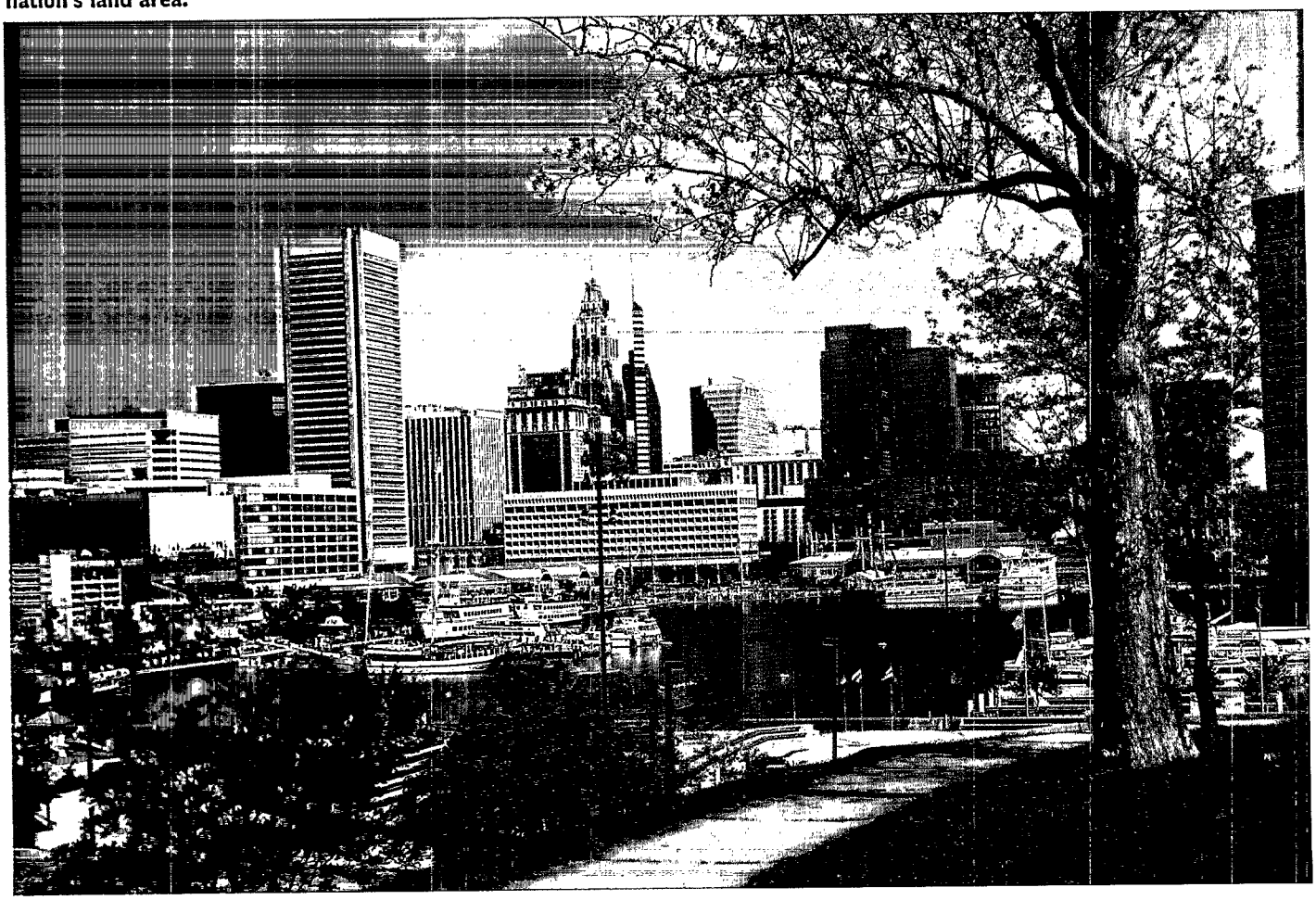
We're also inadvertently destroying ocean habitats at ever-increasing rates. I'd like to highlight the dragging of trawling nets across the seafloor as a little-appreciated and particularly destructive activity. Trawls crush, kill, and expose to enemies the rich assemblage of life found on the ocean bottom. They also destroy the homes and hiding places of marine critters. Trawling has been compared to harvesting corn with bulldozers that scoop up the topsoil and the cornstalks, along with the ears.

You might be surprised to learn that the entire Gulf of Maine is raked annually by nets and that Georges Bank is swept three to four times a year. This is strip mining plus clear cutting, but on a much grander scale than is happening on land. The area hit by trawls each year is estimated to be between 15 and 150 times that of global deforestation.

We're also destroying the rich legacy of life in the oceans. It's impossible to overstate the richness of life in the sea. Thirty-three of the 34 major groups of animals are found in the oceans; 17 of these are found exclusively in the seas. These are the products of billions of years of evolution. This diversity is being changed in a geological instant of time.

One of the most serious but least-appreciated causes of this change is invasive species. On the

More than one-half of the nation's population now lives and works within 50 miles of the coastline, but coastal areas account for only eleven percent of the nation's land area.



order of 3,000 species are hitchhiking in the ballast water of ships around the world on a daily basis, landing in new, often degraded bays and estuaries where they may thrive and outcompete or eat native species. The destructive potential of invaders can be seen in one particular example.

The comb jelly *Mnemiopsis,* which came from our Eastern Seaboard, was a stowaway in the ballast water of ships and transported to the Black Sea. It multiplied very quickly and took over, until at one point in 1992, this comb jelly represented more than 90 percent of the wet biomass of life in the Black Sea. This particular invader not only consumes fish, it eats fish eggs and fish larvae as well, and has contributed to the dramatic demise of the fisheries in the Black Sea. The sum total of these and other changes in the chemistry, physical structure, and life in oceans is threatening the very ocean ecosystems on which all of life on Earth depends. The problems we face now are fundamentally different from anytime in the past.

We talk about stewardship, we talk about sustainability, we talk about the year of the ocean, and even the year of the obvious. Yet our actions don't match the rhetoric. Many of the changes in our ocean ecosystems have appeared as serious problems only in the last decade or so—seemingly overnight. The litany is large and growing: harmful algal blooms, demise of fisheries, dead zones, loss of species, coral bleaching, and mass mortalities of marine species ranging from whales to urchins. The scale and increasing frequency of the problems have caught us off guard.

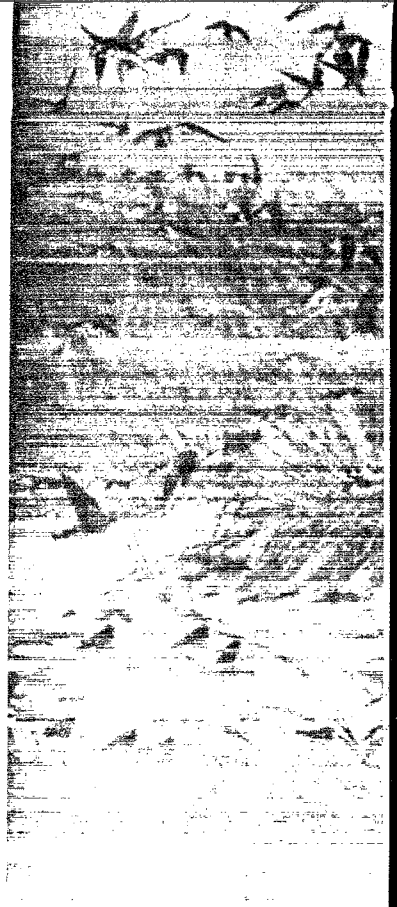
We've responded to each incident as an individual problem isolated from the others. As important and as appropriate to the overall goal as many of these responses have been, in sum total, they've been ineffective. We've treated symptoms, not the underlying problems. This piecemeal, ad hoc, reactive response is not in our best interests.

This conference, I believe, provides us an opportunity to lay the groundwork for a bold, innovative, forward-looking, comprehensive approach to our oceans. The nation needs more ocean awareness and a more comprehensive, enlightened ocean policy. Such a policy would protect human health, well-being, and prosperity by protecting the ocean ecosystems on which we depend. It would evaluate the broad sweep of land-based and ocean-based activities that affect oceans and determine our future. Guarding against uncertainty, shifting the burden of proof, and protecting essential habitats will be cornerstones of this policy. The establishment of a system of no-take marine reserves will be an essential component of the overall strategy.

The oceans and our lives are inextricably linked. Their future is our future. Now that we understand the extent to which humans dominate the oceans, as much as they do the land and freshwater ecosystems, we must act to protect our own interests by protecting oceans. Thank you.

The Honorable Leon Panetta

The Honorable Leon Panetta has had many responsibilities within the Clinton Administration—first as Director of the Office of Management and Budget and then as the Chief of Staff to the President. Prior to that, while serving in Congress, he was the author of legislation establishing the Monterey Bay National Marine Sanctuary. He brings a wealth of commitment to environmental issues from his career in the Congress and beyond.



Ladies and gentlemen, welcome to my home, and welcome to the home of Monterey Bay National Marine Sanctuary, which is the largest sanctuary that we have in this country. As you know, my expertise and my background lie not so much in the sciences associated with the oceans as in how to get it done politically—or maybe in Allen's [Garcia] words, how to convert manure into crops.

The example of the sanctuary is a good one to draw some important lessons from for this conference. The sanctuary is not only a good example of how we protected the vital resources that are part of our ocean and our bay here. More important, it's an example of how to develop a unified strategy to make that protection happen.

The ocean conference is focusing, obviously, on a series of topics—from the environment, to health, to education, to research, to exploration, to commerce, to global security. But I think the fundamental challenges of this conference are how can we balance all of the competing interests that are involved with our oceans, and how can we unify those interests to achieve the proper stewardship of our oceans.

There were competing interests in Monterey Bay. As you can imagine, there were a series of different interests that were involved with the bay—research and educational institutions, our aquarium, the Naval research weather forecasting institutes that were here, commercial and recreational fishing, tourism, environmental concerns, tanker traffic, recreational boating, agricultural runoff, and onshore and offshore developmental interests. Prior to the sanctuary, those interests basically operated in their own spheres with very little coordination or communication between the different interests in terms of protecting our oceans. The result was that management was very haphazard.

I've often said that in a democracy you get things done either through crisis or leadership. James Watt provided us with crisis. What happened is, most of you know, in the early 1980s, James Watt put up all of our offshore tracts for auction to the highest bidder for offshore drilling purposes. That action in itself constituted a common threat to all of the interests that were involved with the future of our bay. What happened as a result of that was that a coalition developed of all of these diverse interests involving a lot of the people in this room who came together to form what I think was an unprecedented political force. This couldn't have been done by one interest operating alone. It took an unprecedented political force working together.

One important mechanism for habitat protection is the creation of marine reserves where human activities are put off limits. Fagatele Bay in American Samoa, shown here, is a National Marine Sanctuary.

Photo: Fagatele Bay National Marine Sanctuary

What we did at first was to adopt a series of moratoria on offshore drilling—moratoria that continue to this day and to the year 2000. The way we did that was annual moratoria through the appropriations process requiring that no funding would go to pursue offshore drilling off of our coastlines. We not only developed a coalition of interests here, but throughout the state, Washington, Oregon, Georges Bank, as well as other areas along the coastline that were threatened with offshore drilling. That force is what produced the moratoria that we were able to achieve.

Our concern was, obviously, that annual moratoria did not provide permanent protection for our coastline. So as a consequence, what we did in Monterey Bay was to try to pursue more permanent protection through sanctuary status. NOAA, while it had considered the possibility of the bay for that status, never acted on it. What we did was we used the science of our area—the deep underwater canyon that we have off of our coastline and species associated with the bay—as the justification for legislation that established the sanctuary.

Even the legislation establishing the sanctuary, which I authored, wasn't very easy. In 1988, I had to direct NOAA to designate a sanctuary status. They still, by 1992, hadn't designated sanctuary status for Monterey Bay. So I passed additional legislation to, in fact, designate Monterey Bay as a sanctuary. We were able to dedicate that in 1992, making it a reality for this area.

What are the lessons that we draw from this experience that relate to the ocean conference?

- First of all, I don't think we have to wait for a crisis, because the crisis is here now. You've heard a lot of it described to you on this panel. Part of the problem we have here is that there is a series of individual crises that are being described—whether it's runoff, whether it's fishing, whether it's pollution, whether it's health. Unfortunately, what that creates is not the sense that there is one large crisis. What this conference has to do is say to the country we have one major crisis affecting our oceans, and it is made up of all of these elements that are producing it. We don't have time to wait.
- Second, action must be coordinated. Individual interests fighting their own battles will never be enough. There must be a coordinated effort at the local, national, and world levels to try to provide the kind of protection that's necessary. We have the sanctuary status here. It's my view that almost every area of our coast ought to have some kind of protective status in order to provide the forum and the planning mechanism that you need to protect our oceans.

In addition to that, at the federal level—something that I'm particularly familiar with—there are too many jurisdictions that deal with the ocean. Now, that's not to say that they all don't do a good job. But the fact is when they all have their different jurisdictions, they all operate in their own spheres. It's just the nature of how Washington operates. You've got Interior, you've got Commerce, you've got EPA, you've got State, you've got Defense,

you've got other groups that have their own areas of jurisdiction. In the very least, we have to establish some kind of Oceans Task Force at the federal level to coordinate policy with regard to the ocean so that these people sit in the same room and talk the same language when it comes to developing policy.

- The third point I'd make is that obviously sufficient resources have to be provided. All of the good will and good intentions are simply not enough unless we're willing to put our money where our mouths are. It's not a problem so much with the administration, because I think the President and the Vice President are truly committed to putting the necessary funds into this. But if you're going to get the Congress to come along, the only way you do that is to show that kind of coordinated force that includes business interests as well as environmental interests to force them to put the necessary funding into these areas.
- Last, we need the will to fight and continue to fight for the protection of our oceans. There's a great story that I often tell, which I think fits here, about the rabbi and the priest who decided they'd get to know each other a little better. So one evening they went to a boxing match, and just before the bell rang, one of the boxers made the sign of the cross. The rabbi nudged the priest and he said, "What does that mean?" And the priest said, "It doesn't mean a damn thing if he can't fight." We bless ourselves with the hope that everything is going to be okay with the oceans. But very frankly, it doesn't mean a damn thing unless we're willing to fight for it. Thank you very much.

Fred Hansen

Thank you, Leon, particularly for ending on the point of how do we move from here and for some of those practical steps. Thank you panelists for all of your comments, your insight, and your expertise.

We've heard a lot of challenges today, but also a lot of opportunities. Based on what we've heard, we all know that polluted runoff, air deposition of toxins, boating waste, sewer overflows, and a host of other problems are contributing to the degradation of our waters. We know our economy suffers when oceans suffer.

We know also that we need to take strong action—more public access to timely and accurate information, more monitoring, more partnerships, better pollution controls and prevention of spills and chemical accidents, and faster and more timely responses and better protection of our fisheries. One of the threads that I've heard this morning and will want to hear more from all of you about is how much we yet need to know and how much science still has a key role to play.

On the flight in to Monterey last night, I was sitting on the airplane and overheard a conversation of one of the scientists here in the audience who was talking to one of his colleagues and was describing how, with each new scientific understanding, we somehow feel we have "the answer" and can now go about not worrying anymore about science. He was describing with a voice both of enthusiasm and of awe how he realized how complex nature was and that we needed to fully and continually understand that complexity. Thank you for that comment. As we go forward into this discussion, the list is long about what needs to yet be addressed, but certainly it's not yet exhaustive.

Comments from the Audience

Captain Ed Davidson

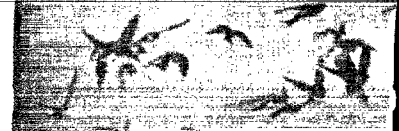
I'm chairman of the board of the Florida Audubon Society. In Florida we have more coasts and estuaries and wetlands than many countries of the world. While we have huge problems, we have some tremendous successes, thanks very much to the leadership of the good Secretary [Babbitt].

The point is that the whole 60 percent of South Florida is one great ecosystem—the great Everglades ecosystem, which most of you have heard of. We've done terrible damage to it, but we have some unique solutions that I don't think are happening in the rest of the country.

I think a couple of panel members ought to talk about how we managed to put together this great composite, because we started out with nine primary federal agencies, a couple with peripheral jurisdiction; six or seven state agencies; and a multitude of county, municipal, and regional agencies, all of them with different pieces of jurisdiction—sometimes overlapping, sometimes conflicting, sometimes with gaps in between—all peering myopically through small windows of limited jurisdiction.

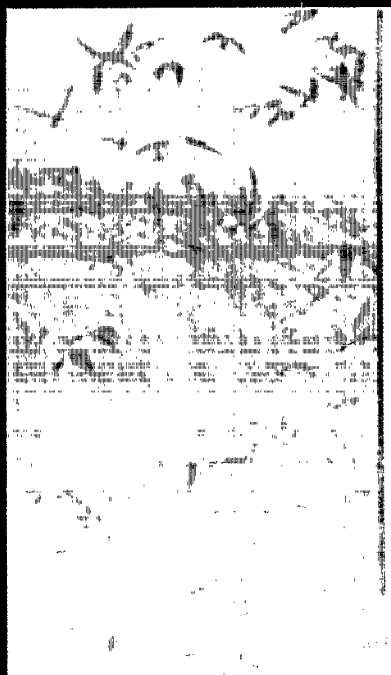
Through the Secretary's leadership, we now have a federal task force, and we have a governor's commission, which is independent. We have terrible problems with the Federal Advisory Committee Act. Agencies aren't inherently designed to work together and, in fact, are prevented in some ways. There were huge challenges, but this model is working.

We have the governor's commission now in an advisory capacity. All of these are advising the



We have a globally unique opportunity in the Bering Sea to develop precedent-setting partnerships to positively change the way we conduct our marine science and our understanding of the human being's role in the environment.

– Larry Merculieff



Corps of Engineers. We designed one of the biggest systems in the world, and I think it would be very helpful to people in the rest of the country if we discussed how we were able to work with some of those difficulties and get this integrated because that's the problem—too many layers, too many players, and not getting integrated.

Billy D. Causey

I touched on the South Florida Ecosystem Restoration Task Force. And again, Secretary Babbitt has shown leadership in South Florida to initiate an unprecedented ecosystem management approach.

We started moving in 1993 as federal agencies to sit down and first define the ecosystem. Many of us, as resource managers, were looking at our little parcel of the system, thinking we were managing the ecosystem. The Secretary challenged us to define the ecosystem, and we now define it from Orlando all the way through the Everglades agricultural area, all the way through the heart of the Everglades, the Big Cypress National Preserve, the west coast of Florida, the east coast, all the way through Florida Bay, and all the way through the Florida Keys to the reef track. It's only until we get that kind of vision and that kind of admission that that is the ecosystem can we start doing the things that we have to do to improve our quality of life and protect the resources.

As we were moving forward, the governor became a little concerned that all these agencies were moving along and doing good work, and that we may be leaving out people. People are a critical part of the ecosystem, especially when you have five and a half million in South Florida. He made sure, with the Commission for Sustainable South Florida, that people were brought into the picture.

Niaz Dorry

My name is Niaz Dorry, and I work for Greenpeace. I want to thank you for this opportunity. There are three points that came up here during the presentations that I wanted to offer some actions on and see if we get some reaction.

One of the comments is about essential fish habitat—and this is specifically for you, Mr. Secretary, and Mr. Deputy Administrator. The assault right now on the essential fish habitat regulations that are coming out of the National Marine Fisheries Service are by nonfishing industries, such as lobbying, mining, oil and chemical companies, that fall under your jurisdictions as well. I'd like to know what your agencies are going to do in order to help strengthen the essential fish habitat and to actually protect marine ecosystems. We always can identify the worst of the worst, if you will, and there is legislation currently in Congress that will take care of industrial spill problems that are primarily operating in the Bering Sea region. I'd encourage folks to consider taking this position and supporting the American Fisheries Act, Senate Bill 1221.

The other issue that came up was common property. I heard a lot of folks respond to the need for preserving our oceans because we all have common access. There are threats to privatizing our oceans through individual property rights. I'd encourage folks to weigh in on the National Academy of Sciences' decision and the recommendations they're going to make in Congress in order to stop the privatization of our resources and our ocean resources and actually allow for common property to remain common property with proper management—not for everybody else to go willy-nilly, but actually to have some proper management in place.

The last point that came up was what Mr. Panetta said. We all have to identify one major crisis. I'd suggest that the most major crisis that's facing our ocean is the industrialization of our ocean—from industrial scale agriculture, to industrial scale mining, to industrial scale fisheries. If you want to address something, we've got to look at small scale. We've got to look at low-impact fisheries. Thank you.

Angela Sanfilippo

Good morning, everyone. Thank you for giving me this opportunity. My name is Angela Sanfilippo. I'm the president of the Boston Fishermen's Wives Association, and I also was the only representative to the World Forum of Fish Workers last November in New Delhi. Three things came out of there: we must stop coastal pollution, we must stop industrial agriculture, and we must protect our oceans, because without the proper protection, the world cannot sustain its habitat.

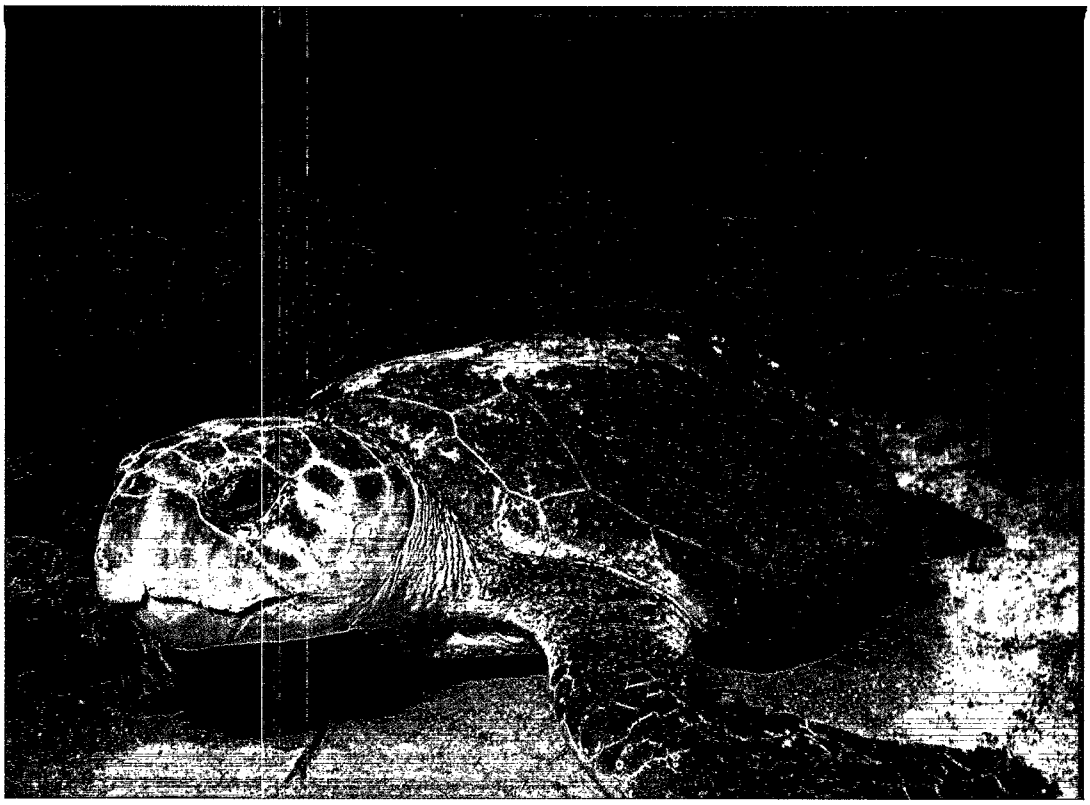
We worked very hard for 27 years in protecting the ocean. My group was the people who asked for the original Magnuson Act. We got it. Right after that, we had to stop oil and drilling on Georges Bank. Right after that we had no option but to declare Stellwagen Bank a National Marine Sanctuary because of oil drilling and mining that were going to take place at that time.

We are fishing people, and I represent fishing families and a fishing community. I come from seven generations of fishermen in Sicily and the United States. The coast of California is where all my ancestors started fishing, so I feel very

attached to this part of the country. We have suffered, and we have disrupted many families' lives in order to do the best in New England. I'm proud of Bill and his comments.

We, as a fishing people, have given up bays. All this happened to us because in the early '80s, money came and was available from the U.S. government to build better and more efficient boats for fisheries. Because of that, we're suffering. Just last year, when we were struggling, again a factory trawler was given a permit to fish in New England—a 360-foot factory trawler that is hurting the bottom of the ocean.

We have fished for generations. I grew up on the waters I fish. My family is there. We have a special love for the ocean. It's everything to us. Protect it. We must keep the ocean healthy because the sacrifices we'll make as fishing people won't work if we keep dumping and poisoning. Yes, Mr. Panetta, all branches of government have to come together and talk to each other. Now on one of the Boston fishing grounds, a pipeline has been proposed. It has to stop.



The decline of once-thriving populations of marine species such as cod, capelin, pollock, grouper, blue fin tuna, swordfish, shark, shrimp, turtles, abalone, and urchins is a clear indication that the use of the sea has not been managed wisely or sustainably.
Photo: NOAA

Elliott Norse

Thank you very much. I'm Elliott Norse, president of Marine Conservation Biology Institute in Redmond, Washington.

Earlier this year, 1,605 marine scientists and conservation biologists from 70 countries worldwide issued a statement called "Troubled Waters" which said: the sea is important, the sea is in trouble, and here are things that we have to do to make the situation better. One of the five things that they identified was to establish a science of marine conservation biology and funding mechanisms thereof. The idea behind that is that ignorance is our greatest enemy. If we don't know, we can't do it right. And we need to do it right. I think fishermen and scientists and environmentalists can all agree on that. That's a common point.

We don't have a funding mechanism in the United States for marine conservation biology. The National Science Foundation won't fund it; it's too haughty. NOAA won't fund it; it's too pure. It falls through the cracks. I'd like to ask the panel how we could establish appropriate funding mechanisms for the integrated multidisciplinary science of marine conservation biology so we can deal with harmful algal blooms, we can deal with overfishing, we can deal with the effects of global climatic change on the marine environment, we can deal with the epidemics that are taking marine mammals and sea urchins and other organisms. What are funding mechanisms for doing this?

The Honorable Leon Panetta

One direct way to do this would be to introduce legislation and specifically focus on this area. Develop a program, and then hope that you can get it funded through the appropriations process. I have to tell you that's probably a waste of time right now, just because of my sense of where this Congress is in dealing with these kinds of issues.

I think you're better off, through the administration in its funding areas—whether it's the National Science Foundation or whether it's working through some of the myriad funding programs that exist throughout these agencies that we have, working to administratively establish a fund for the purpose of developing that kind of integrated science that you're talking

about. I think that can be done. I don't think, frankly, the Congress would challenge that kind of administration, because I think there's the flexibility in those programs to develop that. What you just have to do is change the mind set of the people who are in some of these programs who like to do their own thing, as opposed to trying to expand their programs and making them fit the needs that are out there.

Fred Hansen

I think that's exactly the type of recommendations we need from you—in this case, a particular issue around funding. There are structures, as Leon indicated, that we already have established as an administration, that would allow for us to be able to address this. I think that's the perfect place to do it. I'll take that message back personally.

Allen Garcia

You know what I really see as the problem is the international cheap-food policy of this world. We're only paying the fishermen to harvest. We're not paying them to plant. They're not farmers of the sea. There's no mechanism in place for farming it. As consumers, we go in and we just basically pay for the cost of the harvesting of the ocean, not for the cost of managing the resource sustainably. The cheap-food policy in this country across the board is probably responsible for most of the nonpoint-source pollution going into the ocean. Think about it. Thank you.

Ports spend millions of dollars each year in developing public access sites; creating, restoring, and enhancing wetlands and other habitats; monitoring water quality; and recycling various materials.
Photo: Robert Campbell Photography

Ken Olden

I'm Ken Olden, director of the National Institute for Environmental Health Sciences in the NIH. It seems to me that the panelists have made a compelling case for protecting the environment and, more specifically, the ocean. If we're going to get recommendations out of this group—which I think is what we're supposed to do—we have to focus this discussion on three issues. One was identified—investment in the science—because science is going to inform policy. Policy is the second issue we need to focus on. The third issue, identified by Mr. Panetta, is coordination.

It's a fact—and I think to anybody in here who is with the federal government and has any responsibility for funding the science—that we don't have the adequate science base for environmental policy decisions. These decisions have tremendous impacts not only on the economy, but on the health of the American people, as well as on plant and other wildlife species. These decisions are going to cost us money, and we need more of these decisions based on science.

Sarah Chasis

I think funding for science obviously is critical. But funding for management and carrying out the controls necessary to stop the pollution that threatens our fisheries and our habitat is absolutely critical. Congress just authorized an ISTEA [Intermodal Surface Transportation Efficiency Act] bill—$200 billion for transportation projects. The Clean Water Action Plan would cost $500–$600 million. If we can't invest in protecting the coastal and ocean resources and put our money there, then we're not doing our job.

Bud Laurent

Thank you. Secretary Babbitt, thank you very much for your role in this. My name is Bud Laurent. I'm a county supervisor in San Luis Obispo County, the county immediately to the south of Monterey. We're part of the Monterey Bay National Marine Sanctuary. Thank you, Mr. Panetta.

I was delighted to hear the common themes in the presentation today. Basically, we need better holistic management. We need to manage on the basis of habitat, rather than

single species. We need to bring governance to the people. We need to continue decentralization of policy. We need to get rid of the waste in the overlapping and competing interests.

Mr. Panetta mentioned one of the factors we need is political will to achieve all of these things. While more funding for science and the gathering of information is certainly indicated, possibly there's enough money already to do a better job than we're currently doing. My question to you—and the challenge to all of us—is how do we overcome the human resistance to change? How do we beat the turf battles that will inevitably occur if we're going to restructure governance as it needs to be structured? And when does that begin?

Larry Merculieff

Our elders and wisdom keepers say nothing is created outside that isn't first created inside. The reason that we trashed the environment on the outside is because we're trashing inside. The reason we're fragmented outside is because we're fragmented inside. We're in conflict outside because we're in conflict inside. It begins with us, and that's all.

Billy D. Causey

I wanted to address the three areas—investment, policy, and coordination—and address the funding issue of science. Right now, I don't think we're doing a good enough job with the funding that we have. It doesn't mean to say that we don't need more funding for research, but while we have academia present, I want to challenge academia to start giving managers answers. We need to have the science more directed at answering critical issues and questions that managers have and not just pure research. We have space for pure research and a need for it, but what we need are answers.

In the policy area, the Federal Advisory Committee Act, FACA, is something we need to put on the table—that needs some revision. We have a difficult time bringing partners and stakeholders to the table because of a very old piece of legislation. FACA is something that is useful and has been useful in its time. It's been a way to get over some of the hurdles that I mentioned earlier. But we need to have better coordination between academic science and agency science and bring all of those into focus.

Gary Lytton

My name is Gary Lytton. I work for the State of Florida, and I'm the president of the National Estuary Research Reserve Association.

Many of the issues we've heard about are linked to local, coastal problems. My issue is more concerned with information management. My question is, How do we as federal and state agency representatives do a better job of getting relevant science information into the hands of local communities?

I've got one answer to that, but I'd be interested to hear how other people might respond to it. My answer is to use existing networks—marine coastal protected areas, like national estuarine research reserves, marine sanctuaries, state coastal programs, and NEPs [National Estuary Programs]—because they represent federal, state, and local partnerships that have existing networks with open communities. We have an excellent opportunity, but I don't believe federal agencies are taking advantage of that opportunity yet. I'd challenge federal agencies to think about that.

The other part of this is the feedback loop of local communities' getting science information needs back to academia and to federal agencies. And that gets to one of Billy's [Causey] questions—making sure that we're addressing science relevant to issues that are important to local and regional communities.

The Honorable Bruce Babbitt

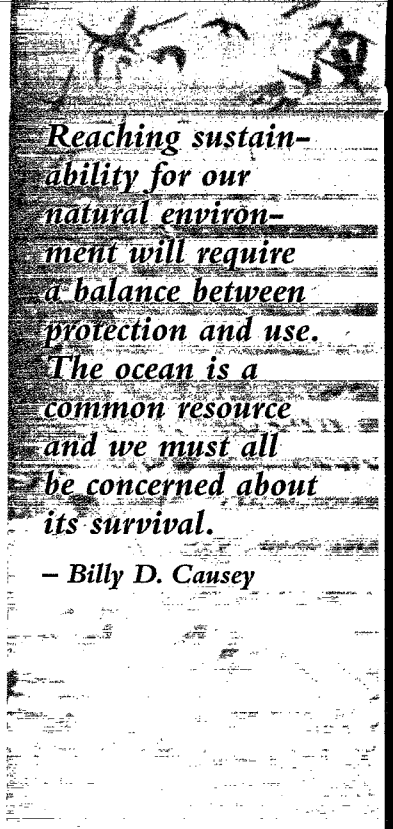
I'm hearing an important common theme here reflecting the supervisors. And that is that this coordination issue runs not only horizontally among federal agencies, but it must, in some measure, draw vertically upon state, local, and community organizations.

Mark Gold

Thank you. I'm Mark Gold, executive director of Heal the Bay. I've been involved in a lot of these stakeholder processes, but I'm going to focus on a more specific issue.

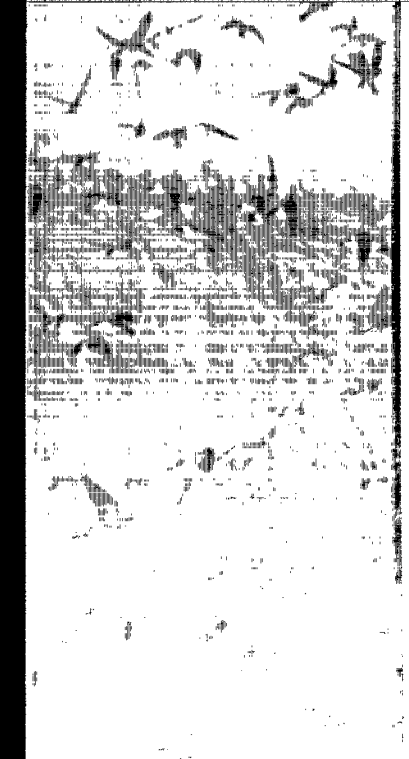
So many of our coastal pollution problems and environmental public health risks stem from stormwater and nonpoint-source pollution. However, the Clean Water Act stormwater regulations and CZARA [Coastal Zone Act Reauthorization Amendments of 1990] have proved largely ineffective to date because of lack of funding, lack of enforcement, and lack of substantial incentives for stormwater management. Watershed management is often offered as a more effective stakeholder consensus-based approach to solving water problems and protecting public health.

Again, these programs are underfunded and don't have teeth to ensure commitments are followed through upon. Increasingly, the envi-



Reaching sustainability for our natural environment will require a balance between protection and use. The ocean is a common resource and we must all be concerned about its survival.

– Billy D. Causey



ronmental community has turned to total-maximum-daily-load [TMDL] lawsuits to ensure that impaired water bodies are managed for designated-use recovery. Often these lawsuits are as a result of environmental group frustration with the increasing degradation of our nation's waters by stormwater and nonpoint-source pollution. The Clean Water Action Plan is a good—yet relatively small and grossly underfunded—step in the right direction.

What should the federal government do to ensure that TMDLs are being developed outside the litigation realm? That's where they're all occurring right now. And what should it do to ensure that CZARA and the Clean Water Act stormwater requirements are being complied with and—more important—lead to protected, designated uses and the elimination of impaired water bodies?

Fred Hansen

Mark, a series of very good comments. Just a couple of quick things. One, this administration—as you know, President Clinton and Vice President Gore—stands firmly behind the Clean Water Action Plan. Although you say there's not as much money in there—and Sarah's point as well, recognized that—just this week, the Congress on the Senate side has already cut that number in half.

Number two is, as an administration, we're committed to not just using the direct funding in a program, such as what EPA operates, but also in the Department of Agriculture and in other areas to be able to ensure that we're bringing together not just the coordination, but the other resources of the Department—other programs that in fact can provide more benefit. The issue that I think is here—and it's what Bruce [Babbitt] mentioned earlier—we're hearing that we need to find a more complete fashion for integrating up and down and across our normal structures to do that. Couldn't agree with you more.

Mike Ham

Thank you. Mike Ham from the Guam Coastal Management Program. I'm also the point of contact for the Coral Reef Initiative, which serves as a good example of how partnerships evolve and become workable.

I'm sitting here with my science side. I'm the management side. We work together. Everybody checks their egos at the door when you walk in. You sit down at the table—science, management, at all levels. One of our partners at the federal level from Interior is sitting right next to me. We work together, we talk together, and nobody is trying to run the show. We're all trying to find what the problems are, what's the best way to resolve them. And you do that if you find that everybody is an equal partner at the table.

We've done without money. We've been in the Coral Reef Initiative now for about five years, and there's been no money. It would be great if there were. But if there isn't, you still have to plug ahead, and you still have to do the work. There are things being done in coral reef initiatives with very, very little money. We're talking $5,000, $10,000, $15,000. Any amount of money you get is a benefit. You do it anyway. It's the same thing with developing ocean programs and ocean policy.

Billy D. Causey

I just want to point out that that's an excellent observation, and that definitely we've been experiencing tremendous decline in coral reefs globally. Ten percent of our coral reefs are lost beyond recovery; 30 percent more are threatened. Clearly it's a resource that has given us a signal internationally that things are changing and happening. During the International Year of the Reef, we learned that we had to start looking more broadly at the impacts affecting the coral reefs. And definitely the Year of the Ocean is the time to step up to that next level of awareness.

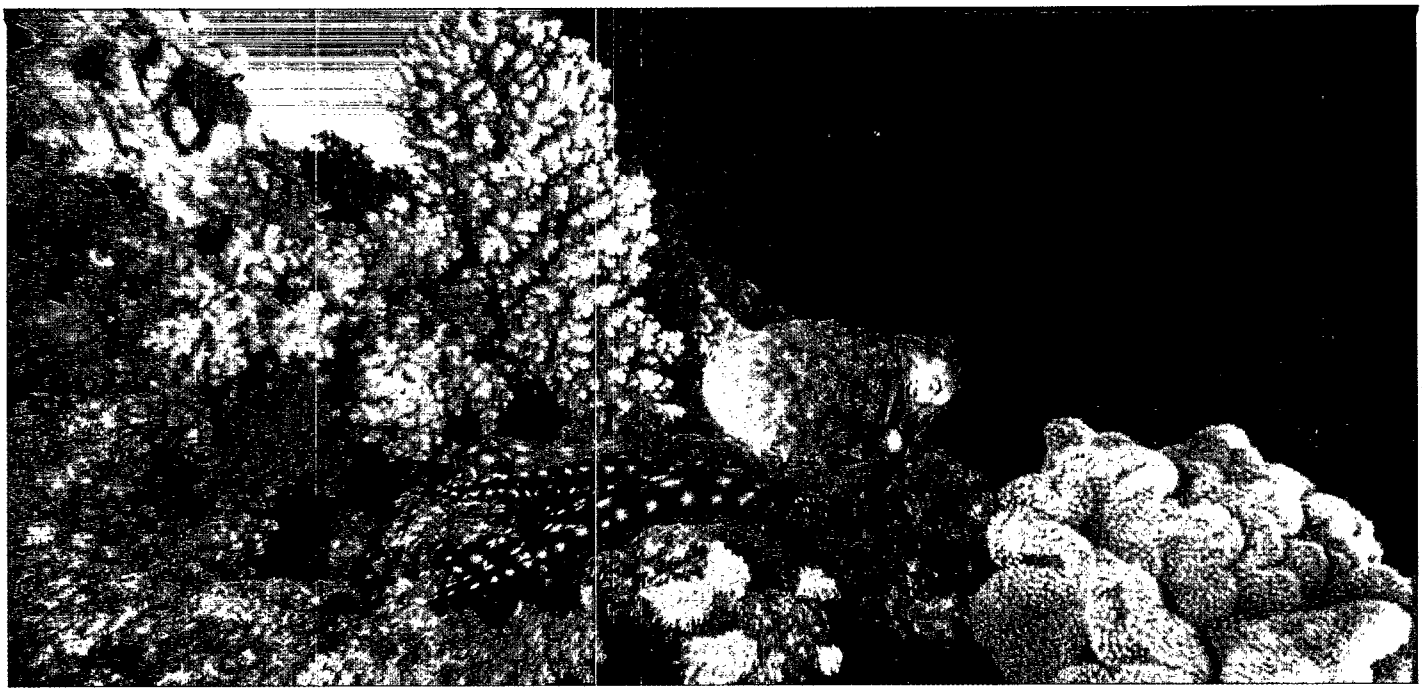
Allen Garcia

I'd like to make one comment on the nonpoint-source pollution issue on coral reefs. I'm going to appeal to you as consumers, instead of scientists. We could actually use the cash register at the grocery store to spend our dollars wisely—to use it as a ballot box, to vote for whatever kind of environment we want by supporting those businesses that are green. That is probably more important than education and research. How the consumers spend their dollars is going to create the kind of environment in the future. Thank you.

Matt Hayden

My name is Matt Hayden. I'm manager of environmental affairs for ITW [Illinois Tool Works] Hi-Cone.

In deference to the encouragement for sound science, I applaud that. We really need that. We also need the partnerships to be spoken about. There's talent in this room. There's no mystery about what a lot of the science is here, is there. We understand the priorities, and we know how to put partnerships together. But I think Mr.



There has been a tremendous decline in coral reefs globally: 10 percent are lost beyond recovery, and 30 percent more are threatened.

Panetta hit it right on the head when he talked about the will of the people to achieve the objective. We can have all the sound science in the world, but it's actually the voters who decide what checks get written.

I chair a research team at Rutgers University, and I can tell you that if you poll a thousand consumers and ask them what's the most important issue facing the United States today, 3 percent will tell you the environment—3 percent. There's a lot of scientific information out there resident in the minds of the voters and the people who write the checks. Almost all of it's wrong. I was walking over to this forum today with a young volunteer. He's a toxicologist. And we were talking about the quality of the reporting—the quality of the information available to the consumers. I said, "How much of that is correct?" He said, "Almost 100 percent of what's reported is incorrect."

If you polled a thousand science teachers, you'd get 900 of them to tell you there are chlorofluorocarbons in every aerosol can. There's a lot of bad information out there that needs to be replaced. That's an educational process over time. It needs to start now. If you want to have the right money—to fund the programs properly, to fund the partnerships properly—it's going to have to come from the people, all of whom get bad information.

Zeke Grader

My name is Zeke Grader. I'm the executive director of the Pacific Coast Federation of Fishermen's Associations.

We largely have a fishery still left in California because we've had a good coalition between commercial, sport, and conservation groups for the past 35 years. The thing I've noticed—and what I think needs to be emphasized—has been said by a number of speakers before: the two things lacking right now are the funding, as you mentioned, and the political will.

By the funding, I don't think we should be looking at just going after each appropriation in sight and getting more money from the Congress. But perhaps we might look at developing a long-term funding source—a trust fund, if you will, similar to what we have on the highways. We might consider looking at it from that standpoint, because we're terribly underfunded right now on everything from basic research to enforcement to management. All of those things are missing, and we desperately need them.

That gets to the issue of political will. I know some people aren't going to want to hear this. But, frankly, it's been a coalition of commercial fishing groups and conservationists that has often, so often, had to sue government agencies to get them to enforce the law—the Endangered Species Act, the Clean Water Act. Every year, we have to sue the National Marine Fisheries Service to try to do something on the Columbia River because of endangered species. That's a lack of political will. We had to sue the EPA to enforce TMDLs. That's a lack of political will. We need both the money and the will, and those are critical. We're not going to do it unless we have both of those elements.

We all depend—real fishing people and real environmentalists—on a healthy, sustainably managed resource.

– Captain Bill Amaru

The Honorable Bruce Babbitt

I think Mr. Grader is proposing that as a counterpart to the Land and Water Conservation Fund, we need a dedicated Ocean Conservation Fund. Is that your proposal? Everybody support that?

Audience

Yes.

Jack Caldwell

I'm Jack Caldwell, Louisiana Secretary of Natural Resources. I agree with Leon Panetta when he says we've got to learn to hit. You just put your finger on the key. We need a dedicated fund.

I had the great honor to serve on a Management Service Advisory Committee that has come up with a plan to dedicate a portion of nonrenewable offshore oil and gas revenues into renewable investment—into coastal environmental projects for preservation and protection, such as estuaries, the fisheries, the wetlands, the wildlife habitat—in Louisiana, where we're bearing the tremendous impact of offshore activities. I want to say that this plan is gathering bipartisan support right now. I'd like to have Mr. Panetta's views on whether this is a worthwhile avenue to pursue.

The Honorable Leon Panetta

I think this is a worthwhile avenue to pursue. I think the effort to try to get additional funding is a worthwhile effort to pursue. But let me be frank with all of you. This is politics. And you're not going to move anybody unless you bring political pressure on the people who have to make decisions on this issue.

It's a little bit like when we were dealing with the offshore drilling issue on the moratorium. I had great support among the coastal communities, but there's a vast area between California and New York that doesn't lie near the ocean. People there don't have the sensitivity that a lot of us who live near the coast—and are a part of the ocean, and see the ocean every day, and recognize how important it is—have. Frankly, they'd care more about the price of gasoline at the pump than whether there was a rig off of Big Sur.

What we had to do was not only create a coalition but engage in an information strategy that said to the country, "Wait a minute. Wait a minute. Are we going to destroy some of the prettiest areas of our coastline in exchange for that?" If people think about Big Sur, and then think about what we could do to damage Big Sur, then people relate to that.

We're in the Information Age. There's a lot about the Information Age that I hate, particularly in politics. I think there's too much money that's now used in politics to try to get your message across. But we're stuck there, and that's what the future is all about.

This isn't about grassroots. With all due respect to all of you, this isn't about grassroots communication at your level. All of you are well informed. All of you know what the crisis is. What you've got to do is get to the public. And the only way you get to the public is through the media. This means that instead of having programs that focus on the latest scandal or the latest killing or the latest three-headed monster, we've got to get them to focus on the dangers that are involved with the ocean and develop the kind of series that the American public can look at, and then bring pressure on their representatives to deal with this issue. That's the only way you're going to deal with this kind of situation.

Captain Bill Amaru

Thank you. I've been listening to these comments concerning the best way to be organized to approach the problem. And I sense that we're nibbling around the edges—although I must say the nibbles are being delivered by some giant bluefin tuna and white sharks in the room!

My comment would be this—and it goes toward the cause and not the symptom. I'd prefer to see my fishery run under a department of government that has at its root the belief that sustainable protection is necessary, rather than exploitation. I'm under the Department of Commerce as a commercial fisherman. It doesn't make sense to me as we're trying to rebuild the fish stock that we have commerce as a root.

My comment would be this, Mr. Secretary. Somehow, through work with President Clinton and tomorrow with Vice President Gore, we let them know that we believe that Interior and Oceans is an appropriate title for the department that you head. And that we have a strong leader who can bring the elements—that we've been hearing now seem to be splintered—under one roof and act as a parent to an agency that will then gather in all the people from NOAA, from EPA, from these other distinct groups that are far apart. And then when we have these kinds of meetings you won't have to have 25 different agencies all running around trying to coordinate. It will be under one roof.

Sarah Chasis

I wanted to insert some notes of caution about this idea of a creation of an ocean fund—not so much the idea of the fund, but where the revenues would come from. This was an issue in Congress in the early '90s. There has been repeated talk of using offshore oil revenues as a way to fund this kind of fund, and our concerns are that it not be structured so as to provide an incentive for offshore drilling in sensitive areas. That's a major concern. That's the way these have always been proposed from Don Young and others. I think we have to be very, very cautious.

Second, the uses to which a fund like that would be put would need to be very carefully spelled out. And there would need to be clear and careful oversight of how the money was spent.

Third, we'd have to be very cautious that just by creating a fund, we wouldn't be diverting monies that are currently appropriated for our clean water and CZM [coastal zone management] and other programs. And that the fund wouldn't be used as justification for not continuing to fund those programs.

Debra Williams

Hello. My name is Debra Williams. I have the privilege of representing Secretary Babbitt in Alaska. I have a series of three quick rhetorical questions the panel members can answer that will lead me to an observation that will lead me to a question for the panelists.

Alaska is proud to claim 50 percent of the coastline of the United States. There is one marine ecosystem in the United States that boasts the largest commercial production of fishing—75 percent, that boasts the largest aggregation of marine mammals in the United States, and that boasts the largest aggregation of international birds in the world. While I'm sure many people in this audience would answer Bering Sea, which is the correct answer, you could stop a thousand people in Omaha, ask them that question, and how many people would answer the Bering Sea? You'd be lucky you if you get one or two.

The challenge we face in Alaska with respect to our marine ecosystems—fortunately many of them are commercial—is how to keep them flourishing. We're not, for the most part, in crisis. We have some significant blinking yellow lights, but we're not in the emergency room. We're pregnant, or just about conceived, and we're in the doctor's room. And we're just asking for vitamins, please, so that we don't have our child in ICU.

That's our big challenge, and I have two questions. One for Mr. Panetta: How, when we're not in crisis, do we convince the American people that the marine ecosystems in Alaska should have an opportunity to flourish? Here's a subquestion. Do you think in coming up with an oceans policy that one of the planks of that policy could be to recognize the intrinsic right of marine mammals, birds, and other marine species to flourish in the marine environment? Of course, that means that—while we all know and appreciate and recognize and embrace the anthropocentric values of the marine environment—should this plank be considered?

The Honorable Leon Panetta

If you say the Bering Sea isn't in crisis, but if we don't get sufficient funding, if we don't get the policies we need, then surely we may very well be in the ICU. The problem you have here is it's not just leadership from the administration. It's leadership in the Congress, and the Congress basically divides the stuff up and plays jurisdictional games with each other. They decide how they're going to fund and whom they're going to cut. There's no kind of unifying force that forces these different members to really recognize the overall oceans policy that you've got to have.

I'm not worried about Bruce Babbitt. I'm not worried about Bill Clinton. I'm not worried about Al Gore. But I do worry about your chairman of the Appropriations Committee from Alaska. I do worry about some of the chairmen of these other subcommittees who, very frankly, don't sense that there's enough political pressure out there to be able to put the proper funds into these programs.

How do you build that pressure behind them? That's the fundamental question. And the only way you do that is when their people and their constituencies say to them, "Get off your butt. We need to do something about oceans protection." That's the only way you get it done.

Mimi McConnell

My name is Mimi McConnell, and I've worked for many years on coastal issues. What I'd like to point out is that the nonprofit organizations—that are in the interior part as well—are a great power we haven't talked much about today. We've talked about the end result, how we want the Congress and our so-called leaders to carry out what the people want. But how do we inform the people about not only how they should be living their lives, and not using poisons, and how to take care of their septic systems, and all of that, but how to have the political clout? This is where the nonprofit organiza-

tions—we who get along basically on a shoestring—are doing powerful things and courageous things.

I'd like to suggest the EPA do even more on your educational programs. I know from my own experience that you can take a small sum of money and you—the EPA—can then take our product so that everybody isn't reinventing the wheel. That's one of the curses of small organizations. They always have to start from ground zero. I think that's a crucial way to start to get the American people much more informed and much more galvanized so that they'll beat upon their people in Congress, because that's where the power is. Politics is always right at home. Let's put more emphasis on the nonprofits, help them do a better job.

Eighty percent of pollution entering the marine environment comes from land-based sources, including runoff from city streets, suburban lawns, and rural farms.

Fred Hansen

Mimi, thanks very much. We obviously think that that's a very effective part of our education and outreach, but I also think it's important to be able to think in the broadest context. We had 2,600 warnings this last year in terms of beach closings that, my guess is, most people didn't know existed. By the end of this conference, you'll be hearing about a major effort to make that information much more accessible to the public—as a way to be able to help encourage and allow for nonprofits and others to be able to engage that broader public in these very issues. I agree with you completely in terms of that seed money helping.

Dr. Jane Lubchenco

I'd like to comment very briefly on the analogy between human gestation and changes in ecosystems. We know a huge amount about what happens when a baby is developing *in utero*. We understand what those changes are. We know how to understand the warning signals about something that's going wrong, and we know, in many cases, what kind of mid-course corrections to take when problems arise. In contrast, our information base for marine systems is nothing like it is for human physiology. We simply don't have the same kind of information, number one.

Number two, we know that marine ecosystems often change very dramatically, very quickly. There are real threshold events that happen in marine ecosystems. And the collapses of many of the fisheries that we've seen have come almost instantaneously where people thought that, in fact, things were pretty hunky-dory.

There's a very real difference between managing human health and managing marine ecosystems—in part because of the difference in the knowledge base, but also in part because of the nonlinearities of these systems. That's one of our biggest challenges, and it means that we need to think about oceans and deal with ocean management in a very different way from what we have in the past.

We need to be able to see early signs of change. We need to be much more proactive. We need to take a much more precautionary approach and not allow changes to happen until all of a sudden there's a crisis. We need, in fact, to err on the side of caution—to be much more precautionary. We need, in part, to change the way all of us—and the public in particular—think about ocean ecosystems. They don't just change very slowly, and you can't often reverse

changes that have been set in motion. They're fundamentally different.

The Honorable Bruce Babbitt

Jane, I want to give just a brief example of what you've spoken about, and it comes from Guam. The coral reefs offshore of Guam reproduce just once each year, and they do it in a two-hour period, seven to ten days after the first full moon in July.

At that little point, packets of sperm and eggs are discharged. They float to the surface and then explode into the mix on the ocean surface. Fertilization happens at that moment or not at all for the entire year. Polluted runoff, freshwater discharge at the surface and that year is gone in that two-hour period. The result in Guam is that many reefs now are headed toward becoming fossil reefs. There are no children.

Dr. Daniel Baden

That's actually a very good scientific observation, because, in fact, for years and years, no one knew how coral reproduced. Once that was determined, we were able to say, "Yes, the fertilization takes place at the surface, and if pollutants are at the surface, then we have a total loss of that year's recruitment."

In educational terms and in scientific terms, let me say that talking to Larry [Merculieff] here, we don't know if the Bering Sea is healthy. And the reason we don't know is because some of the scientific methods that we use to statistically measure and mathematically calculate that did not succeed the collapse of two fisheries in Canada, where a year and a half after the fisheries, it was already too late. They said it was going to be too late, and it was already too late.

What we need to do in that case then, as Dr. Olden stated much earlier, is to enable the science-based funding aspect to take on the policy development aspect, so we can have the good science necessary for making good policy.

Duane Silverstein

My name is Duane Silverstein of the Goldman Foundation. As a recommendation coming from this session, I'd like to endorse the concept that Jane Lubchenco raised about no-take marine reserves, which has been successful for thousands of years in the small Pacific islands with the indigenous people. In western culture, the leader of that is New Zealand.

My question for Bill is that when the no-take reserves were established in New Zealand, the fishing community was very much opposed to them generally. And now they're very much for them, because they see it leading to an increase in stock. How can we get the fishing community to support that in the U.S., so that these become politically feasible?

Captain Bill Amaru

I have a brief answer to that question, and it's a great question. Thanks for asking it.

In New England, as I mentioned in my discussion, we closed substantial portions of the banks. Initially, the fishermen were against it, because they were boxed out of their traditional fishing grounds. Now, almost to a one, they're in favor of keeping the areas closed. We've created *de facto* sanctuaries by doing a management strategy that was designed to protect species. The fishermen are in favor of it because it's producing results—excellent results—that I outlined in my discussion.

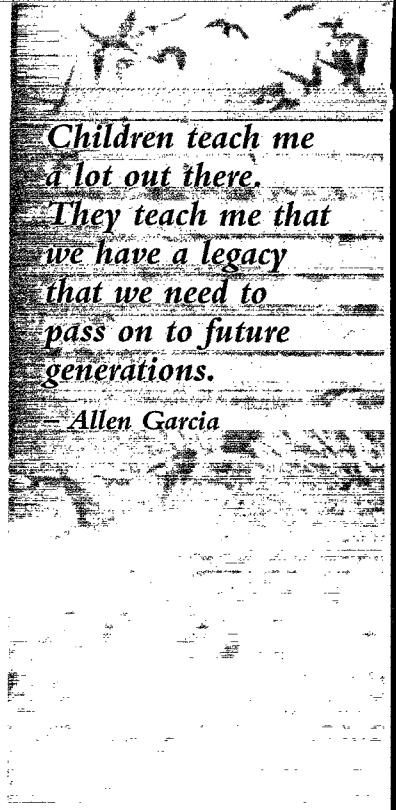
I'd say this to your question, specifically. How do you do it elsewhere in the country? Use New England as an example, for starters. Send them up, and we'll show them what we did, how we did it, and now what we're getting for results. You have to have the will of the people in the management councils that will be deciding on these areas. You have to work with the people in the sanctuary departments to identify critical habitat that you can get the biggest bang for the buck from. You don't need to close the entire area. In some cases, they can be very specific locations where you have the most critical habitat protected. We tried to do that with our work, and we think we've done it.

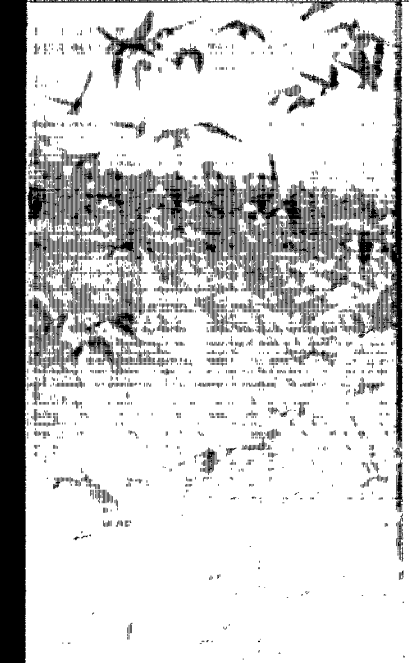
Billy D. Causey

Eleven months ago we implemented a management plan in the Florida Keys where we're using no-take areas. We've set up a three-level monitoring program, and already we're anecdotally seeing positive changes.

To get to your question, the way to get the fishermen on board along with the other stakeholders is to bring them in at the beginning and work with them every step of the way. It can't just be lip service. It can't be just artificial. It has to clearly be with them involved in a role.

We've started a process now we call Tortugas 2000 to establish a second ecological reserve of large size in the Tortugas area to the western end of the sanctuary. Already we have the fishermen at the table. The main thing is—and this is to the environmental conservation community—we all have to play by the same rules. Number one,





don't start talking geography or percentage. Rather, you should start setting up criteria and objectives, and then you have everyone talking about what you're trying to do and identifying commonly to the goal. That's how you bring the fishermen in. You turn to the fishermen for their wise advice because they've been out there and they know the area. And that's what we're doing now to bring the fishermen on board at the beginning of our process.

Wolcott Henry

Wolcott Henry, Munson Foundation. One of the issues regarding affected areas is enforcement. One of the facts that comes at us is maybe 30 percent of protected areas have any enforcement globally. I was just wondering what would the potential for using our military and Coast Guard be for that. I know it's a little "out there," but if we don't need money, let's put perhaps the Navy and Coast Guard to work especially in the legal realm.

Captain Bill Amaru

In our case, the Coast Guard is the agency that does the patrolling, and they're extremely effective, primarily because the fines now are so dramatic that fishermen simply choose not to take that risk. Plus you don't have to take the risk when the fishing is getting better.

Tom Malone

Thank you. Tom Malone from the University of Maryland Center for Environmental Science.

We've been reflecting on one issue, and a lot of issues we've been talking about have to do with disclosure of information between various groups. One of the issues that has just almost been touched on by Jane and Dan a little bit is the fact that we're functioning blind at just about all levels—whether you're talking about scientists, policymakers, or managers. This isn't the only problem, but it's a big problem that we're not taking the right kinds of measures in the environment with the right kind of frequencies to get into seriously talking about outcasting and forecasting environmental change or linkages between land use and what's going on with the water.

My question is that the technology is there all the way from the sensors to telemetry to visualization to assimilation models. Why can't we combine our resources to focus in on that issue in terms of just making the right kinds of measurements? Where would the National Weather Service be without having anemometers?

Larry Merculieff

Again, bringing another perspective on this, northern fur seals in the Bering Sea have been the most studied marine mammal in the entire world. We have over 100 years of research with comprehensive data in every single aspect of fur seals, and scientists from four different countries have been studying that. Even after that, we still don't understand why fur seals have declined 60 percent from their historical peaks. When we look at the situation, we find that the amount of variables in creation is so huge that it's impossible to determine which factor is more important than another. For example, of the organisms in the world seas, the most abundant are sea viruses. Nobody studies them. How do we know if they're not being ignored as a significant component of the environment, which we believe they are? I think that we need to start having some humility in the process.

Dr. Tyrus Cobb

My name is Dr. Tyrus Cobb. I'm president of Yosemite National Institutes, and we're an official partner of Secretary Babbitt. We're the National Park Service's only multi-park partner.

I'd like to touch on a point I don't think has really been emphasized today. And that goes back to the education, the role of nonprofits. I'd like to see an endorsement for this aspect of it, because we've spoken so much on specific issues. What we try to do is bring 30,000-plus people a year through our experiential programs. Two of our campuses, Olympic and Marin Headlands, are located in marine sanctuaries. So we stress marine education very heavily. The output is designed to ensure that school groups—which come five days, five nights—walk away with a sense of spirit of conservation and a sense of personal stewardship for the environment.

It seems to me that when we're talking about building a sympathetic public for the future that will join us in order to make the change that Congressman Panetta talked about, that we don't do it unless we have built up this sympathetic public through this experience—and, in our case, informal environmental education. One of the tasks that was laid out before this conference was that we should have concerted efforts to introduce environmental studies into all levels of form and curricula in order to eliminate environmental illiteracy, increase environmental awareness, and promote environmental advocacy. I'd like to see that factor woven into our discussions as well.

Dr. Daniel Baden

Many of the federal agencies—NIH, NSF [National Science Foundation], and others—already have educational programs in place—K-through-12 programs, high school teacher programs, etc. In fact, in most of these agencies, the centers, programs, or concentrations of experts actually do this already. Those are already on a federal funding basis, so success is variable. Those all do exactly what you're talking about—getting that educational work down into the kindergarten-through-12 grade levels.

Ocean education provides an exciting means to draw children in to science and technology and a commitment to the stewardship of our planet.

Photo: New York Aquarium for Wildlife Conservation

The Honorable Leon Panetta

Let me suggest one possibility that might help. I know when we were dealing with AIDS, part of the problem of dealing with AIDS research was that it was located in many different parts of the federal government—in [the] Veterans [Administration] and NSF and NIH—and you never had a sense of what exactly was going for AIDS.

One of the things, Bruce [Babbitt], I think that might be a good idea is to consolidate a budget on oceans, and even separate it out in the budget at the federal level so that you really do see what all the programs are that relate to the oceans. Then you know what the consolidated number is that you're after in terms of funding. It will help. I think instead of having this battle over who does what, you can at least see it in one place, what is being devoted at the federal level to oceans research and education, etc. I think that would help out the lobbying effort as well.

Billy D. Causey

I want to address the issue of education because it's one that keeps coming up, and I think it's another common thread that we can weave with one of our other panels. In turning to the co-chairs of this conference, the Navy has been extremely successful over the years in reaching middle America with their message of getting sailors from middle America to ships on the coast. We need to tap into that kind of educational success to get the message to middle America that our national marine sanctuaries, our oceans, and our estuaries are important. However the Navy has done that, we need to capitalize on that opportunity.

Vicki Nichols

Hello. My name is Vicki Nichols, and I direct Save-Our-Shores. Save-Our-Shores has been very instrumental in sanctuary protection and in designation, so I very much understand the concern and the quandary of how you get money into an area that's already protected.

That leads me to another question about protection and then the implementation of these measures. Can you give us some guidance as to how we can actually implement the essential fish habitat provisions? It looks like they're getting weak; it looks like we might be losing them. It is so important to really work on habitat. I bring that to the panel.

Jake Merculief

I'm Jake Merculief. I'm mayor for the city of St. Paul, Alaska. We have a Bering Sea pamphlet here that lists four points on how we like to manage the ecosystem in St. Paul. St. Paul Island is in the middle of the Bering Sea, about 750 miles west of Anchorage, 200 miles west of the Aleutian chain.

Gerald Barber

Thank you, sir. I'm Gerald Barber. I'm the chairman of the National Wildlife Federation, and I think that we've come to a consensus by talking about several different things. One of them was that we need more science, we need more education, we need more enforcement.

On the education front, we have 700,000 hits a week to our Web site in the National Wildlife Federation, so we know about education. On

Healthy beaches, estuaries, and oceans depend on the health of the upland areas, like those bordering the Columbia River shown here, and on the control of nonpoint and point sources of pollution.

enforcement, particularly the Clean Water Act, we're real concerned that there's not good enforcement in many cases, particularly when it comes to enforcing mitigation that's already been promised. I'd like to know, how do we get the promised mitigation, not future promises? If we can't get the past taken care of, I know we can't get the future taken care of.

Peter Douglas

My name is Peter Douglas. I'm the director of the California Coastal Program. I'm also the co-chair of the Coastal Zone '99 conference. And I appreciate the importance of leadership—Leon [Panetta], Mr. Secretary [Babbitt], the administration—being here.

I'd suggest that you target Coastal Zone '99—which is a biannual conference, a premier national, international conference on coastal and ocean management that's going to be held at the end of July of 1999 in San Diego—as the forum to give a report card on what actions have been taken to follow up on this conference here in Monterey.

The Honorable Bruce Babbitt

Excellent. Good idea. Specific challenge. We'll take that under advisement. We'll carry that to our superiors.

Michael Wilson

Thank you, Mr. Secretary. My name is Michael Wilson. I'm the director of the Department of Land and Natural Resources in the state that our governor distinguishes as being managed as an inland state—and actually, it's Hawaii.

I want to thank you for the sanctuary program. And I want to endorse the idea that if we're going to bring together various interests for political development, there is no better way than with the sanctuary. It brings in enforcement. It brings in education. For us, it's creating a partnership with fishermen. I'd suggest that, referring to your terrestrial analogy, if we can increase the number of sanctuaries—start thinking of them more as national parks—it could be a tremendous point of cultural inspiration so we can get organized politically.

Cliff Curtis

My name is Cliff Curtis with the World Wildlife Fund. I direct the toxic chemicals program.

Two points. The precautionary approach can be a very exciting, dynamic framework for the recommendations coming from this panel. Jane [Lubchenco] alluded to it and others indirectly. I hope in the co-chairs' and panel's recommendations, that's a key component of a symbol for what's at stake here in terms of ocean management and decision making.

Second, on toxic chemicals, several of you alluded to the land-based impacts in our coastal and marine waters. It's a critical issue that needs to be addressed at the national level through reductions at the source, but it also needs to be addressed internationally. The U.S. needs to show leadership in an upcoming global treaty negotiation that starts in two weeks in Montreal on this terribly important subject of persistent organic pollutants. Thank you.

Richard Charter

My name is Richard Charter. I'm co-chair of the National OCS [Outer Continental Shelf] Coalition. I think I need to introduce a cautionary note to this quest for funding. There was mention made earlier of a report from the OCS

policy committee. I'd direct each of you to go to the NFS Web site, download this under "Impact," and go to page 9. What you'll find is a very interesting set of formulas that provide incentives for new offshore leasing, new offshore drilling. It says the closer your community is to the drilling activity, the more money you get. Particularly of interest in Alaska, it says that, after the OCS program in your state, if you're willing to allow new offshore drilling or new production to existing leases, you'll get more money.

This bill is going to be introduced by Congressman Don Young in about two weeks. It is being billed as a rehash of the Land and Water Conservation Fund. And I'd suggest that as our distinguished co-chairs return to the plenary session and convey to the Vice President our need for funding, we don't make a Faustian bargain that undermines the moratorium that Mr. Panetta explained to us was generated by Interior Secretary James Watt 17 years ago. We come from a coastal state that's protected by the OCS moratorium. That's any East Coast state, any West Coast state, Alaska, and parts of Florida. Be very careful about OCS impact assistance. It is a bargain with the devil.

Linda Krop

I want to follow up on what Richard Charter just said and ask for some real specific advice and commitments from our illustrious guests here today. My name is Linda Krop. I'm with the Environmental Defense Center, which is a nonprofit political environmental law firm in Santa Barbara, California. A lot of our work deals with offshore oil and gas facilities, which are a major source of pollution in our ocean environment in terms of air quality, spills from platforms and pipelines, discharges of toxic chemicals, and now platform disposal at sea.

We have great policies and laws at the state and local levels. We need support from the federal government. Despite state bans on oil and gas leasing, the federal government, every five years, pushes more leasing off our coast. Despite state and local policies against marine pollution, the federal government authorizes development off our coast.

We have different strategies to pursue. I have a question for Mr. Panetta. Which of the following do you think would be most effective in terms of designating more marine sanctuaries: pursuing legislation for a permanent ban on oil and gas leasing, such as the Coastal Fisheries Protection Act; administrative policies; or buying back leases? I'd also like to hear from Secretary Babbitt. What kind of commitment would you be willing to make, given that these actions I'm talking about have been taken by the Minerals Management Service, which is under your oversight?

Dr. Pierce Flynn

I'm Dr. Pierce Flynn, director of the Surfrider Foundation. I wanted to endorse the idea that our healthy beaches and coastal waters are dependent on healthy inland watersheds.

My question is for Congressman Panetta and Secretary Babbitt. What are the administration and Congress doing to increase welfare grazing, mining, and timber-cutting subsidies on publicly owned federal lands that contribute to nonpoint-source pollution, and what are we doing to increase economic incentives to business for compliance?

Carl Safina

I'm Carl Safina from the National Audubon Society. Jane [Lubchenco] identified these following problems: nitrogen, phosphorus, algal blooms, destruction of ocean habitats, invasive species, etc. I'd submit that these are not problems. These are symptoms, and the root problem is overpopulation and overconsumption.

Another quick comment is that some themes that have emerged are that this administration hasn't enough money, this administration hasn't enough science, and Congress has too many Republicans. That Republican-dominated Congress gave to this administration the Sustainable Fisheries Act. I'd like to posit, since we don't have time for questions, that the National Marine Fisheries Service isn't faithfully implementing the intent of the Sustainable Fisheries Act, with regard to ending overfishing and rebuilding depleted populations. Thank you.

Panelists' Closing Remarks

Sarah Chasis

I want to address the fisheries issues because we're very concerned right now about overfishing, bycatch, and essential fish habitat. We're seeing the National Marine Fisheries Service and NOAA and the White House appear to back down in terms of really sticking to the mandate of the Sustainable Fisheries Act.

We need support from scientists, from fisher people, from not just the environmental community to reverse this and to make sure that the fisheries are managed in a sustainable way and that serious compromises aren't made at this very critical time in the implementation of the act. I look to all of you for support on that point.

Dr. Daniel Baden

For those issues that we already know about, the solutions we ought to be implementing. For those that we don't, we ought to be developing the science-based measurements, correlating with effects, developing the solutions, and then implementing. Thank you.

Larry Merculieff

I don't come from a place that subscribes to the belief or paradigm that we can control or manage ecosystems. I think the only thing that is under our influence is the ability to influence human behavior, and there are no scientific studies being done on that in terms of the environment.

Billy D. Causey

I have to point out that there have been several themes that I've picked up on, and one is the concept of marine protected areas and marine reserves. I think that we need to continue to be a leader and forge ahead in adopting this concept to protect the biodiversity of our marine environment.

Captain Bill Amaru

I'm going to try to answer one of the questions. It was the first one posed by the director of Save-Our-Shores. As the vice chairman of the habitat community on the New England Fishery Council—and, by the way, it's the councils who have the responsibility for drafting the wording of protecting habitat areas—we're not giving in or letting up on our determination to identify essential fish habitat and to make changes in fishing activities. I don't know about the other councils. I know that the National Marine Fisheries Service, as part of its responsibility to the country, has addressed comments made by people who are in the nonfishing sector concerning what we're doing with essential fish habitats. I think there may be a rush to judgment on exactly how much is being let go on this issue.

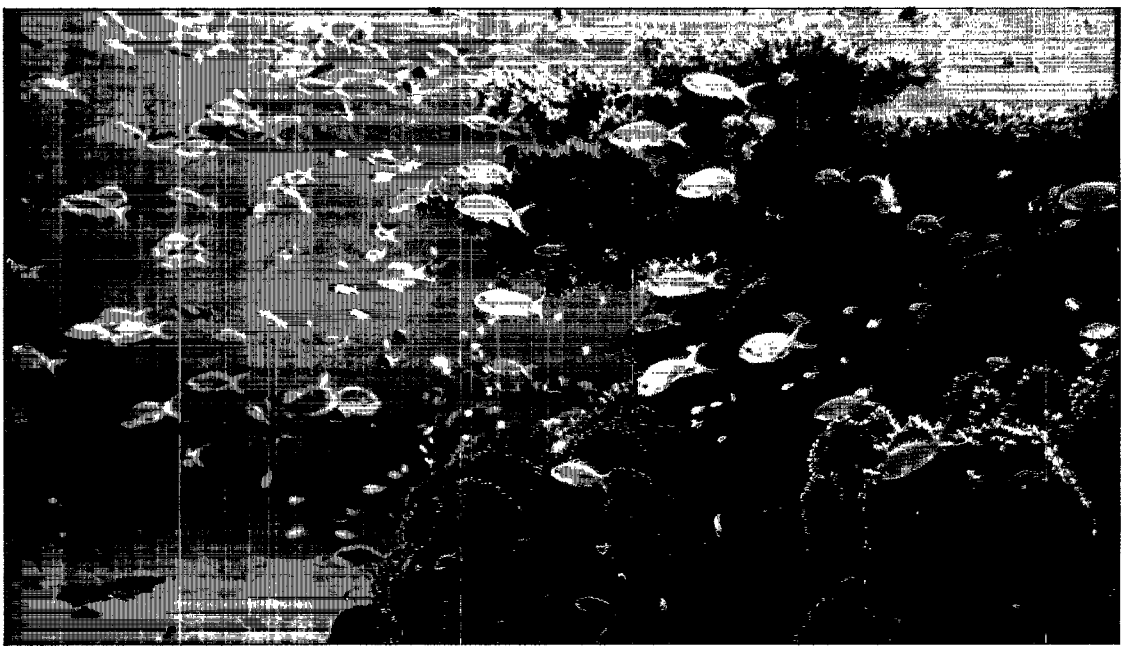
Allen Garcia

It was very interesting that someone brought up the fact about subsidized industries. Agriculture is heavily subsidized for one thing: producing commodities. Why don't we take the commodity program and turn it into an environmental program. Then it will pay farmers to be the good stewards of the Earth that we really are. The money is in place. It wouldn't cost the American public one dime more.

Dr. Jane Lubchenco

Three quick points. First, I'd urge us not to unnecessarily politicize ocean issues. They're far too important. We need broad bipartisan support to move ahead. Second, Carl [Safina] drew our attention to the overarching drivers of population and overconsumption, and to that I'd add inequity and ignorance, that are right on the money. We have to address those issues. Third, I endorse the suggestion that the single most powerful management and conservation action that we could take at this point would be to establish no-take marine protected areas.

Marine reserves, or "no-take" areas, where marine life is fully protected have successfully allowed natural coral reef populations to recover from the damage caused by human activities in certain areas.



The Honorable Leon Panetta

I want to respond to a couple of issues. Number one, the OCS issue is an issue close to my heart because in the year 2000, the moratoria that was put in place expires. I think it's very important that rather than hope that you can develop sanctuaries or protected areas that ultimately would solve a lot of the problem, what's neces-

sary is for the administration to issue an executive order that continues the moratoria on offshore drilling. George Bush could do it. I think Bill Clinton can do it as well.

On the issue of subsidies, I think it comes back to the necessity to have an Oceans Task Force at the federal level. Unless you put all of these people in one room, and unless they face each other, you have no idea what kinds of incentives one department is doing that conflict with policies in another department. You've got to put people in the same room. They've got to know what the ocean strategy is. Ultimately, that kind of coordination is absolutely essential if you're going to be able to develop some kind of common oceans policy at the federal level.

Fred Hansen

There were so many comments. We'll be weaving them into our report to the Vice President this afternoon.

Two points I'm struck particularly by. First is that there are four panels or four different discussions going on this morning. We, by far, in this group have a disproportionate number of people in this room because of how very critical the health and ecological issues are around oceans. I think that is—just by numbers, if nothing else—underscoring the importance of the issues we've been discussing.

Number two is that, as both Jane [Lubchenco] and Carl [Safina] said, we need to be able to make sure we focus on the problems, not the symptoms. We've identified a lot of different parts of the problems and some symptoms. We'll be pulling them together and making recommendations on them.

Thank you all. This has been very, very valuable. A special thanks to our panelists.

Issue Forum Summary Report to the Vice President

(Presented during the Cross-Cutting Issues Plenary Session)

Vice President Al Gore

The Deputy Administrator of the EPA, Fred Hansen, is prepared with the report of the panel. I know Secretary of the Interior Bruce Babbitt was with you all this morning, but left to attend his daughter's graduation. Of course, the EPA Administrator, Carol Browner, is here now. But Fred, you're kind of the continuity on this panel, and you've got the report of the panel, correct?

Fred Hansen

I do, Mr. Vice President. It is the environment and health panel. Although certainly taking nothing away from the other three panels, it's important to note that the attendance at this panel was the largest among all of the panels. I think it underscores how the people in this room believe that the environment and health issues are absolutely critical to long-term sustainability, and it is essential to be able to protect this very vital resource.

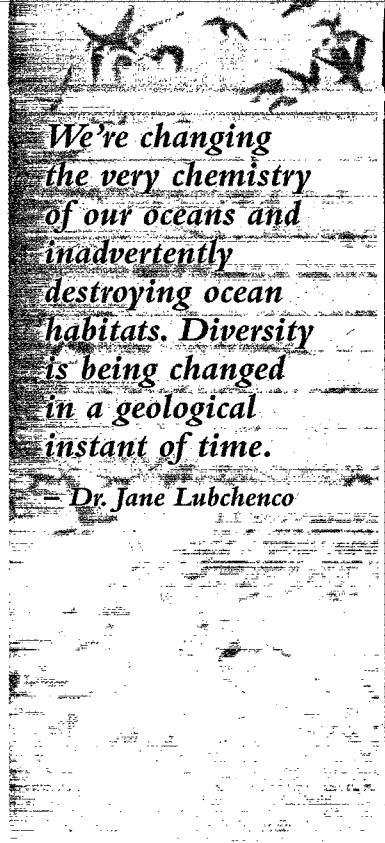
The causes of the ocean crisis are real. And I think our panel did put it clearly in terms of crisis that the oceans are under assault from pollution that comes from both the land and the air, destructive practices from dragging of certain nets or other fishing practices, overfishing, and certainly habitat loss. As one of our panel members, Jane Lubchenco, said, systematic changes are happening to our oceans. We're changing the chemical, physical, and biological composition of the oceans.

Some of the things that people saw as the symptoms of the issues were:

- First, the damage to the quality of the beaches, the oceans, and the estuaries is showing up in beach closings and contaminated shellfish beds, contaminated waters, dead zones, and harmful algal blooms—a series of issues that are of very real concern, certainly in 1996, as we saw beach closings of 2,600 across this country, and increasing in 1997, as well as over 2,200 fish advisories that were issued for fish consumption in 1996, again increasing in 1997.
- Second, the symptoms also pointed to the loss of the carrying capacity of the oceans, declining fisheries, loss of habitat, loss of biodiversity, and invasion of exotic species. All of these again underscore the issue of declining capacity.
- Last, the panel spoke to the lack of understanding on the part of the American public as a whole about how important the oceans are, how critical they are to our long-term sustainability.

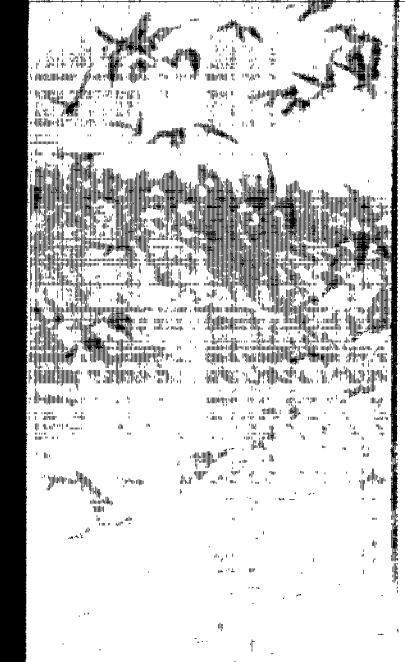
The specific areas that the panel focused on that needed to be addressed broke down as follows:

- The first dealt with how we manage—or, in some view, how we don't manage—effectively our ocean resources. As one looks at the issue of healthy beaches, estuaries, and oceans, we understand that they depend to a large degree on the health of the upland areas and the control of nonpoint-source pollution, additional controls on point-source pollution, and incentives as ways to be able to address those issues.



We're changing the very chemistry of our oceans and inadvertently destroying ocean habitats. Diversity is being changed in a geological instant of time.

— Dr. Jane Lubchenco



- We also believe that the lining up of the public interest with the threats and the risks that are facing our oceans was particularly important. There is the need to bring together ocean interests and competing interests from multiple stakeholders, to be able to produce a unified powerful force to build political will for action. In that, a key ingredient was to be able to have broader information for the public about what those risks are.
- Within that management of the resource, we need to be able to focus on the role that government plays and the disparity across the federal government and also among the federal, state, and local governments—the fact that those are not coordinated. There is a need to be able to have a much better integration both across and among those different governmental levels.
- We need to be able to build substantially in the areas of partnerships. You've heard this from each of the panels. There is the need to be able to bring all interests together—from indigenous people who are relying upon the oceans for their livelihood, for their very lives, to commercial and sports fishery interests, to the environmental and community interests, to shipping, to all parties.
- Next, the panel discussed education and the need to be able to bring a much higher level of understanding to all Americans about the need for protection of the oceans and a much better understanding of the health of our oceans. You announced this morning some of the efforts that are in fact being taken to be able to address more information to the public—absolutely critical.
- We also focused on research and the need not only to be able to have a better understanding of exactly what the risks are to the ocean environment, but also to be able to ensure that research and that information lead us to be able to address better management decisions, to be able to manage the resource better.
- Last, there was some discussion about the need for additional funding. The concept of being able to have this tied, as some have suggested, to any form of royalty or extraction met with large amounts of skepticism in terms of whether or not that would in fact build incentives that did not appropriately balance the long-term protections of the ocean resource.

The specific recommendations were:

- To establish a federal Ocean Task Force to coordinate national ocean actions and the policies of all parties.
- To be able to coordinate much better the federal agencies, in terms of their research budgets, to use existing structures within the administration, and to coordinate and better focus those efforts.
- To construct a national network for marine protected areas.
- To establish systems of no-take marine areas as a way to be able to further protect sensitive marine areas.
- To implement the Clean Water Action Plan that you and the President have so strongly supported and have reflected in the budgets that are before Congress now.
- To be able to finally report back to the Coastal Zone '99 meeting—the next year's meeting—what the results are that have come from the actions being recommended here today. There are obviously very real interests in terms of being able to make sure that we have overall a comprehensive approach to oceans, to be able to balance and involve all different parties, and to be able to make a science to address problems both to understand and to better refine our responses.
- Last, again, public education is necessary to better address all of these issues and have the support of the American public.

Questions from the Vice President

(Presented during the Cross-Cutting Issues Plenary Session)

Vice President Al Gore

Well, thank you very much, Fred, and thank you, Administrator Browner, for what you all have been doing at EPA on these issues. One of the announcements that I made this morning had to do with a new Web site that EPA is putting up to give the public—all of us—the chance to instantly find out about the health of beaches that we might want to take our families to. If there's some problem or beach closure, then the information is there immediately. It was up as of today, right? Do you know the address?

Carol Browner

You go to the EPA site.

Vice President Al Gore

Okay. If you don't know that one, you can get to that through the White House Web page, which is "whitehouse.gov." Then you go to EPA, and then you go to Beach Watch.

I want to call on Sarah Chasis, a senior attorney with the Natural Resources Defense Council. She has a lot of experience in serving as an attorney for this environmental group, working to deal with the problems of pollution in the oceans and decline in fisheries and coastal pollution and the like. In that capacity you've been involved in these ocean and coastal issues for quite a while. In your opinion, based on your experience, what is the most important thing that the federal government and state governments can do to address problems that result in these beach closures and fish kills and loss of marine habitat?

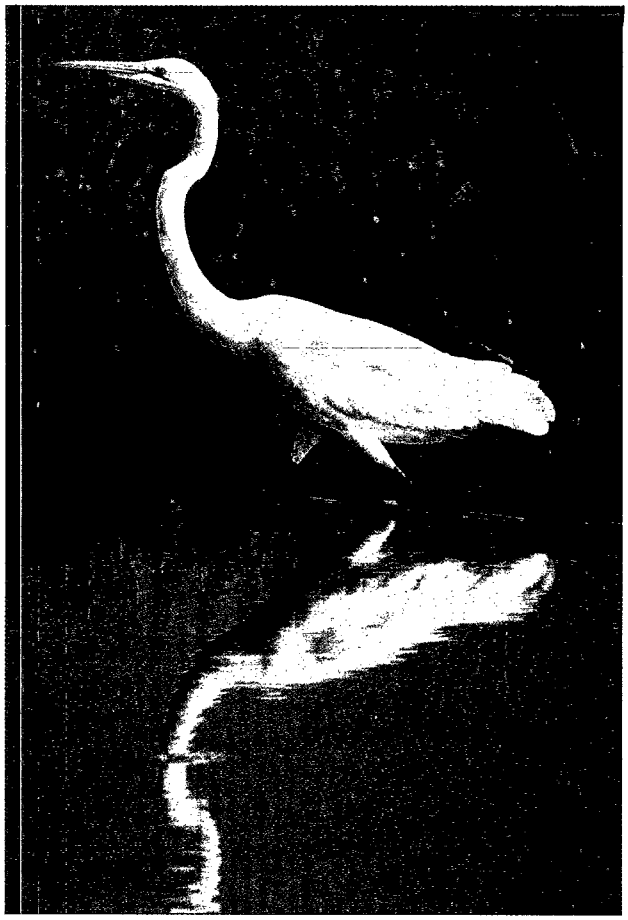
Sarah Chasis

They need to do a better job of cleaning up the sources of pollution. We're still seeing untreated or poorly treated sewage and polluted runoff from agricultural and urban areas entering our coastal and ocean waters.

In the meantime, states need to more comprehensively monitor and notify the public when there are contamination problems in our beaches or in our fisheries and shellfisheries. We think there needs to be a national safety standard that will guide the states and standards for what constitutes an adequate monitoring and public notification process. The people should have a right to know what they're getting into and whether the fish they catch are contaminated.

The Clean Water Action Plan that you and the President released in February contains many important elements that would address these problems. What we see now as the challenge is to secure funding for implementation of that plan. We think that if Congress can authorize $200 billion for transportation projects, they should be willing to appropriate half a billion dollars for implementation of this plan. We think the federal agencies that have committed to quite specific timetables for action need to adhere to those in the implementation of that plan.

In terms of protecting marine habitat, we see two very critical and important opportunities. One is the newly amended nation's fishery law. The Magnuson–Stevens Fishery Conservation and Management Act provides a real opportunity to enhance habitat protection. It has a provision for the identification and protection of essential fish habitat. We are somewhat concerned right now that there is pressure to weaken implementation of that important provision, and we would urge the administration to stand strong on that.



The Administration's Clean Water Action Plan commits to a net gain of 100,000 acres of wetlands annually by the year 2005.

Photo: S.C. Delaney, U.S. Environmental Protection Agency

There were many panelists and members of the audience at our environment session this morning who strongly believed that another important mechanism for habitat protection is the creation of these marine reserves in each region of the country where there would be no take of fish, and human activities, essentially, would be put off limits. There has been experience reported in New England and Florida and elsewhere that when this has been done, there has been a resurgence of marine life in these areas, and they can, in fact, contribute to sustainable fisheries.

Those are important mechanisms we see to help address some of these environmental issues.

Vice President Al Gore

Very good. Thank you. I remember coming out here to this location in 1992, right after I had worked with Leon Panetta in support of his effort to establish the national marine sanctuaries, the largest of which is here. That's been a big advance, hasn't it?

There must be a coordinated effort at the local, national, and world levels to try to provide the kind of protection that's necessary. We need the will to fight and continue to fight for the protection of our oceans.

– The Honorable Leon Panetta

Sarah Chasis

That's been tremendous. It's a great example of how you can bring agencies and different levels of government in an effort to more comprehensively and effectively manage a resource. I think we need to see more of that experience replicated elsewhere.

Vice President Al Gore

Now, years ago there used to be a saying, long since thoroughly discredited, that the solution to pollution is dilution. A lot of people had it in their minds that there's so much water in the ocean, you're not going to do that much damage if you just let some pollution drain off into the oceans. Now tell us succinctly why that's so wrong.

Sarah Chasis

I think Jane Lubchenco on our panel this morning was very eloquent in describing how excessive nutrient pollution has really changed the chemical content of the ocean and has contributed to the proliferation of toxic algal blooms and dead zones. We have a dead zone the size of the State of New Jersey in the Gulf of Mexico during the summer months.

Vice President Al Gore

And it's growing rapidly.

Sarah Chasis

Yes. And pathogens. We have beach closings mainly due to the fact that we've got disease-carrying bacteria and viruses entering our coastal waters. So, clearly, dilution is not the answer. We're seeing acceleration of contamination because of the pressure on our coast from so many more people living in our coastal areas.

Vice President Al Gore

I know that in some quarters, people sometimes get angry at what you all do, and frustrated. I'd just like to say on behalf of millions of people, there are lots of us who appreciate what your group and other environmental groups do in helping to marshal the forces that are needed to clean up the water and the air, and we appreciate that very much. Please keep it up.

I'd like to call now on Larry Merculieff, who is an indigenous people activist with the Bering Sea Coalition. Mr. Merculieff, you've spoken of the valuable resources in the Bering Sea and of the need to seek traditional knowledge and wisdom from Alaskan natives in understanding that sea and to engage Alaskan natives in collecting new information. Could you please elaborate?

Larry Merculieff

Yes, I'd be glad to, Mr. Vice President. In the Bering Sea, our people have noted at least 16 major species in a state of severe and sustained decline. The magnitude and geographic spread of these declines on the Russian and U.S. sides of the Bering Sea are such that they threaten to fundamentally restructure the Bering Sea as we know it and threaten the viability of the coastal cultures in a way very similar to what's happening to South American rainforest cultures.

Our people have been out there for at least 500 generations, and we have traditional knowledge and wisdom passed along from each generation to each generation. We also are raised in a way that we have a holistic view. We see things in the environment in terms of connections.

In the Bering Sea, we have an unprecedented opportunity to connect—given today's technologies in telecommunications—all these coastal communities around the entire marine ecosystem in a formalized network of information sharing. If we were able to do that, we'd be able to, for example, perhaps function as an early warning system and identify environmental and biological anomalies very quickly and over a very large area. We can also have a big-picture view of the Bering Sea, very quickly, in a way that we can identify whether or not an anomaly is an isolated incident or something that's ecosystem-wide. I believe that these kinds of things can help formulate the scientific hypotheses to better target what really is going on.

Fundamentally, what this is all about is whether or not we have a process in the systems of marine science that embraces different ways of viewing the world and different ways of thinking. I think if we do that, we're going to come up with much better solutions to what's going on in our marine systems.

Vice President Al Gore

Thank you very much. Now, incidentally, they say that the effects of global warming are more pronounced in the higher latitudes. Have you and your people noticed changes in this generation compared to the previous ones and the onset of spring, the warmth, etc.?

Larry Merculieff

Yes, we have very significant changes. Some of the information passed along for generations goes back, in some cases, a thousand years. All of the native peoples, particularly in the further north latitudes, the Siberian Inupiat and the Inuit peoples have noted that sea ice is thinning very fast and in a way that has never been known in memory for a very long time.

We're also seeing very subtle but significant changes in the behavior of animals, where they're moving, reproduction, etc. They're very, very subtle, but we picked those up. We believe that in the Bering Sea and in all northern latitudes, global warming probably is going to be identified quicker in terms of significant impacts than any other place in the globe.

Vice President Al Gore

A lot of the scientists confirm what you say. One of the reasons, as they explain it, is that the effect is magnified in areas with a lot of snow cover because when the snow melts at the edge, there's a great big change in the amount of sunlight that's reflected. Where, as more than 90 percent of the sun's heat as well as light bounces off snow and ice when it melts, more than 90 percent is absorbed by the dark earth and by the dark sea. That magnifies the extra heat right at the edge of that ice and speeds up the ice melting and kind of magnifies the phenomenon there. That's one of the main reasons they say that that warming trend will be significantly more pronounced in the Arctic and in parts of the Antarctic also.

Of course, since the climate system of the Earth is partly an engine that balances out the heat around the world and moves heat from the equator toward the poles, if that traditional ratio of heat at the equator to coldness at the poles has changed not evenly at every latitude, but dramatically at the poles and less dramatically at the equator, then that ratio changes. And some of the patterns of wind and ocean currents and clouds and storms that transfer heat and exchange heat—some of those patterns that have been stable for thousands of years can be disrupted.

We had an event in the White House earlier this week where the scientists from Jim Baker's agency, NOAA, showed us the evidence that appears to demonstrate that this global warming trend is associated with much more frequent and much stronger El Niño events. While more research needs to be done to pin down the relationship and explain it, we know that El Niño is driven by heat, and if there's more heat in the system, then that correlation is one that shouldn't be all that surprising.

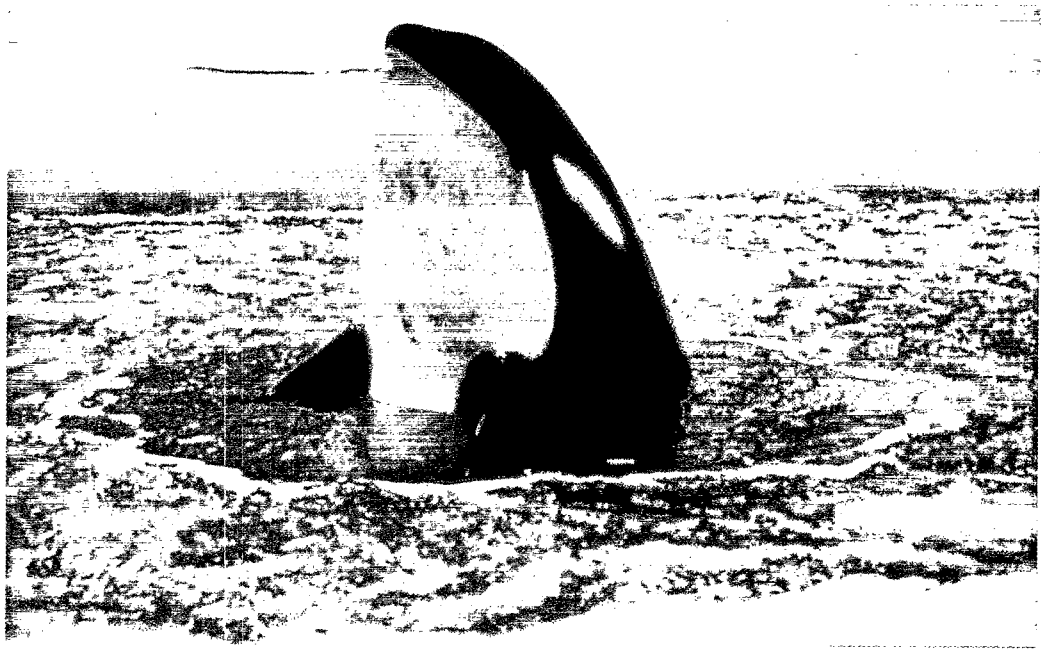
The real point is that if it's the way they think it is, we could be seeing a lot more strong El Niños like the one this past year, and they could be coming more frequently. That, in turn, has an impact on the distribution of the species in the ocean and what latitude these fish species are at. There have been studies about the salmon moving much farther north, just to take one example. Certainly the experience of your people is a unique source of knowledge to try to better understand all this, and I want to thank you.

Larry Merculieff

Mr. Vice President, I just want to say one last thing. What you just said is absolutely true. The El Niño events are so huge we already have a situation where the species are weakened because of the decline, and our people throughout the Bering Sea are now noting tens of thousands of sea birds washing ashore dead on a monthly basis.

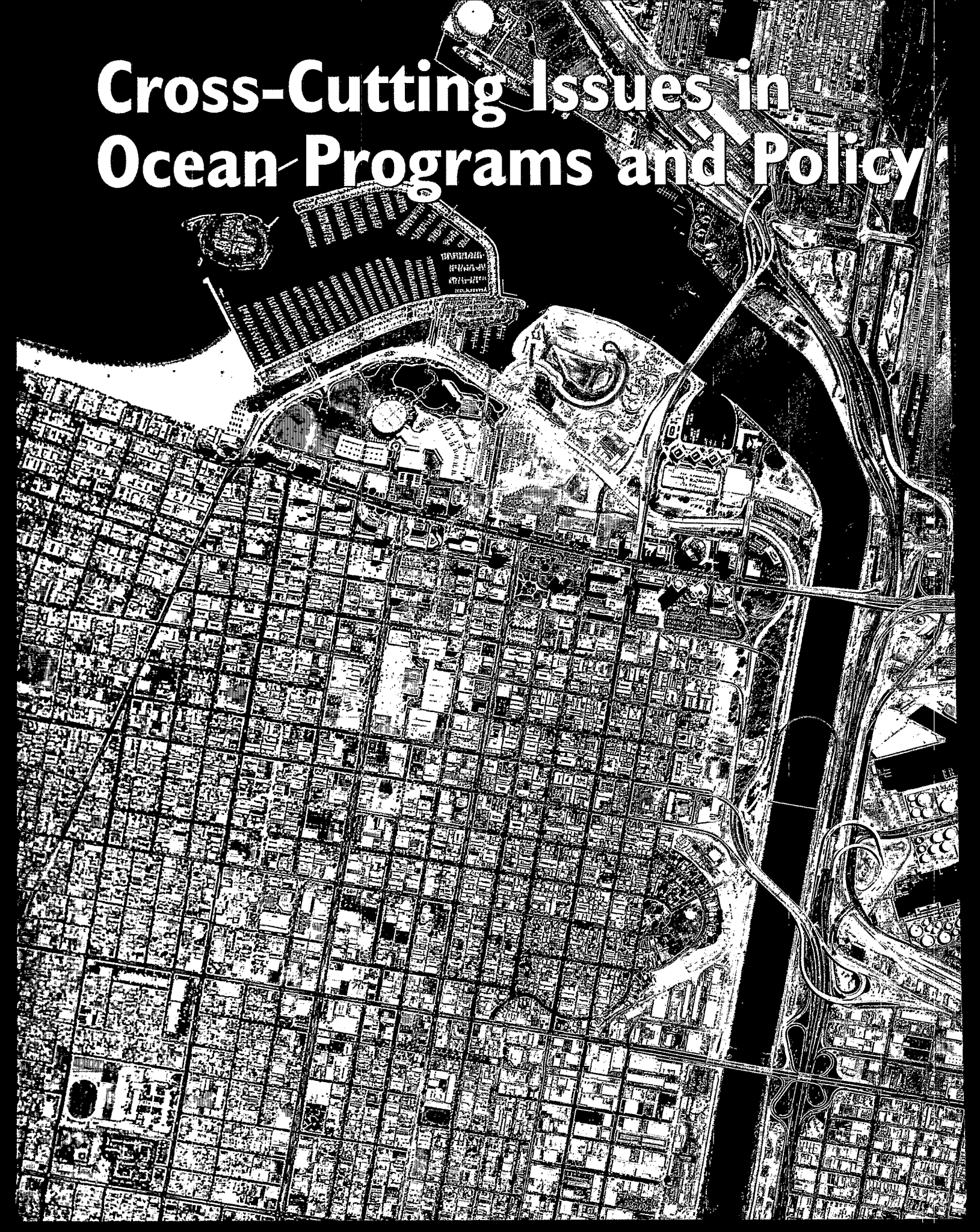
Vice President Al Gore

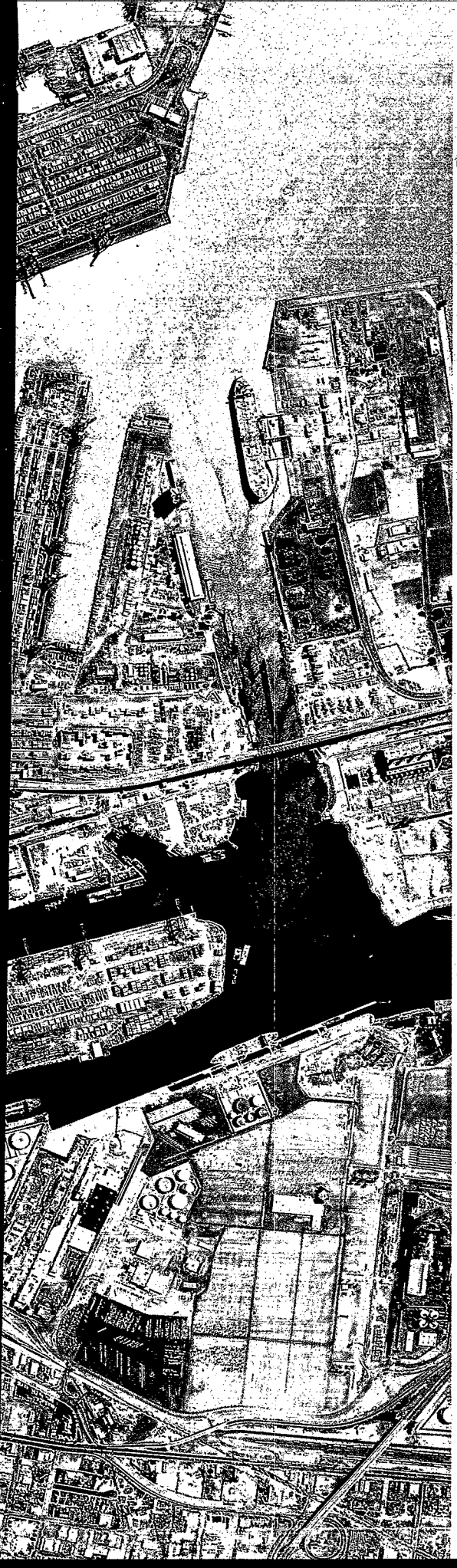
Maybe that will make some people wake up. No one won't think it isn't a serious problem.



In far northern and southern latitudes, global warming may be identified quicker, in terms of significant impacts on ecosystems, than other regions of the globe.
Photo: NOAA

Cross-Cutting Issues in Ocean Programs and Policy





Five cross-cutting issues were key points of discussion during the conference: ecosystem health, sustainable use of ocean and coastal resources, research, Law of the Sea, and ocean management.

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VICE PRESIDENT AL GORE

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PHOTO: NOAA

Cross-Cutting Issues in Ocean Programs and Policy

[Editor's Note: Issue forum summary reports and issue-specific questions from the Vice President presented during this plenary session can be found in the preceding chapters on commerce; global security; exploration; education, and research; and environment and health. For page numbers, see the contents list at the beginning of this document.]

Introductory Remarks

The Honorable Sam Farr

Good afternoon. I'm Congressman Sam Farr. It gives me a great deal of pleasure to welcome you here to King Hall at this great naval facility here in Monterey, the birthplace of California government.

I stand here as a Congressman in the shoes of Leon Panetta, my predecessor, who served so ably in Congress and entered Congress with the Vice President in 1976. Leon went on to become Chief of Staff to the President and is now an activist citizen and a panelist.

The Vice President first visited the Monterey Peninsula in 1992 as a candidate for Vice President. At that time my daughter had the honor of introducing the Vice President, so I stand here today as the father of the daughter who gets to introduce the Vice President. Perhaps this Vice President, to this room, doesn't need any introduction. Nobody in this role in the White House has ever done more for protecting the global interests in the environment than Al Gore.

Arriving in Congress in 1976 as an activist Congress member and then getting elected to the Senate in 1984, Al Gore was the voice that started the cry about deforestation of the rainforest and the need to pay attention to global warming. Certainly those of us who have served on the Armed Services Committee recognize his leadership in being able to unite the defense industry in the United States to collaborate with the scientific community so that we could use the intelligence-gathering satellite systems and other monitoring systems to enhance our understanding of the planet.

Vice President Al Gore has been an activist Vice President. And it gives me a great deal of pleasure to introduce you to a person who is probably the greatest friend of all the people in this community of interest here today—whether they be the defense interest, the environmental interest, the economic interest, or the social welfare interest—because today we are welcoming the person who has stood tall to bring the issues of environmental science and ocean protection to the street level and interactions of all politics and all community discussions. Our great Vice President, Al Gore.

Vice President Al Gore

Thank you very much. I want to thank Sam Farr for his wonderful leadership in this district and our country. He does a fantastic job. He's been telling me about this conference since before it was even planned, and I'm just thrilled to be here. I've been looking forward to it. Sam and I had a

Vice President Al Gore presided over the conference's plenary session on Cross-Cutting Issues in Ocean Programs and Policy.
Photo: Official White House photograph

good time earlier today exploring the ocean bottom with that remotely operated submersible vehicle. It was really great. Anyway, thank you very much.

As you mentioned, Sam, we're here today with my long-time friend whose shoes you've filled, who did such a great job as Director of OMB [Office of Management and Budget], Chairman of the Budget Committee before that, and then Chief of Staff to the President—Leon Panetta. We had a great visit earlier today. I want to say to the people of this congressional district that you've developed a really good pattern of sending terrific people to the Congress, and I really mean that. Leon and Sylvia [Panetta] both had lunch with me and Tipper [Gore], and we've been very, very close for almost 23 years now. Anyway, it's great to be here with both of you.

To my colleagues and President Clinton's Cabinet; Administrator of the EPA [Environmental Protection Agency], Carol Browner; the Chair of the Council on Environmental Quality, Katie McGinty; the Secretary of the Navy, John Dalton; Admiral James Loy, Commandant of the U.S. Coast Guard; Administrator Jim Baker of NOAA [National Oceanic and Atmospheric Administration]; and Rear Admiral Chaplin, Superintendent of the Naval Postgraduate School, thank you very much for your hospitality. To all of the other distinguished guests who are here, I'll be calling on many of you as this session goes on.

To every one of you, welcome to the nation's very first National Ocean Conference. Just a short time ago, as I mentioned, I was aboard the MBARI's [Monterey Bay Aquarium Research Institute's] *Western Flyer,* and I saw that remotely operated vehicle and had a chance to steer it a little bit. It was great fun and very impressive, because it's able to gather specimens and geological samples from the seabed. It's able to drill holes in the bottom of the ocean floor and take broadcast-quality video, all at the same time. It made me realize freshly just how much scientific knowledge is now at our fingertips and how important it is for us to harness it.

Let me move now, since we've heard a report from each of the four panels, to some of the issues that cover all of the panels.

Law of the Sea

Vice President Al Gore

We talked about that Law of the Sea earlier, and I don't want to dwell on it overly, but it seems to be a very, very important issue that touches all of these panels. The hallmark of the Convention on the Law of the Sea is the fact that it strikes a balance in setting an overall legal framework for the high seas. I'd like to call on John Norton Moore, who is on our Oceans and Global Security panel. Professor Moore, you were one of the U.S. negotiators for the Convention, and you serve as a leading expert on the Law of the Sea. What has changed since that Convention was first negotiated, and why is it significant to U.S. economic interests?

Professor John Norton Moore

Mr. Vice President, America should adhere to the Law of the Sea Convention now. You've heard from Secretary Dalton and from Admiral Loy and many others on the many important U.S. oceans interests and environmental and security interests that are served by adherence and, very important, that no U.S. interests would be served at this time by continued nonadherence. Our interests strongly favor the United States' accepting the treaty at this time. Very rarely does one find any major public policy issue—much less a treaty—to be considered by a nation that has virtually all benefits and virtually no costs as you look at the difficult cost-benefit equation. And this is one of those.

I think, Mr. Vice President, that in the broadest sense, what's really at stake here is America's leadership role in the world. Our nation did lead the world in the very long negotiations lasting more than a decade for the Law of the Sea Convention and, as you indicated, in terms of what changed yet another decade of renegotiation to get the deep seabed mining issues right. And we have done so. I think to some extent people haven't noticed that fundamental second decade of renegotiation that leaves us in this happy cost-benefit position where we are now. As a nation, do we choose to continue that leadership in the oceans and the rule of law? Adherence to the Convention now, I believe, Mr. Vice President, says that we do.

Vice President Al Gore

Thank you.

Research

Vice President Al Gore

Thank you. Let me move to another cross-cutting issue. I want to call on Admiral Jim Watkins. He's retired as an admiral; many of you know this. He's President of the Consortium for Oceanographic Research and Education, or CORE, and I had the privilege of working with Admiral Watkins when he had a distinguished

Photo inset: **The Honorable Bruce Babbitt, Secretary of the Interior and Ocean Environment and Health panel co-chair.**

Top row—Ocean Environment and Health panel—from left to right: **Dr. Daniel Baden, Fred Hansen, The Honorable Leon Panetta, Allen Garcia, Carol Browner, Larry Merculieff, Dr. Jane Lubchenco, Captain Bill Amaru, Sarah Chasis, Billy D. Causey.**

Bottom row—Oceans and Global Security panel—from left to right: **Melinda L. Kimble, Admiral James M. Loy, Professor John Norton Moore, Rod Vulovic, The Honorable John H. Dalton, Paul L. Kelly, The Honorable David A. Colson, Lee A. Kimball, Admiral Donald L. Pilling.**

Photo: Ronald Bell, U.S. Department of Commerce

naval career as Chief of Naval Operations and then served as Secretary of Energy under President Bush. It's great to see you again, Admiral.

We talked a little bit about making available some of the classified data, or data that used to be classified by the Navy and by the intelligence agencies—data that have been carefully scrubbed for national security reasons but are very valuable for commercial interests and for scientific purposes. I'd like to ask you, since you've been in both worlds now—academia and the commercial realm, as well as in the military and security and intelligence area—what do you see as the potential benefits of the increased availability of these formerly classified data sets and other Department of Defense technology and knowledge and making them available to the public?

Admiral James D. Watkins

Thank you, Mr. Vice President. As you well know, in your presentation before the National Oceanographic Society here not too long ago, we saw the benefits of the first atlas of declassified information from the Russian Navy and the United States Navy in the Arctic. Our researchers have never seen anything like that. They were astonished to see the incredible isothermal layers and the gateway, you might say, to the conveyor belt that feeds the climate of the world. We're looking at the heart pump of the world, and we know very little about it. Only the United States Navy and the Russian Navy have that data. To get that data now, with all of the archival interests by researchers, by any other means, would be impossible. That's just an example.

We have the same thing today. I appreciate your taking action on my recommendation this morning in our panel, Mr. Vice President, on public access to military data and technology. It's at the heart of the building of the kind of modeling systems that we need to begin to get into the management of things like biodiversity, things like climate change, and so forth. In fact, I believe very strongly that if we try to build the kind of ocean observation system that was clearly the consensus of our panel, we need desperately to be able to monitor what's going on in a variety of forms in the world. Unless we have access to the archival data that exist—the volumes of information that's there—we're going to make many mistakes. As I said this morning in the panel, at best, what we're going to do is design a system that's redundant; and, at worst, it's going to be grossly misguided and very expensive.

There is a $16 billion investment just in the SOSUS [Sound Surveillance System] array. This is the big acoustic array from which we used to track the Russian submarines that are no longer there. It has tremendous value for fisheries tracking, mammal tracking, seismic projections—the kinds of things that predict tsunamis and the like. This information can be sanitized and can be moved. The United States Navy has just agreed to a protocol where not only the old data are

made available, but it's very important we don't allow those arrays to disintegrate on the basis that they're no longer able to justify it on the basis of national security from defense. We should work with the Hill and get them to pick it up in the NOAA budget, in the NASA [National Aeronautics and Space Administration] budget, and in the other budgets. We desperately need that information to flow, and many of the researchers don't even know the value that is there, sitting there to be worked.

I'd say the number one value of all of this is the fact that the Navy has the data. But the brains are in the research institutions that can take that data and feed back to the Navy information today they don't even understand themselves. The Navy looks at the data for national security purposes—a beautiful acoustic record—and knows how to track submarines. But there's so much other data there. We rejected all the fisheries data. We rejected all the biologics. So the algorithm has got to be reversed. Let's get the algorithm to go for the biodiversity and for the other things now, and let's pay for it by other means. But don't throw it away. Return to the public the great investment of $16 billion just in that one alone.

There are many other applications. I think in your environmental task force work, we saw the GEOSAT [U.S. Navy GEOdetic SATellite] declassification of incredible value to the researchers. We haven't gone fast enough, I think, on the military side, and we need high-level attention to this. We can't leave it down at the bureaucratic level. We have to get it up to the high level to get panels together to really push this. The Navy is doing it, and there are some modest gains there. But they're going to need some resources and guidance from you and the Secretary of Defense to get on with it and report back. I know that the Congress is ready to do this now, and they want to see that done. I think we're going to find that there's incredible new treasure. This is a submerged treasure of great value, and we need to bring it to the fore.

Vice President Al Gore

I appreciate that, and I had a lot of fun working with you all in the Navy, putting that deal together back in the late '80s and early '90s. I'll never forget. I took two trips with the Navy on submarines under the Arctic ice pack, and on one of those trips went all the way to the North Pole. The instruments they were using to measure the thickness of ice for purposes of launching missiles and for other military purposes turn out to be extremely useful in scientifically measuring the thickness of the ice cap, in measuring the effects of global warming.

Likewise, what he was talking about when he used that word "SOSUS"—the undersea hydrophones. There may be some of you who don't know about that system. It's an elaborate network of hydrophones—listening devices on the ocean floor—that were extremely important during the Cold War to listen for Soviet submarines. You

Top row—Oceans and Commerce panel—from left to right: **The Honorable Madeleine Z. Bordallo, Roger McManus, The Honorable Ron Sims, Jekabs "Jake" P. Vittands, The Honorable D. James Baker, Dr. M.R.C. Greenwood, The Honorable John Graykowski, Charles W. Foster, Richard du Moulin, Philip Anderson.**

Bottom row—Ocean Exploration, Education, and Research panel—from left to right: **Dr. Robert Gagosian, Ursula M. Sexton, W. Thomas Mitchell, Dr. Sylvia A. Earle, The Honorable Katie McGinty, Admiral James D. Watkins, Dr. Rita R. Colwell, Dr. Warren M. Washington, Dr. Neal Lane.**

Photo: Ronald Bell, U.S. Department of Commerce

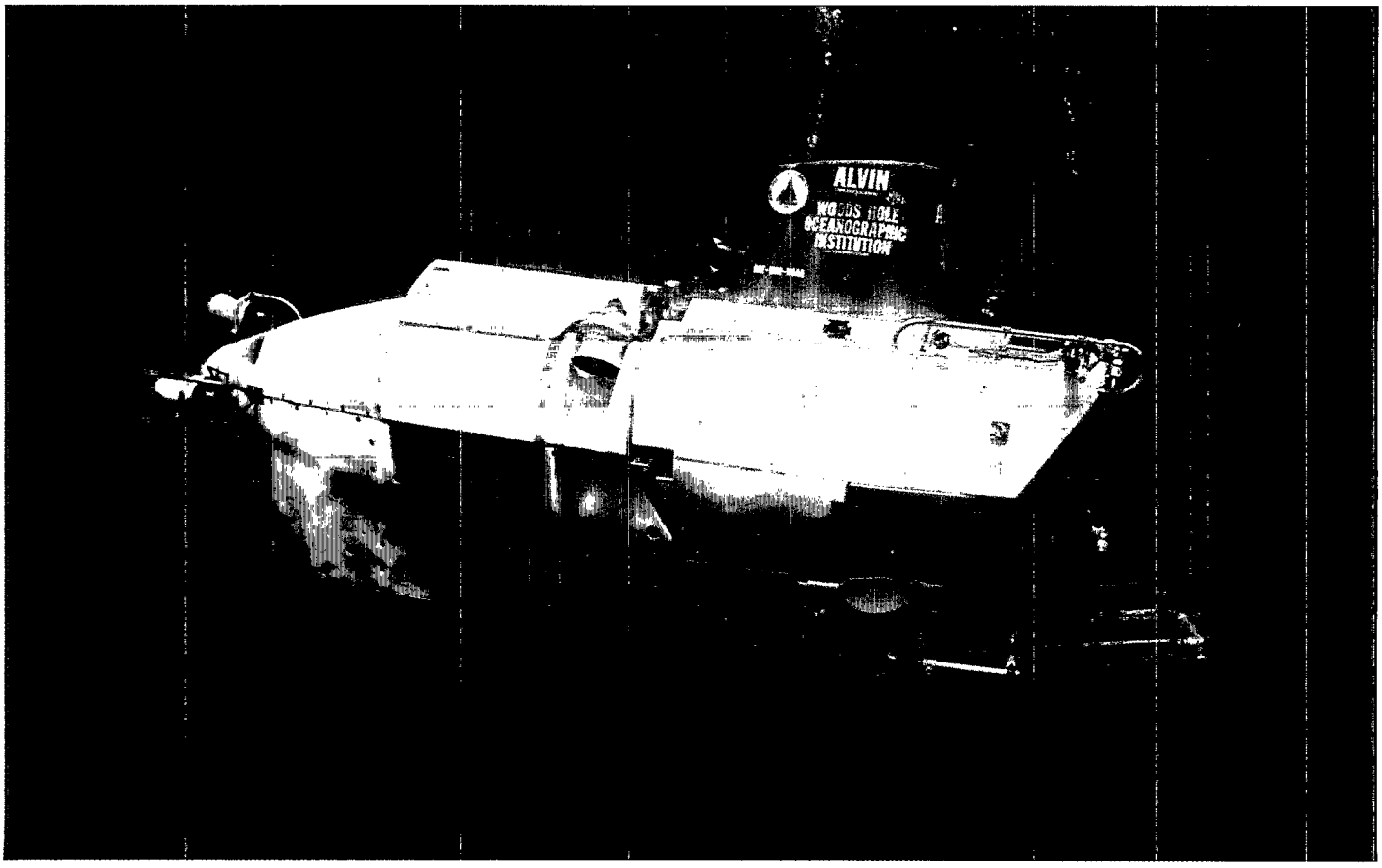
remember the *Hunt for Red October.* That's probably a bad example, I guess, but you remember some of the popular descriptions of that technology.

Correct me if I'm wrong, Dr. Baker, but I'm going to tell a brief story of what happened when we finally got this environmental task force worked out. Some of the researchers who are the leading experts on whales went to the place where you can put on the headphones and listen to those microphones on the ocean floor. Right away, they heard this sound, and one of the Navy technicians said, "That's a snapping shrimp, isn't that right?" The researcher said, "Snapping shrimp? That's a blue whale." He said, "Look at the outline of this sound on the instruments." The technician said, "Well, if that's a blue whale, we sure do hear a lot of them."

It turned out that in the first 60 minutes that these whale researchers were down there in this formerly top-secret place, they made more observations of whales than had been recorded in the entire scientific literature in all of history up until that time. Just in one hour. It's an example of how valuable this incredible array of information collected during the Cold War is. It is collected still with these very expensive and highly sophisticated collection systems. Most of the information was just thrown away, considered irrelevant to tracking the Soviet military threat, stored, as it were, in electronic silos, and considered useless, but still classified top secret. In field after field after field, there's more information available in that treasure trove than the environmental scientists and other kinds of scientists have been able to get in the traditional way of studying their fields. In field after field, when they get access to that information, it's completely revolutionizing their knowledge of what's going on.

This atlas of the Arctic seafloor is another example of that. That came from the top-secret submarine data. Then in the former Gore–Chernomyrdin Commission with Russia, we persuaded the KGB [Komitet Gosudarstvennoy Bezopasnosti, or Committee for State Security] and the Russian Navy to give up their information. That was a little bit easier than getting our Navy and the CIA [Central Intelligence Agency] to do it. Some of those responsible for that are here, and we're very grateful. Together, the Americans and the Russians put together this sea atlas, published for the very first time. Some of that data are also being released for the first time today, and it's yet another example of a revolutionary advance by using these systems.

What he said about making sure that now that the Cold War is over, we don't just throw away or



Vehicles that can go beneath the sea's surface, such as the Deep Submergence Vehicle *Alvin* operated by the Woods Hole Oceanographic Institution, have revolutionized oceanographic research and exploration.
Photo: Rod Catanach, Woods Hole Oceanographic Institution

allow these systems to fall into disrepair is very, very important. And I hope you're right about there being enough support in the Congress to do that. We're certainly 100 percent committed to it and working very hard to make sure it happens.

Now, let me move in the time we have remaining to a few more people before we close. I'd like to call now on Warren Washington, who is a meteorologist with the National Center for Atmospheric Research, NCAR. He's the climate division director and a senior scientist at the National Center for Atmospheric Research. As we've learned so well with El Niño, the oceans not only affect our climate, but shape our climate. What are the highest-priority research areas that you can specify for us that will help us better predict future El Niños and better understand this complex interaction between the ocean and our atmosphere producing our climate?

Dr. Warren M. Washington

Thank you very much for asking that question. I believe that we have the scientific priorities established by the U.S. Global Change Program, which I think is a real success story for all of the agencies that are involved in atmospheric and ocean research.

The highest priority, in my opinion, is that we have a good ocean observing system. The interannual sort of variations like the El Niño and the decadal changes that we're observing are essentially ocean–atmosphere interactions, and we haven't had the pleasure of a good observing system for anytime in the past. I believe that we're putting together a system that's based upon *in situ* measurements, also satellite and other sorts of measurement techniques, to try to measure all aspects of the chemistry of the current systems, the salinity on the biosphere, and even on the pollution.

Now, one of the problems for trying to understand things that have time scales on the order of decades to centuries is that we need to monitor in a systematic way. And we essentially must have observational systems that work with computer models so that we can use those models to predict into the future. I'd say that the highest priority is to have a well-balanced research agenda and observational system to succeed.

Vice President Al Gore

All right. I appreciate that. I noticed in the news that some of the TV stations that showed us those pictures of El Niño and found out that people were tuning in in large numbers to find out what the latest El Niño news was are now telling us about La Niña, which they describe as the reverse of El Niño, with cooler waters in the Pacific Ocean, and yet with very pronounced effects on the climate, different in the pattern, different in the nature of the effects from El Niño, but still strong effects. Tell us how these things are related. Jim Baker, you want to take that one?

The Honorable D. James Baker

Let me answer that. La Niña is the opposite phase to an El Niño. If you think about the way El Niño is formed, it first starts with a relaxation, a weakening of the trade winds in the tropical Pacific, way over in the western tropical Pacific. This causes kind of a slosh of the water as it goes across the tropical Pacific, and then it splits and goes north and south. Then there's a reflection of that wave that goes backwards, and it is in that reflection that—

Vice President Al Gore

Let's pin down the first part of that, first. Without El Niño, there's a strong wind that blows westward across the Pacific near the equator, right?

The Honorable D. James Baker

Strong wind that blows toward the west, yes.

Vice President Al Gore

When that wind weakens, then the water just kind of pools up and gets warmer in the part of the Pacific near us, near Central America, anyway.

The Honorable D. James Baker

When the wind weakens, the sea surface tends to change. It gets flatter, and you have a movement of water and heat across the equator toward the east.

Vice President Al Gore

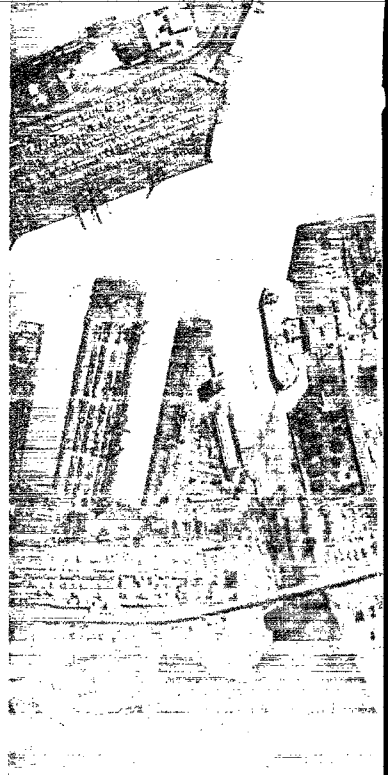
Toward Central America and toward the Americas.

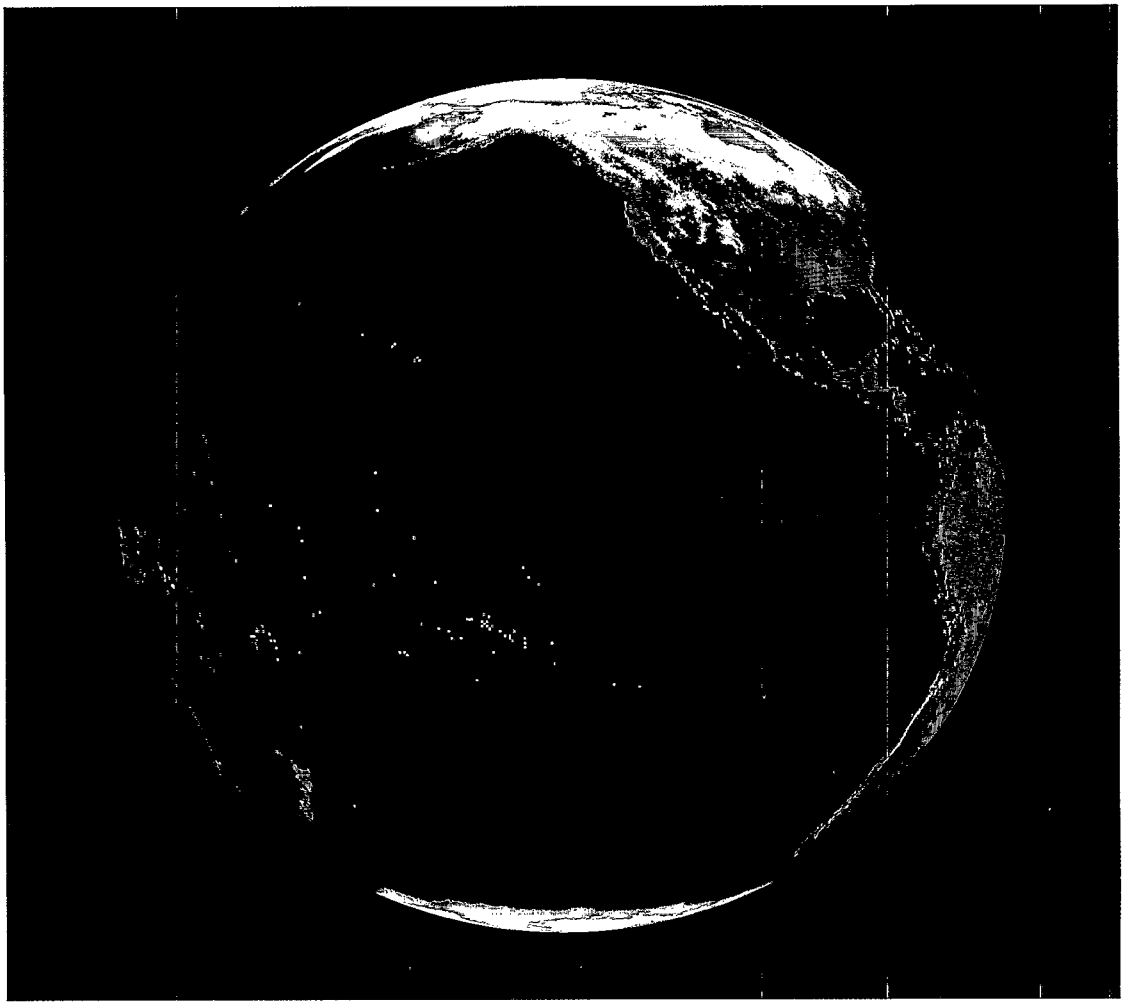
The Honorable D. James Baker

That's right, and we see the warm anomaly then.

Vice President Al Gore

Then that warm water that's gathering there drives the storms that come across and drives the rest of the El Niño pattern. So far, so good?





El Niño is a disruption of the ocean–atmosphere system in the tropical Pacific, having important consequences for weather around the globe. Large changes in the global atmospheric circulation force changes in weather in regions far removed from the tropical Pacific. The sea surface temperature anomaly during an El Niño year, as depicted here in red, shows clearly that the water in the center of the Pacific Ocean is much warmer than in non-El Niño years.
Photo: NOAA

The Honorable D. James Baker

So far, so good. The changing temperature moves the precipitation patterns, which then have an effect on the jet stream that affects the weather of the United States.

Vice President Al Gore

All right. Now, then you talked about some—what was the phrase you used?

The Honorable D. James Baker

I said reflection. What you have is these waves that come across the equator split at the South American coast, going north and south. And in fact we see a movement and a change of the water temperature north and south, both along Mexico up to California, and then down along the coast of South America.

Vice President Al Gore

Getting warmer along the coast.

The Honorable D. James Baker

Getting warmer along the coast.

Vice President Al Gore

So when we see that picture, if you can imagine it, of that red warm water as the El Niño progresses, it keeps on coming toward the Americas and then it splits, and the warm water comes up the coast toward us and down the coast along Peru, where it creates a catastrophe there. That's what you're saying?

The Honorable D. James Baker

That's exactly right, and then that's, of course, superimposed on longer-term changes that are also happening. Then as this phenomenon slows down, there's a relaxation or a reflection—that is, water moves back in the other direction. It's that movement that begins the process of what we call La Niña. That's the change of El Niño as it's moving back. The relaxation of El Niño starts the phase that would move it in the opposite direc-

tion toward colder water—in fact, in the case of La Niña, colder than normal. It keeps moving in that direction.

Vice President Al Gore

Now, what's this oscillation business they talk about?

The Honorable D. James Baker

The southern oscillation?

Vice President Al Gore

Yes.

The Honorable D. James Baker

The southern oscillation is a difference of air pressure between the tropical island Tahiti and Darwin, which is in Australia. It was noticed late in the 19th century by Sir Gilbert Walker, who was looking at the impact of the change in air pressure and the Indian monsoon and the problems with famine. In fact, he discovered that there was a large-scale oscillation of air pressure. Later research showed that that connection of air pressure was connected to the water movements and then the changing temperatures.

Vice President Al Gore

So the La Niña they're telling us about now is just the flip side of El Niño?

The Honorable D. James Baker

That's right. It's a cooler anomaly, as opposed to warm. It's the flip side of El Niño.

Vice President Al Gore

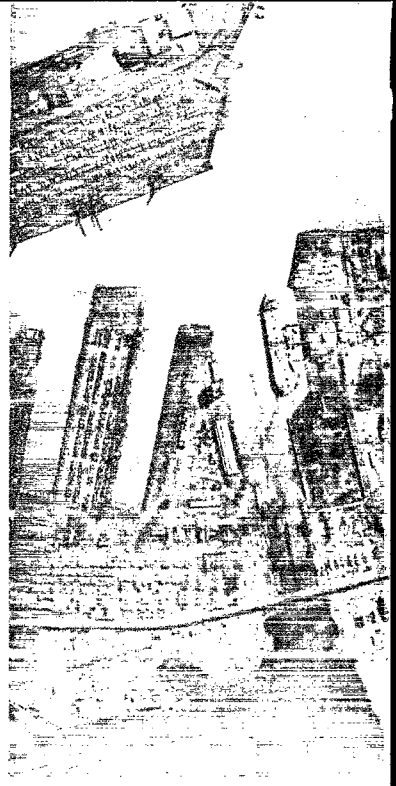
Well, the connection between the ocean and our nightly weather reports on television and the consequences of weather and climate for us is very, very pronounced and much clearer for all of us since we've lived through this El Niño. What should people expect from La Niña?

The Honorable D. James Baker

Well, if we had a strong La Niña, we'd expect that normal kind of winter, but exaggerated—that is, colder, drier winters. We'd expect a colder, drier California, a colder, drier Florida, and a somewhat colder northern part of the United States—exactly opposite to what we saw this last winter. In fact, the models are predicting that we'd probably see a weak La Niña this winter, but I have to say the models are notoriously unreliable such a long time in advance. We can't really give you an official forecast at this point.

Vice President Al Gore

Well, one of the things that we heard from Dr. Washington is about the need for more research to help these scientists get an early warning for us about what's happening out there so we can not only predict it, but prepare for it as well. One of the things that I announced on behalf of the President this morning was a new network of more ocean buoys and more satellite data collection systems that are focused on the oceans. Because while we have a lot of data collected about daily weather patterns over the land masses of the Earth, it's not as available over the oceans. This is designed to help remedy that.



Ecosystem Health

Vice President Al Gore

Now, let me move to Billy Causey, who is with the Florida Keys National Marine Sanctuary. We just heard some of the impacts of changes in the ocean on global climate. And I've personally observed the impact of climate on coral reefs in the form of coral bleaching. As the Superintendent of the Florida Keys National Marine Sanctuary, you have extensive experience in the issues facing the largest coral reef system in the U.S. In addition to the effects of warming, what are some of the other stresses facing U.S. coral reef ecosystems?

Billy D. Causey

Thank you, Mr. Vice President. Last year, in 1997, we just ended the International Year of the Reef. It was a tremendous opportunity for us to raise awareness around the world about the threatened global coral reef ecosystem. In fact, we learned many, many different lessons from that tremendous year in that we learned that many of the threats facing coral reefs—such as water quality degradation, habitat destruction, and overfishing—were happening on a very large scale.

One of the most important things we learned during the International Year of the Coral Reef was that we had to look more broadly at the problems. We had to look more globally. In fact, we learned that many of the problems affecting the coral reefs were coming from other parts of the marine ecosystem. In fact, we had to start looking at all the oceans.

You hit it right on the head earlier. The ocean is really a finite resource. We can't just keep dumping things into it. We're changing its chemistry. We're changing the ecology of the oceans. We need to start looking on a broader scale and addressing globally the health and the environment of our oceans.

Vice President Al Gore

Thank you for that. I appreciate what you all are doing down there.

Sustainable Use of Ocean and Coastal Resources

Vice President Al Gore

Let me direct a question to William Amaru, who's a commercial fisherman in New England. He's a member of the New England Fishery Management Council.

In the late '80s and early '90s, Mr. Amaru, you and your fellow fishermen in New England witnessed firsthand what happens when a fishery just collapses. Today we're witnessing similar problems in fishing communities across the nation. Based on your experience in New England, how should we address overfishing, while at the same time minimizing the impact on coastal economies?

Captain Bill Amaru

That's quite a task, quite a question. I'm glad I was taking notes, as the earlier speakers were actually creating an outline, or a framework, for ways we could do that.

We did have some substantial problems in the New England area. We still do. But because of the excellent work that's been done on the Sustainable Fisheries Act, we have a very good framework for rebuilding the fisheries. And we're beginning to move in that direction, especially in New England.

I can speak for New England because I'm part of the process there. I'd suggest that you continue to support overcapitalization reductions. These can be done through vessel buyouts. We've just completed one in New England, which effectively reduced the number of days at sea by 20 percent that the fleet can continue to fish with. This was a difficult pill to swallow, but it was a graceful way for a lot of people to leave the industry who had no other choice. I thank the government for making the funds available. It was over $30 million to do that. In the future, I think that the fishing industry should become a partner in providing the funds.

Vice President Al Gore

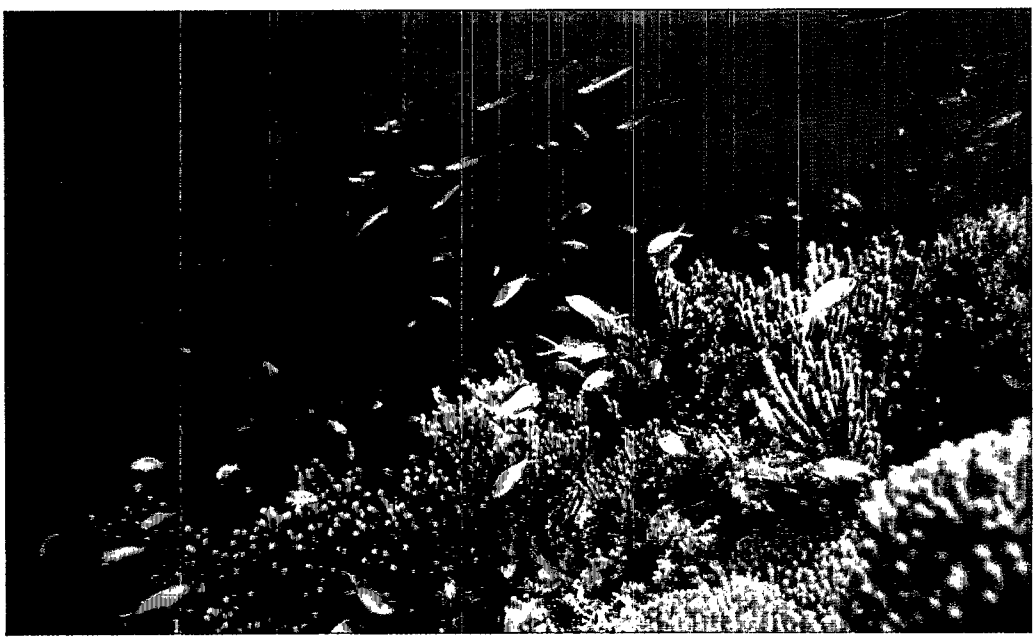
Now, when you say "overcapitalization," what you mean is we've got too many boats and not enough fish? There's too much money invested in fishing boats compared to what can be sustained?

Captain Bill Amaru

That's the simple definition. In a lot of cases, we don't have enough boats of the right kinds and too many of the wrong kinds. We could probably have a lot more boats fishing in New England if we fished in fish-friendlier ways.

This gentleman up here in the picture, who's dumping a basket of shrimp, is a good example of the kind of clean fishing that we'd like to see, especially for the shrimp fishery. We in New England have a regulation and, fortunately, a really good system for catching shrimp that eliminates bycatch down to—believe it or not—5 percent. For people who think that you can't catch shrimp without catching a lot of other fish and killing them, that's not necessarily the way it is. We have a regulation, and it works at 5 percent.

The other methods that I'd suggest include the management process that the new Sustainable Fisheries Act puts into place. It identifies critical habitat needs, which we're now working on. I hope Sarah



Many of the problems affecting coral reefs—such as water quality degradation, habitat destruction, and overfishing—occur on a large scale and need to be addressed globally.
Photo: NOAA

[Chasis] motivated you to continue to pursue that level of dedication toward our critical habitat needs. It's certainly an important part of the Sustainable Fisheries Act, and it will be very important to sustaining the growth in the fish that are starting to come back.

I'd say that if you could continue to fund the Coast Guard at a rate that perhaps is a little greater than what you currently do, it would allow them more hours at sea and more vessels to do the patrolling. And we do need effective enforcement. Effective enforcement is a great deterrent in engendering cooperation by the fishing fleets.

Finally, it hasn't been mentioned yet, but recently there was an FAO [Food and Agriculture Organization of the United Nations] code of conduct that the United States is now adopting to our own fisheries for responsible fishing. I hope that we can get the commercial fishing public on board to understand that their connection to the resource is a direct one, and that every fish they take out or damage in the process of fishing is going to affect their future and the future of the nation.

I hope that there is a way we can develop a sense of more responsible fishing through education programs, involving the fishermen more directly in the process that's there—their fishery. Today it takes place on the water pretty much only. But we're evolving and changing and seeing that our responsibilities are more than just harvesting, but being good shepherds as well.

Vice President Al Gore

Thank you very much. Thank you for what you're doing.

Captain Bill Amaru

Can I add one other point, since you reminded me? One of the primary reasons that we're having the recovery of groundfish stocks in New England is because we've got substantial closed areas. These are *de facto* no-take zones. We don't allow any fishing. The recovery is being fueled, I believe, as a person who spends my time out on the water catching these critters, by the fish coming out of those closed areas. They're being left in a natural environment. They're doing their spawning. The habitat has come back in those areas. They're growing out and they're moving out of those zones in search of more prey, and we're having opportunities to catch them outside those areas. They're really working.

We have a substantial amount of the Georges Bank complexes closed to all forms of groundfish fishing, but the areas outside are having additional capture rates increasing. It's a very important thing. I'd like to see a continuation of the coordination between sanctuary work and closed areas for commercial takes. We don't need to necessarily close any more in New England. But if we could have critical areas identified within our present closed areas and have those become sanctuary areas, then in the future they're protected when people on the councils perhaps aren't as in tune to the needs of closed areas in the future as we are currently.

Vice President Al Gore

In farming, it's common knowledge that you have to give the land a rest after a while and rotate crops. In many religious traditions, including my own, there are injunctions directed at that ancient wisdom. When you look at the massive impact of industrial fishing on the seas, obviously the same basic principles apply. You just need to give it a rest from time to time in these areas that are in danger of being overfished. To have the commercial fishing groups come to the table exercising leadership, as you are, is one of the real keys. Of course, not everyone thinks the way you do, but more and more do. With you talking like that, the way you do today, it's going to speed up. So I really do appreciate that.

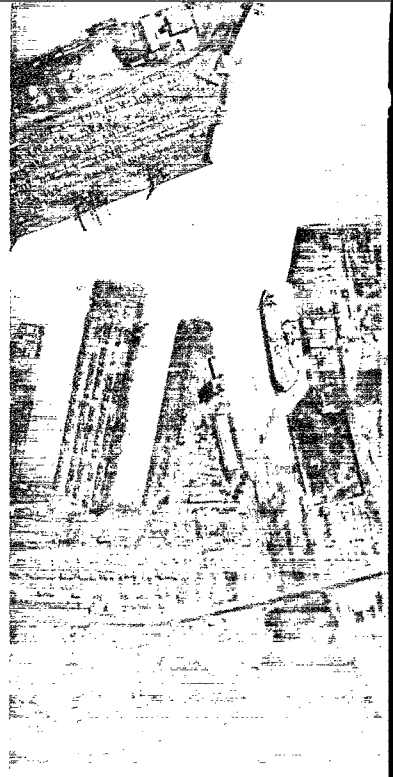
Let me move on to Rita Colwell, who is President of the University of Maryland Biotechnology Institute. Earlier, Tom Mitchell talked about some of the rapid breakthroughs in biotechnology, and Bill Amaru just now discussed some of these sobering issues related to overfishing. As a marine biologist, please explain to us how biotechnology might help us in our effort to meet the future food needs for the world's population.

Dr. Rita R. Colwell

I'd be glad to, Mr. Vice President. There have been some very exciting new developments that have been coming out of the applications of molecular biology and biotechnology to marine biology and also to biological oceanography.

For example, salmon, trout, sea bream, sea bass, striped bass, and a lot of other commercially important fish have been brought into culture, a land-based intensive aquaculture. We've overcome the barriers in getting reproduction in captivity. Really what's very exciting is that the genes controlling growth and reproduction in these fish have been cloned, so now we have the ability to produce faster-growing fish that achieve larger size, and they're more efficient in utilization of their food.

In addition, current research on disease detection, diagnostics for fish diseases, as well as devel-



oping fish that are resistant to disease allow us to take aquaculture, which is probably around 20 million metric tons at present, and double it or triple it. This would be another way of allowing rest for the capture fisheries.

In fact, I'd say in the future that the oceans would really be a repository—a gene bank—in that we'd be able to do our intensive production of fish through aquaculture. We can also protect ornamental fish in aquariums, in that we can then get them to reproduce in captivity through biotechnology and allow our reefs to be a resource rather than a source of fish for aquariums.

So biotechnology offers some tremendous potential for contributing to the sustainability of our world oceans.

Vice President Al Gore

Thank you very much, Dr. Colwell. Very interesting.

I'd like to call on Dr. M.R.C. Greenwood, who is Chancellor of the University of California at Santa Cruz. As we look to the future of the local economy here in Monterey, M.R.C., what do you see as the potential for new jobs and economic growth derived from ocean resources, and how can we best balance that economic growth with protection of the environment?

Dr. M.R.C. Greenwood

Good afternoon, Mr. Vice President. Well, of course, I'd really need a crystal ball to be able to answer that question entirely correctly. Certainly the economy in California right now looks very bright—something we're very pleased with. That's a derivative, at least in part, of the high-tech industries here in the state of California.

I'd say that one of the things we have great hopes for is that the biotech industry and the industries associated with it, which are actually quite clean industries and tend to be very environmentally responsible, will continue to grow. We're trying to encourage that in the Monterey Bay area through the Fort Ord base reconversion.

The University of California at Santa Cruz is involved in the Monterey Bay Education, Science, and Technology Center. One of the things we hope from that is that we'll be able to house a marine village set of industries that will help us both with the important jobs that are associated with analyzing such data as those talked about by Admiral Watkins and others, so a scientific com-

In farming, it's common knowledge that you have to give the land a rest and rotate crops. The same basic principles apply to fishing.

ponent, but also with a component for the new industries that we do think will be derivative of the oceans in the Monterey Bay area.

In many ways, this area here in Monterey Bay is a living laboratory. It is in many ways a model for many of the questions that have been raised in today's—and I'm sure in tomorrow's—sessions, and we'd like to keep it that way. As one of those members of a coastal community where everyone wants to live—and increasingly we see more folks wanting to live—we'd like to encourage people to build the kind of industries here that allow them to sustain the growth of commercial foods and also to produce some new ideas and new products. How well we do that, I'm afraid, is a bit in your hands and in the hands of the administration and the rest of us. How well we do our job here today, and whether the outcomes are really important for the future probably is a much better indicator of the quality of life and economic development in Monterey Bay than anything I can forecast today.

Vice President Al Gore

Thank you. That's a powerful point.

Ecosystem Health

Vice President Al Gore

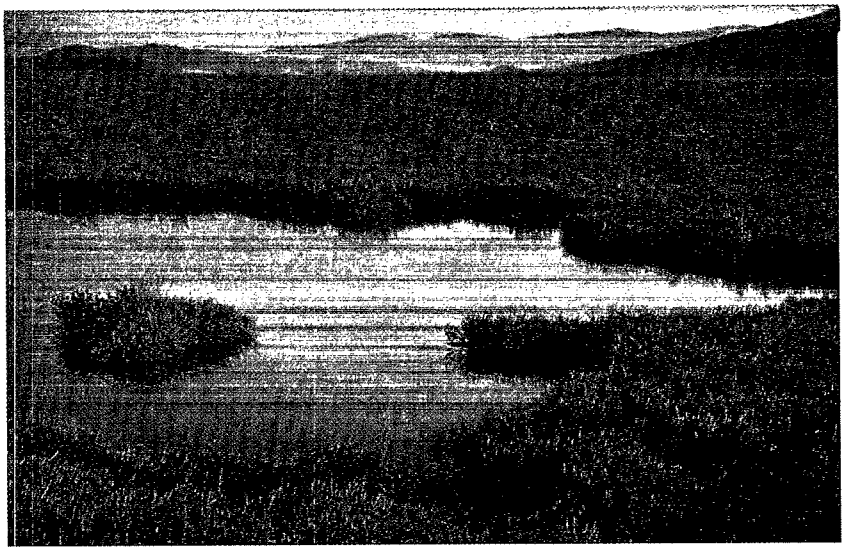
Just two more questions to panelists. Administrator Browner, tell us what EPA has been doing to promote public health in the coastal areas, in our coastal waters.

Carol Browner

First of all, Mr. Vice President, thank you for bringing all of us here today. I think this has been a great session.

When it comes to oceans, EPA's particular focus is really the near-shore waters, where our fresh waters meet our salt waters, where our rivers and estuaries give way to our beaches and oceans, and where so many of us like to vacation with our families. What we see, unfortunately, is too much sewage discharge, polluted runoff, air deposition, and air toxics. We see marine toxics. We see algal blooms. We see red tides. We see dead zones—areas where literally nothing can live, nothing is growing.

Today, despite all of our efforts over the last 25 years to address water pollution problems, 40 percent of the coastal waters and estuaries in the United States that have actually been studied still do not meet water quality standards. They still have real problems. Over the last 10 years, almost 19,000 closings of beaches, health advisories, have been issued across the country.



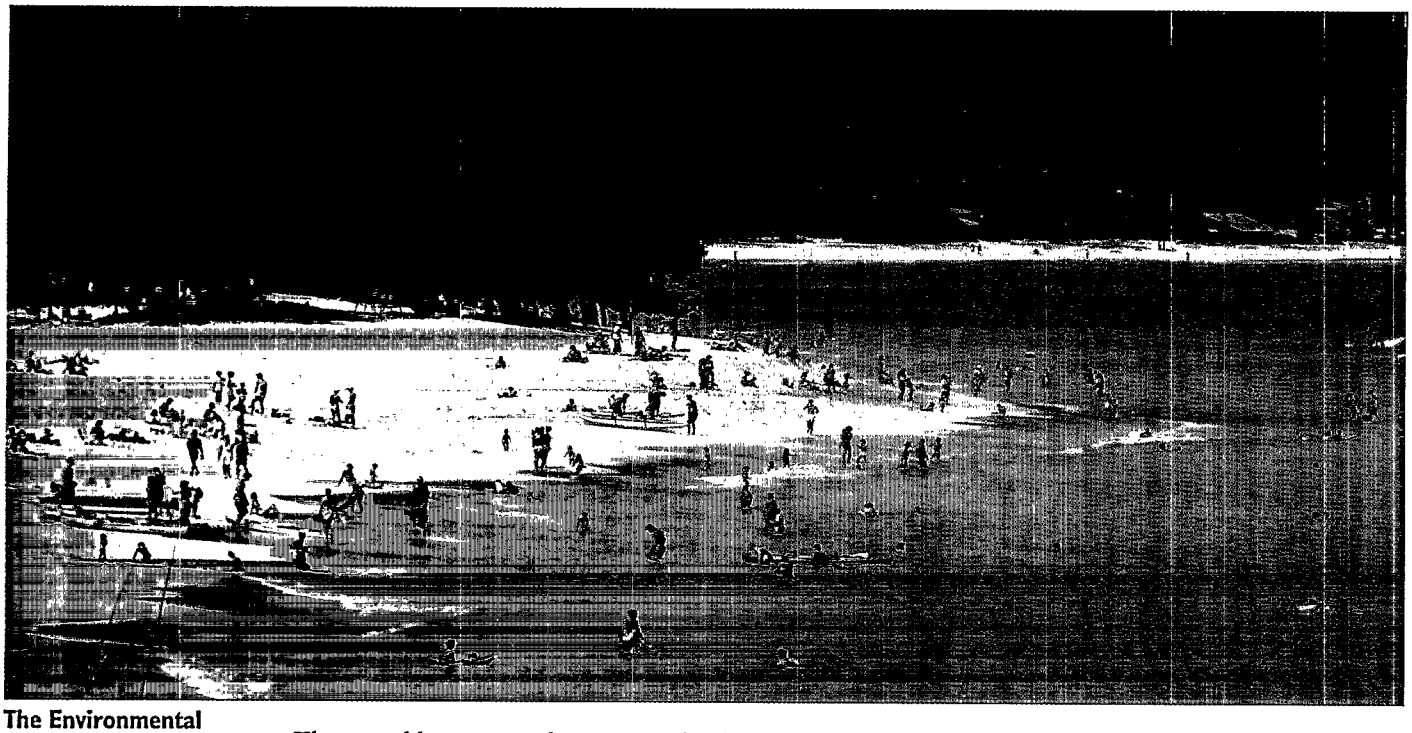
Wetlands naturally filter and cleanse the water flowing from rivers and streams into the ocean. Estuaries depend on wetlands to maintain water quality.
Photo: San Francisco Bay National Estuarine Research Reserve

We think it's really quite simple. No parent should have to tell their child that the fish is unsafe to eat or that the water is too dirty to swim in. No fisherman, no restaurant owner, and no tourism business should have to worry about polluted water keeping the customers away. I think many of us have focused on the fact that clean, safe, healthy oceans also mean a healthy economy and vibrant communities.

Mr. Vice President, under your leadership and under the President's leadership, we're taking a number of actions at EPA. Fundamental to many of those is the Clean Water Action Plan, announced by the President and yourself earlier this year. It is really a national blueprint to clean up and restore the nation's waters, rivers, lakes, underground aquifers, and estuaries. While the Clean Water Action Plan is largely focused on rivers and lakes, it forms an important backbone for the ocean work we all need to do. If you think about it, the entire country is in some way a giant watershed for our oceans. It all ends up there, ultimately.

The Clean Water Action Plan was designed to address the next generation of water quality problems: the polluted runoff, the loss of wetlands, the restoration of our waterways. As you mentioned earlier, it makes a commitment of tools and it provides the flexibility, the technical expertise, and, most important, the money—$2.3 billion over a five-year period—to bring people together to find the common-sense, cost-effective solutions.

I know, Mr. Vice President, you share our disappointment that the Senate subcommittee responsible for the EPA budget didn't provide full funding for the EPA's share of this program. Obviously, we're all going to be continuing to work in Congress to see if we can resolve that. We think these dollars are extremely important. They're part of the President's balanced budget.



The Environmental Protection Agency's Beach Watch Web site tells users which beaches are closed, the sources of the pollutants that have caused the closures, and whether a beach's water has been tested.

They would go out to the states to develop watershed, polluted runoff plans to address that remaining water pollution problem.

We're also focusing at EPA on things like animal waste runoff and the large animal feeding operations. We're looking at algal blooms, including *Pfiesteria* outbreaks. We actually have a new technology that will cut in half the time it takes to test the waters for dangerous pathogens, so we can tell swimmers whether or not it's safe to swim. A lot of the testing now has a lag time. It takes a long time to get the information. This new technology will literally cut the testing time in half.

We're continuing to work through our National Estuary Program. We've now provided almost $85 million to protect and develop plans at how best to protect estuaries across the country. We're working in the Florida Keys, San Francisco Bay, the Everglades, the Chesapeake, and the Gulf of Mexico. We've committed $3 million in the past two years to research *Pfiesteria* and to help control other nutrient problems.

The plan that the President put forward also commits to a net gain of 100,000 acres of wetlands annually by the year 2005. We've curtailed the loss of wetlands. We're not losing as many acres as we used to. We're still losing some, but the plan actually calls for a net gain, which will be extremely important to the health of all of our water bodies.

Finally, as you said earlier, most important to all of these efforts is engaging the public and honoring the public's right to know. We were excited to have you announce today our Beach Watch Web site. Sarah [Chasis] spoke about the need for a site about fish consumption advisories. We'll have one shortly. We're working at getting that up and getting that information available to the public. This Web site isn't just about finding out if a particular beach is closed today or was it closed yesterday. It's also about finding out whether or not a local beach's water is tested. It's about finding out where the pollution is coming from that is actually causing the problem, and really giving people a right to know about what's happening in their community, and building on a number of right-to-know initiatives that you've been involved in.

In closing, Mr. Vice President, let me again thank you for bringing us all here today. I think what I've heard today and what is so important to all of us is to remember that we have to remain vigilant both as a nation and as a global community if we're going to be able to address these problems. Thank you for your leadership in that regard.

Vice President Al Gore

Thank you, Administrator Browner. Thank you for what EPA is doing. We appreciate it very much.

Ocean Management

Vice President Al Gore

Now I want to call on just one more person before we close this session. Roger McManus, your organization, the Center for Marine Conservation, recently published a 10-point plan for protecting America's oceans. You believe there have been major changes in domestic ocean

activities since the Stratton Commission issued its landmark report back in 1969. What are those changes, briefly, and why do you believe that now is the time for the new commission to examine our domestic ocean policy?

Roger McManus

Thank you, Mr. Vice President. As you know, it's been 30 years since the Stratton Commission did its work. We saw many important changes occur because of that: the formation of NOAA, the passage of the Coastal Zone Management Act, and many others. Many things weren't done that would have better ensured that we had an effective ocean management regime for the United States. Not including many of the agencies—for example, the Coast Guard—within the new ocean agency, NOAA, was an issue. There's a lot of controversy, too, about the independence and the ability of our ocean agency to lead in a Cabinet level.

Since the Stratton Commission did its work, the population of the United States has grown tremendously, and our demands on the oceans have also grown tremendously. The pollution loads that we're putting into the marine environment and our harvest of marine wildlife have increased incredibly.

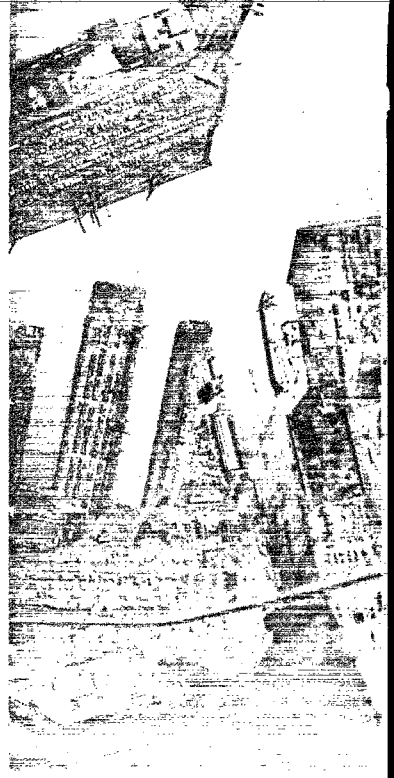
I think all of this points to the fact that it's time now for the country to review its national ocean policy. This idea has been referred to by a number of terms throughout this conversation: a national ocean strategy, a plan, a business plan. The fact of the matter is, we have in our ocean territory a larger area than the entire terrestrial part of the country combined. But we have no overall national policy or plan for taking care of that territory and the resources in it. We're beyond the time when we need that. I think if one thing came out of this conference besides recognizing the importance of ratifying a Law of the Sea, we need Congress to pass the Oceans Act and establish a new commission to do a stem-to-stern review of our ocean policy.

Now, I'd like to add to that that getting something passed is just the first step—the beginning of the work. There will be a couple of years of real hard work for the commission and, I think, for the administration. It will require, if I may say so respectfully, a dedication on the part of the administration to really give ocean stewardship a priority. This administration is probably the greatest environmental administration since the founding of the republic. And we're all very thankful for your leadership and that of the President. I'd have to say that one can't always do everything all the time. And one of the problems we've seen is ocean stewardship hasn't gotten the priority that it needs and deserves. Over the next two years, hopefully, with the commission in place, that priority will be there.

In the meantime, I'd like to add a couple of things that have come up during this meeting that I think will deserve serious consideration. There's been a rather interesting idea about having an ocean budget for the year 2000. While we're waiting for the results of the commission, it might be a good idea to see if we can expand and coordinate the federal budget in one piece to really direct our attention to some of the many pressing problems we face right now.

Finally, there's a lot of indication that you and the President are paying a lot of attention to this issue. I want to commend the President on his Right whale decision recently, which was a tremendous decision. This conference and the work that has gone into preparing it and doing it so successfully are certainly evidence of a commitment from the administration, and we're very thankful.

Finally, cueing off of Admiral Watkins' comments earlier, I really appreciate the initiatives that have been announced by you today. I want to thank you for picking up on so many of the ideas that were in the 10-point plan, and we hope that the President will make similar use of it tomorrow. Thank you, sir.



Vice President Al Gore

Thank you for your work. I appreciate it very much. I'd like to say, in response to your comments, that I give you my commitment that you'll see this administration give the ocean the priority that it deserves. In fact, this conference was viewed by us from the very start as an opportunity to gain just the sort of overview and perspective that's needed in order to chart a comprehensive course on ocean policy. We did that 30 years ago as a nation. The time to do it again is now, taking into account all of the changes that have taken place. This conference gives us that opportunity. The fine work that you and the others here have done can serve as the basis for very sensible recommendations to move forward in balancing the environment and the economy and protecting the oceans for ourselves and for future generations.

I look forward to seeing many of you at the aquarium tonight. I look forward to the rest of the deliberations and the President's visit tomorrow. In concluding this session, I'd like to ask the audience here to join me in expressing gratitude to each and every member of all four of these forums for doing an outstanding job in developing recommendations and policies. Thank you very much.

Congressional, State, and Local Perspectives

The world's oceans are essential to our economy, to our national security, and to our physical, intellectual, and spiritual well-being, and are home to organisms found nowhere else on Earth.

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Congressional, State, and Local Perspectives

Introductory Remarks

The Honorable William M. Daley

Good morning to all of you. My name is Bill Daley, and I'm the Secretary of Commerce. It's indeed a pleasure to welcome you to the second day of the National Ocean Conference. Let me say how pleased we are for the participation in this tremendous conference. It is the first of its kind where all of the ocean community has come together to discuss the issues that are affecting the future of the ocean.

I'd obviously like to thank our co-host of this conference, the Department of the Navy, and its terrific Secretary John Dalton. I'd also like to thank at this time our host community, Monterey, its people, and its institutions, who have made this conference possible and also so successful.

Yesterday, our focus was on specific issues and on cross-cutting themes. Today, our focus will be a little different. We're going to talk about the oceans from a regional and also a legislative perspective. We're fortunate to have a number of elected officials from California and from island nations. They have a deep interest in the oceans, both from an environmental and also from an economic point of view. We'll hear from governmental officials with an acute understanding of how important healthy oceans are to all of us on this planet.

The Honorable William H. Daley, Secretary of Commerce and panel co-chair

Photo: Ronald Bell, U.S. Department of Commerce

I'd like to introduce our very special congressional panel members. First, Senator Barbara Boxer; Representatives George Miller, Anna Eshoo, Lynn Woolsey, Sam Farr, Brian Bilbray, Earl Blumenauer, Lois Capps; and Delegates Eni Faleomavaega and Robert Underwood. We also have with us California Assemblyman Fred Keeley, who, as you know, is from Monterey. Many of them joined us at the Department of Commerce to open our Year of the Ocean celebration a few months back. We've been privileged to work with all of them on the most important issues of the ocean. I'm also delighted to have with us Secretary Rodney Slater, who is co-chair of this panel.

Before I turn the podium over to the Secretary and we open our discussion, I'd like to say a few words about an issue critical to the debate of our oceans' future, and that is the fact that we don't have enough information about the oceans' impact on our economy. A complete and accurate assessment of the ocean bounty has never been done, and I think this has been a serious handicap in our decision making over the past number of years. We need such information to make decisions on how to responsibly use our ocean resources. And we need it to protect the marine environment. We need it if we're going to give the public a better understanding of how the oceans directly affect our lives.

Waters like these offer so many gifts that build our economy: food, transport, medicine, and, of course, recreation. The first step in balancing the riches of this territory is to fully understand the economics involved. That is going to require a lot of information and also cooperation. We have to know the true value of the many ways in which we use our oceans, whether it's for shipping or fishing or for surfing. We need to factor in things that aren't usually assigned economic values—like seascapes, sensitive ecological systems, and shifting sands—and then assess values. Then we must determine all together exactly how they contribute to our national GDP [gross domestic product].

To do this, we've got to have business, government, and the public stakeholders all working together. That's why we were all so pleased yesterday when the Vice President announced that the Department of Commerce and a group of renowned economists will conduct such an economic assessment. With this critical information, we can better make the decisions to preserve

our oceans' heritage for generations to come. We all look forward to hearing from our panelists. At this time, let me turn the podium over to the Secretary of Transportation, Rodney Slater.

The Honorable Rodney E. Slater

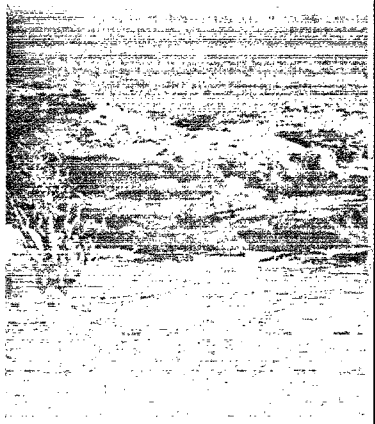
Thank you, Secretary Daley. The buzzword for this Congress or for this administration—and for that matter, for this gathering—has been "partnership." There is no better manifestation of that partnership than the great work of the Departments of Commerce and the Navy, led by Secretary Daley and Secretary Dalton and their team, in bringing us all together for this, the first National Ocean Conference. A debt of gratitude is owed to both of them and to their staffs in making this conference possible.

I'm also honored to be here among so many distinguished people who care deeply about the oceans of the world as we gather to commemorate the Year of the Ocean. Let me say, if ever there were doubts about the significance of our work, look only to Secretary Daley, who flew across an ocean and a continent, more than 12 hours from Ireland to be here with us today. That is a very strong statement about the importance of his commitment and the importance of this conference.

Let us also acknowledge the members of Congress, with whom we work on a daily basis on behalf of the American people. They're here with us during this session so that we might grapple with the important legislative issues that have to be addressed as we go forward. If I might just take a point of personal privilege, I'd like to thank all of them for the leadership role that they played in the tireless effort to move through the Congress the historic surface transportation bill, The Transportation Equity Act for the 21st Century, which the President signed just the other day. These individuals and the partners with whom they work delivered to the President a major piece of surface transportation that will help us in our connections with our airports and seaports, giving us access to the world as we move into a new century and a new millennium.

Through a solid commitment of fiscal responsibility, we will maintain a balanced approach in our investments in our transportation systems, both highways and transit, and also intermodal connectors and safety programs, connecting us again with airports and seaports and giving us access to the world, but doing it in a way that enhances safety, creates jobs, provides for global trade, and protects our environment. Working together, we have achieved passage of this important piece of legislation, but we've done it in a way that protects other priorities of this administration and the American people: education, child care, social security, and the like.

Those of you representing state and local governments, we gather on the heels of this success to listen to you and to learn from you about how the oceans and the waterways and the ports impact your cities and states. Your work is invaluable to this administration that works actively every day in every way to bring a common-sense approach to the work that we do with you in partnership as we work on behalf of the American people whom we have the privilege to serve. As stewards of the ocean, representing more than 500 scientists and business leaders and dedicated workers and military commanders and environmentalists participating in this conference, you care deeply about our oceans. We share your concerns.



Secretary Daley represents, again, one of the strongest voices of commerce. And, again, Secretary Dalton represents one of the strongest voices of national security. Our economic security and our national security come here together hand in hand in a powerful way as we discuss the importance of our oceans as we move forward into a new century and a new millennium.

Many of you also share a responsibility for America's marine transportation system. All of you know this nation was built on its waterways and ports. Our economy today is still inextricably linked to the ocean. One in every six jobs in the United States is marine-related. More than one billion tons of cargo move through U.S. seaports every year, and the volume continues to grow. Nearly all—some 95 percent—of U.S. trade is carried by ship back and forth across the oceans and the seas, and it is expected that this will double over the next 20 years—the capacity as well as the volume. Clearly, sea and ocean power is vital to America, not only since its birth, but as it continues to grow and to prosper.

The Honorable Rodney E. Slater, Secretary of Transportation and panel co-chair
Photo: Ronald Bell, U.S. Department of Commerce

Franklin Roosevelt said, "The ocean has laid much of the foundation on which the nation has grown to the America that it is today." I often say that transportation is about more than concrete, asphalt, and steel, so I join you. I join you in making the case as we look forward to the ratification of the U.N. Convention on the Law of the Sea and the fact that it must be a priority during this legislative session.

We also seek to work with you to enhance the condition and the strength and the power of the transportation system that is so vital as we move America forward. I'm proud of the work of

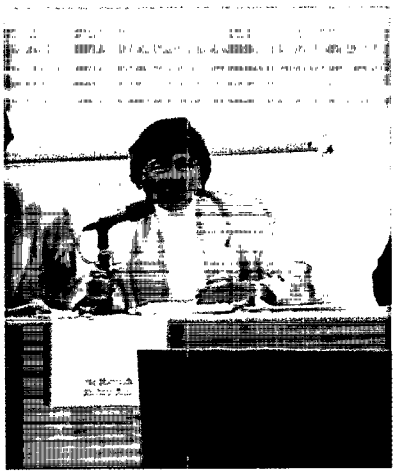
the Coast Guard as it continues to ensure the safety of our waters and to protect us from dangers, especially the threat of illegal drug traffickers. I'm proud of the work of the Maritime Administration and the fact that it finances many of our environmentally sound developments as related to our seaports and our waterways. I'm pleased to be here to join Secretary Daley and our members of Congress as we listen and we learn from you.

In closing, let me say that it is indeed a pleasure to be here. We join you in the commitment of partnership as we work to give a strong voice to the importance of our work and as we work to make real what is an inscription on the U.S. Navy Memorial, which says, "The waters that divide unite us." President Clinton, Vice President Gore, and all the members of this administration have taken that message to heart, and we're pleased to join with you today in an effort to unite us and to ensure that our best days as a nation are yet ahead of us. Thank you.

Panelists' Statements

The Honorable Rodney E. Slater

Secretary Daley, I'm pleased to join you in asking a series of questions of our panelists, and I'd like to start with Senator Barbara Boxer. Senator Boxer, you know the importance of oceans as they relate to the economic well-being and the national security interests of our nation. You were very instrumental in ensuring that provisions dealing with trade corridors and border crossings were a part of the recently passed T-21 legislation, the Transportation Equity Act for the 21st Century. Please share with us why you feel it was so important to have provisions dealing with trade corridors and border crossings as we deal with the importance of transportation to the future strength of our nation, especially in a mighty state like California.



Senator Barbara Boxer
Photo: Ronald Bell, U.S. Department of Commerce

Senator Barbara Boxer

Thank you very much, Mr. Secretary, for asking me this question and for your great leadership on these issues.

For us in California, trade is of great importance, and as we look at the value of our ocean—I think we can come up probably with more than this—but I came up with five of these values: (1) fishing; (2) tourism and recreation; (3) commerce and trade; (4) education; and (5) spiritual, which you can't quantify, but it's there.

When we look at this issue of commerce, it is very, very important. What we have done with your leadership and with my colleagues here is to point out that it is very important, since we're going to be the number one economic power in the world, to be able to move our goods and people. When we look at what is happening now, we find that our commerce is infringing on our quality of life. So what we attempt to do is focus on the border and focus on the ocean trade.

We have two elements in the ISTEA [Intermodal Surface Transportation Efficiency Act] bill that will deal with these that will give us the funding we need to be able to—once we get the goods—move them efficiently and in an environmentally sound way through our country, away from ports and to the ports and certainly at the border where we now see—and I'm sure that Congressman Bilbray can expand on this—the tremendous glut at the border with Mexico. We see a lot of pollution and a lot of stalled time. When you waste time with these kinds of problems, it's bad for your business and it's bad for the environment. Again, improvement in these two elements—the border infrastructure and the trade corridor—would be immensely helpful so that once the goods get through the ocean to the ports, we can move quickly through and continue to utilize our oceans.

The Honorable William M. Daley

Let me ask a quick question of the Senator also. You mentioned many of the uses of the ocean, and that was one of the themes at yesterday's conference forums: how to balance these. What kind of actions do you think are necessary to address that need to balance all the uses of this finite resource of the oceans?

Senator Barbara Boxer

Mr. Secretary Daley, I would say this. I think we can and should take eight actions to make sure that we can value and honor this resource called the ocean.

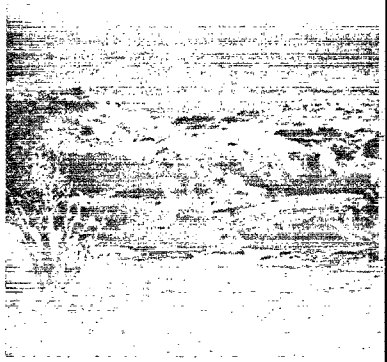
- First, Congress should pass the Coastal States Protection Act, which so many of us here support. I introduced it in the Senate, and Lois Capps introduced it in the House. I really do believe everyone sitting at this panel is a strong supporter. We should pass it. It would say that if the state has a moratorium on offshore gas drilling and oil drilling, it should be extended to federal waters. It's very clear, very

simple, and it will work. We should send it to the President. May I say that for those who say the President has the power to permanently protect the coast, I wish that he did. The fact of the matter is, Congress must pass permanent protection. A President needs to sign it into law, and then we'll have that permanent protection.

- Second, we should ratify the Law of the Sea, the international protection of the ocean that Secretary Dalton has been calling on us to do in the Senate. We should be leading the world, not standing in the way.
- Third, we should pass the Oceans Act. This is a bill written by Sam Farr and Fritz Hollings. Again, so many of us are on that bill. It would set up a commission and give us a road map on how to protect the ocean out into the next century.
- Fourth, fully fund President Clinton's Clean Water Action Plan to clean up the rivers and the oceans and the streams of our nation. If we don't fund it fully, it's not going to happen.
- Fifth, expand marine research and education. We don't know the mysteries of the ocean. We have an Endangered Species Act, Mr. Secretary, and what we found is that some of these plants hold the key to curing diseases. We don't know the promise of the ocean. We need to know.
- Sixth—an idea from the wonderful Sam Farr again—is to get behind a sea camp for our children. We have a space camp for our children, and we have a whole generation of young kids who want to be astronauts. Well, let's have another generation of kids who want to study and learn about the sea.
- Seventh, we should expand our sanctuaries to protect wildlife habitat that are so important to our country.
- My last point is this: we should come up with an ethic about the ocean. We should have zero tolerance for ocean dumping, zero tolerance for damaging our ocean. When I first got involved in this, I was talking to Rachel Binah, one of the heroines of mine, on this whole issue of ocean protection, and I realized—it was in 1983, I had just gotten elected—the military, which has gotten better since, wanted to dump nuclear reactors out near a sanctuary up in northern California. It galvanized the whole community, and then they decided not to do it. Then we had to fight EPA [Environmental Protection Agency]. They were going to grant a permit to allow ocean incineration of hazardous materials. We just can't go back to those days. We must say zero tolerance for damaging our oceans.

With that, I'll stop and thank you for asking me that question, Mr. Secretary.

The Honorable Rodney E. Slater



Thank you. I think it's clear from the response to the question and also the response from the audience that Senator Boxer gets it. She's a strong voice for you, and she's also willing to give credit to others who work in a mighty way on your behalf. I appreciate the mention of Congressman Farr. Over the course of the session we'll talk about roles being played by the other members of the Congress here.

Congressman Blumenauer, as you know, the Department of Transportation—led by the Coast Guard, Admiral Loy, and members of the Maritime Administration here today—has been working with a number of federal agencies that have responsibilities for the nation's waterways and ports and intermodal connectors. They've actually held a series of listening sessions. In addition to the specific issues and needs that were identified during these listening sessions, the uniform call for a national vision for maritime transportation and effective leadership and coordination at the federal level was something that came through time and time again. As we now complete work on a highway bill that deals with our policies on the surface side for the next six years to a decade, how do we move forward in dealing with the important issues of marine transportation and its importance and how our surface system has to connect with our waterways?

Representative Earl Blumenauer

Representative Earl Blumenauer
Photo: Ronald Bell, U.S. Department of Commerce

Thank you, Mr. Secretary. I think the point is one of connection, and I think the Department of Transportation, under your leadership, helps illustrate how we cannot look at these as separate elements anymore. Indeed, as my friend Sam Farr continually points out, given global warming and the opportunity for rising levels of the oceans and what we know about seismology and earthquakes, we're all going to be coastal communities at one point or another. It's just a question of when. If we persist on trying to slice these problems up into little tiny pieces and use that as an excuse for not solving them in a comprehensive fashion, we're doomed to failure.

The reauthorization of ISTEA is a blueprint for continuing three critical elements:

- One, even though it's anathema to some people, we need to plan for the future—whether it's land-use planning or it's work with oceanic transportation. We need to plan.
- Second, this gathering here this weekend is an example of having a meaningful engagement with the citizenry. Under ISTEA in its reauthorized form, citizen participation is not supposed to just be an afterthought, something that's checked off on a list. But by engaging citizens who are deeply involved in these issues and their solutions, we can qualitatively improve the product that comes out of it.
- Last but not least, using the resources—and the ISTEA reauthorization is an example of that—is it enough? Probably not, but with a couple hundred billion dollars, we ought to be able to make a start in a number of places, and we have examples of where a small amount of money invested wisely will make a huge difference.

It's sad to say, but the federal government is still part of the problem. We still have federal programs that are wasting dollars and using failed technologies of the past. California again is a leader, making us look at cheaper, greener alternatives for flood control, for instance. We throw a lot of money trying—a futile effort in some cases—to keep a shoreline that God doesn't want us to have. Or the administration having real leadership with FEMA [Federal Emergency Management Agency] with disaster relief where we have the federal taxpayers spending billions of dollars putting people back again where God doesn't want them, instead of maybe using that as a signal that we ought to be able to have greater harmony with the natural environment.

I see the ISTEA reauthorization and this administration having an opportunity for us to take simple steps to be able to pull those pieces together to make a big difference in the future.

Representative George Miller
Photo: Ronald Bell, U.S. Department of Commerce

The Honorable Rodney E. Slater

If I may, Secretary Daley, I'd just like to mention one point that Congressman Blumenauer mentioned, and that deals with the work of FEMA. James Lee Witt, the Director of FEMA, is taking a different approach to this issue and is trying to work with communities after they have dealt with disasters to deal with land-use questions and to really bring more prevention into the process. I'm glad you raised the point. I just felt it necessary to acknowledge his leadership in that regard. Thank you.

The Honorable William M. Daley

Thank you, Rodney.

Congressman Miller, we all know that coastal tourism is extremely big business and has had a tremendous positive impact on our economy over the last number of years. Obviously, in many parts of the country—the East Coast and the Gulf Coast specifically—there's been real concern about pollution problems with red tides and brown tides. I'd just ask a general question. What do you think that the administration, the Congress, and the general public stakeholders can do to try to address this, because it is a big part of our economy in so many regions of the country?

Representative George Miller

Thank you very much, Secretary, and thank you, Secretary Slater, for being here today.

As we learned yesterday and we've learned over the last couple of decades, much of what plagues the oceans is caused on the shore. The problems of our fisheries on the Pacific Coast start in the watersheds of Idaho, Washington, Oregon, and the Sierras in California and how we manage those forest areas. As Sam Farr has reminded us, he sits on the Agriculture Committee, we now see in California huge feedlot operations and very, very large dairies. We're seeing them in the Midwest and on the East Coast. We now see nutrients flowing into our streams and our waterways and into our oceans, and we now see the economies of Virginia, North Carolina, and South Carolina plagued by the *Pfiesteria* problem in that area. We see a 7,000-square-mile dead zone at the end of the Mississippi River in Louisiana. We see thousands of beaches closed periodically across the coast, across the country.

As Senator Boxer mentioned, the President's Clean Water Action Plan, and I think the President put it best, is an effort to finish the job. The Clean Water Act is one of the fundamental basic environmental laws of this nation. It's the model across the world, but we need to finish it.

The President has set forth trying to give local communities the remaining tools that they need, some resources, but we need better monitoring. Some of our municipalities aren't doing the job they should in treating their waste products.

The EPA has now started some actions against some of these large feedlots. We now have five

tons of animal waste for every man, woman, and child in this country. We can no longer just spread it on the land and hope that the rain will take care of it. It's ending up in the oceans.

The President's plan sets forth this effort. He's asked for about a half a billion dollars to finish the job. And it's terribly, terribly important because the runoff from our farmlands and from our municipalities and the failure of some people to tend to the law are now causing huge problems in all of the coastal areas of this country. I think in one of her eight points that Barbara [Boxer] had it right with the Clean Water Action Plan. I think the President's call to finish the job is one that, hopefully, the Congress will heed.

The Honorable Rodney E. Slater

Congresswoman Lois Capps, first of all, let me say we enjoyed very much the opportunity to work with your husband, and we look forward to the opportunity to work with you. We know of your interest in national security and trade. My question is, as the United States enters into the 21st century, what advancements in transportation would you envision for California, and how can we in the Department of Transportation work with you to bring that vision to life?

Representative Lois Capps

Thank you very much, Secretary Slater. I just want to say what a tremendous honor it is to be a new representative in Congress from the neighboring district south of here, the two beautiful counties, San Luis Obispo and almost all of Santa Barbara. We have Bud Laurent, supervisor from San Luis Obispo County, here and quite a good delegation from our area. We're pleased to be part of this conference.

My hat's off to my neighbor, Sam Farr, for organizing this. You've set the model. I have a feeling that we don't do this often enough. This is a very good way to have a conversation. We have the administration represented with its highest-ranking officials in commerce and in transportation. We have our Senator, well known for her leadership in this area, Senator Boxer. We have a delegation, as many of us who can be here, tremendously interested in your ideas and in putting forth what you want us to do to protect.

When we sit here with the waves crashing behind us, what more of a lesson do we need than what our mandate is now: to protect, to conserve, and to educate ourselves and our children about this most wonderful resource we have—the ocean. And what lessons we can learn today? Many of you have spent lifetimes learning lessons about the waters that we're on, how we can apply this to our transportation needs. It's a challenge.

When we're sitting on this fragile coastal area that runs up and down this beautiful state where Highway 101 links us all along the coast, we realize what a limited means we have in this four- to six-lane highway. It runs down my county, too, my counties. The alternative that we must look for, in terms of the trade, the commerce, and the sheer ability to bring so many people who want to get what Senator Boxer called the spiritual resources also from being near the ocean, is that we need to use transportation with respect to the ocean. It's a magnet. It's a mecca, and we need to be creative in our way of transporting people and goods and services and ideas.

Our district has commercial space developing. That was the frontier we all talked about for so long. We need to look now at the ocean as a frontier that includes transportation, but also that will be a life-renewing source for us all. Thank you.

The Honorable William M. Daley

Let me at this point ask Congressman Farr a question. But before I do, let me acknowledge, as I know has been acknowledged before, the importance of his determination that this conference take place. All of the members up here and so many others have encouraged that this conference take place. I have to tell you from a personal perspective, I couldn't see him or run into him over the last number of months without a strong statement by him as to the importance of this conference and the need to move forward and, once it was set, to make sure that it's the success that it's become. We thank you, Congressman, for your leadership.

The question I have is, you've been the author of the Oceans Act in the House, and I know yesterday, Roger McManus spoke of how important it is as one of the things we have to address after this conference. This is terrific, but it's really about where we go from here, not what happened yesterday or today, but more important, what happens after today. Could you give us an overview of the act, where we're at, and what we—not only those of us up at this table, but, more important, the people who are in the audience from all over our country—can do to help in moving that forward?

Representative Lois Capps
Photo: Ronald Bell, U.S. Department of Commerce

Representative Sam Farr

Thank you very much, Mr. Secretary, and thank you for being here, both you and Secretary Slater. It's indeed a pleasure to sit here in my own backyard with this distinguished panel and members of Congress who helped bring this conference together. We circulated a letter on the House floor, and Senator Boxer in the Senate, requesting the administration to have a conference like this for the very reasons that all of the panelists have talked about. I was overwhelmed when they decided that those who squeaked the loudest get the grease, and they would have it here in Monterey. I'm pleased to have you all here.

We need to have a national act, a new law, creating a Stratton-like commission, which was the commission that was created back in 1966 to take a look at the oceans. That commission sat for a very short time and made some very strong recommendations to Congress and to the executive branch suggesting that we needed to get our national house in order. Out of doing that was the formation of NOAA, the National Oceanic and Atmospheric Administration.

It's interesting that at about that same time, we began the space race. Since then, Congress has been appropriating at a pace of about $13 billion a year to NASA [National Aeronautics and Space Administration] and about $2 billion to NOAA. We've certainly put a much higher priority into space than we have into the ocean, and half of that NOAA budget is atmosphere, is weather. We're short on funding, and we need to bring the ocean agenda, the ocean budget, up to the space budget.

Representative Sam Farr
Photo: Ronald Bell, U.S. Department of Commerce

Second, and probably most important—and I think Vice President Gore said it so beautifully last night at the Monterey Bay Aquarium reception—the U.S. population since the Stratton Commission recommendations went into effect, which was back in 1968, has grown by 70 million people. Most of those people live around the coastline. So the pressures on this resource are, indeed, threatening.

Historically, as you've heard from panelists, we've been putting things into the ocean at the same time that we've been taking out. We take out what is valuable to us, which we can commercially market, and we put back in things that aren't valuable to us—sewage and waste. We can't keep polluting the very place that we're getting our food sources from and continue to have a healthy environment. We have to stop that. I think that Senator Boxer outlined what we need to do most, and that's to have the eight-point plan—"The Boxer Points"—to address all of those issues.

The bill in Congress is essentially a bill to create this commission, which would last for 18 months and bring the products that you in the audience are giving to us. As I've said and others have said, there's never been such a diverse group of people sitting at the same table discussing the issues that you all have in common. We didn't all expect that 1998 would be the Year of the Ocean, and in that year, the Academy Award would go to a movie about the *Titanic,* and the *New York Times* best-seller list would have *A Perfect Storm,* and we'd have El Niño. All of these things happened at this time.

I think there's a calling out there that this nation wants this Congress and these members of Congress and their colleagues in Washington to really get going on the issues that we're talking about today. That's what the Ocean Act is. It's set for markup in June [1998]. You need to contact your members of Congress and ask them to support this bill so that the ideas of this conference can be solidified.

Last, let me tell you that it works. This system of democracy, of petitioning the United States government, works. You're sitting on the edge of a National Marine Sanctuary. That was a bottom-up creation. You're sitting next to a National Estuarine Reserve called Elkhorn Slough. That was a bottom-up effort by people in this community petitioning their federal government to say that these laws that you've created, we want to partake in them to use them in the ways that all of the members of this panel have talked about, working with the communities to solve the problems. If, indeed, all politics is local, then all solutions to the world's ocean problems are local. It begins here, right at home. We in Congress should be helping you, not hindering you.

The Honorable Rodney E. Slater

The next question goes to Delegate Robert Underwood from Guam. Delegate Underwood, we know that the world's population will increase by 50 percent by the year 2020. Trade between nations is expected to double or even triple during the same time period. Over 95 percent of that trade will move by vessel through coastal and inland ports. At present, U.S. ports and waterways are close to capacity and require significant infrastructure improvements in order to meet the coming challenge. In your view, what should be the role of the federal government in meeting this challenge?

Delegate Robert Underwood

Thank you very much, Secretary Slater. Before I answer that, obviously as a representative of an island community, nothing impacts us more than issues pertaining to marine transportation. But I wanted to take the opportunity to thank the community of Monterey and, of course, your representative, Sam Farr.

Some 5,500 miles from here resides Guam. Sometimes we think of the ocean as a barrier, but I tend to think of it as a way that connects us all. And so I think of Sam as my neighbor. From the people of Guam, "Hafa Adai" to all of you, and "Hafa Adai," especially, to Sam Farr.

Initially, what the federal government can do most effectively is elevating the priority of marine transportation on the national agenda. By doing so, we can highlight how important the marine industry is to all of us. Over 16 million people work in the port industry of the United States, and more than 95 percent of all of our imports and exports move through our ports.

It is very important to understand that as we improve the infrastructure of these areas and the ports, that there are myriad coordination and collaboration problems with all the agencies that have an impact on this. Coming from an island community as I do, nothing is clearer than that when you have to rely on your port as your interstate, your airport, your railhead. Everything that we do comes through that port. Everything that we rely on for our lives comes through that port. As we seek to not only improve the infrastructure of ports but at the same time protect valuable resources, we certainly run into a number of problems with all the various federal agencies that we have to deal with, ranging from the Coast Guard to the Army Corps of Engineers, and all of the environmental regulations and all of the regulators.

Yet, at the same time, we certainly acknowledge, those of us who come from an island environment, that the ocean is not only a place of recreation, it's also very much connected with our livelihood. I think we have a unique understanding of how that interplays. We don't just think of the ocean as a place to draw inspiration from or to recreate in or to study or to enjoy. We've done those things. We also understand it to be a source of our livelihood.

I look forward to working with you, Secretary Slater, on some of these issues and on trying to bring some clarity to the myriad issues that attend to dealing with the maritime industry and the development of ports and the improvement of ports while at the same time safeguarding our ocean resources.

The Honorable Rodney E. Slater

Thank you. We look forward to working with you as well.

The Honorable William M. Daley

Let me ask Congressman Bilbray a question. This has been a difficult season because of El Niño and the impact that El Niño has had on the coastline. You're obviously well known for your use of the oceans—literally. Let me just ask you as to the impact of the weather of the last year and what economic impact that is having on your district and any observations on that you'd like to make.

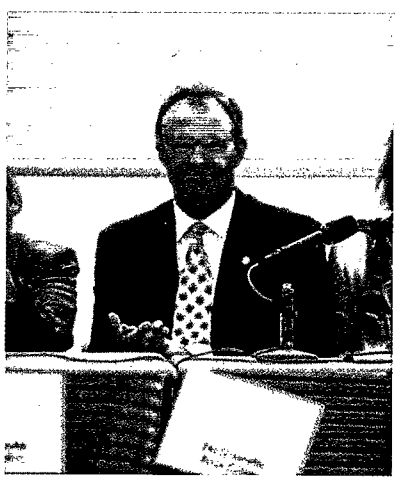
Delegate Robert Underwood
Photo: Ronald Bell, U.S. Department of Commerce

Representative Brian Bilbray

Thank you. I appreciate being here, though I do feel it's rather strange to spend Saturday morning with a coat and tie, talking about the ocean, rather than what we're supposed to be doing. And that's being out in the ocean with our wet suits—especially here, where one of the best diving spots in all the world is right behind us, second only to San Diego.

The El Niño experience has really taught us a lot of things. First of all, let me make a plug for the fact that Scripps Institution of Oceanography told us about El Niño years ago and tried to get the message across. Washington, being a little slow, picked up on it, and it's really showing how important ocean sciences are—not just to those of us on the coast, but to the entire nation, and the entire world. I'm very happy to start seeing people talk about El Niño and now La Niña. They're starting to listen to the scientists who are working in the ocean.

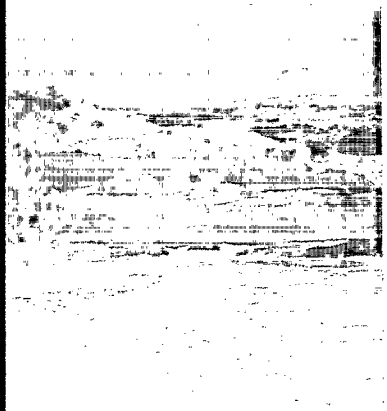
The impacts of the weather pattern we saw this year really sent a very strong message about two things. I think that it was quite clear, first of all, that our clean-water strategies have missed one point or not focused enough on another point. Our beaches were closed almost consistently during this winter because of the extensive runoff and the problems related to nonpoint sources.



Representative Brian Bilbray
Photo: Ronald Bell, U.S. Department of Commerce

The other issue is that contrary to what you hear about all the great surf that went on this year, it was very, very destructive—not just from the pollution point of view, but also the disturbance of traditional beach areas, and especially

those of us who are near and dear to beach breaks. The disturbance and the transport of sand away from the beaches that not only affect those of you who like to lay on the beach and sun but also those of us who like to paddle out into the water and catch some waves. That sand is a resource that is terrestrial and submarine, and I think that we really need to address that.



My frustration is, as somebody who has worked on clean-water issues, that in Washington we've been so obsessed with point sources and talking about treatment plants, which are easier to manage from a federal and environmental point of view, because there are less of them. The nonpoint sources, the runoff—everybody who washes not just oil and antifreeze down the drain, but those who don't even think about washing grass and leaves down the drain—add to a biological component that when it rains like we had this winter, end up closing the beaches that many of us want to use during the winter. It's something we need to talk about more when it comes to the federal strategy.

The other issue, and I appreciate the fact that the Secretary brought it up, is that the damage to traditional recreational beaches is something that has to be addressed, not just for protecting homes and property upland. We also need to address our sand beaches as being a social and economic resource. It is just as much of an economic resource as farmlands in the Midwest, and FEMA has addressed those issues in the Midwest.

Now, working with FEMA, we hope to be able to separate from that natural erosion, that natural process that will happen over a period of time, those extraordinary damaging processes that take away resources that are desperately needed for social and economic reasons. I'm very happy to see that FEMA has within its existing structure an exception for those beaches that we have traditionally replenished, because there was a community involvement of what they call engineering beaches or man-made beaches. One of the concerns I have is that the federal system traditionally has said, "We won't replenish your beach" or "won't work at repairing damages to the sand." But we'll end up approving a structure or a breakwater or a wall that then creates all kinds of major problems— socially, economically, and environmentally.

Representative Lynn Woolsey
Photo: Ronald Bell, U.S. Department of Commerce

The other issue we really became sensitized to under El Niño was that, at least in California, we were able to go to the beach. And when I walked there with my 10-year-old daughter and 11-year-old son with our surfboards, we could look out and see red signs that said the beach isn't safe to go into. The rest of the United States doesn't have that type of information. We need to empower the local community with the knowledge of when their beaches are closed. And that's what I hope that almost everyone here is addressing. Member Pallone from New Jersey and I have introduced a bill called H.R. 2094, which will give the communities the knowledge—and the number one power is knowledge—that there is a problem and the ability to address this.

The real message that we've gotten from El Niño is that we can take a lickin' and keep on tickin', but that Washington needs to get more to outcome-based strategies when it comes to protecting our resources on the coast. The processes are important, but all the work in the world and the Clean Water Act that addressed one source and that ignores indirect sources does not mean our beaches will be open for our children. That, without giving the people the knowledge to be able to know their beaches are closed, is not going to make it. Then again, we've got to recognize we want the beaches there to be able to go to, too. All of those things need to be concentrated on the outcome, and I think we can learn from El Niño. Now, ladies and gentlemen, get ready for La Niña. Thank you.

The Honorable William M. Daley

Congresswoman Woolsey, if I could ask a question. We talked about the uses. One of the main uses—and in California, a main part of the economy—is farming and agriculture. You have an innovative suggestion, and I wonder if you can talk about that piece of legislation for us.

Representative Lynn Woolsey

Thank you very much, Secretary Daley, and thank you, Secretary Slater, and thank you, Sam Farr, for today. I think Secretary Daley is my straight man today. I've been talking about a bill that I've introduced in the Congress and that Senator Boxer has introduced in the Senate that comes from the vision of a supervisor in Marin County, Gary Giacomini.

We have a concept that's local to my district, which is the two counties north of the Golden Gate Bridge, but can be spread across the nation. It's a model. What we want to do is provide 38,000 acres of protection for landowners who are third- and fourth-generation farmers just east of Tomales Bays, along Tomales Bay and Bodega Bay, and east of the Point Reyes National Seashore, a national park that's one of the most visited in the nation.

Why is this important to the waterways and to this conference today? It's important because those waterways—estuaries in Bodega and Tomales Bays—are two of the most pristine waterways in this nation. And that's because of the good stewardship of these landowners, these third- and fourth-generation farmers.

Now what we've proposed is that *willing* landowners can enter into a contract with the federal and local government working in partnership to purchase their development easements. *Willing* only. Nobody will force them to do this. But by doing this, they will stay in private ownership, on the tax rolls, in agriculture in perpetuity. They will be protecting the east side of Tomales and Bodega Bays and protecting our investment in the Point Reyes National Park. And, at the same time, for $30 million local, $30 million federal, we'll have 38,000 acres of open space along those estuaries, and they'll remain undeveloped. I think, one, it's important to our economy because agriculture is so important to Marin and Sonoma Counties. Two, it protects our investment in the Point Reyes National Seashore. But more important than that, it stops any encroaching development along those pristine waterways.

Thank you for asking me that question, because I want more and more people to understand this.

The Honorable William M. Daley

Let me ask Congresswoman Eshoo a question. Her district is made up of a growing urban population and also a huge coastline, and the conflict that can occur with those two can be enormous. I'd like your observations on how to balance those two, and the problems that come as a result of having those two, at times, different sorts of constituencies.

Representative Anna Eshoo

Thank you, Secretary Daley, and thank you for your leadership and that of Secretary Slater, and certainly the administration and the Navy. Let me add my voice to the chorus at the dais today in thanking everyone here from the Monterey area, from this magnificent congressional district, for sending one of the most prized human beings in the Congress on the issue of oceans and so many other things—Sam Farr.

I have the privilege of representing California's Fourteenth District. Part of it is coastal, on the San Mateo County coast, but part of it includes the Silicon Valley. There's one thing that the Silicon Valley doesn't have, and that's part of the California coast. There is commerce, there is fishing, there is tourism on the California coast, and certainly around Pillar Point Harbor. And we have Año Nuevo. So we have much to protect. There are dollars that are earned from the industries that are already there.

I think that what this conference really represents is a national notching up of what we already know and how we coordinate it, because we have so many pieces that really need to be stitched together. We need to have both a national plan and an international plan for our oceans.

And then, of course, there's the mystery of our oceans. In many ways they represent—at least to me, and I think to others—what our national parks do. We wouldn't think of doing some of the things that are done to our oceans in our national park system. You can tell that I have two young children. They preach to me about it. On the part of our California coast side, dredge spoils pose a huge threat to the fishing industry. What we can conserve and protect for them and the resources that represents, not only to the coastal communities but to others as well, is really very important.

I can't help but think of something that my grandmother used to talk about. She used to say it with great pride because she was one of the few family members who was a Californian. She used to write to her relatives across the country, as a very faith-filled woman, and say to them, "God was in a good mood when he created California." Part of that good mood is the magnificence of what we have as a backdrop here today. We collectively, in service to our nation, owe it to what has been given to us not only to protect it for ourselves and future generations, but also to recognize that it is a treasure that really binds peoples around the world.

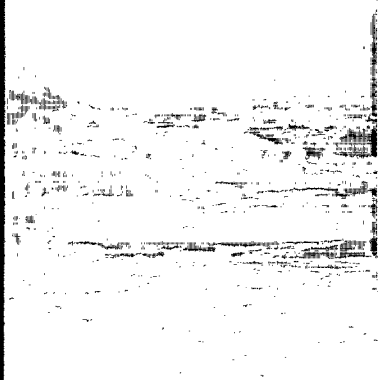
Representative Anna Eshoo
Photo: Ronald Bell, U.S. Department of Commerce

We can sort out the conflicts that are there today in terms of uses. We know how, but we must have a national plan that has not only consistency to it, but a seamlessness to it. Where there are conflicts within federal agencies, where we haven't passed the national laws that should be put in place, and the national laws that need to be strengthened—the Endangered Species Act, the Clean Water Action Plan, we can go on and on.

Senator Boxer outlined that eight-point Boxer plan for the nation. I think that we can do it, and as a result of it, we will be a better people, a better nation. And what my wonderful Nana said at least a generation and a half ago will really be true.

Thank you to all of you. I hope, Mr. Secretary, when each one of us has been asked our question

that maybe we can leave the dais and move out into the audience and speak to everyone who is here, meet with them, get more of their ideas, because they're just as much of this conference as we are up here on this stage. Thank you.



The Honorable William M. Daley

Thank you, Congresswoman. I think that's a great idea.

Let me ask Delegate Faleomavaega a question. You come from an island nation. Much has been discussed, and I know there were discussions yesterday regarding the possibility of additional research of the ocean that may help cure some of our health concerns. I wondered if you could speak to that issue.

Delegate Eni Faleomavaega

Thank you, Secretary Daley. First of all, in the years that I've served in the Congress so far, I don't know of any member who has managed to get the President of the United States and the Vice President and two Cabinet secretaries to be in his district in the span of two days than Sam Farr. Sam Farr, it's a tribute and a credit to you and your leadership and to the good people here of Monterey. I do have fond memories of this place. I took my basic training in the Army at Fort Ord before they shipped me to Vietnam. I had a very pleasant experience, and I enjoy the weather here.

Secretary Daley, I appreciate your question about someone who comes from an island community, and the Pacific is an interesting place. One-third of the Earth's surface is in the Pacific, both the south and the Pacific Ocean. Some 25 island nations and territories live in that area, comprised of a little over 5 million people.

Delegate Eni Faleomavaega
Photo: Ronald Bell, U.S. Department of Commerce

Over the years, the leaders of the island nations have been pioneers in every international forum known in expounding on the importance of what we have to do not only nationally, but globally, on the issues not only relevant to the problems affecting global warming, but also the fact that there are so many rich resources available out there in the ocean.

I can safely say that our people are an ocean people. We have a love and a deep respect for the ocean. The ocean was our highway, and still is. Our nation does stretch from as far north as Hawaii and one as far south as New Zealand and as far east as Rapa Nui, or what is now known as Easter Island.

In that community of inter-island relationships, we have now come to discover this little thing known as nodules. I recall my good friend, Geoff Henry, the Prime Minister of the Cook Islands. This island nation has a population of only about 20,000 people, but is about 3 million square miles. They've recently assessed at least well over $200 billion worth of these seabed nodules that are in this island nation.

If there's ever a time that our country needs to reach out to these island nations, the time is now. I sincerely hope that President Clinton will come or call a summit next year, on his return from the APEC [Asia–Pacific Economic Cooperation] meeting in New Zealand, and see that we need to work together and that we need to be proactive and not reactive. I think this will make a great nation. Thank you.

The Honorable William M. Daley

We're honored to have with us Assemblyman Keeley. I think it's important that we see and hear from him as to his perspective as a state leader. We've talked much about the federal government involvement and the problems. The same problems, obviously, that we've talked about in Washington he has to deal with at the local level and the state level. We'd like to hear your observations, Assemblyman, if you could.

Assemblyman Fred Keeley

Mr. Secretary, thank you very much. I want to also welcome all of you to the Monterey Bay area, and add my thanks and appreciation and congratulations to my friend and my representative in Congress, Sam Farr, and to United States Senator Barbara Boxer for their fine work in helping to pull this together, and all of you other members of Congress and the other secretaries who are here.

I think a couple of things about this issue. One is, when you think about it, there is certainly an overarching federal perspective that needs to be taken with regard to the oceans. But the states are where the ocean meets the land. The first three miles is the jurisdiction of the states. It is certainly critical all the way out to the 200-mile limit and beyond that, but when you've got 70 percent of the people of the State of California living within a one-hour's drive of the coast—and that's true of most coastal states—they create an enormous impact on the near-shore coastal waters and water quality.

This federal government has done a good job in reauthorizing the Magnuson Act. There's a lot more work that needs to be done. If it's really

going to work out, the interface that needs to be improved is what's going on at the state level. Let me use California as an example.

California's public policy with regard to managing the marine environment is a relic of the 19th century. It was one of the very first things California government put together, and it was based on things that made sense at the time. California was basically rural, agricultural, and the challenge was how to manage abundance. Now, 150 years later, we're no longer basically rural, we're no longer basically agricultural. And the challenge is not how to manage abundance; it's how to manage scarcity. Yet we're constrained with a public policy architecture in the State of California that's outmoded—150 years old.

As we're on the threshold of the 21st century, it seems to me the challenge for the state—and in order to be a good partner with the federal government and the good work that they're doing—is this: let's completely reinvent how we manage marine resources in the State of California. We can actually do that. And we have to because the public policy we've got now literally prevents us from acting in a proactive manner. In fact, you have to wait until a fishery is in collapse before the state government can act. And at that time, it takes enormous resources to try to bring the fishery back, with enormous environmental and economic consequences.

Senator Bruce McPherson is sitting up here in the front row. He and I are co-authors of a major reinvention of fishery management—marine management—in California, called Assembly Bill 1241. The basic idea is this. We're going to replace that 150-year-old, outmoded policy with the following public policy concept: we're going to use sustainability as the foundation upon which to build public policy in California. We'll build on that sustainability policy an architecture that says we're going to use good, sound, iterative science. There's no better place than the Monterey Bay area, with Long Marine Lab, MBARI [Monterey Bay Aquarium Research Institute], Hopkins Marine Station, California State University–Monterey Bay, and others to help us do that.

We'll put together fishery management plans for every fishery—not the ones that are just in collapse and wait until it's too late, but get ahead of the curve. And then we'll give modern management tools to the people in Fish and Game to work with their partners in the federal government to make sure that we have that sustainable marine environment into the 21st century and beyond. That's the big picture. That's what we can do in California as a good partner with the federal government.

Let me mention something real small that can be done, and it would be enormously helpful. We have a salmon season opening in California next week. This may seem like a small thing, but it's a huge thing to the people who are in that business. There are three marine weather buoys sitting on docks that the Coast Guard has rehabbed. They're sitting on docks, and they need to be put back out in the ocean in San Francisco and Monterey and elsewhere so that those in the fishing industry will be able to rely on those weather buoys to be able to safely go out there and conduct their business in an environmentally and economically sound way. That would be a helpful thing if they could do it. Thank you.

Assemblyman Fred Keeley
Photo: Ronald Bell, U.S. Department of Commerce

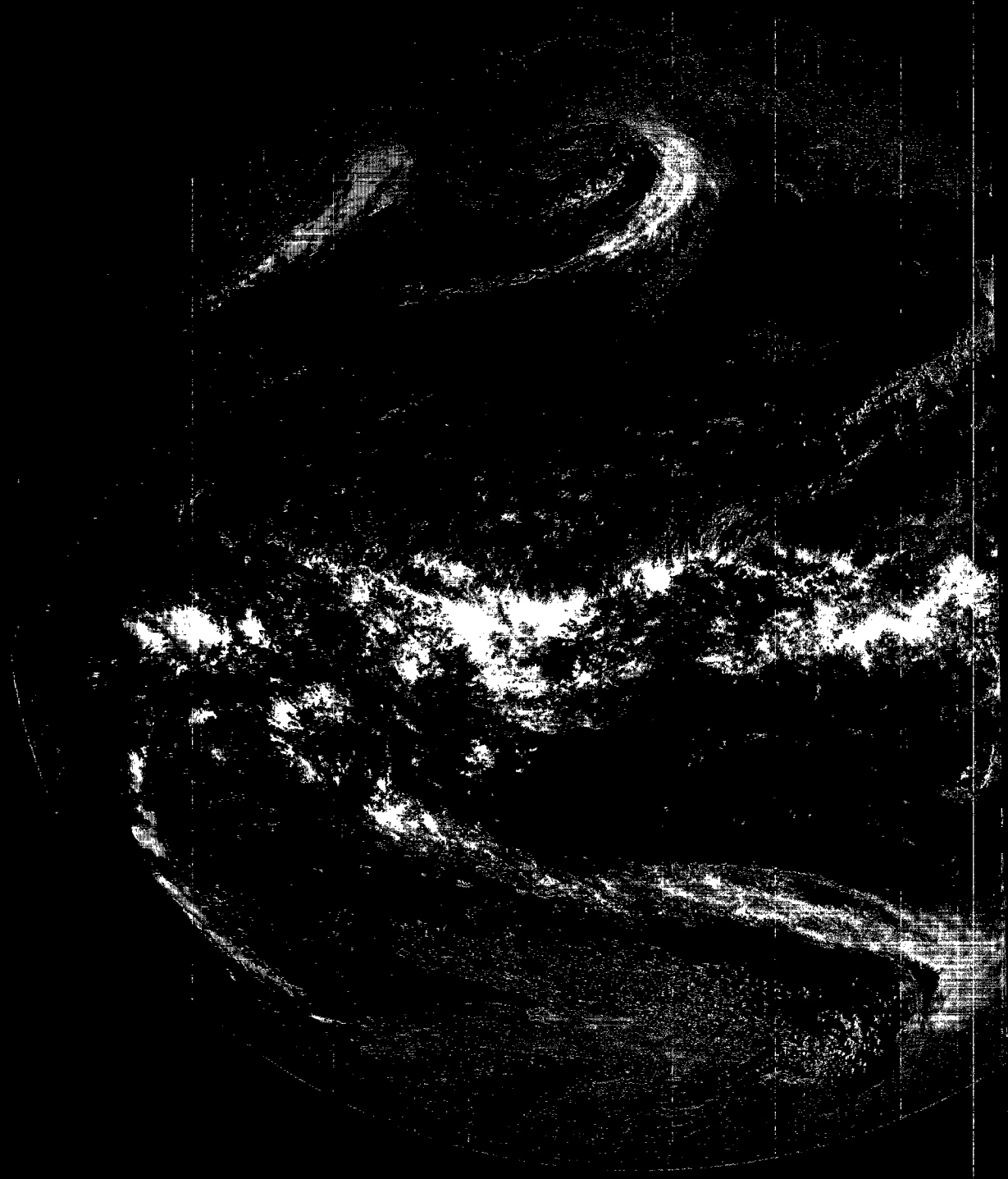
The Honorable William M. Daley

Thank you, Assemblyman, for your comments, and also for bringing that to our attention about the buoys being on dock. I don't think they're meant to stay there very long. I think between Rodney and I, we can try to find a way to get this taken care of. If we can't, we'll talk to the President.

Let me thank all of our panelists who joined us this morning. We're going to take Congresswoman Eshoo's advice and give the panelists an opportunity to engage with all of you.

Let me once again, on behalf of Secretary Dalton and myself, thank all of you, the participants of this conference. This has been a tremendous success because of the turnout that we've received and the fact that so many people who have worked so long on these issues have come together with different opinions for the first time ever to talk together in such a forum with governmental officials like this, and the President and Vice President spending so much time with all of us. Indeed, we thank you for making this conference a success. Thank you very much.

Programs and Policies for the 21st Century



This is the time—
this historic point in history—
to do for the oceans what our
predecessors did for space.
This Year of the Ocean marks the
beginning of the millennium of the ocean.

INTRODUCTORY REMARKS

REPRESENTATIVE SAM FARR
SENATOR BARBARA BOXER
FIRST LADY HILLARY RODHAM CLINTON
DR. SYLVIA A. EARLE
VICE PRESIDENT AL GORE

KEYNOTE ADDRESS

PRESIDENT WILLIAM JEFFERSON CLINTON

PHOTO: NOAA

Programs and Policies for the 21st Century

Introductory Remarks

Representative Sam Farr

I'm Congressman Sam Farr. Mr. President, Mr. Vice President, First Lady, Senator Boxer, thank you very much for coming to Monterey, where California state government began. It gives me a great deal of pride to be here on the banks of this great bay, Monterey Bay, where the National Marine Sanctuary was formed when my predecessor Leon Panetta was in Congress. On behalf of all the people of the United States who appreciate the creation of the largest National Marine Sanctuary here, I have a Monterey Bay Marine Sanctuary hat specially engraved for the President and First Lady.

I'm also very proud to be standing here looking over to my right and seeing our local band welcome the President, a band that has been in the United States White House playing the President's alma mater song from his high school. Welcome back, Mr. President, to our band, the Watsonville band. Thank you very much for being here.

To all our friends who are watching this telecast in the American Pavilion at the World's Expo in Lisbon, we greet you. Dr. Sylvia Earle and I, as soon as this is over, are going to be on a plane, along with others from here, that will be flying right to Lisbon to be joining congressional colleagues who are with a delegation there for a panel discussion on the issues of this conference on Sunday in Lisbon. We welcome you to this as well.

Representative Sam Farr
Photo: Ronald Bell, U.S. Department of Commerce

Yesterday this conference opened by calling the world community of science to protect the oceans. We heard from national speakers on the best methods to use the oceans wisely and sustainably. Today I'd like to narrow our focus a bit and look to California. The next speaker, the person whom I'm to introduce, is a fighter for the oceans, a fighter for good environment, a fighter for California. Senator Barbara Boxer is in many ways the epitome of California: respectful of nature and protective of the environment, imbued with entrepreneurial spirit, considerate of traditional values, but not afraid to challenge the convention.

Senator Boxer's great "can do" attitude is one of the reasons that much of California's coast continues to be safe from new oil drilling. It was on her part, her tireless effort, that helped create the National Monterey Marine Sanctuary. She's one of the leading co-sponsors of the Oceans Act, which I've introduced in the House of Representatives, and which has successfully passed the Senate. This legislation will develop a comprehensive approach to long-range national planning on ocean activities.

Senator Barbara Boxer
Photo: Ronald Bell, U.S. Department of Commerce

Her commitment to the oceans and the environment in general is but one side of Senator Boxer. In an age when politicians are often criticized for not speaking their minds or for following public opinion polls, Senator Boxer is refreshingly candid and an energetic spokesperson for her constituents and for their causes. It is her passion that sets her apart from others in Washington, and it is that passion that she lends to every issue that she touches. She's tenacious on assisting the disadvantaged. She's committed to economic expansion. She's dogged in promoting California's agriculture and high technology. Most of all, she's bullish on the environment. She fights our fight from the seat she holds on the Appropriations Committee in the United States Senate. She's a skillful coalition builder and tactician who gets results for this great state of California. I'm proud to call her my friend, and I'm happy to introduce to you California's own United States Senator Barbara Boxer.

Senator Barbara Boxer

Thank you all so much. Thank you my beautiful colleagues—my former colleague Leon Panetta, my wonderful friend Sam Farr, President, the Vice President, the First Lady, and Dr. Earle.

Sam, I just want to take a minute to thank you for your ongoing efforts to protect the oceans. It is so fitting that we hold this conference in your magnificent district. As a California Senator, I want to welcome all of you here today—my fellow Californians as well as guests from other states and all around the world. Your presence underscores the fact that our oceans are a national and a global resource.

Why are we here today? Just over a year ago, Sam Farr and many of his colleagues who are here today and I and many of my colleagues in the Senate wrote to this great President, and we asked him to convene a White House conference on the ocean sometime in 1998. The President responded in the affirmative, and for that, Mr. President and Mr. Vice President, we thank you from the bottom of our hearts. Your administration mobilized, and I'm deeply grateful for this wonderful response.

California's coast is a natural marvel. From the beaches and coves of southern California to the grandeur of Big Sur, to the wild rocky north, this coast is one of the Earth's greatest treasures.

California's coast, however, is much more than a scenic treasure. It's a dynamic convergence of land and sea, a grand yet fragile system that depends on one thing: the health of the Pacific Ocean. The cold, clear waters of the Pacific sustain a wealth of marine life, and some of this life supports California's multibillion-dollar fishing industry, an industry based on good resource management. Clean Pacific waters also form the basis for the coastal tourism industry—valued at over $27 billion annually—and is the creator of tens of thousands of California jobs.

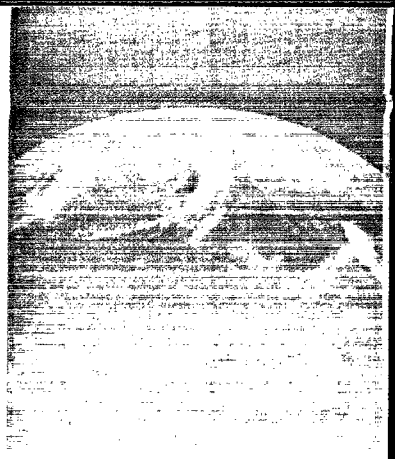
The value of the ocean is economic, to be sure. But our ocean is also a spiritual reminder of our God-given heritage. Offshore drilling, dumping, incineration, and mining are activities that should never be part of our national strategy for the future. Never. Our ocean deserves protection from these threats. Protection forever.

I have every confidence that our President will do his part to the full extent of his powers to take us down this path of permanent protection. But it is very important to recognize today that permanent protection must take the form of legislation passed by the Congress and signed by the President. This Congress has not done it, and today I challenge the congressional leaders to act. Congress should send to this President a bill to permanently protect our oceans for his legacy and ours.

I've written several bills since 1986. So has Leon Panetta, so has George Miller, so has Lois Capps, and I could name so many. There's no shortage of legislative ideas. Today, let me state clearly, when it comes to our oceans, the minimum should be do no harm. At the maximum—and we should do the maximum—we should enhance our ocean environment. When future generations visit the magnificent coastlines of America, they should walk in our footsteps, not in our pollution. How fortunate we have a President and a Vice President who understand this.

I want to say to all of you, it will take all of us—yes, the President, the Vice President, the members of Congress, and all of us—to ensure that decades from now, when we hold a young child's hand and we take that child for their first visit to the ocean's edge, we can share with that child the wonders of a clear, powerful wave, the beauty of the shells and the rocks left behind as the wave recedes, and not have to explain what it used to be like before human neglect left our shore dirty and damaged. We owe it to our children and to their children to act before it's too late. Today is a glorious start.

Ladies and gentlemen, speaking of children, it is now my high honor to introduce our next speaker, who is one of the strongest voices in the world for children. Children in America and children in every country have an extraordinary friend in this woman. May I present to you a wonderful friend, a great citizen, a wonderful First Lady, Hillary Rodham Clinton.



First Lady Hillary Rodham Clinton

Thank you. It is a special pleasure for me to be here. This is not an issue that I know much about at all as an expert in any way. But as a citizen and as a person who has always loved the ocean, I wanted to come today just to lend my voice of support to what all of you are doing who understand what is at stake and the crisis that we face as we try to do what we should to respond to the needs of our oceans.

I particularly want to thank the President and the Vice President, Senator Boxer, and the other members of the congressional delegation, including our host, Congressman Farr, for making this a top priority so that people like me all over our country will be able to start thinking about the oceans differently and will understand what those of you who are experts or who sail the seas or who fish for a living or who have some other direct interest in the health of our oceans are trying to tell us.

First Lady Hillary Rodham Clinton
Photo: Ronald Bell, U.S. Department of Commerce

My husband told me on our flight out here this morning that he had learned that 71 percent of our planet is ocean, and 71 percent of our body is salt water. I just can't stop thinking

about that, that there is this extraordinary connection between who we are as human beings and what happens behind us in this magnificent body of water.

I want to commend Commerce Secretary William Daley and Navy Secretary John Dalton, who have been the guiding forces behind this important gathering. I know that they've been backed up by absolutely terrific staff from throughout the government whom I want to thank.

This is an important conference held during the International Year of the Ocean. You've just heard how some of those who are here today will be leaving immediately to go to Lisbon, Portugal, where they're opening up a great Expo about the oceans because this is not just an issue for Americans, it is literally an issue for everyone who inhabits this globe and who, whether they know it or not, directly or indirectly, is in some way dependent upon what happens in our oceans.

I'm privileged today to have a very special honor to introduce someone who is one of those experts, who knows so much about why this conference is so timely and important. Before I do that, I want to urge all of you who are going to remain here in this area to go down to downtown Monterey and attend the Oceans Fair, which is for children and which has a lot more information about what is happening in the oceans. If you know any children or you can borrow any children, take them, because what we're doing here today is probably more about their futures even than ours. I hope that the Oceans Fair is a very big success in attracting a lot of people who want to learn more about what we're learning through this conference.

One of the people we've looked to for guidance about what we should be doing to respond to the needs of our oceans is Dr. Sylvia Alice Earle. She has a title that I think many of us would covet. Could you imagine when you're asked, "What is it you do?" to be able to say, "Well, I'm the Explorer in Residence at the National Geographic"? You know, that just makes me tingle. I just think, what a great way to spend your life.

Dr. Earle also heads up Deep Ocean Exploration and Research, Inc. She's one of our nation's—indeed, one of the world's—most highly regarded marine explorers and oceanographers. She understands how important it is that we map and explore the oceans before they're further damaged. She has committed her prodigious skills and talents toward that goal. She's developing a Sustainable Seas Program, which is designed to help us understand what resources exist in the National Marine Sanctuaries, and she's deeply committed to preserving those precious natural resources for future generations. Her work is supported by both the National Geographic Society and the Ruth and Bob Goldman Foundation, but it's work that all of us should support. It's especially important as we move toward the end of this century and the new millennium, which you'll hear more and more about.

I think it's important for all of us to pause and consider what it is we want to leave to future generations, and how we'll honor the past and imagine the future and give gifts to those who will live out their lives in the 21st century. There's no greater gift that we could give than to pay attention to the words and the passion of someone like Dr. Earle, who is pointing us in the direction of doing what we must do to preserve our oceans for the future. It's a pleasure to introduce a scientist, an engineer, a teacher, and an explorer, Dr. Sylvia Alice Earle.

Dr. Sylvia A. Earle

Thank you, Mrs. Clinton. It's an honor to share this podium with you and to be here in front of all of the rest of you. Mrs. Clinton, I admire your energy, your passion, and your commitment to make life better for all Americans and for all citizens, wherever in the world we live. Mr. President, Mr. Vice President, and all of you who love and care about the ocean, including those watching on a live link from that beautiful U.S. Pavilion at the Ocean Expo in Lisbon with Commissioner Tony Coelho and his team, hello out there.

At the Monterey Bay Aquarium last night, Vice President Gore referred to this ocean conference as an historic event. And so it is, because never before have the highest officials in this country—the President, the Vice President, members of the Cabinet, caring members of Congress, Barbara [Boxer], Sam [Farr], many of the others of you out there—come together to focus on ocean issues. On behalf of everybody here—from the tips of my flippers to all of you—thank you for being here.

Never before have the oceans been a national priority. That fact alone makes this conference an historic event. Consider this: more of the United States is ocean than land. Consider the territory out 200 miles. Mr. President, Mr. Vice President, more of your constituents are fish than people. Too bad fish can't vote. But then neither can our children or our grandchildren.

Ironically, there are no voters, no constituents, certainly no fish on the moon. Yet this didn't stop us 30 years ago from lofting more men to the moon and back than have been to the deepest sea—a mere seven miles and back. Technology is the key. Without technology, we are as earthbound as buffaloes and bears. We have made the investment needed to venture into the skies, and

it has paid off mightily. We have neglected the oceans, and it has cost us dearly.

One hundred percent of the moon's surface has been meticulously mapped; 5 percent of the Earth's ocean has had similar attention. Less than 5 percent has been seen, let alone explored. Yet as Vice President Gore and Julie Packard reminded us last night at the aquarium, the ocean is the cornerstone of Earth's life support. It's not just the system that drives power, that powers climate and weather and gives jobs to Dr. Baker and thousands of NOAA [National Oceanic and Atmospheric Administration] employees. It isn't just the system vital to national security or a place for the Navy to float ships and send forth submarines. It's not just home for most of life on Earth. It's our life support system.

The greatest explorations in our history, which opened vast new frontiers and changed our lives, have always come from youthful, forward-looking leaders. President Jefferson was about the age of President William Jefferson Clinton and Vice President Gore when he sent Lewis and Clark to explore the unknown American West. And of course it was President Kennedy who challenged us to explore space. Americans knew more about the West before President Jefferson sent Lewis and Clark on their mission of exploration, and we knew more about the moon before we landed men there than we know today about our own ocean.

The right leaders were there in the 19th century to explore the nation's land. The right leaders were there in the 20th century to explore space. This is the time—this historic point in history—to do for the 21st century what your predecessors did for the land and for space. This Year of the Ocean marks the beginning for the millennium of the oceans. The leadership is in place—might I say this forward-looking, downward-looking leadership.

Yesterday, there was good news for the oceans, for the fish, and for our children. I was particularly pleased by the announcement of a commitment by this administration to map the ocean floor from the shore to 200 miles seaward—a vital investment sure to pay economic and environmental dividends. I'm also particularly pleased by the commitment to the Sustainable Seas Expeditions, especially since I have the fun of leading the expeditions from my home base here in California. This is a public–private partnership between the National Geographic Society, the Goldman Fund of San Francisco, NOAA, the Navy, NASA [National Aeronautics and Space Administration], and others to explore this nation's system of marine sanctuaries, a promising young counterpart of our national parks. How about the commitment to protect and restore coral reefs? All right. The commitment to monitor the ocean with a new system of buoys and a renewed and an expanded commitment that Vice President Gore initiated years ago to release previously classified data and technology without compromising security.

Dr. Sylvia A. Earle
Photo: Ronald Bell, U.S. Department of Commerce

Thirty years ago, before the Vice President had been elected to his first public office, as a Representative in his home state, Tennessee, years before his 1984 election as a Senator, Al Gore already had in place the convictions of one born and raised close to the land, close to nature. He already felt the connections about which he spoke last night, that we're all connected to something other than ourselves. We're connected to one another, to the Earth, and to the oceans. Your book, Vice President Gore, *Earth in Balance,* makes that clear.

Here is a man who sees beyond yesterday and today and far into the future, and lives today with knowledge and convictions born of cruising under the ice at the North Pole in a Navy submarine, born of being in Antarctica, of being a student of that legendary ocean hero, Roger Revelle. This man born of a mother who taught him about Rachel Carson and read to him from the book *Silent Spring,* and a father who taught leadership and statesmanship by example. A man shaped by diving among coral reefs and observing for himself not only their beauty but also their recent decline. Here's one who takes his wife and his children diving in the Florida Keys National Marine Sanctuary, and here's also a man who yesterday, in total character, went to sea to see for himself the new technologies that are revealing the nature of life in the Monterey Canyon, who this morning was out kayaking in the kelp with some of California's beloved local residents, the sea otters. They can't vote, but he was listening. His is an inquisitive mind, this man of action, this man of the 21st century, this extraordinary visionary, this knowing, caring man, this Vice President of the United States, Al Gore.

Vice President Al Gore

Dr. Earle, I really can't thank you enough for your generosity. Actually, we've known each other for a long time. As a member of the Senate, I presided over her confirmation hearings many years ago, and found instantly how deeply committed she was to the environment, especially the oceans. I can't tell you what an honor it is for me to be introduced by you, especially in that fashion, this morning. I do want to thank you again.

From left to right: **Representative Sam Farr, Senator Barbara Boxer, Vice President Al Gore, President William Jefferson Clinton, Dr. Sylvia A. Earle, First Lady Hillary Rodham Clinton**
Photo: Ronald Bell, U.S. Department of Commerce

It's a great pleasure, as you can imagine, to be here with the President and the First Lady and with all of you in this stunningly beautiful site. I want to thank Senator Barbara Boxer for her leadership in helping to bring about this catalyzing congealing of our nation's commitment to the oceans. Thank you so much, Senator Boxer, and Stewart Boxer, who's here also. Senator Boxer's a great leader on the environment and on every other issue. Likewise, I want to thank Congressman Sam Farr, whose wife, Shary, is here. Sam Farr has talked to me about this conference since it was just a gleam in his eye, and he has really done a fantastic job leading all of us to this place and to these conversations. Thank you very much, Congressman Farr, for your tremendous leadership. We appreciate you.

I want to acknowledge individually the other members of Congress who are here. California is especially blessed with a lot of elected representatives in our United States Congress who have made protecting the environment in a commonsense way a part of their life's work. I'd like to ask them, the ones that I'm introducing here, to please stand. I'm going to ask you to hold your applause. I want the whole group to stand, and then let's thank them. Congressman George Miller and his wife, Cynthia, Congresswoman Anna Eshoo, Congresswoman Lois Capps, and Congresswoman Lynn Woolsey. Thank you all very much. Fantastic job.

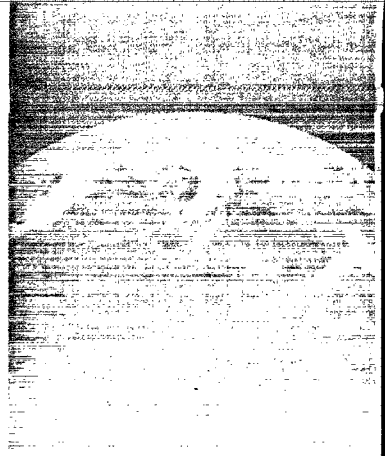
Now, there are three other members of Congress who are here, and I want to ask them to stand. First of all, a great environmentalist from Oregon, Congressman Earl Blumenauer, is here. Thank you, Congressman. Delegate Eni Faleomavaega of American Samoa and Delegate Robert Underwood from Guam, thank you very much. Earlier today, Congressman Brian Bilbray was here, and Delegate Donna Christian–Green, from the Virgin Islands, was here. This is a bipartisan effort, and we thank all of the many local elected officials who are present, state officials who are present, and everyone who has played such a significant role.

I've taken this out of protocol order, and I hope they'll forgive me. I now want to acknowledge the members of the President's Cabinet and the administration team who are here who have been the leaders of this conference. I want to start with the two co-chairs, our Secretary of Commerce, Bill Daley, and Secretary of the Navy, John Dalton. Both of you, thank you. Thanks for your great leadership. I want to thank the administrator of the EPA [Environmental Protection Agency], Carol Browner. Thank you very much, Administrator Browner. The Secretary of Transportation, Rodney Slater. Thank you very much, Rodney. The chairperson of the Council on Environmental Quality, Katie McGinty, thank you very much. The administrator of the National Oceanic and Atmospheric Administration, Jim Baker. Thank you very much, Jim.

There are quite a few other members of the administration team here, including from the Navy and the Coast Guard and other Cabinet agencies. Please allow me to acknowledge all of you as a group. There are a couple of other good friends, they've been mentioned, but I want to say a special word of thanks to my longtime friends of a quarter century, Leon and Sylvia Panetta. Thank you, Leon and Sylvia. Thank you both. Leon was the first one to bring me out here to see this beautiful place. Sam and Shary's [Farr] daughter introduced me on that occasion. I'll always remember that.

May I say a formal word of acknowledgment and welcome to this event electronically to our great friend, Commissioner Tony Coelho, there with a distinguished group in Lisbon. You're very much a part of this conference, as our hearts are very much a part of that great exposition under way in Lisbon. We thank you for all of your leadership there.

Speaking of that wonderful gathering in Lisbon, it was 500 years ago when the great Portuguese explorer Vasco da Gama drew distant lands a little bit closer when he began the very first ocean voyage around the Cape of Good



Hope. Today, we can communicate across that same great distance instantly, and we can actually physically cross it in a matter of hours.

In spite of those advances in communications and in travel, the great ocean depths remain largely unexplored. Their natural wonders remain barely glimpsed, their potential bounty virtually unknown. That's why this historic oceans conference is so long overdue. And that's why all of us are grateful for President Clinton's commitment to protect and harvest and explore our oceans and safeguard them for the next century and for future generations.

Oceans are critical, not just to our economy; not just to our food supply, here in the shadow of Cannery Row; not just to America's trade and security; but to the fabric of life itself. They're perhaps the greatest natural treasure on God's Earth. Improved understanding of the ocean can lead to very tangible benefits for those of us here.

Just think about how few years it's been since we've gained an understanding of El Niño. Think back over the past year—not only here in California, but all over the country—about how many people have been transfixed by the nightly television newscasts of El Niño. Well, we've been having them for a long time. The Peruvian fishermen knew that, but we didn't know it because the scientific pieces of the puzzle had never been put together until about seven years ago. The reason they hadn't been put together is that most of those pieces were out in the ocean. Now, thank goodness, because of NOAA and the scientific community and others, we've put those pieces together, and damage costing billions and billions of dollars was avoided because of the warnings and the preparation and prevention activities that we were able to undertake before the full brunt of El Niño hit.

I remember when Barbara Boxer sounded the alarm early last year, because she had looked at the scientific evidence, and she organized that big conference in California and brought everybody together. I came out for it at her invitation. Because you sounded the alarm on that, Senator Boxer, California was able to prepare. As bad as it was, it would have been 10 times worse, except for your sounding that alarm. I want to thank you very much for what you did there. That's an example of the kinds of discoveries with very practical benefits that we can get by improving our understanding of the oceans.

There are probably other unrecognized phenomena similar to El Niño in the oceans—perhaps in the Arctic Ocean, perhaps in the North Atlantic—where the conveyor belt brings the Gulf Stream up and it sinks deep down to the reverse cold current running underneath it in the opposite direction. These phenomena have *effects* on us, but we need to understand them more clearly. That's why the President's commitment to vastly expand our research effort is so important.

It was a great event yesterday, and I had the privilege of giving the President and the First Lady the opportunity to hear from the leaders of each of the four forums yesterday in some depth this morning. They heard all about the events that went on yesterday. It was such a terrific dialogue, and I want to thank everybody who was a part of it.

As Dr. Earle mentioned, I had the great fun yesterday of going on MBARI's [Monterey Bay Aquarium Research Institute's] *Western Flyer* with Julie Packard and all of that crew over there. I saw for myself the exciting new research that's possible if we just follow through on the commitment that the President is asking our country to make.

We call this planet the Earth. But in truth, it holds a lot more salt water than it does soil. As others have noted, the oceans cover far more than two-thirds of the Earth's surface and contain 99 percent of all its living space. If those statistics seem surprising, here are a couple of others that hit even closer to home. The oceans now sustain one out of every six jobs in the United States of America, and our coastal areas now produce 85 percent of all of our tourism dollars. Beaches are now the leading tourist destination in America, and that may be why almost half of all construction in the United States during the '70s and '80s took place in coastal areas. Fish and marine life is increasingly being used for path-breaking medicines and pharmaceuticals, including new cancer treatments and anti-inflammatory drugs. And then there is the simple matter of the quality of life. It is estimated that within 30 years, a billion more people will be living along the coasts than are alive today.

Given those statistics, it's surprising that we still know so little about our oceans. Until recently, we knew more about the surface of the moon than about the ocean floor. Here's what we do know. More and more, we're polluting coastal waters. We're exhausting important fisheries. We're threatening the rich and precious coral reefs that are, in a sense, the rainforests of the sea, supporting the great diversity of life. Poor stewardship of the oceans is bad for the environment and bad for our future, because it contaminates our beaches, compromises our food supply, and robs us of a precious resource that we depend upon.

Ladies and gentlemen, for five and a half years now, I've been intensely proud to serve with President Clinton, who is not only one of the greatest environmental Presidents in our nation's history—one of the greatest environmentalists of modern times—but also a person who understands clearly in his bones the need for balanced

Environmental Hero Awards

For the past three years the Department of Commerce has recognized key environmental contributions of both local volunteers and national figures with its Environmental Hero Award. Signed by the Secretary of Commerce, this certificate of recognition has been accompanied for the past two years by a personalized letter to the awardee from Vice President Al Gore. The Environmental Hero Awards are normally presented to recipients in their own communities on Earth Day. However, the National Ocean Conference was identified as an appropriate high-level venue for recognition of these individuals. The Honorable D. James Baker, Under Secretary for Oceans and Atmosphere, U.S. Department of Commerce, and Administrator of NOAA, served as MC for the awards ceremony. The Honorable Katie McGinty, Chair of the Council on Environmental Quality, presented the awards to the honorees. ***(Photos: Ronald Bell, U.S. Department of Commerce)***

1998 recipients of the Department of Commerce Environmental Hero Award.

Nathaniel Shaw "Nat" Bingham was a former commercial fisherman who gave up his trade to advocate on behalf of salmon habitat restoration. Ultimately, he became one the nation's most effective fisheries conservation champions. Jolene Bingham, his daughter, received the award on behalf of his family.

Bob Talbot, noted marine photographer, has dedicated his professional career to bringing home to millions of people the message of the oceans. Both as cinematographer and still photographer, Bob has helped create a personal connection to the ocean for millions of people.

Luncheon Address

Rear Admiral Paul Gaffney II delivered the conference's Luncheon Address.

This year, the International Year of the Ocean, has heightened public interest in our planet's most important features—the oceans. If we could represent the Earth with a sheet of paper folded in thirds, the bottom two-thirds illustrates the area covered by our oceans. About 1 square inch of this paper is equal to the area of the ocean that has been fully imaged—acoustically surveyed, if you will. That's 5 percent of the ocean bottom. In contrast, about 2 square inches would represent the entire area of the moon—front and dark side—that has been fully imaged. That's 100 percent of the moon!

Yes, we do have 100 percent of the ocean characterized in some fashion. Using satellite altimetry, we have been able to discern 15-km resolution, but 100 percent of the moon is characterized at 100 times that resolution.

What's my message? It's an old one: "We know more about the moon's backside than the ocean's bottom!" This concerns me, and I believe we should do something about it.

We must have knowledge of our ocean planet before we legislate, regulate, or operate in the ocean. Unfortunately, no one agency can afford it alone. We need partners. I propose we focus partnership initiatives on surveying and exploring the littorals. Most people live near the coast. We eat, travel, play, and fight there. We also pollute there.

What's your choice for the most important maritime nation in the history of the world? There are many opportunities to do something. One is through the National Oceanographic Partnership Program [NOPP]. Secretary Dalton used Navy money and took the lead in getting NOPP started.

Jean-Michel Cousteau, son of Jacques Cousteau, has spent much of his life exploring the world's oceans. He works today to preserve his father's legacy through his solutions-oriented, nonprofit organization, the Jean-Michel Cousteau Institute.

Dr. Sylvia Earle, Explorer in Residence at the National Geographic Society, is organizing the Sustainable Seas Project, which is a partnership among several federal agencies, the National Geographic, and the Goldman Foundation to embark on a multiyear, multimillion-dollar project to map and explore ocean resources.

Ted Danson, president of the American Oceans Campaign, has been an important figure in marine preservation activities for more than a decade. His vision helped found an organization dedicated to protecting and preserving the vitality of coastal waters, estuaries, bays, wetlands, and deep oceans.

Moss Landing Marine Laboratories (MLML) faculty, staff, and graduate students have worked extensively with NOAA's Monterey Bay National Marine Sanctuary programs, including the mapping of habitats in Monterey Bay. Kenneth Coale, Acting Director of MLML, accepted the award on behalf of MLML faculty, staff, and students.

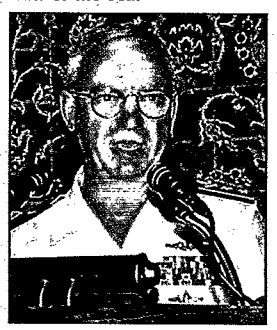
Other agencies are now joining with funding and are actively participating. Another opportunity is through MEDEA [Measurement of Earth Data Environmental Analysis], Vice President Gore's and former CIA [Central Intelligence Agency] Director Gates's plan to safely harness defense and intelligence data for other purposes. MEDEA and NOPP, both led in part by our Conference Director here today, Dr. Jim Baker, represent the best partnerships of the '90s.

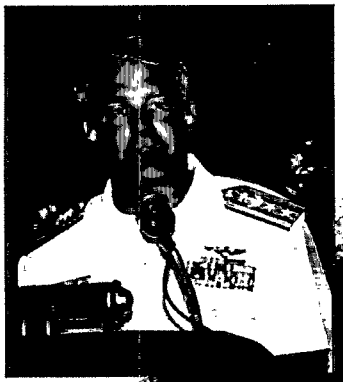
In the 1800s, Lt. Charles Wilkes led a nationally chartered world ocean expedition. I'd like to propose one similar effort, before the end of this millennium, to again complement important national oceanographic objectives. It's just one alternative, but one I've been considering.

Let's do a GISMOE: Great Intra-American Sea Millennium Ocean Expedition. It would fit natural laboratory candidates like the Gulf of Mexico, but it could also be the Gulf of Alaska, the Florida Bay, the Georgia Bight. It could be called GABE: Great American Bays/Bights Expedition. What's important is to begin now. GISMOE would be 100 percent coverage of the ocean—bottom to baseline—with long-time series observations to follow. The time is right! I think we're missing the most important geophysical discoveries in the universe, and they start only a few blocks from this ballroom—our oceans.

Thank you.

During the luncheon, Rear Admiral Winford G. "Jerry" Ellis, prospective Oceanographer of the Navy, introduced a video on the U.N. Convention on the Law of the Sea.





Rear Admiral Robert Chaplin, Superintendent of the Naval Postgraduate School, speaking at the conference welcome breakfast. ***(Photo: Ronald Bell, U.S. Department of Commerce)***

Hermann Hall, Naval Postgraduate School. *(Photo: Ronald Bell, U.S. Department of Commerce)*

Participants in the Environment and Health Issue Forum. *(Photo: Ronald Bell, U.S. Department of Commerce)*

President Clinton and Vice President Gore with conference Executive Committee members Sally Yozell, Linda Glover, and Monica Medina. *(Official White House photograph)*

Dr. Nancy Foster, NOAA Assistant Administrator for Ocean Services and Coastal Zone Management, discusses ocean issues with Dr. Robert Knecht. *(Photo: Ronald Bell, U.S. Department of Commerce)*

Vice President Al Gore and conference participants at the evening reception at the Monterey Bay Aquarium. *(Official White House photograph)*

Panelists briefing President and Mrs. Clinton and Vice President Gore on conference discussions. *(Official White House photograph)*

President Clinton and Vice President Gore arriving at Plenary IIb session. *(Photo: Harry Strong)*

Plenary IIb participants at San Carlos Beach Park. *(Photo: Ronald Bell, U.S. Department of Commerce)*

Entrance to San Carlos Beach Park. *(Photo: Ronald Bell, U.S. Department of Commerce)*

Family activities at the post-conference Oceans Fair. *(Photo: Virginia Tippie)*

A walking jellyfish at the post-conference Oceans Fair. *(Photo: Virginia Tippie)*

Appendices

National Ocean Conference Agenda

Wednesday, June 10

6:00 p.m.–9:00 p.m.
Registration
Herrmann Hall Lobby, Naval Postgraduate School (NPS) and DoubleTree Hotel

Thursday, June 11

7:00 a.m.– 8:00 a.m.
Registration
Herrmann Hall, NPS

8:00 a.m.– 8:30 a.m.
Opening Remarks & Welcome
Ballroom, Herrmann Hall, NPS
Sam Farr, Congressman (D-Calif.)
John H. Dalton, Secretary of the Navy
William M. Daley, Secretary of Commerce (taped)
Rear Admiral Robert Chaplin, Superintendent, NPS

9:00 a.m.–11:30 a.m.
Concurrent Issue Forums

- Oceans and Commerce—Ingersoll Hall, NPS
- Oceans and Global Security—Mechanical Engineering Auditorium, NPS
- Ocean Exploration, Education, and Research—Glasgow 109, NPS
- Ocean Environment and Health—Glasgow 102, NPS

12:00 p.m.–1:00 p.m.
Lunch
Herrmann Hall Ballroom, NPS

1:30 p.m.–4:00 p.m.
Plenary I: Cross-Cutting Issues in Ocean Programs and Policy
King Hall, NPG
Chaired by Vice President Al Gore

- Ecosystem Health
- Sustainable Use of Ocean and Coastal Resources
- Research
- Law of the Sea
- Ocean Management

7:30 p.m.–10:30 p.m.
Reception
Monterey Bay Aquarium

Friday, June 12

9:30 a.m.
Opening Remarks
San Carlos Park
William M. Daley, Secretary of Commerce

9:30 a.m.–11:30 a.m.
Plenary IIa: Congressional, State, and Local Perspectives
San Carlos Park
Chaired by William M. Daley, Secretary of Commerce, and Rodney E. Slater, Secretary of Transportation

12:30 p.m.–1:30 p.m.
Plenary IIb: Ocean Programs and Policies for the 21st Century
San Carlos Park
Introductory remarks by Representative Sam Farr, Senator Barbara Boxer, First Lady Hillary Rodham Clinton, Dr. Sylvia A. Earle, and Vice President Al Gore

Keynote Address: President William Jefferson Clinton

Ocean Initiatives for the 21st Century

Building Sustainable Fisheries

To restore America's fisheries and sustain the coastal communities that depend on them, the President is announcing measures to reduce overfishing and protect essential fish habitats, including a ban on the sale or import of undersized Atlantic swordfish. The President is proposing an additional $194 million over five years to speed implementation and is calling on other nations to undertake similar efforts.

In the past, oceans were thought to be inexhaustible sources of food. Today, most of the world's commercial fisheries are being exploited at or beyond their ability to sustain themselves. Apart from overfishing, many species are suffering from pollution, habitat destruction, and wasteful bycatch—the indiscriminate capture of noncommercial species, which usually are thrown back and die.

Marine fisheries support millions of U.S. jobs and billions of dollars in economic activity each year. The collapse of major fisheries in New England demonstrates the devastating impacts of overfishing on coastal communities and economies. With the help of federal efforts, New England fisheries now are beginning to rebound.

To rebuild and sustain America's marine fisheries, the President is proposing an additional $194 million in fiscal years 2000, 2001, and 2002 to:

- Acquire three state-of-the art research vessels to increase the frequency and accuracy of fisheries assessments, providing better data on the health and abundance of fish stocks so management decisions are based on sound science.
- Develop measures by October 1998 to meet the goals of the Sustainable Fisheries Act—restoring depleted fish stocks within 10 years, protecting essential fish habitats, and reducing the bycatch of noncommercial species.
- Implement a ban on the sale or import of undersized Atlantic swordfish (under 33 pounds) to help restore and sustain this important fishery.
- Increase research and promote public–private partnerships to develop environmentally sound aquaculture—commercial fish production—to ease pressure on ocean fisheries.
- In addition, the President is calling on other nations to help reverse the decline in the world's fisheries by vigorously implementing measures to stop overfishing, eliminate the use of destructive fishing practices, and protect and restore essential fish habitats.

Ports for the 21st Century

To maintain competitiveness and ensure America's ability to safely handle the increase in ocean vessel traffic expected in the 21st century, the President is launching a ports modernization program financed by a proposed new Harbor Services Fund. The fund would raise $800 million over the next five years to deepen and maintain shipping channels, improve navigational safety, and undertake other port projects.

More than 95 percent of U.S. overseas trade by tonnage (excluding Mexico and Canada) passes through U.S. ports and harbors. In 1996, U.S. ports handled approximately 2.3 billion tons of cargo and supported nearly 16 million jobs. As we head into the 21st century, international trade will continue to grow. Unless our ports are prepared—for instance, by deepening channels to accommodate larger cargo ships—American consumers will pay more for imported goods, and American businesses will pay higher export costs.

These efforts must be undertaken in a way that protects the ocean environment. This includes a continued commitment to environmentally sound dredging and safe disposal or reuse of dredged material. Ports must also take

full advantage of new navigation technology, such as the Coast Guard's new Vessel Traffic Services system and the National Oceanic and Atmospheric Administration's prototype Physical Oceanographic Real-Time System (PORTS). These computer-based systems provide ships with up-to-the-minute weather and oceanographic data to help move cargo more efficiently and avoid collisions that cost lives and harm the environment.

To continue to prepare our ports for the new millennium, the President is proposing to:

- Establish a new Harbor Services Fund to hold revenues from a new user fee on shippers that would replace the existing harbor maintenance fee. Revenues would be used to finance harbor dredging, port construction activities, and navigation safety improvements.
- Enhance federal partnerships with industry to commercialize government-developed PORTS technology and make it available to ports across the U.S. and around the world.
- Combine the capabilities of PORTS and the Vessel Traffic Services system to place powerful new navigation safety tools in the hands of the harbor pilots who guide ships into port.

Joining the United Nations Convention on the Law of the Sea

To maintain America's leadership in international ocean affairs, the President is calling on the U.S. Senate to recognize the overwhelming support expressed at the National Ocean Conference for the Convention on the Law of the Sea, and to clear the way for the United States to join the Convention.

The Convention on the Law of the Sea provides the international legal framework that supports activities at sea, including fishing, international trade, military operations, and environmental protection. With 125 member nations, including virtually all of the industrialized countries, the Convention is the central force in international ocean policy.

The United States, however, risks losing its leadership role if it does not join the Convention. For instance, the United States will lose its provisional membership in the International Seabed Authority, which will establish international rules for potential seabed mining, if it does not join the Convention by November 1998. If the United States does not join, it also will not be represented on the Continental Shelf Commission and the Law of the Sea Tribunal. All of these bodies will make important decisions affecting U.S. interests.

The United States launched the Convention negotiations in 1972 and, by 1982, achieved most of its fundamental objectives. Concerns over deep seabed mining remained, however, and President Reagan declined to sign the Convention. Most of the industrialized world followed. However, President Reagan committed the United States to honor all of the Convention's other provisions while attempting to reform the deep seabed mining provisions. Negotiations led by the United States resulted in the 1994 Deep Seabed Mining Agreement that resolved all outstanding issues. The United States signed the agreement, and again the rest of the industrialized world followed.

The Convention balances economic, strategic, and environmental concerns. Joining it will:

- Preserve freedom of navigation and overflight through, for instance, international straits like Hormuz and Malacca and sea lanes in the strategically located archipelagoes of Indonesia and the Philippines.
- Support U.S. maritime drug interdiction activities.
- Secure open and efficient trade routes and prevent unwarranted restrictions by coastal nations.
- Enhance fisheries management, protection of whales and other marine mammals, and global ocean protection, especially the control of land-based sources of pollution.

The National Ocean Conference is the first of its kind because it involves all sectors of the U.S. ocean community—federal, state, and local governments and science, industry, academia, environmental, and other public interests. All have expressed the critical importance of U.S. membership in the Convention on the Law of the Sea.

Protecting Coral Reefs

To strengthen protection of natural coral reefs in U.S. waters, President Clinton is signing an executive order directing federal agencies to expand research, preservation, and restoration activities. The President is proposing an additional $6 million through 2002 to speed these efforts and complete restoration of 18 damaged reefs in the Atlantic, Caribbean, and Pacific.

Coral reefs are among the most exquisite—and most endangered—ecosystems on Earth. As a foundation of the tourism, recreation, and fishing industries, coral reefs sustain billions of dollars in economic activity. Often described as the marine equivalent of the rainforests, coral reefs support a stunning diversity and abundance of undersea life. Thousands of species have yet to be catalogued, so their potential value—as life-saving medicines, for instance—remains undiscovered.

Yet around the world, coral reefs are suffering the effects of pollution, development, overfishing, and rising ocean temperatures brought on by global warming. This degradation threatens both the reef and the economies they sustain. In 1994, with leadership

from Vice President Gore, the United States founded the International Coral Reef Initiative to mobilize efforts to protect and restore these fragile reefs. Global attention was further heightened in 1997, which was declared the International Year of the Coral Reef.

To strengthen U.S. efforts and encourage similar action by other nations, the new Executive Order on Coral Reef Protection:

- Directs agencies to ensure that no action they authorize or fund will degrade coral reefs in U.S. waters.
- Creates an interagency Coral Reef Task Force, headed by the Secretaries of the Interior and Commerce, to coordinate implementation of coral reef policy.
- Directs the task force to coordinate a comprehensive program to map, monitor, and assess the health of U.S. coral reefs; research the major causes and consequences of coral reef damage; and develop strategies to reduce damage and restore ailing reefs.
- Directs the State Department and other agencies to take action to promote conservation and sustainable use of coral reef resources, building on the success of the International Coral Reef Initiative.

The Executive Order and proposed funding increase, together with ongoing efforts, will allow the completion of 18 restoration projects—nine in the Florida Keys National Marine Sanctuary, two elsewhere in Florida, two in the Virgin Islands, three in Puerto Rico, one in Guam, and one in Hawaii.

Protecting Our Oceans from Offshore Oil Drilling

To protect our oceans and coasts from the environmental risks of offshore oil and gas drilling, the President is issuing a directive extending the moratorium on offshore leasing for an additional 10 years, and permanently barring new leasing in national marine sanctuaries.

Some portions of the Outer Continental Shelf off the coast of the United States contain oil and gas reserves. Over the years, some areas have been leased to private industry for oil and gas development. Offshore drilling, however, poses the risk of oil spills and other environmental damage. To guard against such risks, many citizens oppose new leasing off the coasts of their states.

Through a combination of executive and legislative action, many coastal areas are now closed to new leasing. The Department of the Interior's latest five-year plan for the Outer Continental Shelf, adopted in 1997, effectively prevents new leasing in federal waters off most of the U.S. coast through 2002. In addition, the particularly sensitive areas encompassed by America's 12 national marine sanctuaries are protected from oil and gas drilling only to varying degrees.

To strengthen protections against the risks of offshore oil and gas development, the President is:

- Issuing a directive under the Outer Continental Shelf Lands Act that prevents leasing of any area currently under moratorium prior to 2012. This extends by 10 years the protection currently provided by the Department of the Interior's leasing plan. The moratorium covers virtually all of the coasts of the North Atlantic, California, Washington, Oregon, southwest Florida, New England, the Mid-Atlantic, and southern Alaska (the North Aleutian Basin).
- Permanently placing off limits all areas of the Outer Continental Shelf contained within existing marine sanctuaries. They include the Channel Islands and Monterey Bay sanctuaries in California, the Florida Keys sanctuary, Gray's Reef sanctuary in Georgia, and the Olympic Coast sanctuary off Washington.

The President's directive prevents consideration of any of these areas for either exploratory or production leasing for any resource development in the waters of the Outer Continental Shelf. It does not cancel or interfere with existing leases. The 10-year moratorium covering most of the coast is consistent with the Administration's policy of allowing future review based on new science and technology that could allow safer development of the Outer Continental Shelf. The President has decided that because of their unique and sensitive ocean resources, the marine sanctuaries should be permanently protected from new leasing.

Exploring the Last U.S. Frontier

To unravel deep-sea mysteries, discover new opportunities in the ocean, and better understand how to protect marine resources, Vice President Gore is launching a program to map and explore U.S. ocean waters with advanced underwater technology. A proposed $12 million through 2002 will be used to expand two shallow-water observatories, build two new deep-sea observatories, and develop two high-tech submersibles to explore exotic sea life.

Oceans cover most of the Earth, yet only five percent of the seafloor has been explored. Until recently, we knew more about the surface of the moon than the ocean floor. Recent exploration of deep-sea vents, which spew hot water from deep within the Earth, have led to the discovery of life forms never thought possible. And advanced technology now allows researchers to go, and send unmanned submersible vehicles, to greater and greater depths. Dramatic visits to the sunken Titanic offer a glimpse of the exciting discoveries that are now possible.

To protect the ocean, and particularly our marine reserves, we must know more about them and how human activities affect them. Information gleaned from the sea can also help identify new sources of minerals, life-saving pharmaceuticals, and other materials. It also will provide a clearer picture of the oceans' enormous contribution to our economy. The Administration is proposing an additional $4 million a year in fiscal years 2000, 2001, and 2002 to:

- Develop two new unmanned deep-sea observatories—on the Juan de Fuca Ridge off the west coast of the U.S., and in the Gulf of Mexico—to monitor unusual life forms.
- Expand existing shallow-water observatories—such as the *Leo* in New Jersey and the *Aquarius* in Florida—to enable researchers to stay under water for several days at a stretch to directly observe biological, chemical, and physical processes in the ocean.
- Develop, in partnership with industry, two state-of-the-art submersibles—an unmanned undersea vehicle remotely operated from a ship, and a manned self-propelled mini submarine. These systems will be leased by the government and made available to the scientific community.
- Assess the contribution of ocean resources and activities to the nation's economy. A panel of economists, scientists, and ocean experts, to be named by the President, will complete the assessment by the year 2000.
- Contribute $250,000 a year to support the "Sustainable Seas Expeditions," a public–private partnership spearheaded by the National Geographic Society and the Goldman Foundation to explore undersea life in America's marine sanctuaries.

Strengthening Protection of our Marine Reserves: The "Sustainable Seas Expeditions" will help complete a comprehensive inventory of biodiversity in America's 12 National Marine Sanctuaries; revise management plans for the sanctuaries by 2002; and develop science-based recommendations for stronger protections, such as the "no-take" zones in the Florida Keys National Marine Sanctuary.

Protecting Our Beaches and Coastal Waters

To help protect the nation's beaches and coastal waters—as well as public health—Vice President Gore is announcing a new Web site listing beach advisories and closings, and a coordinated strategy to respond to toxic algal blooms. He and President Clinton also are calling on Congress to fully fund the Administration's Clean Water Action Plan.

Despite significant progress in protecting our beaches, bays, and coastal waters over the past quarter century, the job is not done. Many beaches and coastal areas remain threatened by bacterial contamination from sewage, polluted runoff from farms and city streets, and ocean dumping. Each year, thousands of beaches are closed to swimming because of pollution. And toxic algal blooms are choking marine life, threatening fishing, and disrupting coastal economies.

In February, the President launched the Clean Water Action Plan—a comprehensive blueprint for completing the job of cleaning our rivers, lakes, and coastal waters. The plan will set strong goals and provide states, communities, and landowners with the tools and resources to meet them. New initiatives under the plan that will protect coastal areas include:

- An Environmental Protection Agency Web site offers important information on beaches, including which beaches are monitored for microbial pollution, which have advisories issued because of pollution, and how to find out more. The new Beach Watch Program Internet site is found at http://www.epa.gov/ost/beaches. A similar Web site is being developed to provide easy access to national fish advisories.
- The Beach Action Plan is a five-year strategy to develop stronger, faster, and more accurate beach monitoring programs for states, to strengthen beach water quality standards, to improve public access to information on beach water quality, and to increase research to address problems related to skin, upper respiratory tract, as well as eye, ear, nose, and throat infections in swimmers.
- Federal agencies will develop a coordinated response system to support state and local efforts to address toxic algal blooms, such as *Pfiesteria,* microorganisms that cause red and brown tides, and other harmful organisms. Agencies will work with states, academia, and others to implement the National Harmful Algal Bloom Research Monitoring Strategy.
- Federal agencies will work with coastal states and territories to ensure that, by December 1999, they have developed enforceable plans to reduce polluted runoff in coastal areas.

Full Funding for Clean Water: The President's budget proposes an additional $568 million in fiscal year 1999—a 35 percent increase—and a total increase of $2.3 billion over five years to carry out the Clean Water Action Plan. The president and Vice President are calling on Congress to approve those funds to ensure clean, healthy water for all Americans.

Monitoring Climate and Global Warming

To better understand the role of the oceans in shaping our weather and climate, and to help address the threat of global warming, Vice President Gore is announcing an expanded ocean monitoring system. The Administration is proposing an additional $12 million through 2002 to place hundreds of monitoring buoys in the North Atlantic and North Pacific to measure critical ocean data.

The oceans cover two-thirds of our planet, and their interaction with the atmosphere has a profound influence on climate patterns and our daily weather. For instance, the recent El Niño, which caused severe flooding and drought worldwide, began with unusually warm temperatures in the South Pacific. Despite significant advances in forecasting, severe weather events inflict a costly toll on agriculture, industry, and communities.

One of the most significant factors shaping our future climate is the oceans' response to global warming. The oceans area a major sink absorbing carbon dioxide, the principal greenhouse gas contributing to climate change. How much carbon dioxide the oceans can store, and how that ability changes over time, will heavily influence how quickly the Earth warms. The rate of global warming, in turn, may have serious ramifications for fisheries and other marine life. Finer measurements of ocean data are needed to better track climate shifts, understand the interaction of the oceans and the atmosphere, and predict severe weather and the regional impacts of global climate change. To fill these data gaps:

- The Administration is proposing an additional $4 million a year in fiscal years 2000, 2001, and 2002 so the National Oceanic and Atmospheric Administration (NOAA) can place a vast array of floating buoys in the North Atlantic and North Pacific, which now are largely unmonitored. Instruments on the buoys, which can sink and rise on their own, will measure temperature, salinity, and currents at different depths. Data from the buoys, part of an expanded Global Ocean Observing System, will complement shipboard and satellite measurements to refine climate prediction models.
- NOAA, the National Science Foundation, the Department of Energy, the National Aeronautics and Space Administration (NASA), and the Navy will continue observations and research on the interaction of the oceans, the atmosphere, the polar ice caps, marine ecosystems, and the movement of carbon through the oceans.
- NASA also plans to develop, launch, and operate a series of new satellites to provide extremely accurate measurements of biological productivity in the oceans, as well as wind, currents, and temperature at the sea's surface.

Public Access to Military Data and Technology

To help increase our understanding of marine life, enhance weather forecasting and climate change research, and identify valuable ocean resources, Vice President Gore is announcing the declassification and release of secret and restricted Navy data. The Department of Defense will also produce computer-based nautical charts replacing the paper charts used by mariners for centuries—a significant advance in marine safety.

Declassifying Secret Data: In support of its military missions, the U.S. Navy has long gathered vast amounts of ocean data. Much of these data are of important scientific and commercial value. The data can be used to track the migration of fish and marine mammals, uncover illegal fishing activities, forecast underwater earthquakes and tsunamis, and understand long-term climate patterns. In response to the Environmental Task Force launched by Vice President Gore while in the U.S. Senate, the Navy is reviewing and releasing large quantities of data:

- The Navy has signed an agreement with a private foundation to create a mechanism to declassify secret data from the Sound Surveillance System, an array of underwater listening devices used to hunt submarines. The acoustical data can be used to track whale migrations, predict natural catastrophes, and support climate change research.
- The Navy also is releasing data on ocean temperature and salinity levels collected by Navy submarines on patrol under the Arctic ice cap. Combined with declassified data from other oceans released by the Navy in recent years, this new information completes a global data set that will be a valuable tool in researching long-term climate change.

Computer-Age Nautical Charts: Over the next five years, the Defense Department's National Imagery and Mapping Agency will prepare, for military use purposes, a series of computer-based charts for most of the world's oceans and coastal waters. Digital Nautical Charts covering virtually all areas of commercial shipping activity worldwide will be available by 2002.

Used in conjunction with the Defense Department's Global Positioning System, this new technology is considered by many the greatest advance in safety since the introduction of radar. It will allow mariners to move cargo more efficiently through ports worldwide while minimizing the risk of collision and environmental harm.

Supercomputer Weather Forecasts: The Navy employs one of the nation's 10 largest supercomputers to provide highly accurate and localized forecasts of battleground weather conditions. Under a new agreement, the Navy will work with the National Oceanic and Atmospheric Administration to assess whether these techniques can be used to improve the prediction of severe weather over the United States.

Summary of Regional Satellite Downlink Meetings

"As part of the International Year of the Ocean, a large number of initiatives have been launched to tell people about the threats to the ocean's biodiversity. We need to balance the reports of threats with hope that is rooted in success stories that provide direction for future action. We must bring the public's perceptions of the major threats to marine biodiversity into alignment with what experts tell us, so that our resources can be targeted at real threats and not the environmental 'bogeymen' who haunt our planet."

– Jerry Schubel,
President, New England Aquarium

Summary of Four Issue Areas

The Coastal America (CA) partnership, through its unique regional alliance of Coastal Ecosystem Learning Centers (CELCs) and Sea Grant Institutions (SGIs), coupled with the utilization of satellite downlink technology, augmented the scope and impact of the National Ocean Conference in several significant and distinct ways:

- In a collaborative effort with NOAA, CA was able to offer the satellite downlink signal of the plenary sessions to all organizations in our network at no charge.
- At the same time CELCs were encouraged to organize programs comprised of regional experts and to discuss issues raised in the plenaries in the context of:
  - Have all issues been identified?
  - Are there additional key regional issues that need to be considered?
  - What are the implications of the strategy presented for your region?
  - Are your regional issues likely to be addressed by the integrated ocean strategy?
  - What actions should be taken at the regional level to implement this strategy?
- SGIs were encouraged to offer their facilities as viewing areas for faculty, staff, students, area local/state/federal government offices, environmental groups, and interested members of the community.
- Finally, through enlisting the Globe Program, the plenary sessions were made available virtually to any individual in the world with Internet access.

Six CELCs participated in the downlink, while one (Monterey Bay Aquarium) was involved with the actual conference. In addition, the California Science Center was invited to participate as a program downlink

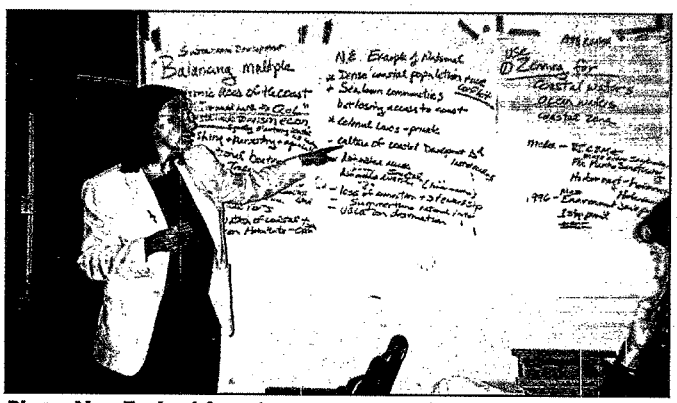


Photo: New England Aquarium

Photo: California Science Center

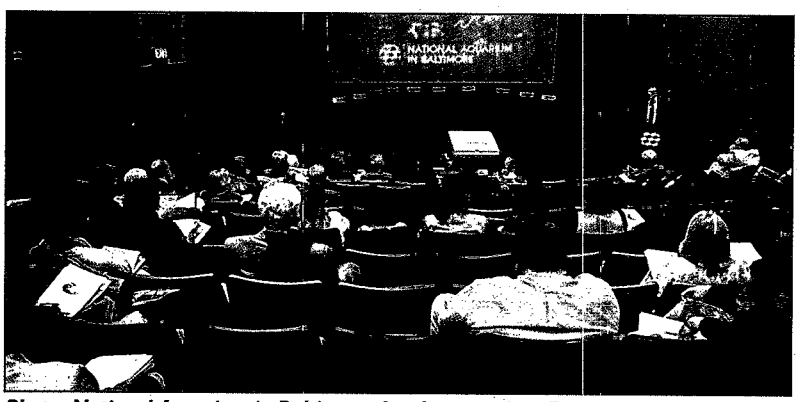


Photo: National Aquarium in Baltimore, by photographer George Grail

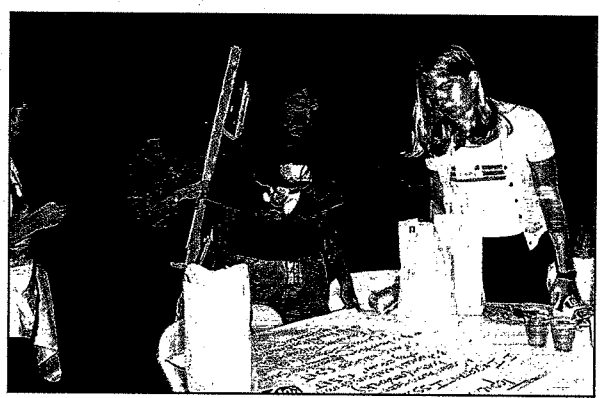


Photo: The Florida Aquarium

site. This network provided regional programming (and participation) in Massachusetts, Maryland, Florida, Texas, California, Oregon, and Alaska. Additionally, 16 Sea Grant programs participated at 24 campuses. With the inclusion of five federal and two state agencies, the National Ocean Conference was viewed at 33 locations, in 18 states by almost 1,000 people, and received in excess of 2,600 video sessions on the Internet.

This report summarizes the opinions and concerns raised by regional expert panels convened at the various CELCs in response to the Monterey conference, and follows the format of categorizing comments according to the four subject areas: Oceans and Commerce; Oceans and Global Security; Ocean Environment and Health; and Ocean Education, Exploration, and Research. The reports submitted by these panels tendered many insightful recommendations related to the concerns presented; however, the constraints of this report preclude their inclusion. Readers are encouraged to contact the Coastal America Coordinating Office for a more comprehensive presentation of those issues, or for copies of the actual reports.

Oceans and Commerce

Regional Trade—New Strategies for Ports and Shipping

New England—While much of the nation's shipping occurs through a handful of large ports, smaller regional ports play a vital role in national security and regional economies, and must be maintained. Loss of secondary ports and subsequent shallowing would restrict use by the Navy, and would severely affect local economies (e.g., Boston Harbor). Imaginative solutions to the problem of dredged material management is critical.

Further, our shipbuilding industry must be supported. The aging of the U.S. fleet (average age 35–40 years), combined with environmental requirements (double-hulled ships), translates into a need for approximately 1,000 new ships in the next 15 years, generating more than $100 billion in revenue.

Sustainable Development for Coastal Tourism and Recreation

New England—With coastal populations burgeoning and land values increasing, the challenge for the future is to balance multiple economic uses (commercial and private) of the coast with human and environmental health, while maintaining the special quality of life that defines coastal communities.

Ocean Environment and Health

National Ocean Strategy

Alaska—Alaskans are working on several initiatives that should be incorporated into a national strategy: the Bering Sea Ecosystem Research Initiative, the Conservation of Arctic Flora and Fauna, the North Pacific Research Board, the North Pacific Fishery Management Council, and the *EXXON Valdez* Oil Spill Restoration Program.

Fisheries Management

Maryland—There are serious problems with habitat and the legal system dealing with habitat. The new fisheries statute (which the President spoke of) establishes an essential fisheries effort, but does not take into account that an overwhelming amount of this critical habitat is outside the authority of that statute in state and local waters. Also, most of the fisheries management already is in the hands of the Marine Fisheries Commissions (which have been subject to much criticism for having allowed so many species to become depleted). These Commissions are made up of State Fisheries Directors, who do not have authority over most of the fisheries habitats.

Oregon—In the Northwest, key fish stocks are reaching the point of overharvest, and yields are declining to a level that will eventually result in the loss of some industry. Fisheries managers are moving through a transitional stage from managing abundant natural stocks to stocks that can be sustained at lower levels, and they need a coordinated plan through this period of transition. Current methods are flawed, and often lead to polarization between resource users.

New England—The New England Fishery Management Council has experimented with approaches to fisheries management that may be adaptable to other U.S. fisheries. However, many scientists believe that the monitoring programs are insufficient to evaluate the impacts of these approaches. Scientists and fishermen need to work together in determining and evaluating criteria. Federal data must be made available.

The Stellwagen Bank Sanctuary in the Gulf of Maine is currently reevaluating its management plan. However, it lacks clear national criteria to assess the value and importance of this area and what it is giving to the country as a whole. National criteria need to be developed.

Maryland—Goal setting for most fisheries management plans is currently obscure, written in a language of and by itself, unclear to the public, not reported regularly, and with few to no indicators to measure progress. Constituencies need to be broadened beyond those who have immediate self-interest and economic benefits. Public education programs, public awareness of issues, public involvement in measuring progress, and public understanding of how they can contribute are critical, as is the establishment of very clear goals and indicators of progress that are reported on a regular basis by agencies and others who take full responsibility.

In light of the announced moratorium on drilling in marine sanctuaries, prohibition on fishing in those same sanctuaries should be considered.

Alaska—No-take zones may have benefits, but must be based on sound science. Monitoring is essential to determine whether they function as anticipated. There has been insufficient monitoring of no-take zones imposed several years ago around Steller sea lion rookeries in Alaska. Blanket no-take zones should be avoided.

California—There needs to be an increase in marine preserves. However, there is concern regarding population increases, lack of education, inability to monitor use, and fragmentation of government agencies and environmental organizations.

Aquaculture

Maryland—With increasing population growth, aquaculture has the opportunity to fill the gap between supply and demand for food fish, and is an important tool in coral reef preservation. Developing a program can be very dangerous to the environment, as seen in Taiwan and Ecuador. There is concern that we are already developing an industry without the necessary resources for the science, and without the ability to mitigate the potential negative impacts.

Alaska—Finfish farming is illegal in Alaska because of many unresolved problems, such as disease and genetic impacts, competition with wild stocks, conflicts with existing coastal users, and pollution from nutrients and antibiotics. Emphasis on aquaculture must be regionally tailored.

Non-native Species

Maryland and Oregon—In environments that are stressed, you tend to have invasion of opportunistic species that are able to adapt. We need to look at the changes causing degradation of the environment, which are opening the door for invasive species. A network of monitoring systems is also necessary via universities, private labs, and government agencies.

Marine Pollution

New England—The northeastern states, due to industrialization and population density, face pollution issues unique to the rest of the country. These are problems that will affect other areas as coastal development continues. Watershed approaches focusing on nonpoint sources and atmospheric deposition need to be pursued.

California—Stormwater runoff is a critical issue for much of California. We need to develop the political will to deal with this complex watershed issue.

Alaska—More emphasis needs to be placed on the watershed approach, and the modification of land-use practices. Problems related to runoff were mentioned at the conference, but not the issue of upland habitat degradation (logging, agriculture, damming), which severely impacts ocean resources, including anadromous fish.

Ocean and atmospheric pollution enters Alaskan territory from Canada, Russia, and Asia. Attention (i.e., research) needs to be focused on the impacts of pollution crossing international boundaries, and how it affects the health and quality of seafood (a major native population food source).

Human Population

California—The impact of human population growth upon the oceans, especially with regard to the developed and developing world, is one of the most difficult issues to deal with. Though it is seldom addressed in forums, such as the Monterey conference, it has major implications.

Maryland—Human population growth is proceeding at a very rapid rate—over 5.5 billion people on earth now, and projected to go as high as 14 billion. We need to determine how to slow down population growth or increase fish yields, and there is concern that aquaculture will not make up the deficit.

Ocean Education, Exploration, and Research

Outer Continental Shelf Oil and Gas Development

New England—While the President's comments regarding an extension of the moratorium on Outer Continental Shelf development were universally favorable, concern was raised that this action would reduce debate on this issue in the U.S. Although safety and technology have lessened some dangers, issues related to rig decommissioning, seismic impacts, and dangers to endangered species remain. Canada is still proceeding with development near endangered fisheries. Evaluation of these issues in light of Canada's experiences would provide a valuable case study for future U.S. decision making.

Maryland—Without a national energy policy, our dependency on fossil fuels will continue to affect our coastal waters.

Ocean Budget Process for Research and Management

Alaska—Alaskan waters have huge fisheries and wildlife resources that greatly outweigh the state's human population, as compared to marine resources in more populated states. At the same time, Alaska's research funding and federal resource management efforts have lagged far behind those of more populous states. The nation needs an ocean budget process for research and management proportional to their resource value and ecosystem function, rather than population.

Monitoring

New England—Often, the effectiveness of coastal management policies cannot be judged due to a lack of specific information relating cause and effect. The problem is exacerbated in many cases by a lack of biotic indices for marine ecosystem health.

Interagency efforts need to be encouraged to share data, and effective monitoring systems should be required to be in place before receipt of new money for management programs.

California—A lack of scientific data on total maximum daily load standards for pollutants continues to impede our ability to establish standards.

There is a concern about the adequate enforcement of existing policies and the lack of funding to properly monitor compliance. There needs to be less tolerance of violations.

Opportunities and Challenges for Marine Science, Technology, and Research

Oregon—One of our greatest—and largely ignored—challenges is understanding the global ocean's interlinked physical, chemical, and biological processes. There is a vast microbiological biosphere beneath the seafloor with organisms that have tremendous potential for making possible environmentally friendly industrial processes and the creation of whole new families of pharmaceuticals.

Academic Education

Oregon—The need to improve education, training, and funding opportunities for people is an across-the-board theme. High school students entering colleges are poorly prepared and have poor study skills. Undergraduates aren't getting a broad enough education to adequately address myriad marine and coastal issues. In addition, graduate education in oceanography is often narrow, rather than multidisciplinary. Graduate education must be broadened to include the social, economic, and even political dimensions of marine issues, to equip graduates to resolve the global problems of the present and the future.

Fostering the Next Generation of Coastal Leadership and Partnerships

New England—At the professional level, the variety of researchers competing for scarce funding often yields an outcome that doesn't take full advantage of the intellectual talent available. Decision making needs to be decentralized, and local funding made available. It is recommended that regional groups comprised of all stakeholders should define coastal needs.

Education and the General Public

California—The importance of public education and awareness, its role in building constituencies for the ocean, and the roles various institutions can play is increasingly clear. Public education needs to be lifelong.

Universal Themes of Downlink Reports

Competition for a finite supply of money and manpower, amidst today's mind-numbing numbers of theories, good intentions, and solutions to problems is clearly a limiting factor that policymakers need to accept and work within. Several universal themes are emerging from these reports, which deserve attention in the decision-making process:

- The impact on the oceans of increased human populations in the developed and developing worlds must be addressed.
- The public (and certainly a broader array of immediate stakeholders) needs to better informed regarding issues and the opportunities for active participation.
- Data, programs, and policies need to be shared among communities, businesses, states, and the federal government. The Internet is the medium of choice.
- Interdisciplinary approaches to problems hold the key to advancing innovative solutions, both within the local/state/federal government sector and within the private high technology sector. Programs that embrace this concept should be funded; this should be a requirement for most programs.
- Current monitoring programs (especially with regard to fisheries) are generally regarded as seriously flawed. Programs must include clearly defined goals, must have appropriate indices for accurate monitoring, and must be written in a language that everyone can understand and interpret.
- Finally, the regions solidly support the watershed approach to cleaning up our estuaries and oceans. This concept should form the framework from which all future programs emanate.

Alaska Sealife Center

Seward, Alaska

Identification of Issues

Have all key regional issues been identified in materials or conference discussions? Are there any additional issues or concerns that need to be addressed?

Land-Use Practices

More emphasis is needed on connections between oceans and estuaries. The public and governments have greater control over modifying land-use practices. Populations are increasing in coastal areas. Problems related to runoff (nonpoint-source pollution)

were mentioned, but not upland habitat degradation (e.g., logging, agriculture, damming). Such degradation can severely degrade ocean resources, including anadromous fish that use upland waters.

Cross-Boundary Pollution

More attention should be focused on the impacts of pollution that crosses international boundaries. Alaskan waters are too often thought of as being pollution free. Yet ocean and atmospheric pollution crosses international boundaries into Alaska from Canada, Russia, and Asia. We need more research on pollution impacts from external sources, particularly as they affect the health and quality of seafood, including foods consumed for subsistence by Alaska Natives. For example, salmon have recently been found to be a vector for transporting PCBs and DDT into pristine Alaska lakes.

Issue-Specific Recommendations

What are the implications of proposed issue-specific recommendations/actions for your region? Are there any additional actions that you believe would be appropriate in your region?

Revision of Ocean Budget Process

Alaskan waters have huge fisheries and wildlife resources in relation to the rest of the nation. These resources greatly outweigh Alaska's population, as compared to marine resources in more populated states. Alaska's research funding and federal resource management efforts have lagged far behind more populous states. At this time, we probably have less information for our ocean resource base than any other state. The lack of knowledge about the Bering Sea ecosystem is a case in point. The nation needs an ocean budget process for research and management that is proportional to resource value and ecosystem function, rather than population.

Declassification of Ocean Data

Alaska can benefit by declassification of ocean data by the Department of Defense and others. For example, precise hydroacoustic data for monitoring submarine activity may be essential for monitoring whale migrations through the Bering Straits into the Chukchi and Beaufort Seas. Oceanographic data are needed for understanding ecosystem functions and transportation safety. How can Alaskan researchers find out about and access these data?

Ratification of the Law of the Sea and the Kyoto Agreement

Alaska would benefit by the U.S. ratification of the U.N. Convention on the Law of the Sea and the Kyoto Agreement. A recent example is the Coast Guard's attempts to police the Chinese drift-net fishing fleet in the North Pacific. Effects of global climate change may be most acutely felt in the Arctic.

Consideration of Regional Factors as the Basis for Aquaculture

There was a recommendation that increased support for aquaculture and fish farming could improve the ocean environment by taking pressure off wild stocks. Finfish farming is illegal in Alaska because of many unresolved problems, such as disease and genetic impacts, competition with wild stocks, conflicts with existing coastal users, and pollution from nitrates, phosphates, and antibiotics. Investment in shrimp farms in South America and Asia has lead to devastation of mangroves needed as nurseries for wild species. In Alaska, a large constituency for protecting aquatic habitats and wild stocks includes commercial, recreational, and subsistence fishermen. Emphasis on aquaculture must be regionally tailored to prevent degradation of wild stocks and habitats.

No-Take Zones Based on Sound Science and Measurable Benefits

No-take zones may have benefits for conservation of some Alaskan species (e.g., rockfish), but must be based on sound science and must have specific measurable benefits. Monitoring of no-take zones is essential to determine whether they function as anticipated. For example, there has been insufficient monitoring of no-take zones that were imposed several years ago around Steller sea lion rookeries in Alaska. Blanket no-take zones should be avoided.

Ocean Strategies, Programs, and Policies

Are your regional issues likely to be addressed by the integrated ocean strategy and the proposed ocean program and policies?

Principles for Sustainable Fisheries

NMFS and coastal states should endorse principles for the conduct of sustainable fisheries (FAO or similar version). NMFS should support the Marine Stewardship Council's eco-labeling initiative, in which seafood products may be certified as coming from sustainable fisheries.

Recognition of Arctic Responsibilities, Challenges, and Opportunities

The ocean strategy needs to recognize that the U.S. is an Arctic nation by virtue of Alaska's location. This implies particular responsibilities, challenges, and research/management opportunities. The effects of global climate change may be more pronounced

in the Arctic, and the responsibilities for Law of the Sea, security, and ocean pollution issues are increased vis-à-vis our shared border with Russia. Extensive productive coastal habitat and continental shelf areas also need attention.

Disparity in Federal Research Funding

Too much of the available federal funding is funneled into Antarctic research. Federal research and resource management funds need to be refocused with renewed emphasis on Arctic and sub-Arctic issues. Many of our fisheries are not well understood. The demise of the red king crab fishery in the '80s is a good example. The role of many species in the food web remains a mystery. There is too great a disparity between resource/ecosystem value and federal research investment.

Protection of Natural Systems

The importance of coastal and upland habitat protection and pollution controls need to be recognized as major factors in the ocean strategy. These include agricultural runoff, logging, and urban runoff. Protection of natural systems should be emphasized, rather than looking for engineered substitutes.

Emphasis on Oil Production Safeguards

Alaska supplies 25 percent of the nation's oil, all of which comes from and is transported through Alaska's coastal zone and offshore waters. In the future, great quantities of natural gas will be developed. This is important to Alaska's economy and of strategic importance to the nation. Emphasis needs to be placed on improving both equipment and human factors. Alaskans know first-hand what happens when safeguards fail; thus, we fully expect and will require that industry "does it right."

Recommended Regional Actions

What actions should be taken at the regional level to implement the issue-specific recommendations and the integrated ocean strategy and proposed policies?

Enhanced Education, Communication, and Networking

We need to better educate scientists and decision makers about Alaska's role in global ocean issues. We need cooperation from the federal government and from our neighboring states and countries. Alaskan scientists and decision makers cannot work in isolation. They need to be brought into the process to develop an ocean strategy for the 21st century.

Alaskans lack the sense of ownership in the study and management of ocean resources. We need to improve networking among all stakeholders and user groups who depend on sustainable resources. All involved need to feel a sense of resource ownership and a vested interest in resource protection. The Alaska Coastal Management Program provides a good network that can provide the needed sense of ownership.

Alaskans are a repository of indigenous knowledge about the ocean. This knowledge needs to be understood and integrated into ocean research and management.

Integration of Alaskan Initiatives into a National Ocean Strategy

Alaskans are working on several initiatives that should be integrated into a national ocean strategy. These include the Bering Sea Ecosystem Research Initiative, the Conservation of Arctic Flora and Fauna (CAFF), the North Pacific Research Board, the North Pacific Fishery Management Council, and the *EXXON Valdez* Oil Spill Restoration Program.

National Aquarium in Baltimore[1]

Baltimore, Maryland

Dr. Joseph R. Geraci

Welcome to our Year of the Ocean National Ocean Conference. We have an exciting program today that will begin with a video titled "Eyewitness Ocean," which will provide a nice backdrop for our link with the National Ocean Conference under way in Monterey, California. We'll hear live remarks from the Vice President, First Lady, and President of the United States.

Will this be business as usual, or does this set the stage for serious new initiatives that address fundamental issues? Will we be maintaining course and speed, or will we find new winds and new currents that will help us search for solutions for ocean health?

I choose this metaphor because this event reminds me of a book called *The Perfect Storm* by Sebastian Junger. In the book three massive storm fronts—a hurricane, a strong Canadian cold front, and a low-pressure system—all collided off Georges Bank to create what meteorologists call "a perfect storm." Imagine each of the major issues we face—such as population, habitat loss, overfishing, waste disposal, oil and gas exploration, coastal development, point- and nonpoint-source pollution, eutrophication, hypoxia and anoxia, and invasive species—each forming a major storm front all colliding over the ocean's estuaries, coastal zones, and continental shelves. The only difference is that we ultimately control the direction, magnitude, and fate of these storm fronts.

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[1]Moderator: *Dr. Joseph R. Geraci.* Panelists: *Dr. Robert Bachman, Dr. Robert Costanza, Dr. Chris D'Elia, Ms. Hilda Diaz–Soltero, Ms. Diana H. Josephson, Mr. William Matuszeski, Ms. Jane T. Nishida, Dr. Kenneth R. Tenore, Ms. Stephanie Thornton, and Dr. Yonathan Zohar.*

The answer lies in how, as a society, we value our ocean and coastal resources. And, if we do value these amazing systems, what we will dedicate to protect and restore their function. It boils down to a clearer understanding of our responsibility and accountability.

If we can sit back and watch coral reefs bleach, seagrass beds dredged, estuaries turn hypoxic and anoxic, fisheries decimated, and marine mammals near extinction, then we can let these storm fronts collide. On the other hand, if we value and respect all the goods and services that our oceans and coastal areas provide—such as climate regulation, erosion control, nutrient cycling, biological resources, food production, and recreation—then we'll find a way to protect them. As you watch this video, please keep in mind the many storm fronts that are building all around us and how we must work together to find solutions to minimize their impact.

Issue-Specific Recommendations

Restoring Marine Fisheries

Dr. Joseph R. Geraci

The President stated a commitment to restore America's marine fisheries, in part by reducing overfishing and bycatch. How will this be done?

Ms. Hilda Diaz-Soltero

In 1996, Congress enacted new legislation called the Sustainable Fisheries Act, which makes it illegal to overfish any species. NMFS [the National Marine Fisheries Service] is working with fisheries management councils to create plans to restore overfished species over the next 10 years. This includes 96 of the 276 fish species that are commercially overfished.

This legislation also requires that the United States produce a national bycatch plan—this includes nontarget fish, marine mammals, turtles, and sharks that are incidentally caught in fishing nets and gear as fishing operations occur. The first national bycatch plan has been published, and it requires that by October 1998, every fishery management plan to incorporate a bycatch reduction plan. For marine mammals, NMFS has implemented Take-Reduction Teams, which have prepared plans that are very specific as to what a fishery must do to reverse and minimize the take of marine mammals.

Protection of Marine Sanctuaries

Dr. Joseph R. Geraci

The President is enacting legislation to permanently protect marine sanctuaries. How?

Ms. Stephanie Thornton

The President announced a continued moratorium on gas and oil drilling in sanctuaries. This is actually a strengthening one of our basic laws that makes up the National Marine Sanctuaries Act, which prevents gas and oil drilling and, more specifically, alteration of the seabed. This support further strengthens existing regulations.

U.N. Convention on the Law of the Sea

Dr. Joseph R. Geraci

The Law of the Sea and changes in maritime policy. What does this entail?

Ms. Diana H. Josephson

The Law of the Sea Convention is taking customary international law and quantifying it so we can make a specific commitment to those principles, rather than having a general understanding, as being the case until now. For the Navy, they have the right to free navigation and overflight. Other things covered in the Convention deal with living marine resources, oil and gas extraction, laying of undersea cables and pipelines, deep seabed mining, protection of marine and coastal environments, and marine scientific research.

Today, 125 nations are already parties of the Convention, and the United States isn't. If the United States doesn't sign the Convention by November, when our membership in the International Seabed Authority expires, we'll be unable to participate in any further discussions and development with the Seabed Mining Authority and the many activities that are going to take place under the Convention. President Clinton has begun a major administrative push with Congress to ratify the Convention so we don't lose our international maritime voice.

Protection of Critical Habitat

Dr. Joseph R. Geraci

The President also spoke about loss of critical habitat.

Mr. William Matuszeski

There are some serious problems with habitat and the legal system dealing with habitat. The new fisheries statute establishes an essential fisheries effort, but it doesn't take in to account that an overwhelming amount of this critical habitat is outside the authority of that statute, lying in state and local waters under their authority.

Most of the fisheries management already lies in the hands of the marine fisheries commissions, which are made up of state fisheries directors, and they don't have the authority over most of these habitats. In light of what the President said about extending the moratorium on drilling in marine sanctuaries, what about prohibitive fishing in those same sanctuaries? Fisheries management is left entirely to these same fisheries commissions, which are the subject of so much criticism for having allowed so many species to become depleted.

Ms. Stephanie Thornton

In terms of habitat protection, that's why there has been an increase in focus on the concept of marine protected areas. The purpose of marine protected areas is to preserve an area for habitat and living marine resource protection, biodiversity, and cultural resource protection. However, with these multi-use areas, there are a number of challenges that have to be faced when preserving and protecting a marine habitat. Lately, there has been an increase in support for the concept of no-use and no-take areas within protected areas as a protection mechanism for fisheries.

Dr. Joseph R. Geraci

Given that so much seems to be in the hands of state transportation authorities and fisheries commissions, how do you protect resources?

Ms. Hilda Diaz-Soltero

In the near future, there's going to be an active debate on the need to use marine fishery reserves. In New England, the reserves appear to be having a positive influence on groundfish recovery, with the stocks slowing increasing. These observations have gotten scientists looking at how the reserves are actually helping—determining what are the key elements. By understanding how and why the reserves are successful and enhancing the system of federal protected area by linking them to other state and private coastal and marine protected areas, the process for protecting marine resources is going to forward.

Ms. Stephanie Thornton

Many of these sanctuaries are in state waters. States are responsible for habitat protection and fisheries management. However, this can be a successful arrangement, as seen with the Florida Keys Marine Sanctuary. NOAA and the State of Florida have a cooperative partnership to jointly manage the reserves and the resources in it.

Dr. Robert Bachman

Here in Maryland, submersed aquatic vegetation is an essential fish habitat in Chesapeake Bay. To protect these habitats, the state has passed a law prohibiting all hydraulic clam dredging in submersed aquatic vegetation beds. By incorporating these concepts into the fisheries management plan, Maryland and other states can move forward to protect critical habitats.

Global Climate Change

Dr. Joseph R. Geraci

The President is concerned about climate change as we're heading into the fifth hottest year on record. Why should he be concerned?

Dr. Chris D'Elia

The trend we've seen over the past several years in regard to climate change isn't good and the link to greenhouse gases is becoming ever more clear. The Kyoto Conference has launched a debate on whether the regulations that came from that meeting are fully encompassing of all nations, or whether they give leeway to developing nations. Either way, we must reduce CO_2 emissions. Otherwise we will run into potential problems and continued global warming.

This calls to attention some other things we need to address in the U.S. We don't have a national energy policy, yet we rely primarily on fossil fuels. However, habitat change and nonpoint-source pollution are also affecting climate change and our ability to deal with these changes.

Linking Nutrients, Global Warming, and Pfiesteria

Dr. Joseph R. Geraci

There are suggested links between nutrient enrichment, global warming, and *Pfiesteria*. Is it possible?

Jane T. Nishida

The Clean Water Action Plan is an important initiative for the U.S. and Maryland in terms of what we need to do to address *Pfiesteria* and excess nutrients. In the President's plan, he has provided money for research to look at harmful algal blooms. In addition, his plan calls for watershed management, which is a key component of what states need to be doing to address it. Most important, he also recognized we have to look at nonpoint-source pollution, especially agriculture.

In Maryland, Governor [Parris] Glendening introduced legislation, as a result of a *Pfiesteria* crisis last year, prior to the President's Clean Water Action Plan. As a result of the governor's action, Maryland is the first state to adopt nitrogen and phosphorus standards for nutrient management for farmers, and is an important model for other states. The governor also adopted protocols with regard to the closure of rivers and the impact of *Pfiesteria* and harmful algal blooms on public health.

Mr. William Matuszeski

Yesterday, the House of Representatives agreed to a $50 million increase in the basic nonpoint-source pollution grants program. And the states in our region are well positioned to take advantage of these funds.

Invasion of Non-native Species

Dr. Joseph R. Geraci

Pfiesteria is only one of the obvious effects that is happening in our coastal areas. We're also concerned about the exchange and introduction of non-native species. What are invasive species, and what are we doing to prevent them?

Dr. Kenneth R. Tenore

There have always been invasions of species. That's the nature of life. In environments that are stressed, you tend to have invasion of opportunistic species—species that are able to adapt. To deal with this, we need to look at the changes causing the environmental degradation and opening the door for invasive species. With increased mobility, species can arrive in the U.S. and Maryland via planes, boats, and ballast water. However, we know very little about most of these species. For example, through several years of funding, we now have an idea of the salinity and temperature limits of zebra mussels. A network of monitoring systems is also necessary via universities, private laboratories, and government agencies to collect and share information about these invaders.

Dr. Chris D'Elia

We have numerous molecular tools available to us today to identify species but few taxonomists which are crucial to understand invasive species and other topics related to biodiversity.

Regime for Governing the Oceans

Dr. Joseph R. Geraci

The President spoke of $2.25 billion over the course of some years. What I'm hearing is there are a lot of complexities in solving these problems. There are jurisdictional complexities in that we have yet to sign the Law of the Sea. These issues are so cross-cutting that local harmful algal blooms may in fact be due to vessel traffic that originated a continent away. Seems to me an economic nightmare here, can we afford this? If we enact all the legislation that needs to be enacted in order to make these changes, we're going to be seen as an overly regulated, restrictive society.

Dr. Robert Costanza

In one sense, we can't afford not to do something about this problem, because in fact the environment is our life-support system. If we do not protect it, we're making an economic mistake. The environment and economy aren't two separate pieces. In fact, the environment is a key component of the economy in the broad sense. And, conversely, the economy is a subset of the larger global ecological life-support system.

We make a lot of policy based on some very narrow economic indicators, such as GNP, which is a poor measure of welfare. Some alternative indicators include the Index of Sustainable Welfare, which tries to subtract out this loss of natural capital, ecosystem services, changes in distribution of income, and several other effects to get at a much better indicator of welfare. In the U.S. and several other countries, our welfare hasn't been improving since the 1970s.

The six main principles that would need to be adhered to for a sustainable governance regime for the oceans are: Responsibility Principle, Scale-of-Matching Principle, Precautionary Principle, Adaptive Management Principle, Full Cost Allocation Principle, and Participation Principle.

Managing Fisheries Sustainably

Dr. Joseph R. Geraci

We hear the words *fisheries* and *economics* usually in the same sentence. The concept of sustainable fisheries has been with us a long time, and we've been operating in that direction. But as we look around, some of our fisheries haven't been sustained. Where did we go wrong?

Dr. Robert Bachman

One area we went wrong in is with the use of the concept Maximum Sustainable Yield as a guide to fisheries management. It has resulted in the loss of our New England ground fishery, Maryland striped bass and sea trout, and a number of species of flounder. One of the reasons we know this is that we've had some spectacular success in reversing those trends, especially with striped bass. We now know more about the life history and population dynamics of this species than any other marine fish. And by using this information, we've been able to better manage the fishery overall.

Dr. Robert Costanza

Another idea that's being tossed around and experimented with in Australia is the concept of share-based fisheries management. Instead of looking at a species-by-species management plan, the entire ecosystem is considered to be the element of interest to

fishers and others. Then they're given shares in that fishery, allowing for costs and incentives to be allocated more effectively, thus giving the stakeholders more incentive to maximize the value of their fishery as a whole.

Benefits of Aquaculture

Dr. Joseph R. Geraci

Currently, 15–17 percent of the world's population depends on marine resources for protein. How does aquaculture address these and other needs? And what are the benefits of aquaculture?

Ms. Diana H. Josephson

When you have a very healthy population of salmon in Alaska, and fish caught there can't compete economically with aquaculture salmon, then it raises the question: Is there an economic end to catching wild stocks and a future in aquaculture stocks? In fisheries, we've begun to select species that can be grown, like tilapia, salmon, catfish. Is this the future?

Dr. Yonathan Zohar

Seventy percent of the marine fisheries are overexploited or depleted, and seafood consumption is increasing. Aquaculture has the opportunity to fill this gap between supply and demand and provide an alternate source for seafood, thus reducing the pressures on marine fisheries. On the economic side of things, the U.S. is the second-largest importer of fish in the world, which contributes about $400 billion to the annual trade deficit.

Seafood is only one aspect of aquaculture. It is also an important tool in coral reef conservation, in that it reduces the need to collect species for the pet trade and research for new medicines.

Developing an aquaculture program can be very dangerous to the environment, as seen in Taiwan and Ecuador. It needs to be developed in a way that is sustainable and friendly to the environment, using scientific information. Two possible approaches are: (1) going offshore and creating floating pens, and (2) setting up completely land-based, closed, recirculating systems.

Dr. Robert Costanza

It's very important to account for the costs and benefits of aquaculture adequately, especially including these external environmental costs and benefits. When you start to replicate some of these services provided by nature for free, it's hard to say that it's economically efficient. But at the same time, we need to recognize what those services were to begin with and develop mechanisms to manage our wild fisheries more sustainably, so we may continue reap those benefits. We need to be very careful with aquaculture. Unless the economics is handled appropriately, we could be making a great big mistake.

Dr. Chris D'Elia

We've achieved probably maximum sustainable yield of our wild stocks—110 million tons a year—and unfortunately human population growth is proceeding at a very rapid rate—over 5.5 billion people on Earth right now and projected to go as high as 14 billion. With that kind of increase, it's clear that the amount of fish any one human being is going to eat in the future is going to go down. Therefore, we need to figure out how to slow down population growth or increase yields, and there's some concern that aquaculture isn't going to make up the deficit. However, the nontraditional uses of aquaculture for the ornamental fish trade does offer a great alternative, considering 95 percent of marine ornamentals are captured in coral reefs, with 95 percent of them dying during transport. In addition to providing a better return on a per-pound basis, aquaculture of marine ornamentals allows for research and technology development.

Ms. Hilda Diaz-Soltero

As we race ahead trying to develop aquaculture, there has to be a call of action so that we provide funding for the scientific research—not only on the development side, but also on how to have environmentally sound aquaculture. How do we mitigate the possible negative impacts aquaculture (either land or ocean based) may have on wild marine resources, endangered species, and habitat? If we work on a parallel track using science to develop aquaculture in an environmentally friendly way, then we're okay. The concern is that we're already developing aquaculture without the necessary resources for science or for environmentally friendly development.

Public Outreach and Education

Dr. Joseph R. Geraci

It seems to me that we're looking for authority to move—we need power to do something. And for that we need knowledge. And for knowledge we need education. Is the public sufficiently aware of the needs? And if not, how do we get there?

Mr. William Matuszeski

In the Chesapeake Bay area, as a result of a tremendous amount of education that has been done over the years, the public has become more aware, measures progress, understands what Bay grasses are, and how they can contribute. Critical to that mind-set is the establishment of very clear goals and indicators of progress that are reported on a regular basis by agencies and others who take full responsibility for the performance.

However, that's not the case outside of the Chesapeake. The goal setting for most fisheries management plans is obscure—written in a language in and of itself, unclear to the public, not reported regularly, and with few to no indicators for measuring progress. These are some of the areas we can make major improvements in, thus broadening our constituency for beyond those who have an immediate self-interest in the economic benefits.

Dr. Robert Costanza

Dr. Deborah Tannen has a new book out called *The Argument Culture.* She makes the point that in the media, in the law, and in our entire culture, we tend to cast even the most complex issues into simple black and white. And that's what gets in our way of moving forward on many of these issues. Like the debate on the environment, it's as if someone's right and someone's wrong, and the public is trying to figure out who's right and wrong. It's going to be difficult to enlighten the public about these complex issues, until we can get beyond the argument culture and start developing a new aura in which we can actually focus on common ground and areas of agreement.

Ms. Hilda Diaz–Soltero

The lack of public awareness and involvement is our greatest challenge. We must educate and involve the public, especially those people who are most dependent on marine and coastal resources. If the public doesn't get involved in the environment, there's no way we're going to have the support we need to tackle the challenges in front of us. We must also encourage responsible behavior toward natural resources and teach people individual ways they can contribute and get involved.

Dr. Robert Bachman

We've done a fairly good job of raising the conscience of the public, especially among the young people, about our environmental problems and what we're doing about them. However, there's a strong message out there that technology will bail us out. For example, we need to have better aquaculture, better management of stocks, control of pollution, recycling. We're giving people the idea that technology is the solution to all of our problems. It's our job as managers and leaders to make clear the limits of technology and where we have to start: controlling human population.

Ms. Stephanie Thornton

We, as a whole, recognize the importance of public education to achieve ocean conservation. But how do we accomplish this? Through partnerships with institutions, individuals, and programs that have the capability to educate the public.

California Science Center

Los Angeles, California

Identification of Issues

Have all your key issues been identified in the materials or conference discussions? Are there any additional issues or concerns that you feel need to be addressed?

Ocean Environment and Health

Budgetary Issues

The issue of where the resources will come from to improve the environmental quality of oceans wasn't adequately discussed at the conference.

Population Growth

One of the most compelling and difficult issues to deal with is the increase in human population. This issue is seldom seriously addressed in forums such as this. It has implications with regard to the developed and developing world, as well as education—especially that of women.

Enforcement and Monitoring

There was concern expressed about the adequate enforcement of existing policies and the lack of funding to properly monitor compliance. Many felt there was a need to exhibit less tolerance of violations.

Creation of Marine Preserves

There was discussion about how to create more marine preserves and how that would be affected by increases in population, lack of education, inability to monitor use, and the fragmentation of government agencies and environmental organizations.

Ocean Education, Exploration, and Research

Investment in New Technologies

The importance of investing in the improvement of technology to monitor and clean up the oceans was discussed.

Development of Pollutant Standards

The lack of scientific data on total maximum daily load standards for pollutants has impeded our ability to establish standards.

Public Education

The importance of education was vigorously discussed, and the role various institutions can play. Education can lead to building constituencies for the ocean. Lifelong learning and how to reach the out-of-school audience were emphasized.

Issue-Specific Recommendations

What are the implications of the proposed issue-specific recommendations and actions for your region? Are there any additional actions that you believe would be appropriate in your region?

Ocean Environment and Health

Moratorium on Offshore Drilling

There was some concern expressed that the moratorium on offshore drilling wasn't permanent.

Stormwater Runoff

Stormwater runoff is considered a critical issue for much of California. Developing the political will to deal with this complex watershed issue was discussed.

National Dialogue

Many of the other recommendations were considered somewhat vague and general, and it was unclear what would result from them. Much of the conference was viewed as political grandstanding. There was general agreement, however, that a national dialogue facilitating discussions among the stakeholders is a necessary precursor to creative problem solving.

Ocean Strategies, Programs, and Policies

Are your regional issues likely to be addressed by the integrated ocean strategy and the proposed ocean programs and policies?

Fragmentation of Ocean Management

Everyone agreed that the fragmented nature of the management of the oceans impedes our ability to make progress in addressing environmental problems. No one was clear on what it would take to ensure coordinated policies. The issue was also raised about the fragmentation of efforts among environmental organizations and how that makes them less effective in their advocacy efforts.

Hatfield Marine Science Center

Newport, Oregon

This reports focuses on the issues that were identified during the panel discussion. Each panel member was asked to flesh out the issues and work on the recommendations so the report would be more coherent than just notes taken on the day of the panel discussion.

Ocean Environment and Health

Issue: Sustainability of Living Ocean Resources

The Northwest is part of a larger community. Our living marine resource issues are shared among Alaska, Canada, Washington, Oregon, and northern California. International trade and advancing technology have created rapid changes and have expanded the Northwest's influence into the Pacific Basin. Some of our concerns extend to Mexico and the Central Pacific (pelagic and straddling fish stocks are particular issues). In addition, a number of tribal nations are sovereign members of this community.

The Northwest is a resource-rich region. Its developmental history was based on agricultural, timber, mining, and fisheries. The economy of the region has been based on vast reserves of these resources. Harvesting these resources over the decades, and environmental changes that have occurred due to rapid population growth in the region, have reduced these resources to critical levels. Stress on marine systems in the form of declines in available fishery resources is resulting in the re-evaluation of goals and expectations. Similar trends in forestry and agriculture have already been long under way. The loss of jobs and income due to declining resources has brought the debate about the management and sustainability of natural resources to the forefront in the Northwest.

The emergence of sustainability as an economic, social, and biological goal represents a key change from the past concept of renewability or static yields. Sustainability acknowledges our level of ignorance about natural systems and their variability in production. Sustainability accepts that we have overexploited some resources and recognizes that as we continue to use resources we must apply precautionary principles to reduce risk of permanent damage to natural resources, particularly targeted fish stocks.

Northwest salmon and groundfish are in decline. We are moving through a transitional stage from managing abundant natural stocks to stocks that may be sustained at lower levels. The Magnuson–Stevens Sustainable Fisheries Act of 1996 has created new national goals and standards. It implies the need for managing—but did not provide direction on how to manage—the transition between the past and the future. This transition involves activities and short-term actions in a number of areas.

Recommendations

- Recovery of depleted stocks should be the top priority. The Northwest has demonstrated its regional collaborative ability on many resource issues. Regarding salmon and groundfish, federal assistance to match state and local resources is needed.
- Maintenance of healthy stocks requires cautious management and possibly lower harvests than experienced in the past.
- Fisheries research must be expanded rapidly and sustained until the status of species can be accurately established.
- Fishing effort and capacity need to be reduced to match available and sustainable harvests. The industry, community, and social consequences of stabilizing fisheries need to be given more emphasis through a major transitional initiative involving social services and developing job opportunities supported by educational and retraining programs.
- Protected marine areas, including no-take zones, are part of a precautionary approach until greater knowledge improves our ability to manage on a sustainable basis.
- Developing new fisheries involving underutilized species should proceed only if based on corresponding biological information.
- Complex problems need to be addressed at appropriate scales. U.S.–Canada and U.S.–Mexico fisheries issues need continued attention. Central direction and commitment are required, particularly at the international levels, to resolve fishery disputes and ensure cooperative management. Greater decentralization by the federal government is needed in decision making and responsibility. Decentralized decision making by the West Coast states and Alaska needs support by reinforcing and developing their relationship, roles, and abilities.
- Fisheries research needs to expand and to emphasize a more collaborative and coordinated approach among the federal government, the states, universities, and the fishing industry if priority issues are to be addressed effectively and in a timely way.
- National, state, and university funding commitments need to be evaluated and changed where necessary if emerging priorities require it. Adequate new funding cannot always be the assumption tied to problem resolution. Coordinated direction for budgets and coordinated research initiatives can make total expenditures more effective.
- Communication about changing conditions and consequences for resource users is needed. Fishing industry members impacted by reduced opportunities need to be able to assess their situations, respond, and plan a more stable future.
- Research information is an important investment and needs to be communicated in a useful and meaningful way. Clear information is a part of managing risks.

Issue: Human Impacts on Natural Ecosystems

Other potential impacts on natural resources in the Northwest include exotic species introductions and nuclear pollution from the Hanford nuclear facility on the Columbia River. No matter how well we steward our ecosystems, human activities will change them, and the changes can be permanent. Exotic species potentially overwhelm native species. Habitat is lost with housing developments, and nuclear wastes contaminate aquatic species. If our policy is to use the federal Endangered Species Act as a biological circuit breaker, we are headed for serious trouble as native species are damaged.

Recommendation

- Prompt implementation of national legislation is needed.

Ocean Education, Exploration & Research

Issue: Ocean Graduate Education

American higher education is the envy of the world. The prestige of the higher-education enterprise in the United States rests to a great degree on the high quality of its graduate education and accompanying research programs. In 1997 more than a third of all of the 1.2 million students who studied outside their home countries came to the United States for their undergraduate and graduate degrees.

The importance of graduate/professional education and research to all elements of education, and to the long-term benefit of the United States cannot be overemphasized. Graduate education directly contributes to the quality of undergraduate learning. Most of the teachers in elementary and secondary education have graduate training, as do virtually all of the educators in community colleges and four-year colleges and universities. Further, graduate education serves as the base for most continuing education (lifelong learning), and the results of college and university research contribute in a major way to the social and economic development of the United States.

This importance is even more profound in the area of oceanography and the marine sciences which, based on disciplinary skills developed at the undergraduate level, reach their sharpest focus in graduate schools. Oceanography among a number of areas is

most applicable to a multidisciplinary or interdisciplinary approach. Nevertheless, most oceanography graduate programs and their associated research are of a narrow disciplinary nature. Researchers during the past several decades have realized that their best chances of obtaining federal research grants rest on pursuing narrowly focused research objectives. Today, however, there is growing awareness that the most important global and environmental problems facing mankind are multifaceted and will not be solved by a strict disciplinary approach. As the complexity of problems of resource and environmental sustainability is recognized and as the world population grows logarithmically, new approaches are and will be required.

Professionals, well based in the disciplines but having had broad multidisciplinary experience, will be required to successfully resolve resource and environmental challenges. Graduate education must be broadened to include the social, economic, and even political dimensions of such problems. The impact on mankind of potential solutions to such problems must be factored into the solutions.

From a career perspective, graduates with such preparation will be in a much better position to be gainfully employed in their areas of preparation. Today, as many as 22 percent of new science and engineering doctorates fail to find employment in their chosen fields. In all areas, but particularly those areas of science that require an interdisciplinary approach, we must ask: Are our doctoral programs too narrowly focused? And "Is higher education academically organized to resolve the global problems of the present and the future? The questions are not trivial, and the answers are too important to be overlooked. The inadequacies of ocean science graduate programs to prepare for a sustainable world must be recognized by the highest levels of national administration and by the leaders of our institutions of higher education. Traditional approaches to ocean science graduate programs must be altered.

Recommendations

- The President of the United States, the Vice President, and the Secretary of Education should state publicly their support for a policy of broadened graduate programs in areas important to the sustainability of global resource and environmental systems.
- Encourage federal education and research agencies to develop such programs or alter existing programs to encourage complementarity and integration of graduate programs.
- Encourage graduate education for all who are qualified.
- Endorse the personal development, as well as the professional development, purposes of graduate education.
- Such programs should stress the social and economic aspects of research and graduate training, together with the scientific and technical dimensions. Changes in graduate/research approaches could be stimulated by a federal requirement to address the social, economic, and even political ramifications of all.
- Consider establishing a multidisciplinary "Center of Thought" at educational institutions. Such centers would focus on global problems of sustainability, including the human as well as the environmental/resource aspects of sustainability.

MIT/New England Aquarium[2]

Boston, Massachusetts

On June 11–12, 1998, the first National Ocean Conference was held in Monterey, California. The nation had the opportunity to participate in this important event via satellite downlink. The Massachusetts Institute of Technology (MIT) and the New England Aquarium formed a partnership to give regional stakeholders the opportunity to better define regional coastal and ocean issues, to forge a stronger consensus around them, and to relate the regional issues to the national issues identified in Monterey.

The strategy we used was to create on one side of the auditorium a written record of key issues, conclusions, and recommendations made in the live telecast. This record was kept on large sheets of newsprint and posted on the walls so all could see. Concurrently, the audience was invited to respond with statements of how the national points related to the region. These were recorded and posted on the other side of the auditorium.

At the end of the first day, we took all of these records and asked participants to identify priority issues for New England. Participants were asked also to supplement that priority list with other region-specific issues that had been missed. Most of the sec-

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[2] Co-chairs: *Dr. Chrys Chryssostomidis, Massachusetts Institute of Technology—Sea Grant, and Dr. Jerry Schubel, New England Aquarium.* Rapporteur: *Dr. Mike Connor, New England Aquarium.* Participants: *Dr. David Aubrey, Woods Hole Group; Dr. Robert Buchsbaum, Massachusetts Audubon Society; Cathy Coniaris, New England Aquarium; David Dunn, Voyage of the Spray; CDR Steve Garrity, U.S. Coast Guard; Susan Gedutis, New England Aquarium; Jennifer Goebel, New England Aquarium; Hannah Goodale, National Marine Fisheries Service; Cliff Goudey, Massachusetts Institute of Technology—Sea Grant Program; Dr. Ambrose Jearld, National Marine Fisheries Service; Rep. Jay Kaufman, Town of Lexington; Dr. Christian Krahforst, Mass. EOEA; Dr. Sondra Lage, New England Board of Higher Education; Dr. William Lang, Minerals Management Service; Dr. Virginia Lee, Rhode Island Sea Grant; Maggie Mooney–Seus, New England Aquarium; Dr. Marianne Moore, Wellesley College; Dr. Judy Pederson, Massachusetts Institute of Technology—Sea Grant Program; Josh Pennington, U.S. Coast Guard cadet; Dr. Benjamin Sherman, Harvard School of Public Health; Jeremy Sokulsky, Salem Sound 2000; Susan Snow–Cotter, Executive Office of Environmental Affairs; Greg Stone, New England Aquarium; Michelle Sweeney, New England Aquarium; Jennifer Sullivan, MWRA; John Williamson, Commercial Fishing Community Activist, New England Fishery Management Council member; Richard York, Mashpee Shellfish Department.*

ond day was spent in developing, enriching, and refining these issue statements. Between working sessions, we listened to the second and third broadcasts from Monterey, but no new ideas were captured from those events.

In the next section of this report, we present brief background statements for region-specific issues, followed by a series of recommendations. At the conclusion of the Monterey conference, the President asked his Cabinet Secretaries to place a report before him on June 12, 1999, recommending the best actions for dealing with the oceans for the next millennium. We would like the June 12, 1999, report to incorporate our recommendations. The issues identified by the group were:

- Regional Trade—New Strategies for Ports and Shipping
- Outer Continental Shelf Oil and Gas Development—Canadian Issues
- New Approaches in Fisheries Management
- Marine Protected Areas—Criteria for Success
- Sustainable Development for Coastal Tourism and Recreation
- Marine Pollution—Moving Beyond Point-Source Control
- Monitoring for Enhanced Coastal Management
- Fostering the Next Generation of Coastal Leadership and Partnerships

Regional Trade—New Strategies for Ports and Shipping

While much of the nation's shipping occurs through a handful of large ports, smaller regional ports must be maintained. These secondary ports are critical both to national security and to regional economies. While international trade can most efficiently be served by a few major ports, the loss of regional ports and subsequent shallowing of their harbors will limit the areas where naval ships can function in times of national emergency.

The importance of regional ports to their local economies is exemplified by Boston Harbor. The port of Boston is a fairly healthy niche port that handles energy ships, container ships, cars, ferries, and cruise ships. But the survival of the port of Boston, like all niche ports, depends on imaginative solutions to the problems of port maintenance, especially dredged material management.

Meanwhile, the U.S. fleet is aging, and recent legislation necessitates the building of many new ships. Currently, the fleet consists of ships with an average age of 35–40 years, aged well beyond the normal useful life of 20 years. Since Congress mandated that goods transported between U.S. ports must be transported on ships built in the U.S., approximately 100 new ships will be needed. Further, recent environmental laws require double-hulled tankers to transport oil and chemicals in U.S. waters. Approximately 1,000 ships will be needed in the next 15 years to fulfill this requirement. It is estimated that these demands, taken together, will generate more than $100 billion in shipbuilding revenues. U.S. labor costs are competitive, but the industry has languished. The next century will demand its renewal.

Recommendations

- Develop a strategy for the role of secondary ports. The previous National Academy of Sciences study of this issue should be updated. Regional ports cannot be held captive to the decisions of global shipping investors. Boston would serve as a good prototype for what regional niche ports could look like.
- Develop efficient and effective management solutions based on sediment risk for harbor dredging and disposal. We need to determine what risks are posed by contaminated sediments and how they can best be mitigated.
- Support a vigorous shipbuilding industry in the U.S. New England has a series of regional shipyards where land and infrastructure have been committed to shipbuilding. These yards need revitalization, the demand is there, and they should be made to work.

Outer Continental Shelf Oil and Gas Development—Canadian Issues

President Clinton's extension of the moratorium on Outer Continental Shelf oil and gas development will reduce debate on this issue in the United States. However, the Canadian government is considering the development of its oil and gas resources near Georges Bank, a valuable fishing ground, where several important stocks are severely overfished and under strict management. While some historic concerns with such development have lessened (e.g., improvements in the safety of drilling fluids and deep-water drilling technology), new issues have arisen. These include rig decommissioning, seismic impacts, and effects on endangered species. Canada has a plan in place for its offshore oil and gas development after the current moratorium, which could provide a valuable case study for future U.S. decision making.

Recommendations

- Hold a regional workshop on oil and gas development on Georges Bank. This workshop would bring together all major stakeholders, including both American and Canadian local, state, and federal agencies, fishermen, shipping interests, NGOs, and researchers.

- Provide official comment from the states and regional councils through the State Department regarding the potential impact of Canadian oil and gas development on the U.S.

New Approaches in Fisheries Management

The near collapse of the Georges Banks fisheries during the mid-1990s was tragic. Dire measures implemented at that time may now be showing positive results. Recently, the Secretary of Commerce and the New England Fishery Management Council (NEFMC) have experimented with approaches that may be applied to other U.S. fisheries, particularly area-based management through the use of refugia, and overcapitalization buy-outs to reduce fishing effort. Unfortunately, many scientists are uncertain whether the existing monitoring programs will be sufficient to evaluate the ecosystem impact of these approaches, individually and collectively.

The NEFMC has moved ahead with the Essential Fish Habitat (EFH) approach of the Sustainable Fisheries Act. Existing designations will be refined as more data become available. We need to explore—scientists and fishermen together—what we value in marine habitat. We believe the federal data need to be augmented by data collected by the states and the users themselves.

Recommendations

- Emphasize the importance of the EFH approach, and supplement the existing data with more fine-scale data on resource species and habitat types. The EFH approach will need continued support after the October Sustainable Fisheries Act deadline passes.
- Develop a mechanism for effective communications among the fishing industry, managers, and scientists to improve the Fishery Management Council process. This process could be improved by providing training on fisheries science and management to a cadre of industry members who would serve to improve communication throughout the region on fisheries management issues.
- Provide seed money for industry-funded fishery buy-outs. Fisheries effort must be reduced to sustainable levels, but management strategies must also account for the economic devastation facing coastal fishing communities.
- Provide research funding for more selective fishing gear that reduces bycatch and is protective of EFH.
- Improve the reliability, quality, and quantity of monitoring information available to most effectively evaluate and adapt management practices. Monitoring must serve fishery managers' needs for predicting the impact of management alternatives and evaluating the success of previous policies. The new NEFMC initiatives, in particular, will require enhanced monitoring. Expanded monitoring programs may be necessary to meet all of the mandates in the Sustainable Fisheries Act, such as EFH.

Marine-Protected Areas—Criteria for Success

The Gulf of Maine is home to one of the nation's largest marine sanctuaries, Stellwagen Bank. The sanctuary is currently reevaluating its management plan, but it lacks clear national criteria to assess the value and importance of these areas and how they benefit the entire nation. Ironically, the biggest experimental use of marine-protected areas is not in the sanctuary, but in similarly rich areas of the Gulf of Maine and Georges Bank. Almost 6,000 square nautical miles of ocean in four areas of distinct character have been set aside from most fishing activities. The theory behind marine-protected areas is that reserves will provide a spillover to surrounding areas. Such evidence from Georges Bank is not yet available. (It is important to note that because these areas are more distant from shore and have fewer competing multiple uses, it has been easier to garner consensus to experiment with these bold innovations in marine policy.)

Recommendation

- Develop national criteria for evaluating the value of marine-protected areas.

Sustainable Development for Coastal Tourism and Recreation

Coastal tourism in New England conjures images of rustic fishing villages. New England's maritime economic base has been one of its defining characteristics, and it is on this character that New England tourism has been built. Today, rising population and land values have threatened that heritage, and New England has in many ways lost its day-to-day connectivity to the ocean. Accessibility to the water in New England is less protected by local and state laws, and the coast is rapidly becoming an enclave for the fortunate few. The challenge for the future is to maintain the special quality of life that defines New England coastal communities with multiple economic uses of the coast with human and environmental health, including fishing and harvesting, aquaculture, recreational boating, marine trades, commercial ports, real estate, and preservation of coastal open space.

Recommendations

- Use coastal water zoning approaches. Coastal water zoning has been successful in Rhode Island and to some extent with Massachusetts' Ocean Sanctuaries Act. At the local level, town harbor masters provide for a balance of uses.
- Develop a coastal use ethic that fosters cultural respect for the oceans and coast. Involve an educational approach for stakeholder participation. Use existing institutions to spread the word and get local coastal business leaders involved so schoolchildren will know as much about the status of the coast as they do about rainforest conservation.

- Use consensus-based decision-making processes that involve all stakeholders and share *successful models (e.g., the Massachusetts* Barrier Beach process) among regional groups.
- Monitor progress in restoring coastal environmental quality, and use this monitoring to foster further education and stewardship. Volunteer monitoring networks in Massachusetts and Rhode Island have been powerful tools for imbuing stewardship in their participants. Use the Internet to track monitoring and determine what else we need.

Marine Pollution—Moving Beyond Point-Source Control

New England coastal states face unique pollution issues. Their heavily industrialized past and current urban density are harbingers of the issues that will be faced by other coastal states as population continues to grow. The population density of New England is similar to what Florida, California, and Texas will see in the future. On the other hand, some potential pollution problems are mitigated by climate and geomorphology. Except for the numerous salt ponds that fringe the coasts, the issues of hypoxia and eutrophication are not as serious as those faced by the Gulf of Mexico or Chesapeake Bay.

Point-source contamination has been dramatically reduced since the passage of the Clean Water Act, particularly for solids, organic matter, and toxic contaminants. For many contaminants, the remaining point-source loads are far outweighed by sediment reservoirs, urban and suburban runoff, and atmospheric deposition. Nutrients and pathogen loading are responsible for most of the remaining water quality problems, including beach and shellfish bed closures and harmful algal blooms.

Recommendations

- Strengthen watershed approaches for pollution control. Marine pollution sources are land-based, and control programs must cover the entire watershed. To rewrite the old adage alluded to by Vice President Gore, "The solution to pollution is watersheds."
- Develop efforts to control nonpoint-sources and atmospheric deposition that are consistent with what has been accomplished in the control of point sources over the last 25 years. Basic research is still needed to quantify the flux of materials from watersheds characterized by a mosaic of uses and how susceptible these fluxes are to mitigation efforts.
- Consider how cost-sharing funds could support regional centers that address cross-boundary pollution transport issues, provide focused synthesis of regional problems and solutions, and provide guidance for supporting local efforts. Massachusetts is initiating a Science and Technology Center to begin to address these problems.
- Exploit new advances in biotechnology to develop rapid pathogen indicators that will improve our management of beach and shellfish closure areas and find mechanisms for this laboratory capability to be available to municipalities for routine monitoring.

Monitoring for Enhanced Coastal Management

Too often, the effectiveness of coastal management policies cannot be judged because we lack good monitoring information. In the prior sections, we have cited examples from dredged materials disposal management, fisheries management, and use of marine protected areas.

The problem is exacerbated by the lack of biotic indices of marine ecosystem health. One local approach has been to take an epidemiological approach, cataloguing existing data sets about diseases and mortality in marine plants, mammals, shellfish, and birds, as well as humans. Several federal agencies actively collect data in New England's coastal waters, including the National Marine Fisheries Service, the National Ocean Service, the Environmental Protection Agency, the U.S. Geological Survey, and the Army Corps of Engineers. It became clear in compiling these data sets from multiple agencies and jurisdictions that we need to put a mechanism in place to effectively share the information and manage the ecosystem.

Recommendations

- Require that a monitoring system be in place before the receipt of new money for state and local management programs.
- Develop regional Web-based data centers that incorporate all data from federal, state, and possibly local monitoring programs operating in the region, so that regional managers can access these data in one place. Some of the data from different sources are unnecessarily duplicative. This is a federal task, but the actual implementation of the task needs further discussion. For instance, should the delivery be privatized?

Fostering the Next Generation of Coastal Leadership and Partnerships

New England hosts a dense constellation of prestigious academic, government, and research institutions. However, because so many researchers are competing for scarce funds, we often don't take full advantage of the intellectual talent available here. Decision making needs to be decentralized so that local funding is made available for localized research.

Recommendation

- Start with regional groups in defining coastal ocean needs. The National Ocean Conference was conceived and planned nationally and then presented to the states.

- As a next step, the process needs to be reversed. Priorities should be set starting with regional groupings that include local citizens, governmental agencies, researchers, advocacy groups, and chambers of commerce. Media involvement from the start could help develop consensus among these groups (e.g., the Boston Globe/MIT forum on development in the South Boston port area). Taken together, these regional discussions would build the momentum for changing coastal policies on a broader scale.

Regional Oceans Conference for Students

Florida Aquarium, Tampa Bay, Florida

Conference Summary

As a Coastal Ecosystem Learning Center, the Florida Aquarium participated in the National Ocean Conference as a satellite downlink site. The national conference in Monterey included many different stakeholders and allowed participation in the development of a national oceans policy. The downlink at the Florida Aquarium provided the Tampa Bay region a unique opportunity for the area's youth to be a part of this process. Middle and high school students joined college-level students, resource managers, other technical experts, and educators in the day-long event to reflect on the issues at a local level.

To layout the upcoming event, a planning committee was formed. The committee consisted of representatives from the Aquarium, the University of South Florida, the University of Tampa, and the Hillsborough County School District, lead by Tampa City Councilman, Scott Paine. The goals of the [Florida] conference were quickly laid out and quite simple: ignite the curiosity and imagination of young people, and learn form their fresh perspective what we can do as a community to nurture this precious natural resource. This youth focus made this conference unique in the country. The committee wanted to allow students the opportunity to interact with professionals and learn from each other through discussion groups. We also wanted to provide an opportunity for students to form their own opinions and present their findings to an open, listening audience.

The format was set to utilize the broadcast, both taped and live, so that students could reflect on the national issues and perspectives. Students were asked to participate in one of four panel discussion groups on the same focus areas addressed at the national conference. The purpose of each working group was to relate the national findings to regional issues and identify potential regional actions in response to the recommendations. Experts in the four areas of focus were on hand to guide the students in discussion groups. The students then provided group presentations to local experts who asked questions and lead discussions on the subjects. A special emphasis was placed on balancing everyone's needs on the entire day's activities so that students will learn to see others' perspectives as well as their own.

Students were selected from area middle magnet schools, high school environment clubs, and college classrooms. Background information packets, including Year of the Ocean publications and background papers from the National Oceanic and Atmospheric Administration, were distributed to participating students for them to study before the conference date.

Evaluation forms completed by students, teachers, experts, and facilitators indicated that the topics, format, and activities were well received. Participants rated all activities as either good or excellent. All participants, both professionals and students, learned equally from the experience. Students said that they appreciated the opportunity to interact with professionals, be asked their opinions, and be genuinely listened to. Adult participants learned from their interactions as well. Several government representatives pledged to include students in citizen advisory groups in the future. All participants agreed that the effort was worthwhile and that they would be interested in participating in a similar event in coming years. One observation by an adult participant was that students have a much greater capacity for understanding issues and higher-level thinking than they are often given credit for. They also noted that the students provided a much needed, fresh perspective on many of the issues discussed and the activities at the conference had given them hope for the future of our oceans.

The Regional Oceans Conference for Students (ROCS) planning committee is currently developing plans to continue and improve the conference and hopes to move forward on ROCS II for the spring of 1999.

Panel Summaries

Commerce (Transportation, Recreation, Tourism, Fisheries, Oil and Gas)

Issues concerning commerce in the Tampa Bay area as expressed by area students:

- orimulsion;
- use of the port;
- dolphin feeding by tourists/recreational users;
- understock in fisheries;
- offshore oil drilling;
- capacity of Tampa Bay to carry ships;
- recreation invading sanctuaries;
- marine debris and pollution;

- growth of exotic species; and
- restoration of damaged habitat.

Tourism stakeholders:

- tourists;
- businesses (sports, fishing, restaurants);
- state economy; and
- Department of Environmental Protection.

How do we tackle the balance of tourism and the protection of our environment?

- create new legislation to protect the environment;
- create a state-wide plan for tourism;
- educate tourism operators on effects of tourism on the environment;
- do a state-wide blitz to educate tourists on things they should not do (e.g., feeding the dolphins in Panama City); and
- regulate emissions on boats and jet skis.

Environment and Health (Ecosystems, Marine Pollution, Hazards, Weather/Hurricanes)

Issues concerning environment and health in the Tampa Bay area as expressed by area students:

- loss of habitat for scallops and sea grass;
- illegal dumping;
- pollution caused by fertilizers and pesticides;
- overuse of waters; and
- lack of respect for the environment.

Solutions to some of these expressed problems:

- school programs to educate children, field trips;
- training classes in state parks for tourists; and
- expand Nature's Classroom to be visited by parents and business people.

What effect does global warming have on our area?

- droughts, storms, change in temperature;
- sea level change; and
- negative effects on health.

What can we do to slow down the effects of global warming?

- emphasize individual responsibility;
- urge oil companies to assume leadership roles in environmental protection;
- create larger recycling programs;
- add more money for new technology; and
- have incentives for businesses who do positive things.

Exploration, Education, and Research

Kids often have good ideas and solutions and are often more aware than some adults about global problems. They have a greater stake in the welfare of the planet.

Education issues:

- hands-on learning—need more marine curricula and funding;
- educate everyone in realizing the importance of the oceans;
- include beliefs and values in education; and
- educate the public to fund research and education.

Research issues:

- getting to the bottom on the ocean, physical limitations of man;
- medical uses; and
- better local control of research.

Science and technology issues:

- climate, El Niño;
- natural resources, minerals in the ocean; and
- preserving areas for research.

Ways to balance people's concerns and issues:

- create a research village for tourism and community awareness;
- balance people's necessary uses and ecosystem health; and
- address population growth.
- Create awareness of Florida's research facilities: University of South Florida Department of Marine Science, Mote Marine Laboratory, Harbor Branch Oceanographic Institution, Florida State University–Panacea, Rosenstiel School of Marine and Atmospheric Science, Eckerd College, University of Florida–Seahorse Key, United States Geological Survey, Pigeon Key, Department of Environmental Protection/Fisheries Marine Research Institute, Long Key National Estuary Program, Marine Resources Development Foundation, Newfound Harbor, Nova University, National Undersea Research Center.
- Emphasize connections between education, research, technology, and public awareness.

Panel of Experts

Oceans and Commerce

Andy Kimmer, National Marine Fisheries Service
Gerry Leonard, Center for Marine Conservation

Ocean Environment and Health

Dr. Scott Wright, Florida Department of Environmental Protection, Fisheries Marine Research Laboratory
Dr. Joan Rose, University of South Florida, Department of Marine Science
Mike Perry, Southwest Florida Water Management District, Surface Water and Improvement Program

Ocean Exploration, Education, and Research

Dr. Paula Coble, University of South Florida, Department of Marine Science
Nanette Holland, Public Outreach Coordinator, Tampa Bay National Estuary Program
Dr. Randy Runnels, Department of Environmental Protection, Tampa Bay Aquatic Buffer Preservation Program

Oceans and Global Security

Commander Tom Schibler, SOCOM, MacDill AFB
Dr. Paul Bisset, Naval Research Laboratory

Summary of EPA Regional Meetings

Top Ten Issues and Questions

The U.S. Environmental Protection Agency (EPA), jointly with the Department of the Interior and the National Institute of Environmental Health, held two public meetings to gain input from the public prior to the National Ocean Conference, specifically on marine environmental and public health issues. EPA's Administrator, Carol Browner, led one of the meetings, and Felicia Marcus, EPA Regional Administrator for Region 9, led the other. Representatives from academia, industry, environmental groups, and local and federal governments served on panels to initiate topical discussions.[1]

The East Coast meeting was held in Tampa, Florida, on June 1, 1998, and the West Coast meeting in Los Angeles, California, on May 28, 1998. In attendance at both meetings were representatives from industry and environmental groups; local, state, and federal government environmental and health officials; and the general public. About 100 people attended each meeting. While the following is not a complete list of the issues raised by the attendees, it presents some of the highlights. Full transcripts are available on the Internet (http://www.epa.gov/OWOW/oceans/yoto/).

1. Effects of Polluted Runoff

An estimated 40 percent of estuaries assessed by states are not safe for fishing and swimming, primarily because of bacteria and nutrients from urban and agricultural runoff and municipal wastewater discharges. Overenrichment of nutrients from failing septic systems, sewage treatment plants, atmospheric deposition, runoff from farms, animal operations, and yards stimulates growth of algae, contributing to lower dissolved oxygen levels for fish and shellfish, and loss of light and clarity for underwater sea grasses.

- What actions are being taken to stop coastal water quality degradation from sediments, fertilizers, pesticides, household compounds, and air deposition?

Photo: S.C. Delaney, U.S. Environmental Protection Agency

- Actions need to be taken to curb harmful algal blooms along our coasts
- Incentive programs are needed for controls and best management practices to stop polluted runoff, and more research is needed on its cumulative impacts.

2. Public Health

Sewer spills and overflows, urban stormwater runoff, and polluted runoff form farming and rural areas are the major pollution sources responsible for the roughly 2,600 beach closings and advisories in 1996.

- Are our beaches safe for public use?
- Appropriate indicators, including viruses, are needed to protect human health.
- There should be better, more accessible public "right-to-know" approaches to alerting the public about the safety of beaches and fish.

3. Habitat Loss and Degradation

Estuarine environments are among the most productive on Earth, creating more organic matter each year than comparably sized areas of forest, grassland, or agricultural land. The productivity and variety of estuarine habitats foster a rich abundance and diversity of wildlife. The United States coastal zone comprises only 17 percent of the nation's contiguous land area, but is home to more than 53 percent of the nation's population.

- There is concern about the impacts of shoreline modification from coastal development on habitats. Smart Growth principles should be adopted in coastal areas.
- Wetlands should be preserved to both protect habitats and protect against coastal hazards, such as flooding.
- Recreational boating is ruining critical habitats for fish and shellfish.
- The National Estuary Program should be expanded to provide resources to coastal areas without estuaries. There is value in bringing diverse issues and stakeholders together.

4. Funding

- There should be more funding for ocean issues, including research, monitoring, current programs, and local initiatives.
- Congress should ensure that the Clean Water Action Plan is fully funded.
- Programs, such as the National Estuary Program, Border XXI, coastal zone management plans, and nonpoint-source programs, should receive adequate resources.

5. Aerial Spraying of Pesticides (such as Malathion)

Healthy fish stocks and coastal economies rely upon healthy marine and coastal waters and good air quality. During the East Coast meeting, locals attested to risks associated with spraying of Malathion to control the medfly population. Malaoxide, a toxic breakdown of Malathion, was found in one community's treated drinking water last summer. Aerial spraying is affecting fish and birds.

- EPA should deny USDA's request for a permit for aerial spraying.
- EPA should inform and educate the public about the risks from pesticides in consumption of fish and coastal water quality.

6. Center for Marine Conservation Ten-Point Agenda

The Center for Marine Conservation published "An Agenda for the Oceans" prior to the East and West Coast meetings. A representative from the Center formally presented the ten-point agenda at each of the meetings. It includes:

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[1] John Armstrong, U.S. Environmental Protection Agency, Region X; Dr. Daniel Baden, Marine and Freshwater Biomedical Science Center, University of Miami; Jim Bolder, Washington Sea Grant; Warner Chabot, Monterey Bay Sanctuary Foundation; Peter Douglas, Executive Director, California Coastal Commission; Duane Fagergren, Puget Sound Water Quality Action Team; Dr. Mark Gold, Heal the Bay; Katherine Kuhlman, U.S. Environmental Protection Agency; Dr. Sheila Newton, National Institute of Environmental Health Sciences; Ann Notthoff, Planner, Natural Resources Defense Council; Pietro Parravano, Pacific Coast Federation of Fishermen's Associations; Jerry Pollack, California Department of Health Services; Dr. Ellen Prager, U.S. Geological Survey, U.S. Department of the Interior; Peter Rooney, California Secretary for Environmental Protection; Dr. Randy Runnels, Tampa Bay Aquatic and Buffer Preserves Program; Steve Weisberg, Southern California Coastal Water Research Project.

- investing in the future of America's oceans;
- strengthening and expanding marine protected areas;
- protecting endangered marine wildlife; and
- promoting ocean stewardship and education.

7. Monitoring and Research

According to the 1996 National Water Quality Inventory Report, 74 percent of estuaries and only 6 percent of ocean shoreline waters were surveyed for water quality data. There are currently monitoring programs for marine debris, air deposition, and sewer overflows.

- More coastal waters should be monitored.
- Fish tissue samples from domestic and imported commercial supplies should be analyzed.
- Increased reporting is necessary to ensure that monitoring is taking place.
- More research into national water quality standards for marine waters is necessary to protect public health.

8. Comprehensive Ocean Management Planning

- There is a need to reduce and streamline overlapping management strategies.
- Federal agencies should demonstrate comparative risks versus benefits to the public.
- Much of the current approach is on an issue-by-issue basis. Oceans should be managed on a broader basis.
- Congress should establish an ocean policy commission to develop recommendations for a comprehensive ocean policy.

9. Sustainable Use of Fisheries

In the United States, 275 groups of fish are caught commercially in federal and state waters. The National Marine Fisheries Service knows the status of two-thirds of these groups and estimates that one-third of the assessed groups are overexploited.

- Recreational boating is having an adverse effect on fisheries.
- The penalties and restrictions in fisheries amount to millions of dollars a year; this money should be directed toward protection of fisheries.
- Suggestions included establishment of no-take zones.

10. Right-To-Know and Public Education and Outreach

As outlined in the Clean Water Action Plan, EPA is planning to release an Internet-based database of beach closings, advisories, and areas not monitored.

- Are wild- and farm-raised fish safe to eat?
- Fish consumption and beach advisories need to be in layman's terms. Existing advisories are confusing and not user-friendly.
- Better public education and outreach efforts will lead to public support for research and new ocean programs.

Summary of U.S. Coast Guard/ DOT Regional Listening Sessions

Charleston, South Carolina

May 13–14, 1998

Open Public Forum

Approximately 40 people attended the public session. Ten speakers provided detailed comments on many aspects of the marine transportation system in the southeastern U.S. Their comments are summarized as follows.

Importance of Regional Listening Sessions

The federal government's regional listening sessions—particularly with their focus on funding, technology, and communications issues—are an important first step to addressing the needs and concerns of the nation's marine transportation system.

State Departments of Transportation (DOTs)

The states' DOTs need to be represented at the regional listening sessions. Currently there is a disconnect between state-level DOTs and the port authorities. While the state-level DOTs are supposed to foster intermodalism, they do not have effective relationships with the port authorities because of the latter's commercial focus. Until this disconnect is bridged and the relationship becomes more interactive, the goals of the listening sessions will be difficult to achieve.

Successful Marine Transportation Systems

A successful marine transportation system will protect the competitive nature of port operations, and avoid the establishment and expansion of direct involvement by the federal government in port ownership and operations.

Photo: United States Coast Guard

Waterways Management Councils

The Waterways Management Council of Jacksonville, Florida, is an effective forum for resolving problems arising from competing uses of the waterway. To be successful in other places, however, the forum must be a local initiative with a focus on solving local problems.

Cabotage Laws

Current laws governing and restricting the transportation of cargo and passengers in U.S. domestic commerce serve to drive up the cost of waterborne shipping, even when it has been proven to be the least-cost mode for many types of goods. For this reason, current laws dealing with the ownership and construction of vessels should be seriously studied and reconsidered.

"SCTW 98" Not in U.S. Interests

"SCTW 98" seems to have been written from purely a European experience and does not represent traditions of U.S. mariner training. Particularly onerous is a requirement that candidates for mariner's licenses have 360 days of sea time in a watch-standing capacity. Implementation of this requirement would effectively put the U.S. maritime academies out of business, since the schools would be unable to meet it within the constraints of their current four-year Bachelor of Science degree programs.

Latin American Trade and Transportation

A coalition of 14 states and the Commonwealth of Puerto Rico has been formed to study the effects of increased trade with Latin America and identify intermodal transportation strategies that capitalize on these opportunities.

Pollution and Safety Concerns

Concern was expressed about increased vessel traffic in Charleston giving rise to increased pollution from ships' ballast, and the possibility of increased accidents caused by the wakes of large vessels and the actions of inexperienced crews.

Limits on Vessel Size and Dredging

There is a need for federal leadership to establish limitations on vessel size, especially since increasing vessel sizes are bringing about a demand for increased dredging of navigational channels.

Port Access Improvements in Virginia

The State of Virginia recognizes the importance of maritime transportation to the state's economy and has made improvements of intermodal access to its four principal marine ports a high priority.

Improved Port Access in Charleston

In order to improve truck access to the Port of Charleston, numerous highway accesses need to be constructed and/or improved. It was also suggested that expanded hours of port operation would significantly improve safety and efficiency by reducing daytime traffic and accident exposure.

Pollution From Cargo Containers

Concern was expressed about residue from imported cargo containers. Neither the port authority nor the trucking companies want to take responsibility for its disposal.

Hazards From Artificial Reefs

Artificial reefs and fishing activity around them are a hazard to safe navigation in the southeastern U.S. A possible remedy would be to involve the Coast Guard and NOAA in the permitting process for building these reefs, since these two agencies are more conversant in offshore issues.

Focus Group Session

Vessel and terminal operators, land-side transportation representatives, environmental and labor interests, representatives from state and local governments, and other major interests met to assess the current state of the marine transportation system in their region and provide their vision of its future state (year 2020), focusing on infrastructure, people and information systems, and policy. The following major themes and recommendations to implement them were identified.

Timely and Safe Water- and Land-Side Entry and Exit to Port Facilities

Promoting factors are increasing trade and vessel/cargo volumes, good productivity, a port capacity that is attracting industry, an excellent navigational safety record, growing public support for a bridge replacement, and successful intermodal partnering efforts. Barriers are channel depth, current bridge height and width, one-way channel restrictions, lack of a deep-draft anchorage, tide restrictions, an absence of a maritime exchange, lack of available berthing space, inadequate roadways, and ramp congestion at the rail. Recommendations are to deepen the channel to 50 feet, provide funding for proposed bridge replacements (rail and highway improvements), augment efforts to educate the public to support funding for these projects, increase Coast Guard involvement in the bridge planning process (concept approval), adopt a new policy that recognizes the importance of anchorage to safe and efficient navigation, and establish maritime exchanges. (Note: While this theme focused on the Port of Charleston, it also applies to other regional ports.)

Planning and Communications Between the Public and Private Sectors

Promoting factors are the existence of some local/state dialogue and the fact that maritime exchanges, where established, are working well. Barriers are a lack of dialogue at the national level, difficulty and lack of communications on infrastructure gains and limitations, and lack of a structured means of communications from the local to the national level. Recommendations are to establish regional advisory councils of port users, port authorities, and federal agencies; establish a national advisory council to the Secretary of Transportation to work with the regional groups to bring issues to the Secretary's attention; create a program similar to the Intelligent Transportation System to promote innovative technology in the marine transportation system; and form closer links between DOT and the Department of Commerce.

Ownership of Chassis by Trucking Companies

Promoting factors are that some ports are working well (Miami); that the potential for pooling of chassis may lead to better availability and maintenance; that turn-time works well in some places; and that chassis-free ports are working well overseas. Barriers are maritime companies' currently ownership of the chassis; a conflict of responsibility regarding maintenance; turn-time in port (driver time); the excessive space that chassis take up in terminals; the high maintenance costs of chassis; and lack of trucker investment capital. Recommendations are to configure ports to encourage chassis-free operations, and for DOT to put more responsibility on trucking companies to give them the incentive to own chassis.

Improved Understanding Among Elected Officials and the Public

Promoting factors are the regional listening sessions. Barriers are lack of a national recognition program for ports and waterways, and lack of public understanding of the complexity of marine transportation, which carries over to elected officials. Recommendations are to educate elected officials in the efficiency and other advantages (environmentally safe, energy efficient) of marine transportation; a "National Ports Week" Presidential Resolution/Proclamation; and a coalition of industry/ports to promote the sector, with each port taking responsibility for its own efforts.

Construction, Deepening, and Maintenance of Channels and Disposal of Spoils

Promoting factors are current maintenance dredging; the Army Corps of Engineers' effective job at oversight of dredging; and the performance of its research facility at Vicksburg, Mississippi, in modeling and forecasting. Barriers are lack of a cohesive federal policy to promote technology (ships' technology/size); projects that have been approved but not funded; the cost differential for spoils disposal; the environmental impact of the dredging and spoils process; the lengthy permitting process; the impact on endangered species; the cost of dredging; the limited availability of equipment (dredges); and the location/availability of upland disposal units. Recommendations are for a systematic funding source to fund prioritized projects; an equitable distribution of funds between ports; justification of the cost of dredging based on benefit; simplification of rules and processes for environmental impacts to include a "one-stop shop" process to obtain permits; funding for technological improvements of dredging to lessen the impact on the environment; removal of tariffs and restrictions on foreign dredges; and a DOT initiative/group to review/approve all transportation needs and prioritize projects in a systematic and standardized fashion.

Systematic, Ongoing, and Timely Funding

Promoting factors are the success of private toll roads as an example, ISTEA (Intermodal Surface Transportation Efficiency Act) funding, and expanding trade. Barriers are the inadequate/lack of funding for infrastructure and multimodal initiatives; the fact that fees collected from ports are not going back to ports; reliance on "gimmick" taxes to promote system needs; the fact that project funding needs already are behind, with no sense of urgency or priority; politics; lack of a clear government representative for all modes, of an effective merchant marine, and of awareness; and mounting pressure on infrastructure to respond to expanding trade. Recommendations are to have forecasts stressing the urgency of the situation and thereby raising public awareness; to use monies generated within the maritime transportation system (e.g., Customs) for improvements; to establish national funding sources for high-cost, port-related projects; to encourage public/private partnerships; to designate a single agency to be champion for the sector (e.g., U.S. Maritime Administration); and to develop more creative funding methods (grants, loan guarantees, etc.).

Timely Response of Government Agencies to Regional and Local Issues

Promoting factors are a good marine safety program and customer focus on the part of the Coast Guard, effective aids to navigation, and the fact that U.S. Army Corps of Engineers (USACE) has good listeners. Barriers are USACE Regional Offices that have mismanaged priorities; variances in regulation interpretation; government agencies that are reactive instead of proactive; and turf battles among government agencies. Recommendations are to streamline permitting and appeals procedures; redefine boundaries of responsibility among federal, state, and local agencies; and establish regional advisory committees for the federal government.

Public Awareness of the Maritime Industry and Its Trade Benefits

Promoting factors are the local port authorities' promotional activities; adverse publicity, which is forcing action; Coast Guard efforts in support of the industry; the increased number of people involved in and affected by trade; a strong sense of community in the maritime industry; industry outreach efforts; the competitive nature of the industry; the success of the cruise ship industry in bringing the public in contact with maritime activity; greater support for development and environmental awareness; and an

increased common-sense approach to environmental issues. Barriers are the lack of understanding of the industry's importance outside port cities; the media's sensationalist bias and ignorance of maritime issues; environmentalist myopia; lack of a coordinated information effort within the industry; lack of an umbrella maritime promotional organization; the decline of the U.S. merchant marine; and the competitive nature of industry. Recommendations are to refocus existing resources on development of a broadly defined national information strategy for the maritime industry, targeted primarily at politicians and the public; an effective, proactive response to local misinformation; a proactive stance by local governments; greater partnering between industry and states/regions; and stronger lobbying efforts.

Safe Movement of Vessels

Promoting factors are the fact that the marine pilotage system in the U.S. is the best in the world; ship operators' pro-safety attitude; the International Standards of Management (ISM) code; port state control; improved navigational aids (Doppler, global positioning system (GPS)); and maritime training and education. Barriers are the lengthy permitting process for channel widening/deepening, lack of funding for infrastructure, foreign vessel operation and maintenance shortcomings, poor enforcement of small-craft movement regulations, and the fact that too many substandard vessels in international trade are visiting U.S. ports. Recommendations are to accelerate and streamline the permitting process for channel improvements, increase funding for dredging and other waterways improvements, enhance state pilots/Coast Guard communications regarding substandard vessels, establish licensing requirements for recreational watercraft users, and enforce the rules of the road.

U.S. Customs Clearance of Imported Cargo

Promoting factors are current preclearance procedures. Barriers are disruptive inspection procedures for imported cargo, attitudes among Customs personnel, a lack of customer focus by Customs, and incorrect/incomplete mission documentation. Recommendations are for the U.S. Customs to develop more of a customer focus, documentation by cargo activities of Customs obstructions, and communications with Congress about the problem.

Effective Throughput of Cargo Between Ships and Other Connections

Promoting factors are the positive trends in partnerships, improved communications and technology, and creation of maritime exchanges. Barriers are inadequate dual rail access at marine terminals, ship/rail schedule sensitivity, growing disconnects between ocean mode and land mode, inadequate surge capacity at terminals, varying truck weight limits from state to state, and institutional barriers to productivity improvement. Recommendations are to create regional maritime exchange capacity, for terminal management to emphasize productivity improvement, and to improve information technology standards from mode to mode (including pipelines).

Strong Competition and the Survival of U.S. Maritime Professionals

Promoting factors are the need to keep foreign competition out of domestic trade. Barriers are a dated interpretation of laws that no longer serves competing interests. Recommendations are to review and reform legislation (Jones Act, Passenger Vessel Act) from the viewpoint of a global, market-driven economy.

Improved Safety Standards for Personnel, Hardware, and the Environment

Promoting factors are the current high level of safety awareness, few equipment failures, and fewer environmental and drug/alcohol incidents. Barriers are the existence of too many regulations to permit full compliance, too many agencies and overlap of regulatory authority, too many different standards statewide, and inadequate regulations for licensing of recreational boaters. Recommendations are for a national performance review focusing on consolidating standards and procedures (involving industry), and development of national/state regulations for recreational boat operations (Coast Guard).

Cleveland, Ohio

April 29–30, 1998

Open Public Forum

Approximately 70 people attended the public session. Sixteen speakers provided detailed comments on many aspects of the marine transportation system in the Great Lakes/St. Lawrence Seaway region. Representatives of 10 federal agencies heard comments, which are summarized as follows.

Federal Outreach Efforts

Outreach efforts by federal agencies have been well received. In particular, the Coast Guard's efforts to create networking groups among industry, regulatory, and community leaders to plan for almost any type of disaster are thought to be very successful.

Experience Level of Federal Personnel

Decision makers at the federal level who serve as on-scene coordinators lack the requisite experience to work with other agencies and experienced industry personnel. The need also exists for the Coast Guard and other federal regulatory agencies to share their "lessons learned" with industry and to invite industry critique of their efforts.

State and Federal Recreational Boating Agencies

State recreational boating authorities need to be part of the regional listening sessions, in particular because of the growth of recreational boating and its impact on the U.S. economy ($20 billion annual sales of boats and trailers nationwide, 4 million registered boats on the Great Lakes). Some states have attempted to backfill services that have been discontinued by the Coast Guard for budgetary reasons. Other federal agencies, such as USACE and the Fish and Wildlife Service, have promulgated boating regulations for areas under their jurisdiction that lack uniformity with the 1971 Boating Safety Act. For these reasons, the Coast Guard and DOT need to consolidate the efforts of all agencies involved in oversight of recreational boating.

USACE Support of Recreational Boating

USACE needs to become more involved in dredging to support recreational boating, given the impacts of boating on the national economy and quality of life.

Federal Agency Coordination

Federal agencies responsible for waterway safety and shipping matters need to maintain closer liaison whenever state and local authorities take actions affecting their areas of responsibility. An example of this was the State of Illinois' attempt to build a "cut-off" wall to separate the 22-acre Chicago River Turning Basin in the Chicago/Illinois River systems.

NOAA Navigational Services

NOAA needs to improve its nautical charting services (particularly in support of recreational boaters), and to implement the capability to deliver real-time water level information directly to the ship's bridge.

Model of Local Cooperation

The Cuyahoga River Task Force is an excellent example of local efforts to bring together waterways users and other interested parties to discuss common concerns, solve problems affecting use of the waterway, and thereby promote safety on the river.

Radio Frequencies

Marine radio frequencies have become highly congested. Reinstatement of a licensing fee to limit the number of users should be considered.

Cabotage Laws

Current U.S. Cabotage laws need to be kept in place. The nation is best serviced by having U.S. flag vessels that are operated by U.S. nationals under U.S. control.

Integrated Marine Transportation Management

Federal government involvement in the management of waterways systems needs to be better integrated: the Coast Guard is best suited to be the national ocean manager and system regulator; the Maritime Administration (MARAD) as the waterways manager, port planning, and promotional agency; and USACE as developer of infrastructure.

An innovative way of promoting inland waterborne transportation is to market the waterways as a single, integrated system, through such techniques as port-teaming that take advantage of the unique facilities and relative advantages of a group of ports; making available port facilities to nonwater users; ownership of barges by the shippers and their use as floating warehouses; and establishment of integrated freight rates with other nonwater modes.

Bi-national Management

Bi-national operation of the Great lakes/St. Lawrence River Seaway as a single discreet system should be considered in order to increase its effectiveness.

User Fees/Seamen's Documentation

Private ferryboat operators would like a review of vessel inspection user fees and requirements for seamen's documentation for temporary (less than 90 days) nonoperational (waiters, bartenders, chefs, etc.) staff, because these fees and requirements place a considerable operating burden on them.

Nonindigenous Species

Federal agencies need to be more aware of the problems caused by the introduction of nonindigenous species into the Great Lakes by ocean vessels, as well as of the possibility of diseases like cholera being carried in ballast water. Furthermore, there is no bi-national commitment to the agreement regarding cargo sweeping of residue.

Historic Lighthouses

Better communications between the Coast Guard and state governments is desired regarding transfer to new owners of historic lighthouses built on bottom lands. New owners often become insolvent, and the state then has to take responsibility for the properties.

Competition from Rail Carriers

The shipping community faces competition from Canadian companies that own U.S. railroad lines and are capable of shipping containers from the mega-ship container port at Montreal, directly into the U.S. central Midwest.

Focus Group Session

Vessel and terminal operators, land-side transportation representatives, labor interests, representatives from state and local governments, and other major interests met to assess the current state of the marine transportation system in their region and provide their vision of its future state (year 2020), focusing on infrastructure, people and information systems, and policy. The following major themes and recommendations to implement them were identified.

Ice Breaking to Keep Ports and Major Waterways Open

Promoting factors are the fact that Coast Guard cutter *Mackinaw* is still on the Great Lakes, recognition of a federal role in ice breaking, a current study for *Mackinaw* replacement, and the fact that GPS/ECDIS allows for an extended season. Barriers are funding of a *Mackinaw* replacement, a lack of U.S./Canadian ice-breaking policy, the fact that the Coast Guard's 140-foot cutters are too small to break tracks for larger vessels, and environmental concerns. Recommendations are to fund a *Mackinaw* replacement, to study the replacement of the 140-foot cutters to include privatization, and to create a unified U.S./Canadian ice-breaking policy.

Dredging—Regulation, Funding, Disposal, and Sediment Control

Promoting factors are open lake disposal, the creation of new lands, beach renourishment, and increased cargo capacity, which leads to lower costs, reduced environmental impact, and improved safety. Barriers are lack of confined dike disposal facilities (CDFs), issues of who pays, the lengthy regulatory approval process, multiple agency standards, the limited time available for dredging activity, contaminated dredge material, and competing modes of transportation that present opposition to funding. Recommendations are to reduce and control sediment at the source; prevent contamination of sediment; build more CDFs; allocate funding equitably on a regional basis; and create a more efficient and timely regulatory approval process, including long-term approval of authorized projects.

Administration of the Access Route by a Single (Bi-national) Agency

Promoting factors are the more than 30 years of cooperation, the amount of freight that currently is moving on the route, and the prospect of a more cost-effective system. Barriers are ongoing disputes between U.S. and Canadian agencies (tools, privatization, funding, depth, structural improvements, administration, the national interest, the size and depth of the system, the seasonality of operation, the need for marketing the region with new commodities, tolls, pilotage issues, the fact that a dual system is perceived as complex and difficult, and competition with land-based transportation). Recommendations are for the U.S. and Canadian governments to develop a unified policy for the marine administration of the Seaway, a single-agency (joint) administration, a joint economic evaluation of the future Seaway size, a U.S. strategy to get Canadians to negotiate, and funding for a U.S. or bi-national study to increase commercial use of the Seaway.

Use of Technology to Increase the Efficiency of Waterborne Commerce

Promoting forces are progress in systems development; existing systems, such as GPS and weather fax; and integration of computer equipment on vessels. Barriers are education, identification of technology, cost, international standards that have not been promulgated by the U.S., and a regulatory process that does not take advantage of technology. Recommendations are to provide education of what is available, to integrate the regulatory process with available technology to reduce costs, and to promulgate U.S. standards.

Dedication of Adequate Land and Infrastructure to Facilitate Waterborne Trade

Promoting factors are some local support for ports and the fact that current use of property is effective. Barriers are public education, a lack of political support, public vs. commercial use, and lack of state or federal participation in long-term port planning. Recommendations are to obtain state and federal interest to recognize that properties would be committed for maritime commerce, educate the public, gain political (federal, state, and local) support for port development, and conduct port strategic planning with state and federal partners.

Use of Ferries to Reduce Current and Future Infrastructure Overload

A promoting factor is that use of ferries to transport people vehicles can be effective in some major ports. Barriers are the limited season, dock access, public education, development costs, and waterfront parking. A recommendation is to conduct feasibility studies for major port areas.

Balancing the Competing Demands for Land Use

Promoting factors are the existence at the local level of long-term planning under certain conditions, and current coalitions of stakeholders (commercial, recreational, and residential interests). Barriers are a lack of long-term planning in other areas, limited waterfront space, property owner's rights, and a lack of education/awareness regarding the importance of the maritime industry. Recommendations are to conduct zoning and planning at local levels and to create waterfront property using dredge spoils.

Conflicts on the Water and the Need to Balance Users' Interests

Promoting factors are educational efforts, cooperation between recreational and commercial users, declining personal watercraft (PWC) sales, and states' recognition that PWC regulations are needed. Barriers are irresponsible recreational boaters, PWCs, poor

radio etiquette, fishing in channels, and lack of the recognition of the needs of all involved parties and their use of waterways. Recommendations are to have master planning at the local level based on federal guidelines, to continue state initiatives (PWC), to improve the infrastructure, to require radio operator licenses through reasonable fees, and to enforce radio violations more strictly.

An Accident-Free System That Balances Use, Risk, and Cost With Delivery of Safety Services

Promoting factors are new technology (radar, GPS, vessel traffic systems, hydrographic surveys), educational efforts, new regulations at the state and local levels, and insurance-driven safety. Barriers are the cost of new technology, congestion, the elimination of marine event permits, unfunded federal mandates, a declining Coast Guard budget for safety services, and no workers' compensation. Recommendations are to educate Congress on budget priorities, to require recreational boater safety courses and licenses, to reinstate marine event permits, and to create incentives for installing new technology.

Optimal Use of the St. Lawrence Seaway and Its Intermodal Connections

Promoting factors are its accommodation of 78-foot-beam vessels, the Draft Increase Study, and the fact that the system is working reasonably well. Barriers are tolls, fees, and charges; physical dimensions of existing infrastructure; reactive dredging and other infrastructure repairs; redundant regulations among bi-national agencies; the fact that intermodal connections currently are not working well; and myriad regulatory authorities. Recommendations are to conduct a study of system design parameters for the future, to recognize the Great Lakes Seaway as a national asset, and to overhaul the regulatory system.

Harmonizing Environmental Concerns and Economic Goals

Promoting factors are the current efforts (ballast demonstration project/filtration, nonindigenous species task force, ballast exchange program, wash-down guidelines interim rule), speed limit enforcement, economic viability, quality of life issues, the need for ecological integrity, and increased public environmental awareness. Barriers are dredging goals, conflicting regulations and a lack of interagency cooperation, unrealistic expectations, federal legislation that is held hostage by certain special interests, cost factors, the perceptions that cleaning the environment is costly and that growth is bad for the environment, the imposition of technical instead of market-based solutions, and public and political ignorance of waterway benefits. Recommendations are for better coordination and information sharing among agencies involved in environmental issues (federal, state, local); consistent and streamlined environmental regulations; a "Grace Commission" type of review of current regulations; pursuit of advanced technologies; federal funding to help states address issues of nonindigenous, exotic species; increased public awareness of the benefits of harmonization; increased coordination between the Coast Guard and the states; and a rebalancing of USACE's environmental and historic missions.

U.S.–Canadian Government Recognition of the Importance of Maritime Cooperation

Promoting factors are the similar cultures of the two nations, their mutual economic interests, the chance to reduce costs by eliminating duplication of services, and the fact that Canada is the U.S.'s largest trading partner. Barriers are sovereignty issues; the Canadian deficit; user fees; agency turf battles, both within and across borders; industry competitiveness; current protectionist laws; and conflicting regulations. Recommendations are to establish an independent entity that is recognized by the U.S. and Canada, to identify issues and make recommendations to the two governments for solutions, to establish a bi-national agency for Seaway operations, to enhance cooperation between U.S. and Canadian counterpart agencies (Coast Guard, USACE) at the regional level, and to guarantee regional authority for regional issues.

Awareness of the System Among the Press, the Public, and Policymakers

Promoting factors are the role of waterborne commerce and of seamless, multimodal freight movements to the national economy; the system's beneficial impact on the environment; the burgeoning economic impact of recreational vessels; increased safety; and the quality of life. Barriers are public perceptions based on catastrophes (oil spills, zebra mussels, etc.); a lack of public interface; a focus on passenger/personal travel instead of commercial freight; a diverse, fragmented industry that is used to anonymity; and a small constituency. Recommendations are to develop federal legislation and regulations to recognize the role of freight, to improve partnering of regional players, and to form a "stakeholder" coalition to promote industry benefits through a multimedia effort.

Moving Toward Market-Oriented Systems

Promoting factors are regional economic viability and the fact that market solutions ensure longevity. Barriers are government solutions that distort the market and multinational companies with no regional/local loyalties. Recommendations are for more and better research to understand how markets work, and removal of regulatory barriers that inhibit market growth. (Note: Time constraints prevented further discussion of this theme.)

Funding for Federal Waterborne Commerce and Waterways Management Activities

Promoting factors are economic viability, increased safety, ecological integrity, and improved quality of life. Barriers are finite funding and scarce resources, federal policy changes, competition within agencies and departments, and little understanding of the economic contributions of such funding. Recommendations are for federal funding for harbor maintenance dredging (commercial/recreational) and for Coast Guard ice breaking, aids to navigation and Coast Guard Station staff, full funding of the National Invasive Species Act, opposition to the use of user fees to fund federal responsibilities, and stakeholder input into agency funding for specific projects.

New Orleans, Louisiana

March 31–April 1, 1998

Open Public Forum

Approximately 70 people attended the public session. Ten speakers provided detailed comments on all aspects of the marine transportation system. The principal comments are summarized below.

Vessel Safety at Mississippi Entrance

There is concern among Gulf of Mexico gas and oil producers over the safe operation of vessels as they approach the Mississippi River entrance. The large number of offshore facilities (such as MARS platforms) and the high volume of vessel traffic create a situation with a great potential for loss of life and pollution. It was recommended that certain channels be dredged for shallow-draft vessels as a way of easing congestion in the main channels.

Future of U.S. Merchant Marine

A plea was made for efforts to keep the waterways under U.S. control. The U.S. merchant marine continues to decline, as evidenced by the fact that 60 percent of the support to Desert Storm was shipped in foreign flag vessels. The labor force in the U.S. waterways, moreover, continues to decline because of lower wages overseas.

Federal Agency Representation

While the initiative was favorably received, such agencies as the U.S. Department of Agriculture, Customs, and the Immigration and Naturalization Service need to be part of the dialogue because of their roles in the marine transportation system.

Federal User Fees

User fees are a threat to the efficiency of waterborne commerce. Concern was expressed that they cause cargo diversions in parts of the country, serve to increase costs, and create trade barriers.

Coordinated Federal Inspections

As federal agencies downsize, more of the responsibility for ensuring compliance is being placed on industry, causing reduced efficiency in industry operations, such as cargo container movements. It was recommended that federal agencies coordinate their inspection activities into a "single-team" approach, since the current practice of multiple, uncoordinated inspections is disruptive.

Government/Industry Cooperation

Establishing a cooperative attitude and close working relationship among industry and federal, state, and local government agencies is the best way of ensuring an effective marine transportation system. In Corpus Christi, Texas, this is fostered through frequent meetings to discuss and resolve problems. The computerized harbormaster office and information sharing are also important.

Value of Marine Transportation

There is a need to recognize the inland waterways system as an integral part of the nation's marine transportation system and the national economy. Waterways are of high public value because they can carry high volumes of cargo at a relatively low cost. If viewed as an element of the manufacturing process, they help offset higher warehousing and inventory control costs and thus reduce overall costs to the consumer. This public value needs to be considered in the funding of waterways construction and improvement projects.

Funding for Federal Agencies

There is a need for continued funding for federal maritime agencies to continue their level of service. In particular, increased funding for NOAA is needed to conduct long-overdue hydrographic surveys, to update navigational charts, and to provide real-time water level and current information.

Vessel Traffic Systems

Vessel traffic systems (VTS) should be simple, affordable, and useful to the person in the wheel house. Technological advances, such as transponders aboard vessels and electronic charting, will enhance the safety features of the system.

National Leadership/Systems Approach

There is a need for national leadership on the issue of the marine transportation system, particularly with regard to policy, to ensure that our nation stays globally competitive. There was general agreement with the "systems approach" and that the effort not be focused around current agency responsibilities.

Example of Intermodal Link

Port Fourchon, Louisiana, is a prime example of an intermodal link between the offshore gas and oil industry and shore-side supply. Though critical to the needs of the nation, this link is being critically neglected.

Interagency Partnerships

Rather than acting independently, the U.S. Navy should partner with EPA in efforts, such as its study of air quality and emissions. The Coast Guard and OSHA should partner on issues, such as rules for cargo handling crane certifications and retrofitting of above-deck cell guides on container ships.

Rules on Lifting of Containers

International standards are needed regarding the single pick lifting of multiple containers. The Coast Guard as lead agency should examine this need.

Harbor Safety Committees

The Harbor Safety Committees established by California statute were widely praised as a model for bringing together individuals with a common concern and dedication for the system, and for encouraging effective communications nationwide while recognizing regional diversity. A key issue to their success has been that the state fosters a partnership with a local committee but does not attempt to dictate its actions.

Port Rail and Highway Connections

Given the "just in time" business situation of today, the efficiency of the system is directly affected by such factors as the availability and quality of rail and highway connectors in port areas and the efficiency of inland freight movement and transfer.

Joint Intermodal Terminals

Joint intermodal terminals (JITs) are an effective model for intermodal cooperation that should be considered nationally.

Marine Oil Terminals

Marine oil terminals need to be considered as an essential part of the marine transportation system. Safety procedures in place at these terminals have prevented many mishaps, and the terminals have collected significant data on "near-miss" situations.

Dredging of Navigational Channels

Focused dredging of selected navigational channels needs to be conducted, given the increased size of vessels and the need to ensure their safe movement, as well as the importance of shipping to the national economy.

Congested Marine Radio Frequencies/Language Barriers

Marine radio communications frequencies are highly congested and pose a significant safety problem for both commercial and recreational vessels. Communications with foreign-operated vessels are also becoming problematic because of language barriers.

Real-Time Navigation Information

There is a need for improved availability of real-time tide and current data and similar real-time information (i.e., weather buoys) critical to ensure navigation safety.

Inaccurate Navigational Charts

Navigational charts and hydrographic data are inaccurate and outdated and need to be corrected. The problem is particularly acute in shallow-water areas frequented by recreational boaters.

Dialogue Among Waterways Users

There is a need for greater dialogue among systems users, such as tug and barge operators, commercial fishermen, and recreational boaters, particularly with regard to vessel movements and fixed gear areas.

Focus Group Session

Vessel and terminal operators, land-side transportation representatives, labor interests, representatives from state and local governments, and other major interests assessed the current state of the marine transportation system in their region and provided their vision of its future state (year 2020), focusing on hard infrastructure, people and information systems, and policy.

Participants were unanimous in their assessment of the obstacles the region faces in meeting the challenges for the marine transportation system for the year 2020. Dredging; the need to develop significant new land-side infrastructure, such as modern port facilities, highways, bridges, and railways; the need for improved marine navigation and information services; and the removal of certain regulatory barriers to maritime commerce were among the issues participants identified. To address these and other challenges, participants identified 10 themes for change, along with recommendations for institutional and policy improvements that would allow industry, government, and the public to address the region's marine transportation system needs proactively and collaboratively. These themes and their promoting factors, barriers to achievement, and recommendations to overcome the barriers were identified as follows.

Need for an Environmentally Sound National Dredging Policy

A promoting factor is national legislation for cost sharing. Barriers are a lack of agreement on sediment testing standards, lack of funding resources to address environmental issues, and a lack of federally certified disposal sites. Recommendations include estab-

lishment of stand-alone trust funds to support dredging; a multiagency agreement on a sediment test interpretive framework; consistent interpretation of environmental regulations by state, local, and federal agencies; and policies to cover maintenance, soundings, and deepening of channels.

Clearer Vision for the MTS in the National/International Trade and Transportation System

Promoting forces are a recognition that international commerce is an integral part of the U.S. economy, the U.N. designation of 1998 as the Year of the Ocean, and the current state of the economy. Barriers are the current industry/consumer interfaces, the lack of media focus on the system, a regional focus on movement of people vs. goods, the lack of a congressional-political champion, and the fact that many of the marine industries are foreign-owned. Recommendations are to recruit system "champions," to develop coalitions among water-, sea-, and land-based modals and stakeholder industries, and to refine the focus of federal agencies on the system.

Application of Functional Management to the System

Promoting forces are the listening sessions, the support of the Secretary of Transportation, and existing partnerships—e.g., memoranda of understanding (MOUs). Barriers are a lack of continuing dialogue (such as the regional listening sessions), a lack of information sharing and planning, and perceived bureaucratic resistance to change (empire maintenance). Recommendations include an institutionalized, multiagency approach to systems management, with empowered coordinator(s) residing in the designated champion agency.

Institutionalized Stakeholder Forum for National/Regional Policy Development

Promoting forces are the regional listening sessions and the California Harbor Safety Committees. Barriers include the Federal Advisory Committee Act, the difficulty of engaging carriers from many flag states in the process, and fractured responsibilities among multiple federal agencies. Recommendations include a need for federal agencies to reach out to state and local agencies to integrate them into the process.

Recognition of an MTS as a National Asset

Promoting forces are the impact of the system on and its importance to the economy. Barriers include political priorities, the competitive element for funds, BRAC rules, the fragmented nature of the industry, and interport competition. Recommendations include the development of champions and coalitions and a national outreach plan.

Need for Master MTS Planning

Promoting forces are current regional transportation plans, GPRA, the existence of international benchmarks, and the overall economic impact of an MTS. Barriers are the time available to do planning, planning by fragmented mode (people, cargo, etc.), and different geographic groups' interests. Recommendations are to incorporate environmental procedures, processes, and considerations in planning and to recognize that activities take place in geographical spaces.

Need for Clear and Simple Regulations

Promoting forces include matured international regulations, greater international recognition of port state control, recognition and adoption of international standards, and current MOUs. Barriers are there is a reluctance to give up jurisdiction, regulatory language is not user friendly, and change takes a long time. Recommendations are to have regulations by objective and central cataloguing of existing regulations.

Improved Efficiency and Safety of Transportation Systems

Promoting forces include the Harbor Safety Committees, technological breakthroughs, a resilient industry, increased environmental awareness, and the opportunity for expansion with U.S. Navy departure from port areas. Barriers are a decaying physical infrastructure, trade growth that outpaces current capacity, restrictive regulations, funding issues, lack of and access to available space, efficiency in the use of space, environmental concerns, withdrawal of the level of involvement by the federal government, lack of a coordinated intermodal system, misdirection of limited funds, lack of a common language among modes, traffic gridlock and congestion, and lack of coordination and communication. Recommendations include expanding participation in Harbor Safety Committees (USACE, other agencies); focusing on improvements to navigation, vessel traffic management, and other marine information systems to promote safe and efficient maritime commerce; establishing regional infrastructure committees to promote a systematic government/industry/public approach to marine transportation system issues; and recognizing and institutionalizing the roles of regional committees to identify problems and recommend solutions and funds allocation.

Improved/Simplified Communications Among Regulators, the Maritime Community, Vessels, VTS, the Public, Labor, Management, and Shippers

Promoting forces are technology advancements, Harbor Safety Committees, and awareness of the need for better communications. Barriers are Federal Communications Commission (FCC) issues of enforcement and licensing, antagonisms between/within industry elements, resistance to change, insufficient R&D, no effort to translate technology between modes, and no single entity promoting communications. Recommendations are education and training of elected officials and regulators on field issues and the importance of MTS, establishment of a National Harbor Safety Committee system, and national recognition of the Secretary of Transportation as the system's advocate.

Improved Safety of People in the System

Promoting forces are vessel inspections (PSC/STCW/ISM) and a management attitude now driven by the cost of disaster (OPA 90) . Barriers are an enforcement system that does not identify risk for the entire maritime community, different regulations for industry segments, poor communications, and that small boat operators are not well informed of safety information. Recommendations are to have regulations that identify risk as a decision tool for enforcement, to standardize regulations across industry based on risk, to increase safety awareness across all MTS segments, and to fix communications problems.

Portland, Oregon

May 19–20, 1998

Open Public Forum

Approximately 50 people attended the public session. Seventeen speakers provided detailed comments on many aspects of the marine transportation system in the U.S. Pacific Northwest. Their comments are summarized as follows.

Removal of Snake River Dams

The proposed removal of dams on the Snake River and draw-down of reservoirs would end current barge traffic on the river. This would inflict considerable economic damage on the region, by eliminating a low-cost shipping option that has enabled many up-river producers and manufacturers to compete in international markets. It would also result in higher energy consumption and increased air pollution as cargoes are shifted to rail and truck. DOT needs to take a leadership role at the national level to prevent such threats to the nation's transportation system.

Deepening of the Columbia River Channel

The proposed deepening of the Columbia River Channel to 43 feet should proceed with all due speed, given the potential for savings to consumers due to lower shipping costs and for increased shipping volumes and revenues.

USCG/OSHA Cooperation on Containers

Safety standards for the multiple lift of containers should be established internationally to ensure a level playing field. The U.S. Coast Guard and the Occupational Health and Safety Administration should collaborate to ensure that ship owners have the required equipment for safe handling of containers.

DOT Strategic Plan

The DOT Strategic Plan needs to focus on measurements of customer satisfaction with the performance of the nation's transportation system, as indicated by such factors as transportation congestion and slowdowns.

Regulatory Reform

Regulations need to be reformed so that they don't serve as competitive barriers between the transportation modes. Suspension of the Jones Act should be considered as a way of relieving land-side transportation back-ups.

Real-Time Navigation Information

There is a need for improved availability of real-time water level and current data and similar real-time information (i.e., weather observations) critical to ensure navigation safety.

Inaccurate Navigational Charts

Navigational charts and hydrographic data are inaccurate and outdated and need to be corrected. Electronic charts are required.

Portland/Columbia River/Snake River System

The Port of Portland, combined with the Columbia River/Snake River waterways and rail corridor, is the least-cost route for shipping bulk cargoes into international, particularly Asian, markets. Selective investment to relieve east-west bottlenecks will unleash this system's unused capacity and provide the nation as a whole with a considerable competitive edge.

Marine Firefighting Cooperation

A regional approach to marine firefighting—as established in the Portland, Oregon, area—is the best way to provide adequate protection, given the high cost of marine firefighting resources and the catastrophic risk to lives and property that marine fires represent.

Mounding From Dredge Disposal

The Coast Guard was urged to establish conservative mounding criteria associated with dredge disposal on a national basis and to monitor critical disposal sites to prevent disposal mounds from becoming navigational hazards.

Pipeline Hazards

Greater oversight of pipeline operations and safety standards needs to be conducted by DOT's Office of Pipeline Safety, given the aging pipeline infrastructure and the threat to the environment from potential leaks and spills. Areas of particular concern are

the lack of requirements for periodic pressure testing, for shut-off valves, and for replacement of old pipe, and the requirement to conduct a cost–benefit analysis of new pipeline regulations.

Tug Escorts

The Coast Guard should require tug escorts on all laden tankers transiting between Neah Bay and Port Angeles, and should enforce tug escort laws on laden tankers transiting U.S. waters bound to and from Canadian ports.

Gateway Ports

Several seaports are evolving into gateway ports that service trade corridors whose customer base is national in scope. New legislation should recognize the emergence of these corridors and their national importance, and ensure funding to improve the intermodal links to the gateways.

Focus Group Session

Vessel and terminal operators, land-side transportation representatives, environmental and labor interests, representatives from state and local governments, and other major interests met to assess the current state of the marine transportation system in their region and provide their vision of its future state (year 2020), focusing on infrastructure, people and information systems, and policy. The following major themes and recommendations to implement them were identified.

Systemic Approach to National Transportation Planning for Facility and Corridor Improvements

Promoting factors are the ISTEA trade corridor concept. Barriers are the lack of an NTNL plan; limited interstate coordination; competition; and local, state, and federal paternalism. A recommendation is to create a system that allows communication between ports and that takes advantage of existing capacities for the flow of freight and people.

A Seamless, Unified Transportation System for the Fast, Efficient Flow of People and Goods

Promoting factors are recognition of intermodalism as an important factor, the fact that government is showing some leadership in getting competitors to work together, and DOT and MARAD efforts to facilitate intermodalism. Barriers are problems of grade separation, bottlenecks, no systemic approach to a national transportation system, lack of funding, competition, and lack of a "team spirit" approach to finding solutions. Recommendations are to improve planning of infrastructure, reduce the number of grade crossings, and continue to support the intermodal approaches of DOT and MARAD.

Consistent, Adequately Funded Process for Channel Maintenance and Improvement

No promoting factors were identified. Barriers are lack of approved funding, placement of dredged materials, lack of dredging equipment, and project authorization without appropriations. Recommendations are to improve the funding process, to maintain a dredging fleet (U.S. Army Corps of Engineers), and to improve the interface with maritime users.

Federal/Industry Partnerships for a Safe, Competitive, and Efficient MTS

Promoting factors include effective federal agency coordination. Barriers are a lack of funding and trust between government and industry, and a lack of funding for the federal agencies to carry out their end of the partnership. Specific needs include better real-time marine environmental information (i.e., water levels, currents, weather), electronic chart systems, and advanced marine information systems.

A Consolidated, Predictive National Transportation System Process That Balances Commercial and Environmental Interests

Promoting factors are the Brownfields regulations as an example of rational remediation, and the fact that ports are the stewards of the environment. Barriers are overlapping jurisdictions (federal, state, local); inadequate funding to staff permit requests; too many agencies (50 agencies today vs. 9 a few years ago); ongoing/tightening restrictions on in-water disposal of dredge material; a lack of public awareness of the national value of ports and the system; permitting times that are not commercially realistic; a lack of scientifically based standards; and the fact that ports do not communicate their good stewardship effectively. Recommendations are to eliminate redundancies and simplify the process whenever possible, to expedite the process for obtaining environmental permits in corridors of national significance, and to continue the education of the public of the national value of ports and transportation (including young people).

A Strategic, Long-Range Funding Mechanism to Meet Regional and National Needs

No promoting factors were identified. Barriers are politics and constitutional barriers to recognizing a national port policy. Recommendations are to educate the public to elect officials who will support the funding of the infrastructure, create a national port policy to recognize the national significance of ports, create a funding mechanism similar to the Interstate Highway System, and overcome constitutional barriers.

Cost-Effective Movement of Cargo in and out of Ports With Minimum Environmental Impact, Using Improved Technology, Labor/Management Relations, and Information Sharing

Promoting factors are regular informal information sharing, a progressive attitude toward the introduction of new technology, the fact that Puget Sound and the Columbia River are safe waterways, a willingness to invest in infrastructure, and improved ser-

vice and efficiency in water-side transportation. Barriers are a convoluted permitting process, a lack of linkage on funding issues, lack of public support, and problems in other transportation systems that affect marine transportation. Recommendations are to seek a streamlined integrated planning/permitting process with realistic time commitments across intermodal lines and on a regional basis; develop a comprehensive funding program for infrastructure; establish federal leadership and increase federal funding for waterways management; educate the public and politicians on the importance of a marine transportation system; and research the enhancement of IMO standards and enforcement.

Sustainable Partnerships Among Government, Industry, and the Public to Share Risk/Plan/Development/Control/Prioritize Funding for the Regional Waterways System

Promoting factors are a growing recognition of the need for funding by all but citizenry; the Coast Guard's Harbor Safety Committee concept; deregulation; and resource constraints forcing the government into interagency partnerships. Barriers are political and special interests, which can derail projects; the fact that privatization causes distrust of government–industry partnerships; excess of "a need to control"; lack of understanding of issues; and rotation of key federal personnel, which causes a loss of institutional knowledge. Recommendations are for the Coast Guard to develop methods to preserve institutional memory and maintain consistent organizational objectives; to create and maintain a public information program that will raise the awareness of the maritime industry, of its goals and objectives, and of the marine transportation system as a whole; to design a template for dissemination of system information; to conduct partnership deals in the "sunshine" and include all stakeholders in the partnership; and to develop modeling and forecasting tools for intermodal transportation.

Sharing Information Among Ports, Agencies, Stakeholders, the Public, Policymakers, Coastal Zone Managers, and the Marine Industry

Promoting factors are the ongoing informal and formal communications; educational forums promoting maritime transportation system awareness; growing political recognition of needs; Automated Information System (AIS) sharing opportunities; the institutionalization of Quality Management Principles; industry associations promoting communications/lobbying; the Marine Exchange and University of Washington graduate program; and the Regional Listening Sessions. Barriers are the current litigious environment; a disconnect between national vs. regional federal efforts (i.e., a "top-down" approach rather than vice-versa); geographic separation; institutional inertia; competition and the proprietary initiative; and the traditional independence of marine personnel. Recommendations are to get national-level understanding of regional issues and empower regional governments; ensure regional accountability for national programs; find a balance between national and regional issues via open communications; and require greater government accountability (i.e., ensure tie-in of business objectives to performance).

More Assertive Federal Promotion of the Waterways and Their Intermodal Connections as a Key to the National Transportation Agenda

Promoting factors are the current performance of the Coast Guard, Customs, Agriculture, and USACE locally; the fact that ports have taken positive steps on their own; and the current effective waterways system because of a prior federal role. Barriers are the current "vacuum" that a federal role must fill; the fact that the Harbor Maintenance Tax has been declared unconstitutional; the slashing of the USACE budget; nationwide operations and maintenance funding; and the fact that there are too many players with unclear roles in supporting waterborne transport. Recommendations are for the federal government to reassert the traditional role in overall transportation system funding that enabled waterways to be developed; to provide federal funds for 100 percent of the operations and maintenance of federally authorized harbors and waterways; and to increase federal funding for intermodal connections to ports and waterways.

A Scheme of Regulations That Recognizes Risk Factors and Uncertainties, and Promotes Risk Taking and Long-Term Investment

Promoting factors are the fact that ports specify their economic intentions and priorities; current regulatory schemes (Jones Act, Passenger Vessel Act) that promote stability (i.e., level of competition, limits of costs); and a constantly decreasing cost of living (as measured by declining shipping rates, when inflation-adjusted). Barriers are that fact that regulations do not let market forces work, and a chronic debate about the merits of the Jones Act. A recommendation is that regulatory change be made with due concern for the economic, environmental, and defense costs.

Salmon Recovery and Other Environmental Issues and Their Impacts on Transportation and Trade

Promoting factors are a reduction of spills in the Pacific Northwest; the Oregon Coastal Coho Plan as an example of a stakeholder-designed solution; the fact that science is playing an increased role; the ballast wastewater management program; the Elwah River Dam Project as a model of compromise; and the significant environmental advantages to moving goods by water (energy efficient, fewer emissions). Barriers are environmental processes and their costs to transportation projects; unsolved disputes, which introduce enormous uncertainties as to when decisions will be made; marketing barriers; the threat to continued navigation on the Columbia/Snake River; several "no compromise" solutions; and the role of uncertain science in environmental considerations. Recommendations are to base political decisions with billion-dollar impacts on science; to seek solutions that meet both environmental and economic needs; to ensure that the U.S. Congress maintains navigational servitude; and to take energy and emissions advantages into account in environmental impact decisions.

Increased Complexity and Cost of Safety Rules

Promoting forces are the Coast Guard program of Prevention Through People (PTP); industry training of mid-level federal regulators; and the Responsible Carrier Program as an example of an industry proactive approach to safety. Barriers are an inconsistent application of regulations; the growth of human factors expectations, which adds costs to regulatory compliance; and costly duplication and redundancy of federal and state regulations. Recommendations are for the safety regulations development process to include an iterative cost–benefit analysis, to determine if the ultimate results of the regulation are justified by the costs of compliance; to examine federal safety standards and adjust them as necessary to take into account varying regional conditions; to expand the industry training program for regulators; to continue funding for the Coast Guard to maintain and expand its safety programs; and to place an increased emphasis on PTP programs.

St. Louis, Missouri

May 5–6, 1998

Open Public Forum

Approximately 30 people attended the public session. Sixteen speakers provided detailed comments on many aspects of the U.S. inland waterways transportation system to a panel of listeners representing nine federal agencies. The comments are summarized as follows.

Tow Sizes and Minimum Power Requirements

The Union Pacific Railroad favors limitations on tow size and minimum power requirements for tow vessels to protect its railroad bridges from collisions. UP is also willing to work with the Coast Guard and USACE on issues involving dredging and improving alignments of and/or relocating river channels.

Voluntary Industry Environmental Programs

Volunteer programs by industry to recover endangered or threatened species are preferred to regulatory intervention and should be encouraged.

Need for Highway and Rail Connectors

The inland waterways are a national asset that support the national defense and can relieve the burden on the rail and highway system. However, inland ports need more efficient connections to the railways and the national highway system.

Waterways Not Promoted

The waterways are the cleanest and most fuel-efficient way to transport goods. Unfortunately, this fact is not being adequately promoted in the Mississippi River Valley.

Opposition to User Fees

Inland waterways operators oppose any attempt to impose user fees for aids to navigation or waterways maintenance. If the federal government cannot make ends meet, then funds should be reallocated or taxes raised.

USACE Investment and Oversight

The Army Corps of Engineers does not consider competition and changing international trade patterns in its waterways investment and oversight policies and practices (i.e., 50-year development and improvement timelines are too long). As a result, the cost of transporting U.S. products to world markets is rising, export levels of commodities like corn are falling, and the nation is losing its competitive advantage. The U.S. faces increased competition from nations like Brazil and Argentina, who are improving their inland waterways infrastructure so that their agricultural products can be competitive in world markets. For these reasons, the U.S. inland waterways infrastructure needs "serious" expansion.

DINAMO as a Model

The Association for Development of Inland Navigation in America's Ohio Valley (DINAMO) is an example of a multistate, systemic effort to promote the development and improvement of water transportation on the Ohio River and market its advantages.

Nautical Charts and Surveys

Current offshore and coastal navigational charts are based on 50-year-old survey data and need to be updated. Priority for new surveys should be given to the areas of highest vessel traffic, and sources of hydrographic data should not be limited. NOAA should maintain its role of quality assurance over hydrographic data.

Safety of Waterways Personnel

The safety of personnel operating on the inland waterways system is of mounting concern. Job stress is a major factor, and waterways mariners now suffer one of the highest occupational-associated death rates in the nation.

National Waterways Advocate

Given the current separation of authority between DOT and USACE and the acute need for modernization of navigational locks and other waterways infrastructure, there is a need for a national waterways advocate to focus on an integrated, multimodal inland waterways system.

Improved Operating Efficiency

Innovations like saddle barges can increase the tonnage moved by commercial barge operators and thereby increase the efficiency of the current waterways infrastructure.

Integrated Port Management

An innovative way of promoting inland waterborne transportation is to market the waterways as a single, integrated system. Techniques include port-teaming, which takes advantage of the unique facilities and relative advantages of a group of ports; making available port facilities to nonwater users; ownership of barges by the shippers and their use as floating warehouses; and establishment of integrated freight rates with other nonwater modes.

Importance of Passenger Vessels

The U.S. passenger vessel industry generates more than $1 billion in annual revenues and is the largest operator of U.S. flag vessels. With the industry's increased presence on the inland waterways, its concerns need to be adequately addressed.

Geographic Information Systems

The waterways system can be organized more efficiently through use of geographic information systems to consolidate and make available information about waterways terminal capacities, equipment types, commodities handled, etc.

Focus Group Session

Vessel and terminal operators, land-side transportation representatives, labor interests, representatives from state and local governments, and other major interests met to assess the current state of the marine transportation system in their region and provide their vision of its future state (year 2020), focusing on infrastructure, people and information systems, and policy. The following major themes and recommendations to implement them were identified.

Maintaining and Improving a Competitive Advantage in the Global Market

Promoting factors are the nation's past advantage due to its transportation system and current market share. Barriers are increasing waterway costs, which will reduce competitiveness with other modes; a declining system reliability, which raises customer doubts and helps foreign competitors; new foreign transportation systems to compete with the U.S.; a lack of funding priority for modernization; and the current infrastructure capacity. Recommendations are to create a national priority for the waterways, an investment plan to address modernization of the inland waterway infrastructure capacity, funding to remain a global competitor, funding for R&D projects for cargo handling and vessel propulsion and design, expanded eligibility under Title XI for ports and under ISTEA for all modes, and increased system efficiencies through containerization.

Improved Navigational Structures (Locks and Dams)

Promoting factors are their current operational capabilities, the need to maintain navigation safety and promote and sustain economic growth, the water supply, the need to stimulate recreational use and tourism, the need to create wildlife habitats, the dilution solution, and the need for water-level management and consistent power generation. Barriers are sediment retention, current lock capacity (single chamber, traffic delays, limited barges), structural integrity (deterioration) of the locks, conflicts arising from combined recreational and commercial use, draft limitations, timing and availability of funding, and out-drafts. Recommendations are for sediment control (dredging/improved beneficial use of dredged material and watershed solution); support for lock modernization (1200-foot locks and addition of them at single-chamber sites); a review of sill depth (habitat enhancement); efforts to educate policymakers, decision makers, and constituents as to the importance of the structures; funding to meet an optimal construction schedule; structural solutions for out-draft; and resolution of recreational/commercial conflicts through the use of two lock configurations.

Improved Intermodal Interfaces/Gateways from Class I Railroad or Highway Arterials

Promoting factors are the need to provide connection between modes and opportunities for economic development, job creation, and commerce facilitation. Barriers are outdated equipment, limited highway and rail connections, width and size restrictions at roads and bridges, inadequate land-locked facilities, an inability to take unit trains, and the fact that older facilities are subjected to floods. Recommendations are to increase federal participation in the funding of shore-side infrastructures and to create incentives (federal and state) for investment in shore-side facilities (i.e., construction, increased flexibility in transfer and use of available funding, and a national marketing/promotion campaign).

Dredging to Maintain Navigational Channels

Promoting factors are current dredging efforts, approved dredge plans for St. Louis and St. Paul, and agreement between the environmental and navigation communities on the need to address sediment issues. Barriers are the lack of a consistent, systemic

dredging policy, inadequate funding, interagency conflicts (federal and state), the fact that the *current frequency of dredging is* inadequate, and the current interpretation of dredging authorization, which has resulted in restricted channel capacity and tow size. Recommendations are for a national dredging policy that requires state adherence, an expansion of USACE acquisition of disposal sites, the development of beneficial uses for dredge materials, elimination of the term dredge "spoils" and use of the word "material," and extension of 12-foot channels where necessary.

Reduction of Bridges' Ability to Impede Navigation

Promoting factors are that the Truman–Hobbs Act works and bridge modifications normally are not expensive. Barriers are a lack of funding and of a national priority for bridges and historically significant structures, width and span affecting navigation, and safety concerns associated with width, span, and replacement. Recommendations are to fund the Truman–Hobbs Act, to advocate high-level crossings or relocations, and to improve bridge fendering.

Cooperative Alliances Among Government, Industry, Labor, and the Public

Promoting factors are existing trade groups, such as AWO, RIAC, and PAA; the current memoranda of understanding between government and industry; DINAMO's efforts as a model for cooperation; and Industry Days. Barriers are competition among different companies, government entities, and trade groups; budget constraints and downsizing within government agencies; and lack of communication among parties. Recommendations are for recognition of how cooperation can be beneficial and in everyone's self-interest, a public awareness campaign, the fostering of regional government/industry groups, and education of policymakers as to the value of such alliances.

R&D to Apply Scientific Advances to Electronic Charting, Vessel Handling, and Communications

Promoting factors are such systems as the global positioning system, Internet sites, computer programs to track machinery, new systems, etc., communications to home office, and remote lock activators. Barriers are a perceived resistance to the sharing of electronics information, the fact that government does not share existing technologies, the expense of upgrading and training, cultural resistance to change, and an overreliance on technology. Recommendations are to train consortiums that would provide awareness regarding the payoffs and limitations of new technology, government subsidies and incentives for development and implementation, location and use of previous studies, and wider use of cost–benefit studies to show payoffs.

Recognition of the Importance of All Personnel and the Need for Their Development

Promoting factors are individual company's training programs, international requirements, fledgling cooperative ventures between government and industry, and the fact that there is more available training today than 10–15 years ago. Barriers are the need for even more training; an industry that is reactive vs. proactive regarding calamities; low wages, which prevent retention of qualified personnel; uneven accountability among licensed personnel; and the aging of the pool of licensed personnel. Recommendations are to encourage and create incentives for industrywide training programs, encourage development of stakeholder groups to serve as advisory boards, and provide wider information on wage levels and job opportunities.

Policy and Infrastructure to Ensure the Well-being of Personnel, Environment, Cargo, and Vessels Within the MTS

Promoting factors are current government programs and regulations that focus on safety and environment, current industry self-regulation (RJAC, R.C., certification programs), nationwide awareness of environmental and marine safety concerns, improvements in sharing of near-miss lessons-learned information, safety incentive programs for employees, and state licensing of recreational boating operators. Barriers are the fact that only large companies can afford self-regulatory programs, a lack of education and substance abuse among recreational boaters, a lack of individual accountability, time constraints/fatigue, a lack of aids to navigation maintenance resources, oversized tows that disrupt the ATON scheme, and the current crowding and bleeding of marine radio frequencies. Recommendations are for greater licensing of recreational boaters, continued emphasis of boating safety awareness classes, formation of trade groups to provide affordable training, adoption of the STCW concept for inland waterways, a national infrastructure policy that allows more ATON funding, and actions by the FCC to correct marine radio "bleed-over."

Maximized Potential of the Marine Transportation System

Promoting factors are the current strong economy; an improving balance of trade; backups in blue-water transportation, which cause inland water operators to think about possible future problems; and relaxation of free-trade zone regulations. Barriers are a lack of marketing of river facilities and locations; lack of current capacity/efficiency; incomplete intermodal connectors; and overregulation, which hinders development. Recommendations are an all-encompassing inland rivers marketing system; tax incentives to use waterways over other modes of transportation; a one-stop, consistent, cooperative permitting process; and a study of the existing marine transportation system to define gaps and overlaps.

Development of a World-Class, Internationally Competitive Waterway as a National Priority With a Defined Federal Commitment

Promoting factors are an emerging Cabinet-level voice for the issue (Secretary Slater and RLS) and the opportunity to capture new markets and possibly lose current ones. Barriers are the fact that Washington, D.C., is not knowledgeable about waterways issues; an imbalance of federal responsibilities; lack of a Cabinet-level waterways champion; insensitivity of the administration to the maritime industry; USACE's "small" view of the Upper Mississippi River and the fact that its budget goes to the "wrong" things

(environment vs. development). Recommendations are for less federal restricting activities and more enabling activity; efforts to educate, communicate, and define priorities with decision makers regarding the impact of the waterway on the national economy, the cost of system delays, and economic relationships; designation of the DOT Secretary as steward of system development; dedication of USACE funds to infrastructure development; greater public/private-sector partnerships; and appropriate railroad regulation to ensure right-of-way access to port areas.

Delivery of Government Services Through Adequate Funding, Interagency Cooperation, and Public/Private Partnerships

Promoting factors are the national economy and strong local promotional efforts. Barriers are fewer available funds, ever-tightening regulations, and lack of industry clout. Recommendations are for the federal government (senior level) to "come to the table" in a greater promotional role, a national systemic focus vs. regional focus by the federal government, reorganization of USACE to give DOT a greater role in transportation planning and evaluation of comparative impacts, greater cooperation among government agencies, local management/engineering efforts, and a "single face" federal representative for waterway system issues.

Recognition of Change in Transportation Markets, Methods, and Systems and International Competition

Promoting factors are the magnitude of anticipated growth, available economic opportunities, and openness to new technologies and ways to move goods. Barriers are system capacity, understanding of interrelationships among modes, and subsidized competition in overseas markets. Recommendations are development of a decision model that takes into account environment, cost and time elements; creation of a full regional servicing system to major modes to reduce time getting products to market (Point A to B); recognition that international infrastructure development affects the U.S. (e.g., Panama Canal draft reduction); establishment of a national strategy for efficient freight goods movement (e.g., identification of bottlenecks, overall coordination of traffic patterns).

Timely, Sound Environmental Processes

Promoting factors are an industry respect for the environment and the fact that barges are environmentally very safe. Barriers are an imbalance of regulations, an industry image problem, a lack of industry common objectives, and a lack of cost consciousness among environmentalists. Recommendations are to support research and development into recycling, to articulate the environmental advantages of the waterways system and the impacts on other modes if it didn't exist, and to reduce the time frames for environmental considerations (i.e., it shouldn't take six years to build a bridge or any waterway improvement).

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Vice President Al Gore with National Ocean Conference staff at evening reception at Monterey Bay Aquarium *(Photo: Official White House photograph)*

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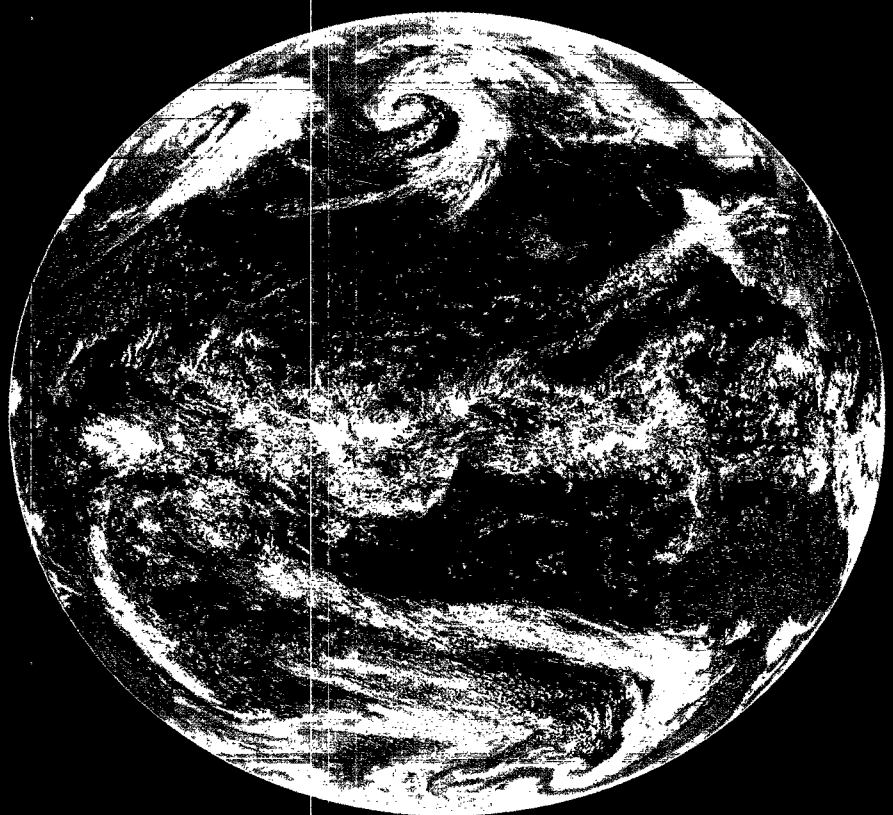
"Those dark-blue waters are perhaps the single greatest natural treasure on God's Earth."

– Al Gore



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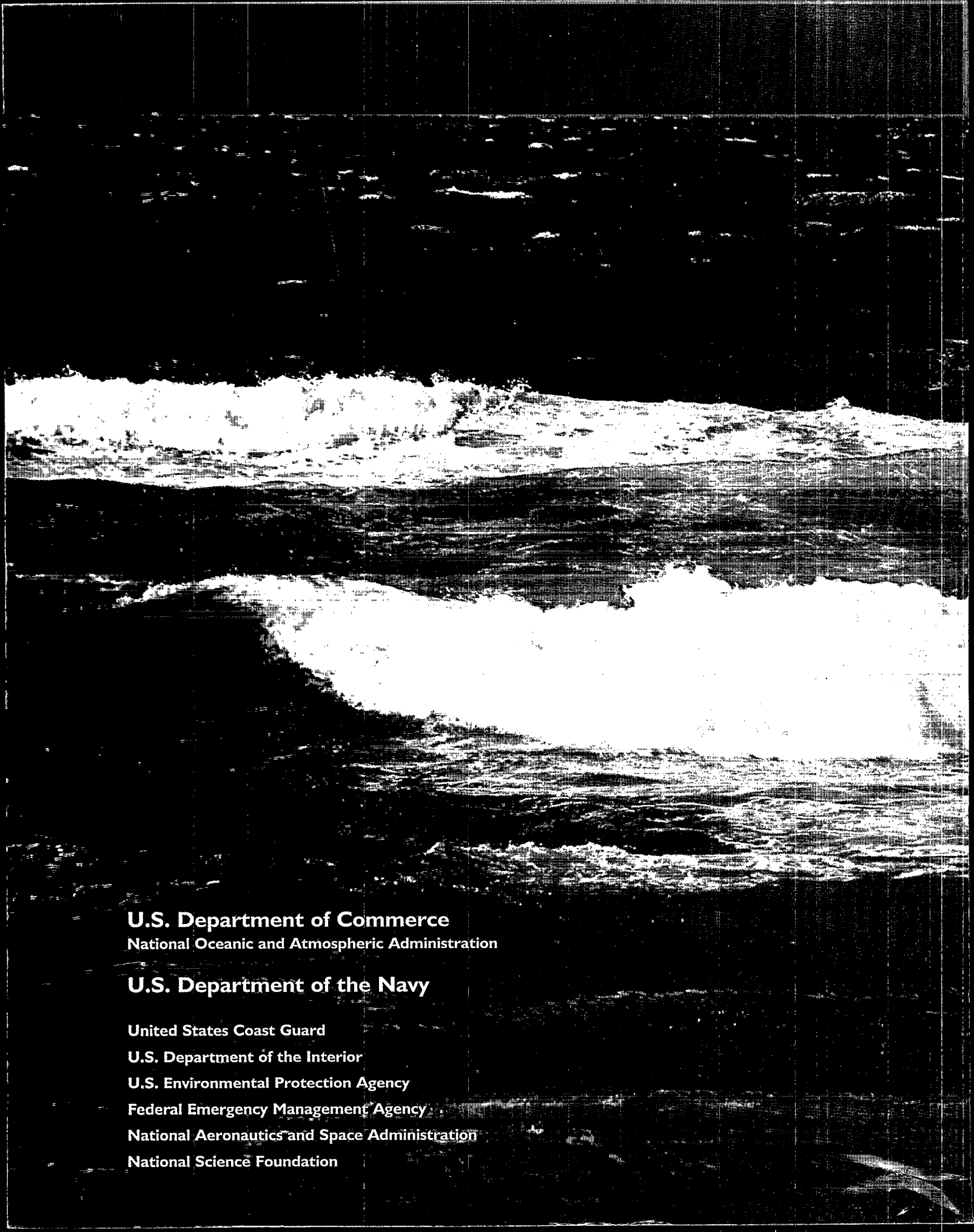

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