

**THE PRELIMINARY RECOMMENDATIONS OF THE
U.S. COMMISSION ON OCEAN POLICY**

HEARING

BEFORE THE

**COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION**

UNITED STATES SENATE

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

APRIL 22, 2004

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

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THE PRELIMINARY RECOMMENDATIONS OF THE U.S. COMMISSION ON OCEAN POLICY

THURSDAY, APRIL 22, 2004

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Subcommittee met, pursuant to notice, at 9:30 a.m. in room SR-253, Russell Senate Office Building, Hon. John McCain, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. JOHN MCCAIN, U.S. SENATOR FROM ARIZONA

The CHAIRMAN. Good morning. The Committee meets today to hear testimony from Admiral Watkins, the Chairman of the U.S. Commission on Ocean Policy concerning the release of its preliminary report. I might add I had the pleasure of knowing and serving under Admiral Watkins for many, many years, and I am forever grateful for his many contributions to this Nation and its security.

Our oceans comprise approximately 70 percent of the Earth's surface, and as the Commission's preliminary report states, they're in crisis. If we're to be good stewards of the Earth, we have to be—we have to better protect our oceans. Congress recognized this need in 2000 in past legislation creating the U.S. Commission on Ocean Policy. The Commission is tasked with making recommendations to the President and Congress for coordinated and comprehensive national ocean policy.

I'm convening this hearing this morning so we can hear how the process is going and provide feedback to the Commission, which it can use in drafting its final report. The last congressionally-authorized commission to review and make recommendations for a national ocean policy was the Stratton Commission, which was a watershed event that led to the creation of the National Oceanic and Atmospheric Administration in 1970. More than 30 years later, much has changed, and we again are looking for recommendations for an updated national ocean policy.

According to the preliminary report released earlier this week, the Commission found that pollution threatens our water quality, many fishing stocks are in danger of depletion, competing interests vie for limited resources, and global climate change is significantly impacting our oceans.

The challenge of correcting this crisis in our oceans is significant and we appear ill-prepared to address it at this time. The Commission states in its report that our ocean and coastal responsibilities are arrayed across numerous Federal departments and agencies,

the states and territories, and tribal and local levels. In many cases, these efforts are poorly coordinated and redundant. In other areas there are serious gaps. We clearly need a national ocean policy and this preliminary report is the place to start.

I look forward to Admiral Watkins' testimony and that of the other Commissioners for learning more about the Commission's recommendations on how we can more effectively manage our oceans and coastal waters.

Senator Hollings.

**STATEMENT OF HON. ERNEST F. HOLLINGS,
U.S. SENATOR FROM SOUTH CAROLINA**

Senator HOLLINGS. Thank you, Mr. Chairman. I'll just put my statement in the record.

The CHAIRMAN. Without objection.

Senator HOLLINGS. And just welcome our House members. Thank you.

[The prepared statement of Senator Hollings follows:]

PREPARED STATEMENT OF HON. ERNEST F. HOLLINGS,
U.S. SENATOR FROM SOUTH CAROLINA

Mr. Chairman, thank you for convening today's hearing on the Preliminary Report of the U.S. Commission on Ocean Policy. It is only fitting that we hold this hearing on Earth Day since the oceans comprise fully seven-tenths of our planet. That's a lot of water—and more than you would find with a Mars Rover, let me assure you. We ought to set aside extra-terrestrials—even terrestrial species—and reaffirm our national priorities by declaring today as "Ocean Day."

We really needed to take stock of how well our oceans are doing, and how well we are doing by our oceans. It has been well over thirty years since the Stratton Commission recommended a comprehensive ocean policy for the Nation. The Stratton Commission's report and recommendations led to the creation of the National Oceanic and Atmospheric Administration (NOAA) and passage of major marine conservation statutes such as the Magnuson-Stevens Fishery Conservation and Management Act, the National Marine Sanctuaries Act, and the Coastal Zone Management Act. Since then, no other report has generated as much talk and anticipation in the ocean community as this report. This is because our oceans and coasts are at a crossroads.

Throughout history, our society has turned to the oceans and coasts for food, transportation, commerce and recreation. It is no coincidence that today, over 50 percent of the U.S. population lives in the coastal zone, and this number is expected to increase to 75 percent by 2025. Hundreds of millions of Americans spend their vacations along the coasts each year and more than 13 million jobs stem from trade along our Nation's marine transportation system. Our oceans are inextricably linked to our personal and economic well-being.

But increasing pressures threaten our oceans and coasts. Our coral reefs and wetlands are disappearing or being degraded at an alarming rate. Increased use has led to increased pollution of our oceans. In 2002, more than 12,000 beach closings and swimming advisories were issued nationwide due to fecal bacteria or other pollution. Just last month, over 100 dolphin carcasses were found along Florida's panhandle beaches and bays. Preliminary test results point to one or more biotoxins that are associated with red tides. We have also over-used some of our ocean bounty—twenty-five percent of the Nation's major fish stocks are over-fished or experiencing over-fishing, causing millions of dollars in economic losses. While we are making some progress here at home, the Committee knows that global overfishing—and bycatch—caused by foreign fleets is posing serious risks to marine ecosystems worldwide. Other costs are closer to our homes—coastal storms and El Niño related events pose increasingly serious and costly risks to human health and coastal property.

Despite our dependence on oceans and coasts, the Nation surprisingly spends only 3.5 percent of its Federal research budget on oceans. The oceans are home to 80 percent of all life forms on Earth, holding incredible promise of new medicines, tech-

nologies, and ecological resources, but 95 percent of the deep ocean remains unexplored.

Our country needs a new vision for ocean policy and management. This is why I sponsored the Oceans Act of 2000, along with several of my distinguished colleagues. The Oceans Act created a Commission of national experts who we asked to conduct a rigorous assessment of ocean and coastal issues and offer their recommendations for a coordinated national ocean policy.

The release of the Ocean Commission's Preliminary Report this week presents state Governors and others with the opportunity to offer comments before a final report is issued to Congress and the President. I urge the Governors of every state to take the report's recommendations very seriously and offer their comments to the Commission. Following the release of the Ocean Commission's final report, the President will have 90 days to submit to Congress his proposals for implementing or responding to the Commission's recommendations.

The Preliminary Report includes some important new directions for our oceans policy. It appropriately places a premium on strengthening our ocean science and research base, calling for a doubling of the annual Federal investment in ocean research, for instance. The Commission's report also highlights the importance of deepening our understanding of oceans and coasts through investments in ocean exploration, ocean observing systems, and ocean education.

The Report also reaffirms the importance of coastal zone management, and the role that states must continue to play in this regard. It upholds the need to carefully manage our living marine resources, and notes growing concerns from land and vessel-based sources of pollution as well as other risks such as invasive species to our oceans. I am particularly pleased to find that the Commission has devoted an entire chapter to the need to understand the connection between our oceans and human health—we need to bring these connections to the attention of all Americans, whether they live or work by the sea, or could one day benefit from medicines developed from the immense diversity of marine life we are still discovering.

I commend the Commission too for recognizing that the National Oceanic and Atmospheric Administration (NOAA) is the Nation's premier civilian ocean agency, and that it needs to be strengthened to lead the Nation toward a more prosperous and healthy era for our oceans and coasts. This leadership role was envisioned by the Stratton Commission but has been marred by underfunded mandates, overlapping jurisdictions, and lack of coordination between programs and agencies. I hope the Commission will elaborate today on precisely how its recommendations will strengthen NOAA as well as address critical gaps in Federal ocean funding. The recommendations describe numerous investment needs but provide little detail about the precise funding estimates and sources.

I am encouraged that our Committee and the Commission seem to be thinking along the same lines on many of these issues. Members of the Commerce Committee have already acted on a number of important legislative proposals to address the challenges facing our oceans and coasts—and I am sure we will see more bills introduced in the coming weeks.

Senator Snowe has demonstrated leadership on these issues by sponsoring S. 1400, the Coastal and Ocean Observing System Act, which calls for the establishment of a coordinated coastal and ocean observing system—a bill that recently passed the Senate, and which I am proud to cosponsor. In addition, the Senate recently passed S. 1218, the Oceans and Human Health Act, legislation I introduced with Sen. Stevens, and which is supported by many of my Senate and Committee colleagues. The Committee also unanimously reported S. 861, the Coastal and Estuarine Land Protection Act, a bill I introduced with Senator Gregg and cosponsored by many Committee members. I hope to see that pass the Senate very soon. I am particularly proud to cosponsor, along with Senator Inouye, Senator Stevens' National Ocean Exploration Act (S. 2280), a bill that will strengthen and enlarge NOAA's Ocean Exploration Program.

All of these initiatives are supported by the Ocean Commission's recommendations. I also am pleased that Sen. McCain and I will be working together on the Commission's recommendation to pass an "organic" act to affirm NOAA as the lead ocean agency in the U.S.

Finally, I would like to take this opportunity to welcome and publicly thank Admiral Watkins for his leadership on the Commission. Admiral Watkins, you and the other commissioners have done a great service for this country. Thank you for your hard work and for engaging us in a critical dialogue about the future of our oceans and coasts. This spring, Dr. Bob Ballard, NOAA's Office of Ocean Exploration, and other partners will conduct an exciting expedition to the Titanic on NOAA Ship RON BROWN. Bob never ceases to capture our imaginations when he embarks on one exciting voyage of discovery or another. We wish him much success.

Thank you, Mr. Chairman, for this opportunity to comment on the Preliminary Report. I look forward to hearing Admiral Watkins' testimony.

The CHAIRMAN. Senator Stevens.

**STATEMENT OF HON. TED STEVENS,
U.S. SENATOR FROM ALASKA**

Senator STEVENS. Thank you very much, Mr. Chairman. I do have a short statement, not too long. But I do thank you for holding this important hearing. We had originally scheduled a hearing in the Appropriations Committee because of the broad-sweeping recommendations for financing the industry report, but we delayed that so that the Committee of jurisdiction, the legislative committee, can have a first look at this ocean policy.

This is, as you said, the first time in 35 years that we have reviewed our Nation's ocean policy, and Senator Hollings and I have been together during those 35 years and have tried in the past to have this type of review, but I'm delighted that we've finally been able to accomplish it, and I think the Commission under Admiral Watkins' leadership, as you said, has done extraordinary work in pulling together the documents that will be before us.

They've had 15 public meetings and 17 site visits around the country, including meetings held in Anchorage and site visits in our fishery communities. And I want to give special thanks to my good friend who's here today, Ed Rasmuson, who has followed his father's footsteps, who was Chairman of the International Joint Commission for Fisheries. And now Ed has spent considerable time and effort on this Commission and I understand he's not missed a single meeting of this Commission.

This has provided the Commission with an important Alaska voice on the impacts of ocean and coastal development on our State. No state has the relationship to the ocean that ours does, with half the coastline of the United States, and it is the economic driver for our state's economy. And at the same time its beauty and wonder has symbolized our pioneering heritage.

The Commission has given us a great deal to think about, with nearly 200 recommendations and over 400 pages of analysis of our oceans and coastal management framework. I really truly am encouraged by the recommendations of this Commission on ocean policy, it has made, at least what we've seen in the preliminary report, and we look forward to exploring these concepts with you and others.

I want to point out that this report closely follows the practices that already exist in the North Pacific, and in the North Pacific there are no endangered species. There are no over-fished species in the North Pacific because we have followed ecosystem concepts, and I'm delighted to see that is the recommendation, basic recommendation of this Commission. Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Stevens.
Senator Lautenberg.

**STATEMENT OF HON. FRANK R. LAUTENBERG,
U.S. SENATOR FROM NEW JERSEY**

Senator LAUTENBERG. Thanks very much, Mr. Chairman. Your action here reflects the urgency of the message contained in the Ocean Policy Commission report. It should be obvious to everybody that our oceans and coastal areas are in serious trouble and that we've got to quickly turn around the disturbing trends that the Commission has documented. From what I understand of the report, Admiral Watkins and the other commissioners have produced a balanced and responsible assessment of our coasts and oceans and offered smart, practical recommendations to better protect these resources.

The ocean holds a special meaning to my State of New Jersey and to me personally as the result of childhood memories of visits there. So during my years in the Senate, one of my principal goals has always been to protect our beaches and oceans, and we've had some successes. My home State of New Jersey has 127 miles of shoreline. We're proud of each and every mile.

But I remember back to the 1980s when medical waste, sewage, and garbage began washing up on the shore. We were horrified and we did something about it, and I'm happy to report that those days have come and gone. Congress passed bills to stop ocean dumping and other problems, but new, equally ominous threats have taken their place.

I was very disturbed last May when the journal, *Nature*, reported a 90 percent decline in the world's large predatory ocean fish over the last half-century. The number of times beaches have been closed for pollution has increased substantially. Population development pressures are colliding with the desire of many coastal residents to protect their beaches. Because of these and other stresses, I'm convinced that major changes must be made. Unlike land environments, ocean ecosystems are essentially unseen by the average person and easier to take for granted. But we do so at our peril.

Mr. Chairman, I look forward to the testimony of our witnesses, and again thank you for holding this hearing.

The CHAIRMAN. Thank you.
Senator Snowe.

**STATEMENT OF HON. OLYMPIA J. SNOWE,
U.S. SENATOR FROM MAINE**

Senator SNOWE. Thank you, Mr. Chairman, for holding this hearing to consider the preliminary report from the Ocean Commission. I want to commend Senator Hollings for his leadership on this issue over the years as well as our House colleagues who are here. They helped to play a critical role in the creation of this commission that was charged to view all facets of our ocean-related policies and activities and to consolidate them under one comprehensive national policy.

I certainly want to express my gratitude and appreciation to Admiral Watkins for his exemplary leadership as chair of the Commission on Ocean Policy and to all the commissioners, some of whom are here today, for undertaking this responsibility. They are helping to enhance our knowledge of our oceans and what steps are

essential for this Nation to take in order to protect this invaluable resource.

What I find to be truly alarming is our lack of knowledge about our marine environment and our oceans. Even while we probe the surface of Mars, remarkably 95 percent of the world's oceans remains unexplored. And as the commission report indicates, we have had a significant under investment in marine assets. That is a broad indication of the fact that we have not made this a great national priority.

I think so many of the recommendations that have been included in here, Mr. Chairman, will require thorough and timely consideration by the Congress. Not only have they provided many constructive ideas, especially creating a national ocean policy and a national oceans council, but I think it's a matter of national imperative as well.

The Commission rightly cites the fact that we need to coordinate all of our Federal oceans-related activities. When you have 14, 15 disparate agencies, it's very difficult to create a cohesive, coherent, and coordinated policy among all those agencies when it comes to sound marine, environmental policy and management. I applaud the Commission for taking a proactive, visionary, and far-reaching approach. We must address all of these issues related to protecting this critical national asset that, as others have indicated today, creates jobs and is a great contributor to our economy. Moreover, our oceans support and provide life-supporting capacities and production for our marine environment, which is so important to our fisheries. Considering the very long coastline along the State of Maine, and the course of fisheries that are dependent upon it, it is very critical that we look at these issues in a comprehensive fashion.

The Commission has performed a tremendous service to this country by creating a meaningful approach for ocean policy. Now it's going to be our responsibility to undertake a review of that approach and to find ways to implement it sooner rather than later.

Mr. Chairman, I ask unanimous consent to include my entire statement in the record. Thank you.

[The prepared statement of Senator Snowe follows:]

PREPARED STATEMENT OF HON. OLYMPIA J. SNOWE, U.S. SENATOR FROM MAINE

Thank you, Mr. Chairman. As Chair of the Subcommittee on Oceans, Fisheries, and Coast Guard, I am especially pleased to be here today to discuss the release of the Ocean Commission's preliminary report. For the first time since the Stratton Commission released its findings 35 years ago, the Senate is receiving an eagerly anticipated Congressionally-mandated report on the state of our Nation's oceans and coasts.

As a nation, we are increasingly aware that our environmental and economic health are directly linked to the oceans and coasts . . . but what I find to be truly alarming is the state of our *knowledge* about our marine environment. Even while we probe the surface of Mars, we have to realize that 95 percent of the world's oceans remain unexplored. We must enhance our collective knowledge of these global systems, and we must make investing in our oceans a greater national priority.

First of all, I would like to congratulate Admiral Watkins, who has done an exemplary job chairing the U.S. Commission on Ocean Policy. I would also like to express my appreciation to the other Commissioners who are in attendance today, and thank them all for their hard work.

Almost four years ago, this committee, along with our counterparts in the House of Representatives, charged the U.S. Commission on Ocean Policy with an enormous task. The Commissioners and their staff were to consider all facets of our Nation's

interaction with the oceans, and bring them together under one comprehensive national ocean policy.

The preliminary report contains myriad recommendations, and there are a few that I would like to highlight. The Commission rightly cites the need for a better Federal framework to coordinate Federal ocean-related activities as one of its top priorities. The Commission is also correct in calling for an Integrated Ocean Observation Network to provide the Nation with much needed data on some of the most basic oceanographic and atmospheric measurements. Additionally, the Commission actually identifies a way in which to pay for its proposed new programs, so that we can avoid going forward with an unfunded mandate.

I certainly concur with the Commission's findings that the Federal ocean activities need better coordination. The collection of 14 disparate agencies that are currently handling ocean-related issues cannot possibly manage our Nation's marine resources and commerce in a sound and cohesive fashion without a formal mechanism for coordinating these activities.

I was also gratified to see the Commission's focus on the establishment of an integrated ocean observation system. I introduced and the Senate passed by unanimous consent S. 1400, the Ocean and Coastal Observation Systems Act, which would establish such a system for the United States. I have long been a supporter of ocean observation—in particular, the Gulf of Maine Ocean Observation System, a regional network of data collection buoys that provides real-time data to researchers, the Coast Guard, mariners, and the public through its easy to use website. I hope the Commission's report will give the necessary boost we need for moving toward the critical goal of implementing a comprehensive, nation-wide ocean observation system.

The implementation of this integrated ocean data collection network will require a significant investment—according to the Commission, it will require \$652 million a year when it is up and running. Fortunately, the Commission has recommended a viable means for funding its proposals, by using revenues from oil and gas leases on the outer continental shelf, an existing source of Federal funds that can provide the much needed funding.

I have, in the past, supported the concept of using revenues from oil and gas leases on the outer continental shelf as a funding mechanism for oceanographic research and management. If we as a country are serious about moving forward with any of the recommendations of the Commission, we need to take a hard look at this approach again. We need to avoid unfunded mandates in anything we do in response to the Commission's report, yet we must ensure we will have the ability to actually implement all of the recommendations we act upon.

Managing our oceans properly is a costly endeavor, but we cannot forget that activities on our oceans contribute *hundreds of billions* of dollars to our economy every year, and directly support more than 2 million jobs. The demands we place on our oceans will continue to multiply, as each year—for many years to come—more than 1.1 million people are expected to move to coastal areas. As a nation, we must pause and re-think how we can best position ourselves to continue maximizing the many goods and services that we reap from the seas, while ensuring that we do not undercut the oceans' productive and life-supporting capacities. The oceans are one of our Nation's most valuable assets, and their health reflects the attitudes and actions of every American, no matter where they live.

Admiral Watkins, the Commission has performed a tremendous service to the Nation by providing a blueprint for making meaningful improvements to U.S. ocean policy. I look forward to receiving the final report and engaging the oceans subcommittee in studying all its recommendations in depth. I am committed to establishing an effective, coordinated National Ocean Policy system—not only is this a good idea, but it is a national imperative. I intend to see that a sustained and integrated ocean observing system is part of this approach, along with other key science and management provisions.

Thank you, Mr. Chairman, for convening this hearing. I appreciate the Commission's efforts and look forward to Admiral Watkins' testimony.

The CHAIRMAN. Without objection. Thank you.
Senator Breaux.

**STATEMENT OF HON. JOHN B. BREAUX,
U.S. SENATOR FROM LOUISIANA**

Senator BREAUX. Thank you very much, Mr. Chairman. I'll try to be very brief. I was one of the original cosponsors with many of

our colleagues of the legislation that created the Commission, and we're delighted to see the presentation of this preliminary report. This is something that many of us on this committee have been looking at for 30 years or more and we continue to look at it and one day we may get it right, but we're not there yet.

My own state of Louisiana is not atypical, I guess, of many of our coastal states in the sense that we are located on the Gulf of Mexico and have these incredible balance problems and competing interests, because some would say the ocean should be only used for recreational fishing, some may argue that it should only be used for commercial fishing, some would argue that it should not have any energy development, some would argue perhaps some different perspective that the entire coastal area can only be used for recreational enjoyment.

The fact is I think that you have to balance all of those interests, and they all have a legitimate stake in how the oceans are managed. Fish production in the ocean is for recreational use, but it is also for food for the world, and that's a very difficult thing to balance. We have the largest amount of energy development in any coastal area probably in the world off my coast, and we've had to balance that with recreational and commercial fishing interests, and it has not been an easy job.

Every year, off Louisiana's coast a dead zone develops that is approximately 12,000 square miles in size, more than the size of my good friend, Senator Lautenberg's, entire state. There's a complete dead zone with no oxygen at all because of much of the run-off that comes down through the Mississippi River and is dumped every day into the Gulf of Mexico. These are huge problems and there are no simple easy answers to them, but I would hope that ultimately we would agree that everybody has a legitimate stake in the use of the oceans and everybody has a responsibility to manage those resources, and I thank you for your work.

The CHAIRMAN. Thank you. As is our practice, we welcome our colleagues from the House of Representatives, and we thank you for coming over today and displaying your interest and commitment on this issue. We always begin with the oldest and so we'll begin with you, Congressman Ehlers.

**STATEMENT OF HON. VERNON EHLERS,
U.S. REPRESENTATIVE FROM MICHIGAN**

Mr. EHLERS. The oldest or the hairless?
[Laughter.]

Mr. EHLERS. Thank you, Chairman McCain and Senator Hollings. I appreciate the opportunity to testify before you on this preliminary report from the U.S. Commission on Ocean Policy. As a member of the House Science Committee and Chairman of its Environment, Technology, and Standards Subcommittee, I oversee much of the National Oceanic and Atmospheric Administration, better known as NOAA, except for the fisheries issues, which are left to my colleagues on the Resources Committee. I also represent the State of Michigan, which has a deep interest in the Great Lakes and I'm pleased to see this report includes that. We also have the greatest coastline of any state in the union except for Alaska, and of course, no one can compare with Alaska.

I must commend Admiral Watkins and other commissioners for all their hard work, effort, and tenacity. Their charge was vast and difficult and they performed it admirably. They have given Congress and the Administration the foundation by which we may improve the health and management of our coast, oceans, and the Great Lakes.

Let me briefly highlight some of the Commission's recommendations that the Science Committee intends to pursue. The Commission recommends that Congress pass an organic act for NOAA. I strongly agree. I believe it is critical for NOAA's mission to be clearly defined and its internal structure strengthened so that it can better fulfill its role in observing, managing, and protecting our Nation's coastal and ocean resources.

My subcommittee staff and I spent many hours working on this task last year, but delayed introducing the bill until we had examined the ocean policy report. I look forward to working with you as well as with my colleagues in the House in a bipartisan fashion to pass a bill into law this year. This will not be an easy task, but it is so important to our environment, our economy, and our children and grandchildren's future that we must succeed.

I thank the Commission for advocating increased funding for ocean research, something that many Members of Congress also support. However, I am concerned that the Commission did not clearly specify which issues and programs should be our highest priorities. Given our current budget constraints, I think it will be extremely difficult to find \$4 billion in new money for the oceans, including doubling the funding for ocean research. As much as I support that effort, I certainly agree that there are enough problems and issues that require this much in new funding. I want to be certain Congress isn't immobilized by sticker shock that can actually fulfill many of the recommendations in the report. A priority list would be most useful in this regard.

Finally, I would like to mention the specific recommendation that Congress transfer management of some of NASA's Earth-observing activities to NOAA. This is a recommendation that the Science Committee will examine closely, as I imagine this Committee will do too as we oversee both NASA and NOAA. A major shifting of duties and resources appears attractive, but would be a complicated undertaking and we should understand the complete ramifications of such an action. We also have to make certain, of course, that the money follows the transfer.

These are but a few of the issues that the Science Committee will be examining from the Commission's report. Let me reiterate my sincere appreciation for the hard work of the Commissioners and their staff. Thank you for the opportunity to testify. I am enthusiastic and optimistic that we can all work together to develop a strong national ocean policy that protects this resource for generations to come. Thank you very much.

The CHAIRMAN. Thank you.
Congressman Farr, welcome.

**STATEMENT OF HON. SAM FARR,
U.S. REPRESENTATIVE FROM CALIFORNIA**

Mr. FARR. Thank you very much, Mr. Chairman, and thank you Senator Hollings and others for allowing me to stumble before you to start off this hearing. It's really a pleasure to be alongside my fellow Oceans Caucus member, Mr. Ehlers, and we have created in the House an Ocean Caucus. We have four Co-Chairs, two Republicans, two Democrats, Jim Greenwood, Tom Allen, Curt Weldon, and myself. The Ocean Caucus represents a diverse constituency of inland states like Missouri and islands like American Samoa.

I speak to you today about the urgent need to protect our oceans. Let me say that it couldn't be more appropriate for you to hold this hearing today on Earth Day, a day that we reflect, take stock, and hopefully make some resolutions. With that in mind, Tuesday's release of the U.S. Commission on Ocean Policy report makes a milestone for our oceans and how we view them.

As shown in the report, the oceans are in a state of crisis, a crisis that affects each and every one of us, because we are all dependent on the oceans. They provide food, opportunities for both scientific discovery and spiritual reflection, and of course, jobs. Some of the tremendous benefits we get from the oceans can't be put into dollar amounts. We must recognize this. However, some of the ocean's benefits can be described with dollar signs. The U.S. Commission's report documents that our oceans and coast add over \$1 trillion to our economy each year. We hope that we can agree that this huge contribution is a return that we must safeguard.

Ensuring that this return keeps coming, in other words, we need to be guided by long-term vision of healthy marine ecosystems, and that will require a change in course. That change in course is simply that we must adopt a new stewardship ethic for our ocean treasures. The stewardship ethic should be based on long-term vision that protects, maintains, and restores the health of marine ecosystems.

To implement that new stewardship, we must admit that our current system of ocean governance, as Senator Snowe pointed out, consists of 10 departments, 20 Federal agencies, and over 140 ocean-related laws. It is inadequate or has failed and sometimes has failed miserably.

The message comes across loud and clear in both the Pew report and the U.S. Commission's report. It is now our turn to act. We must devise a new national and regional approach, and I think that Members of the Committee, the biggest struggle for Congress is going to be figuring out how to do this national governance structure, and probably even more difficult, how we have a better coordinated regional management system. It should be based on ecosystem principles, as Senator Stevens pointed out. Ecosystem-based management will not be easy, but it certainly is necessary.

The Ocean Caucus will be providing a strong vision on where our Nation should set our ocean sights. We are working on what we call the BOB Bill, the Big Oceans Bill, which takes the recommendations of all the commissions and others and puts it into one big bill. At the heart of this bill is a strong national oceans policy, one that protects, maintains, and restores our oceans so we won't be making excuses to the next generations. We are hopeful

there will be a movement once our bill is introduced demonstrating that the protection of our oceans and resources is a bipartisan issue and can't wait until after the next election.

So the time for leadership is now. The Senate is showing that today by convening the first of these hearings. The bipartisan House Oceans Caucus is showing it by working on legislation, and I urge the administration to show it by supporting the efforts of both of these houses.

Thank you for letting me appear today and I'd be glad to respond to any questions you might have.

[The prepared statement of Mr. Farr follows:]

PREPARED STATEMENT OF HON. SAM FARR, U.S. REPRESENTATIVE FROM CALIFORNIA

Chairman McCain, Senator Hollings, and members of the Committee, thank you for allowing me, along with my fellow House Oceans Caucus Co-Chair, James Greenwood, to testify this morning on the absolute importance of using the U.S. Commission on Ocean Policy's Report as an impetus for national action. With over 50 Members in the House Oceans Caucus, we represent diverse constituencies—from inland states like Missouri to island territories like American Samoa. This broad appeal demonstrates the recognition that every American has a stake in the state of our oceans.

Tuesday's release of the U.S. Commission on Ocean Policy's comprehensive report marks a milestone for our oceans and for the way we view them. It has been more than 30 years since we, as a nation, have evaluated our relationship with the sea. Unfortunately, the state of our oceans has significantly decreased since our last evaluation. So much so that today, our oceans are in a state of crisis—a crisis that affects each and every one of us.

We all depend on our oceans and coasts, from the person who lives off the water to the person who visits once in a lifetime. The oceans provide food, jobs, vacation spots, scientific knowledge, and opportunities for reflection. Despite our inability to measure the many non-market values associated with our oceans and coasts, we are able to quantify some of the benefits they provide. For example, over a trillion dollars is added to our economy each year by ocean and coastal economies. I trust that we can all agree that this is a huge contribution; a contribution that must be protected so the returns keep coming. We can craft our uses of the ocean to ensure that they are conducted in a sustainable manner, such that the resources will be there for future generations.

Protection of our oceans will require a change of course. Unfortunately, all too often we take our oceans for granted: we underestimate their value and we ignore the negative consequences human-related activities can have on them. Our oceans represent the largest public trust resource in the U.S. and cover an area nearly one and a half times the size of the continental United States. Americans expect the Government to safeguard this vast resource and I hope that the Report just released will be the motivation for us to actually begin to do so.

Simply put, our current ocean and coastal management system, created over thirty years ago, is archaic and incompatible with new knowledge about how the oceans and coastal waters function as a whole. Our policies are fragmented, both institutionally and geographically. For example, today we find ourselves with over ten Federal departments involved in the implementation of more than 130 ocean-related statutes. It is time to re-consider this incoherent and often times incompatible management situation and bring order to our ocean governance structure. The U.S. Commission's Report offers some guidance on how to do just this.

One of the biggest advances in our understanding of oceans to occur since our last national review of ocean policy is that the natural world functions as ecosystems, with each species intricately connected to the other parts that make up the whole. The U.S. Commission's Report, as well as the independent Pew Oceans Commission Report released last June, clearly states that we must adopt a new policy framework that is based on the concept of "the whole," an ecosystem-based approach rather than one based on political boundaries. This approach will not be as easy or straight forward as our previous approaches, but we must dedicate ourselves to making it a reality. Part of making it a reality is creating a strong regional governance structure. With a comprehensive national ocean policy explicitly written to maintain healthy ocean ecosystems, our oceans will be a bountiful resource in which we can all take pride.

The Report also stresses the importance of instilling a new ecosystem-based stewardship ethic. Involved in instilling this ethic is increasing ocean-related education for all Americans at all levels, from first-graders learning how to read to graduate students investigating challenging scientific processes. The U.S. Commission details suggestions on how we can instill a new stewardship ethic by emphasizing and investing in greater marine science education.

As you know, the Report released earlier this week is, technically, a Preliminary Report. It is being sent to the Governors for their comments. This comment period lasts until May 21, 2004. I sincerely hope that all states will take this opportunity to acknowledge that the oceans provide value for every American, whether intrinsic worth or direct economic benefit, and provide the Commission with input before the comment period ends. Despite historic and geographic patterns suggesting otherwise, every state has a role to play in the management of our oceans.

The House Oceans Caucus leadership is drafting legislation—the BOB, or Big Oceans Bill—that sets our country on the right path—the path of protecting our oceans. Many of the details are still being worked out; however, the broad sections of BOB include national governance, regional governance, science and technology, and education. We will be introducing our legislation this session. We have high hopes that our comprehensive bill will receive hearings and be considered this year, thereby demonstrating the bipartisan nature of the importance of protecting the health of our oceans for future generations.

It is up to each of us to not let this unprecedented opportunity pass us by. With the U.S. Commission on Ocean Policy and The Pew Oceans Commission Reports in the last year, the Bush Administration has a prime opportunity to take the steps necessary to instill a new ocean ethic in our government. Action by this Administration could very well save our largest public trust. The time for leadership is now. The Senate is showing its leadership by holding this hearing. I am dedicated to providing leadership in the House, with the help of my fellow Oceans Caucus co-chairs, and I hope the President will provide it in the White House.

The CHAIRMAN. We thank you both for coming today and we appreciate your commitment on this issue. We look forward to working with you as we seek to implement many of the valuable recommendations of the Commission that we're about to hear. Thank you for coming over today. Thank you.

Now we'd like to have Admiral James D. Watkins, Chairman of the U.S. Commission on Ocean Policy, who is accompanied by Commissioners Dr. Robert Ballard, Professor Marc J. Hershman, Mr. Christopher Koch, Mr. Edward Rasmuson, Mr. Andrew Rosenberg, and Dr. Paul Sandifer. Would you please come forward?

Senator LOTT. Mr. Chairman?

The CHAIRMAN. Senator Lott?

**STATEMENT OF HON. TRENT LOTT,
U.S. SENATOR FROM MISSISSIPPI**

Senator LOTT. While they're coming forward, I'd just like to ask consent that my brief statement be made a part of the record after the panel makes their presentation.

The CHAIRMAN. Without objection. Thank you.

[The prepared statement of Senator Lott follows:]

PREPARED STATEMENT OF HON. TRENT LOTT, U.S. SENATOR FROM MISSISSIPPI

I want to thank Admiral Watkins and all of the Commissioners for their service on the Oceans Commission. You and your fellow commissioners have helped focus the attention of our Nation on our neighboring oceans and our coastal regions.

As a resident of a coastal state, and a coastal city, I have seen firsthand many of the concerns the Commission raised. The attraction of coastal living has significantly increased the population of Mississippi's coastal counties in recent years. The good news is the economic benefit that has flowed to the people of the coast during that time. However, this growth requires coastal residents and governments to have to work harder to ensure that the natural features that attracted the people to the coast are preserved.

Managing our coastal regions and waters requires the collaboration of many people and interest groups. This is best handled locally, but there clearly is a role for the Federal government to play. Management of offshore fisheries, outer continental shelf resources, national seashores, and estuarine reserves are some of those areas where the Federal government has played an active role.

I look forward to working with the Commerce Committee and the Senate in conducting a detailed review of your report. While I may not end up agreeing with some of your recommendations, I'm sure that the Committee will carefully consider all of them.

I also want to praise another member of the Commission, Vice Admiral Paul Gaffney, for his service on the Commission. Admiral Gaffney commanded the Navy Meteorological and Oceanographic Command at Stennis Space Center on the Mississippi coast. He has an in-depth understanding of the oceans and has been a real asset to this country. I wish him well in his current endeavor as a university president.

The CHAIRMAN. Admiral Watkins, welcome, and welcome to all of the Members of the Commission. Thank you for being with us today. Please proceed, Admiral Watkins.

**STATEMENT OF ADMIRAL JAMES D. WATKINS, USN (RET.),
CHAIRMAN, U.S. COMMISSION ON OCEAN POLICY;
ACCOMPANIED BY DR. ROBERT BALLARD, COMMISSIONER;
MARC J. HERSHMAN, COMMISSIONER; CHRISTOPHER KOCH,
COMMISSIONER; EDWARD B. RASMUSON, COMMISSIONER;
DR. ANDREW A. ROSENBERG, COMMISSIONER;
AND DR. PAUL A. SANDIFER, COMMISSIONER**

Admiral WATKINS. Thank you very much, Mr. Chairman, and Members of the Committee. I'm very pleased to be appearing before you today to provide a brief overview of the U.S. Commission on Ocean Policy's preliminary report. I ask that my longer written statement be accepted into the record.

The CHAIRMAN. Without objection.

Admiral WATKINS. Our preliminary report offers a practical blueprint for ocean policy in the 21st century. It lays the groundwork for a coordinated, comprehensive, national ocean policy, with a logical sequence of actions that can start immediately. The report includes almost 200 action-oriented recommendations that present Congress, the President, the Federal agencies, and Governors with workable solutions for some of the most pressing problems facing our oceans and coasts.

There are a few key messages I'd like to convey today. First, our oceans and coasts are a national asset that's in trouble. Second, an opportunity is at hand to reverse these negative trends. And last, our existing fragmented system for managing oceans and coasts is not up to the task. We urgently need better governance, science, and education to achieve meaningful improvements. My fellow commissioners and I believe that implementation of the recommendations in our report will result in bountiful, sustainable oceans that benefit and inspire Americans for decades to come.

Let me now address the basic question. Why should anyone care about these issues? Well, to start, oceans and coasts are major contributors to the United States' economy. Over half of the U.S. population lives in coastal watershed counties, and roughly one-half of the Nation's gross domestic product, which was \$4½ trillion in the year 2000, is generated in these counties and ocean waters. The figure of \$1 trillion comes off the counties, the coastal counties

alone, so we're talking about half the GDP comes out of these regions, and obviously that puts great stress on the region.

As one example, recreation and tourism is the largest sector of the coastal economy and it continues to grow rapidly. Despite selected achievements over the past three decades, however, evidence shows continued degradation of marine ecosystems. For example, about 12,000 beach closures and swimming advisories are issued annually and non-point sources of pollution, often generated far from the coast, are major, largely uncontrolled contributors to coastal contamination.

In our view, it quickly became apparent that the current management regime is outdated and incompatible with the developing picture of complex ecosystems. A Byzantine patchwork of the 15 Federal departments and independent agencies governs ocean and coastal policy in addition to regional, State, and local authority. The current system works poorly to address cumulative impacts and cross-jurisdictional ecosystem-based issues. There's a lack of coordination, of goals, of programs, of funding, at all levels.

These problems were not caused by any particular administration. They're the result of three decades of piecemeal administrative and legislative decisions. But it's absolutely vital that we act now to begin addressing them. Our vision for the future of ocean and coastal management relies on an ecosystem-based approach and that acknowledges the complexity of ecosystems and of human needs.

Ecosystem-based management cannot be constrained by artificial political boundaries such as county or state lines. Rather, it must consider broad ecosystem regions, including upstream watersheds, coastal communities, and offshore uses. This approach to management recognizes the relationships among all ecosystem components—the land, air, water, humans, and other species.

In order to move in these new directions, fundamental changes in governance and greatly improved science and education will be essential. I'd like to spend a few minutes discussing these changes. Let's talk about governance. Although it's hardly a catchy, headline-grabbing subject, good governance is at the heart of any policy change. To begin improving ocean governance, a new national ocean policy framework is essential.

That framework will be central to a comprehensive and coordinated national ocean policy, if in fact we want to carry one out, and it consists of several components. One, a National Ocean Council composed of Cabinet Secretaries and heads of independent agencies with ocean-related responsibilities to coordinate Federal ocean activities. Two, a President's Council of Advisors on Ocean Policy composed of representatives from State, local government, industry, non-governmental organizations, and others who can provide non-Federal perspectives on ocean policy. And I might add that this is not dissimilar from the Presidential Council of Advisers on Science and Technology.

Third, an assistant to the President to serve as a focal point for ocean policy in the Executive Office of the President, chair the National Ocean Council and co-chair the Presidential Council of Advisers on Ocean Policy. Fourth, a network of broadly inclusive, voluntarily established, Regional Ocean Councils to help coordinate

programs at the regional ecosystem level. Next, a coordinated off-shore management regime that encompasses traditional and emerging uses and is flexible enough to incorporate uses not yet foreseen. And finally, a strengthened and streamlined Federal agency structure achieved through a phased approach as outlined in our report.

Talk about science. Improved governance based on ecosystem-based management principles will provide many benefits, but it also imposes additional responsibilities on managers. Perhaps foremost among these new responsibilities is the need to collect better data, provide good science-based information, and improve our understanding of ecosystem function. This improved understanding will allow us to manage marine environments and resources wisely, conserving precious species and habitats while exploring beneficial new uses and protecting national security.

Based on our analysis, the ocean research budget could be doubled to \$1.3 billion a year to support essential basic and applied research. Just a few of the many topics to be explored should include the links between upstream activities and coastal water quality, the impacts of ocean and coastal conditions on human health, the role of oceans in climate, the status and functioning of marine systems and biodiversity, the socioeconomic contributions of coastal communities, and the mysteries awaiting in the vast unknown areas of the ocean.

To do their jobs, managers will also need vastly improved ocean and coastal monitoring and assessments. Implementation of the national Integrated Ocean Observing System, including both coastal and ocean components, will be a key to meeting this need. It was interesting this morning, Mr. Chairman, to read David Broder's comment in the *Washington Post* that dealt with the current meeting on Earth-observing system in Kyoto—or, I'm sorry, in Tokyo. And we are feeding a key component, the key component of that in our Integrated Ocean Observing System, which is the module to insert into the Earth-observing system, because it is key to climate change understanding, and so throughout our report we stress this.

And so our IOOS as we call it, Integrated Ocean Observing System, is the only program that we're really pushing very hard by this commission. The rest is policy, but this one we feel is so connected with policy and so connected with implementation that it must go forward, must be a national commitment. We must move out on it.

Education is next. Unfortunately, recent studies show that a majority of Americans have only a superficial understanding of the important role of the oceans to our economy and global ecosystem. Better lifelong education is recommended to promote public awareness and a sense of stewardship for the ocean. This awareness will then become the foundation for sustained public support. The interdisciplinary nature of ocean studies can be used to convey the basic principles of biology, chemistry, geology, physics, and the language of mathematics, and in an engaging manner.

We've also recommended that ocean-based curricula be developed to enhance student performance in areas such as geography, history, economics, policy, and law. In addition to educating the future leaders of our Nation, there are limited—there are a number of

specific recommendations outlined in the report to improve ocean awareness among the American public.

What about the management challenges? So far I've discussed the four cross-cutting themes of our report: ecosystem-based management, improved governance, better science for decisionmaking, and broad public education. But the commission also addressed a wide range of specific ocean management challenges. Eventually, solutions to all of these problems should be integrated within a more ecosystem-based management approach. The specific management challenges and detailed recommendations for solving them are outlined in our report.

Let's talk about implementation now of a policy. From the beginning, one of our priorities was to ensure that our recommendations for our integrated national ocean policy, one that could be implemented. In our report we are very specific about who should take the lead in carrying out every one of our nearly 200 recommendations. We also put considerable effort into estimating the costs involved. The commission strived to avoid creating unfunded mandates. We determined that new funding for States and Federal agencies will be essential for them to fulfill their front line ocean and coastal responsibilities. Our Nation's leaders, including the honorable members of this committee, should view funding for oceans and coasts as an investment in America's future.

The estimated new costs of the initiatives outlined in our report, including direct support to states for the critical role they play, will ramp up from \$1.2 billion in the first year to \$3.2 billion in the third and subsequent years. We believe this is a modest investment when you consider the economic, aesthetic, and ecosystem values of the oceans and coasts.

To cover these costs, the Commission recommends that revenue generated from activities in Federal waters should be considered as an appropriate funding stream. Through creation of an Ocean Policy Trust Fund, funded primarily out of unallocated outer continental shelf revenues, monies could be provided to coastal states and Federal agencies to support improved ocean and coastal management consistent with a new national ocean policy. These funds would supplement, not replace, existing appropriations, as well as supporting new or expanded duties.

Let me close by saying that I think we can all agree on the goal, achieving bountiful, sustainable oceans that benefit and inspire all Americans now and in the future. Implementation of the recommendations in our report will move us toward this goal, but the time to act is now, and everyone who cares about the oceans and coasts must play a part.

As a specific call to action for the U.S. Senate, we believe it's critical for the following actions to occur as soon as possible. Authorize the establishment in the Executive Office of the President of a National Ocean Council, a Presidential Council of Advisors on Ocean Policy, and an Office of Ocean Policy. Two, enact an organic act—I'm sorry, enact an organic act for NOAA. And third, create an Ocean Policy Trust Fund.

I thank you, Mr. Chairman, and Members of this Committee for holding this hearing and for the continuing support of the members of this committee on ocean issues. It is through your continued

leadership that this Nation will be in a position to realize the full potential of our oceans, and we look forward to working with you, and I along with all my fellow commissioners who are here with me today will certainly stand by and be happy to answer any of your questions.

[The prepared statement of Admiral Watkins follows:]

PREPARED STATEMENT OF ADMIRAL JAMES D. WATKINS, U.S. NAVY (RETIRED),
CHAIRMAN, U.S. COMMISSION ON OCEAN POLICY

Introduction

Mr. Chairman and members of the Committee, I am pleased to appear before you to discuss the Preliminary Report of the U.S. Commission on Ocean Policy, which was released to the public on Tuesday, April 20. We believe this report offers a blueprint for a coordinated, comprehensive national ocean policy for the 21st century. It includes nearly 200 action-oriented recommendations that present workable solutions for a broad range of ocean- and coastal-related issues.

As you know, the last comprehensive review of U.S. ocean policy took place more than 35 years ago when the Commission on Marine Science, Engineering and Resources—known as the Stratton Commission—issued its report, *Our Nation and the Sea*. Since then, considerable progress has been made, but many challenges remain and new issues have emerged. The value of the oceans to our Nation has only grown in 35 years, and the time to act is now.

The simple fact is that the oceans affect and sustain all life on Earth. They drive and moderate weather and climate, provide us with food, oxygen, transportation corridors, recreational opportunities, energy resources and other natural products, and serve as a national security buffer. In our travels around the country, we heard and saw first-hand how communities care about the ocean and coasts, and how they worry about their future.

The Value of the Oceans and Coasts

America's oceans and coasts provide ecological and aesthetic benefits with tremendous value to our national economy. In 2000, the ocean economy contributed more than \$117 billion to American prosperity and supported well over two million jobs. More than \$1 trillion, or one-tenth of the Nation's annual GDP, is generated within the relatively narrow strip of land immediately adjacent to the coast. Considering the economies of all coastal watershed counties, that contribution swells to over \$4.5 trillion, fully half of the Nation's GDP. The contribution to employment is equally impressive, with 16 million jobs in the nearshore zone and 60 million in coastal watershed counties.

The country also remains highly dependent on marine transportation. More than thirteen million jobs are connected to the trade transported through the Nation's network of ports and inland waterways. Annually, the Nation's ports handle more than \$700 billion in goods. The cruise industry and its passengers account for another \$11 billion in spending.

Offshore oil and gas operations have expanded into deeper waters with new and improved technologies. The offshore oil and gas industry's annual production is valued at \$25–\$40 billion, and its yearly bonus bid and royalty payments contribute approximately \$5 billion to the U.S. Treasury.

The commercial fishing industry's total annual value exceeds \$28 billion, with the recreational saltwater fishing industry valued at around \$20 billion, and the annual U.S. retail trade in ornamental fish worth another \$3 billion. Nationwide, retail expenditures on recreational boating exceeded \$30 billion in 2002.

In the last three decades, more than 37 million people and 19 million homes have been added to coastal areas. Every year, hundreds of millions of Americans and international visitors flock to the coasts to enjoy the oceans, spending billions of dollars and directly supporting more than a million and a half jobs. In fact, tourism and recreation is one of the fastest-growing business sectors—enriching economies and supporting jobs in communities virtually everywhere along the coasts of the continental United States, southeast Alaska, Hawaii, and our island territories and commonwealths.

These concrete, quantifiable contributions to the national economy are just one measure of the oceans' value. We also love the oceans for their beauty and majesty, and for their intrinsic power to relax, rejuvenate, and inspire. Unfortunately, we are starting to love our oceans to death.

Trouble in Paradise

Development comes with costs, and we are only now discovering the full extent of those costs. Pollution, depletion of fish and other living marine resources, habitat destruction and degradation, and the introduction of invasive non-native species are just some of the ways people harm the oceans, with serious consequences for the entire planet.

In 2001, 23 percent of the Nation's estuarine areas were not suitable for swimming, fishing, or supporting marine species. In 2002, about 12,000 beach closings and swimming advisories were issued across the nation, most due to the presence of bacteria associated with fecal contamination. Marine toxins afflict more than 90,000 people annually across the globe and are responsible for an estimated 62 percent of all seafood-related illnesses. Such events are on the rise, costing millions of dollars a year in decreased tourism revenues and increased health care costs.

Experts estimate that 25 to 30 percent of the world's major fish stocks are over-exploited, and many U.S. fisheries are experiencing similar difficulties. Since the Pilgrims first arrived at Plymouth Rock, over half of our fresh and saltwater wetlands—more than 110 million acres—have been lost.

Our failure to properly manage the human activities that affect oceans and coasts is compromising their ecological integrity and diminishing our ability to fully realize their potential. Congress recognized this situation when it passed the Oceans Act of 2000 calling for a Commission on Ocean Policy to establish findings and develop recommendations for a coordinated and comprehensive national ocean policy. Pursuant to that Act, the President appointed 16 Commission members, including individuals nominated by the leadership in the United States Senate and the House of Representatives. These individuals were drawn from diverse backgrounds with knowledge in ocean and coastal activities.

Because of the vast scope of topics the Commission was required to address, it sought input from individuals across the country. The Commission members traveled around the United States obtaining valuable information from diverse marine-related interests. They heard testimony on ocean and coastal issues during nine regional meetings and experienced regional concerns first-hand during seventeen site visits. The regional meetings also highlighted relevant success stories and regional models with potential national applicability.

Four additional public meetings were held in Washington, D.C., after completion of the regional meetings, to publicly present and discuss many of the policy options under consideration for the Commission's recommendations. In all, the Commission heard from some 445 witnesses, including over 275 invited presentations and an additional 170 comments from the public, resulting in nearly 1,900 pages of testimony (included as Appendices to the report).

The message we heard was clear: the oceans and coasts are in trouble and major changes are urgently needed. While new scientific understanding shows that natural systems are complex and interconnected, our decisionmaking and management approaches have not been updated to reflect that complexity and interconnectedness. Responsibilities remain dispersed among a confusing array of agencies at the Federal, State, and local levels. Better approaches and tools are also needed to gather data to understand the complex marine environment. Perhaps most important, people must understand the role the oceans have on their lives and livelihoods and the impacts they themselves have on the oceans.

As the result of significant thought and deliberation and the consideration of a wide range of potential solutions, the Commission prepared its preliminary report containing bold and broad-reaching recommendations for reform—reform that needs to start now, while it is still possible to reverse distressing declines, seize exciting opportunities, and sustain the oceans and their valuable assets for future generations.

Vision and Strategy for the 21st Century

Any strategy for change must begin with a clear picture of the desired endpoint. In the desirable future we wish to create, the oceans and coasts would be clean, safe, and sustainably managed. They would contribute significantly to the economy, supporting multiple beneficial uses such as food production, development of energy and mineral resources, recreation, transportation of goods and people, and the discovery of novel medicines and other products, while preserving a high level of biodiversity and a full range of natural habitats. The coasts would be attractive places to live, work and play, with clean water and beaches, easy public access, sustainable economies, safe bustling harbors and ports, adequate roads and services, and special protection for sensitive habitats. Beach closings, toxic algal blooms, proliferation of invasive species, and vanishing native species would be rare. Better land use plan-

ning and improved predictions of severe weather and other natural hazards would save lives and money.

The management of our oceans and coasts would also look different: it would follow ecosystem boundaries, considering interactions among all elements of the system, rather than addressing isolated areas or problems. In the face of scientific uncertainty, managers would balance competing considerations and proceed with caution. Ocean governance would be effective, participatory, and well-coordinated among government agencies, the private sector, and the public.

Managers and politicians would recognize the critical importance of good data and science, providing strong support for physical, biological, social, and economic research. The nation would invest in the tools and technologies needed to conduct this research: ample, well-equipped surface and underwater research vessels; reliable, sustained satellites; state-of-the-art computing facilities; and innovative sensors that withstand harsh ocean conditions. A widespread network of observing and monitoring stations would provide data for research, planning, marine operations, timely forecasts, and periodic assessments. Scientific findings and observations would be translated into practical information, maps, and products used by decisionmakers and the public.

Better education would be a cornerstone of ocean policy, with the United States once again joining the top ranks in math, science, and technology achievement. An ample, well-trained, and motivated workforce would be available to study the oceans, set wise policies, apply technological advances, engineer new solutions, and teach the public about the value and beauty of the oceans and coasts throughout their lives. As a result of this lifelong education, people would understand the links among the land, sea, air, and human activities and would be better stewards of the Nation's resources.

Finally, the United States would be a leader and full partner globally, sharing its science, engineering, technology, and policy expertise, particularly with developing countries, to facilitate the achievement of sustainable ocean management on a global level.

The Commission believes this vision is practical and attainable. To achieve it, national ocean policy should be guided by a set of overarching principles including the following:

Sustainability: Ocean policy should be designed to meet the needs of the present generation without compromising the ability of future generations to meet their needs.

Stewardship: The principle of stewardship applies both to the government and to every citizen. The U.S. government holds ocean and coastal resources in the public trust—a special responsibility that necessitates balancing different uses of those resources for the continued benefit of all Americans. Just as important, every member of the public should recognize the value of the oceans and coasts, supporting appropriate policies and acting responsibly while minimizing negative environmental impacts.

Ocean–Land–Atmosphere Connections: Ocean policies should be based on the recognition that the oceans, land, and atmosphere are inextricably intertwined and that actions that affect one Earth system component are likely to affect another.

Ecosystem-based Management: U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.

Multiple Use Management: The many potentially beneficial uses of ocean and coastal resources should be acknowledged and managed in a way that balances competing uses while preserving and protecting the overall integrity of the ocean and coastal environments.

Preservation of Marine Biodiversity: Downward trends in marine biodiversity should be reversed where they exist, with a desired end of maintaining or recovering natural levels of biological diversity and ecosystem services.

Best Available Science and Information: Ocean policy decisions should be based on the best available understanding of the natural, social, and economic processes that affect ocean and coastal environments. Decisionmakers should be able to obtain and understand quality science and information in a way that facilitates successful management of ocean and coastal resources.

Adaptive Management: Ocean management programs should be designed to meet clear goals and provide new information to continually improve the sci-

entific basis for future management. Periodic reevaluation of the goals and effectiveness of management measures, and incorporation of new information in implementing future management, are essential.

Understandable Laws and Clear Decisions: Laws governing uses of ocean and coastal resources should be clear, coordinated, and accessible to the Nation's citizens to facilitate compliance. Policy decisions and the reasoning behind them should also be clear and available to all interested parties.

Participatory Governance: Governance of ocean uses should ensure widespread participation by all citizens on issues that affect them.

Timeliness: Ocean governance systems should operate with as much efficiency and predictability as possible.

Accountability: Decisionmakers and members of the public should be accountable for the actions they take that affect ocean and coastal resources.

International Responsibility: The United States should act cooperatively with other nations in developing and implementing international ocean policy, reflecting the deep connections between U.S. interests and the global ocean.

Ecosystem-based Management

Ecosystem-based management emerged as an overarching theme of the Commission's work. To move toward more ecosystem-based approaches, managers must consider the relationships among all ecosystem components, including human and nonhuman species and the environments in which they live. Management areas should be defined based on ecosystem, rather than political, boundaries. A balanced precautionary approach should be adopted that weighs the level of scientific uncertainty and the potential risk of damage before proceeding.

In moving toward an ecosystem-based approach, the U.S. Commission on Ocean Policy considers the following actions absolutely critical. First, a new national ocean policy framework must be established to improve Federal leadership and coordination and enhance opportunities for State, territorial, tribal, and local entities to improve responses at the regional level. Second, decisions about ocean and coastal resources need to be based on the most current, credible, unbiased scientific data. And third, improved education about the oceans is needed to give the general public a sense of stewardship and prepare a new generation of leaders to address ocean issues.

Improving Governance

Many different entities at the Federal, regional, State, territorial, tribal and local levels participate in the management of the Nation's oceans and coasts. At the Federal level, eleven of the fifteen existing cabinet-level departments and four independent agencies play important roles in the development of ocean and coastal policy. All of these Federal agencies also interact in various ways with State, territorial, tribal, and local entities.

A lack of communication and coordination among the various agency programs at the national level, and among Federal, State and local stakeholders at the regional level, continues to inhibit effective action. A new National Ocean Policy Framework is needed to provide high-level attention and coordinated implementation of an integrated national ocean policy.

National Coordination and Leadership

A first step in enhancing management, and a central part of the new National Ocean Policy Framework, is improved coordination among the many Federal programs. A number of attempts have been made to coordinate on particular topics, such as coral reefs or marine transportation, or within a broad category, such as ocean science and technology. Within the Executive Office of the President, three entities have specific responsibilities relevant to oceans: the Office of Science and Technology Policy that addresses government-wide science and technology issues and includes an ocean subcommittee; the Council on Environmental Quality (CEQ) that oversees broad Federal environmental efforts and implementation of the National Environmental Policy Act; and the National Security Council's Policy Coordinating Committee that addresses international issues and also includes a subcommittee on international ocean issues.

While all these coordinating bodies are helpful in their designated areas of interest, they do not constitute a high-level interagency mechanism able to deal with all of the interconnected ocean and coastal challenges facing the nation, including not only science and technology, the environment, and international matters, but the many other economic, social, and technical issues that affect the ocean.

The value of the ocean to American society also cries out for greater visibility and leadership. Only the Executive Office of the President can transcend traditional conflicts among departments and agencies, make recommendations for broad Federal agency reorganization, and provide guidance on funding priorities, making it the appropriate venue for coordinating an integrated national ocean policy.

National Ocean Council

Congress should establish a National Ocean Council within the Executive Office of the President to provide high-level attention to ocean and coastal issues, develop and guide the implementation of appropriate national policies, and coordinate the many Federal departments and agencies with ocean and coastal responsibilities. The National Ocean Council, or NOC, should be composed of cabinet secretaries of departments and directors of independent agencies with relevant ocean- and coastal-related responsibilities and should carry out a variety of functions including the following:

- developing broad principles and national goals for ocean and coastal governance;
- making recommendations to the President on national ocean policy;
- coordinating and integrating activities of ocean-related Federal agencies;
- identifying statutory and regulatory redundancies or omissions and developing strategies to resolve conflicts, fill gaps, and address new and emerging ocean issues;
- developing and supporting partnerships between government agencies and non-governmental organizations, the private sector, academia, and the public.

Presidential Council of Advisors on Ocean Policy

A Presidential Council of Advisors on Ocean Policy, co-chaired by the Chair of the National Ocean Council and a non-Federal member, should advise the President on ocean and coastal policy matters and serve as a formal structure for input from non-Federal individuals and organizations. It should be composed of a representative selection of individuals appointed by the President, including governors of coastal states, other appropriate State, territorial, tribal and local government representatives, and individuals from the private sector, research and education communities, nongovernmental organizations, watershed organizations and other non-Federal bodies with ocean interests. The members should be knowledgeable about and experienced in ocean and coastal issues.

Need for Presidential Action—the Assistant to the President

Although Congress should establish the National Ocean Council and the Presidential Council of Advisors on Ocean Policy in law to ensure their long-term future, the Commission is cognizant of the complex and often lengthy nature of the legislative process. While awaiting congressional action, the President should immediately establish these entities through Executive Order, and should appoint an Assistant to the President to chair the Council. As chair of the NOC and co-chair of the Presidential Council of Advisors on Ocean Policy, the Assistant to the President should lead the coordination of Federal agency actions related to oceans and coasts, make recommendations for Federal agency reorganization as needed to improve ocean and coastal management, resolve interagency policy disputes, and promote regional approaches. The Assistant to the President should also advise OMB and the agencies on appropriate funding levels for important ocean- and coastal-related activities, and prepare a biennial report as mandated by section 5 of the Oceans Act of 2000.

Office of Ocean Policy

Because the National Ocean Council will be responsible for planning and coordination rather than operational duties, the support of a small staff and committees will be required to carry out its functions. An Office of Ocean Policy should support the Assistant to the President, the National Ocean Council, and the Presidential Council of Advisors on Ocean Policy. The Office of Ocean Policy should be composed of a small staff that reports to the Assistant to the President, managed by an executive director responsible for day-to-day activities. Strong links should be maintained among the National Ocean Council, its committees and staff, other parts of the Executive Office of the President, and ocean-related advisory councils and commissions.

Committee on Ocean Science, Education, Technology, and Operations

A committee under the National Ocean Council will be needed to assume the functions of the current National Ocean Research Leadership Council (NORLC), a congressionally-established government coordination and leadership organization for

oceanographic research programs on the national level. By placing the NORLC under the NOC and broadening its responsibilities to include operational programs and educational activities in addition to research, it will become more visible and more effective. In recognition of its broader mandate, the NORLC should be redesignated as the Committee on Ocean Science, Education, Technology, and Operations (COSETO). Strong connections between the Office of Science and Technology Policy and the NOC (through COSETO) will be essential. To eliminate overlapping functions, the National Science and Technology Council's Joint Subcommittee on Oceans, should be subsumed into COSETO.

Committee on Ocean Resource Management

The National Ocean Council will need a second committee, to coordinate Federal resource management policy, including the many existing, single-issue coordination efforts such as the Coral Reef Task Force, the Interagency Committee on the Marine Transportation System, the National Dredging Team, Coastal America, and many others. The NOC Committee on Ocean Resource Management (CORM) would perform high-level, cross-cutting oversight of these issue-specific efforts to ensure consideration of cumulative impacts, minimize conflicting mandates, and implement an ecosystem-based management approach. Because of the Council on Environmental Quality's role in environmental issues, this office should also maintain strong connections with the National Ocean Council and its CORM.

A Regional Approach

In addition to improved coordination at the national level, an important component of the new National Ocean Policy Framework is the promotion of regional approaches that allow decisionmakers to address issues across jurisdictional lines. The nation's ocean and coastal resources are affected by human activities that span cities, counties, States, and sometimes nations. Federal, State, territorial, tribal, and local governments need the ability to respond to ocean and coastal issues in a coordinated fashion within regions defined by the boundaries of ecosystems rather than somewhat arbitrary government jurisdictions. The voluntary establishment of regional ocean councils, improved coordination of Federal agency efforts at the regional level, and dissemination of regionally significant research and information would enhance regional coordination and improve responses to regional issues.

Creating Regional Ocean Councils

There are many examples where concern for the health of a particular ecosystem (such as the Chesapeake Bay, Pacific Northwest, Gulf of Mexico, or Mississippi River Basin) has motivated a wide range of participants to create new structures for addressing regional concerns. There is a growing awareness that existing regional approaches can be strengthened and similar approaches can benefit the health and productivity of all the Nation's ocean and coastal regions.

Regional ocean councils can serve as mechanisms for a wide range of participants to join forces to address issues of regional concern, realize regional opportunities, identify regional goals, and promote a sense of stewardship for a specific area among all levels of government, private interests, and the public. It will be up to the participants—including representatives from all levels of government, the private sector, nongovernmental organizations, and academia—to determine how the council will operate in each region. Possible council functions might include:

- designating ad hoc subcommittees to examine specific issues of regional concern;
- mediating and resolving disputes among different interests in the region;
- monitoring and evaluating the state of the region and the effectiveness of management efforts;
- building public awareness about regional ocean and coastal issues;
- facilitating government approvals or permitting processes that involve several Federal, State, and local government agencies within the region; and
- helping to link activities located in upstream, coastal, and offshore areas within an ecosystem-based management context.

Regional ocean councils should be created by interested parties at the State and local level, rather than mandated by the Federal Government. However, to stimulate the process, the National Ocean Council should develop flexible guidelines for the voluntary creation of regional ocean councils. Initial efforts should be encouraged in regions where readiness and support for a regional approach is already strong. The first councils can then serve as pilot projects, allowing those involved to learn what works in the region, building support to implement a regional ocean

council, and paving the way for councils in other regions. Once established, regional ocean councils will most likely evolve, as participants identify the structure and functions that best suit their needs. Whether a council has decisionmaking authority will be up to the regional participants. National involvement may be necessary to implement more formal decisionmaking mechanisms such as legislation, interagency agreements, and interstate compacts.

Regional ocean councils should encompass an area from the inland extent of coastal watersheds to the offshore boundary of the Nation's EEZ. The boundaries of the Regional Fishery Management Councils (RFMCs) may be considered as a starting point, although these regions may not always be suitable. For example, more than one regional ocean council will probably be necessary within California where there is only one RFMC. A regional ocean council for the Great Lakes region is also desirable.

Improving Regional Coordination of Federal Agencies

While the process of planning, establishing, and testing regional ocean councils is underway, Federal agencies should be directed to immediately improve their own regional coordination and provide stronger institutional, technical, and financial support for regional issues. Currently, the actions of Federal agencies often overlap, conflict, or are inconsistent with one another at the regional and State levels. Although several Federal agencies already divide their operations into regions, the boundaries of these regions differ from one agency to the next, the functions of regional offices vary widely, and it is common for the regional office of one agency to operate in isolation from the regional offices of other agencies. Improved regional coordination should be a first step, followed in time by Federal reorganization around common regional boundaries.

Enhancing Regional Research and Information

Decisionmakers at all levels need the best available science, information, tools, and technology on which to base ocean and coastal management decisions. However, research and data collection targeted at regional concerns is severely limited. Furthermore, the data that do exist are rarely translated into products that are useful to managers. Regional ocean information programs should be established to set priorities for research, data collection, information products, and outreach activities in support of improved regional management. Where and when they are established, regional ocean councils will be the logical bodies to administer these programs.

Improved Governance of Offshore Waters

Converging economic, technological, legal, and demographic factors make Federal waters an increasingly attractive place for enterprises seeking to tap the ocean's resources. The challenge for policymakers will be to realize the ocean's potential while minimizing conflicts among users, safeguarding human and marine health, and fulfilling the Federal Government's obligation to manage public resources for the maximum long-term benefit of the entire nation. While institutional frameworks exist for managing some ocean uses, increasingly unacceptable gaps remain.

The array of agencies involved, and their frequent lack of coordination, can create roadblocks to public participation, discourage private investment, cause harmful delays, and generate unnecessary costs. This is particularly true for new ocean uses that are subject to scattered or ill defined Federal agency authorities and an uncertain decisionmaking process. Without an understandable, streamlined, and broadly accepted method for reviewing proposed activities, ad hoc management approaches will continue, perpetuating uncertainty and raising questions about the comprehensiveness and legitimacy of decisions.

To start, each existing or foreseeable activity in Federal waters should be overseen by one lead Federal agency, designated by Congress to coordinate among all the agencies with applicable authorities while ensuring full consideration of the public interest. Pending such designations, the NOC should assign agencies to coordinate research, assessment, and monitoring of new offshore activities.

But better management of individual activities is only a first step. To move toward an ecosystem-based management approach, the Federal Government should develop a broad understanding of offshore areas and their resources, prioritize all potential uses, and ensure that activities within a given area are compatible. As the pressure for offshore uses grows, and before serious conflicts arise, coordination should be improved among the management programs for different offshore activities. The National Ocean Council should review each single-purpose program that regulates some offshore activity with the goal of determining how all such programs may be better coordinated.

Ultimately, the Nation needs a coordinated offshore management regime that encompasses traditional and emerging uses, and is flexible enough to incorporate uses

not yet foreseen. The new regime will need to make decisions and resolve disputes through an open process accepted by all parties. Congress, working with the NOC and regional ocean councils, should establish such an offshore management regime and establish principles for offshore use, including the need to:

- integrate single-purpose programs within the broader offshore regime;
- create a planning process for new and emerging activities; and
- ensure a reasonable return to the public in exchange for allowing private interests to profit from public resources.

Establishing a coordinated offshore management regime will take time, and it will not be easy. No regime for governing ocean activities will eliminate all conflicts, given the complexity of the problems and the diverse perspectives of competing interests. However, the National Ocean Council, Presidential Council of Advisors on Ocean Policy, regional ocean councils, and other components of the National Ocean Policy Framework provide a promising basis for more coordinated, participatory management of ocean activities.

Marine Protected Areas

In contemplating the coordinated, ecosystem-based management of both nearshore and offshore areas, marine protected areas can be a valuable tool. Marine protected areas can be created for many different reasons, including conserving living marine resources and habitat, protecting endangered or threatened species, maintaining biological diversity, and preserving historically or culturally important submerged archaeological resources. These areas have also been recognized for their scientific, recreational, and educational values.

The creation of new MPAs can be a controversial process: supported by those who see their benefits, while vigorously opposed by others who dislike the limitations MPAs impose on ocean uses. Thus, it is important to engage local and regional stakeholders in the design and implementation of marine protected areas to build support and ensure compliance with any restrictions. Because marine protected areas also have national implications, such as possible impacts on freedom of navigation, Federal involvement and oversight will still be needed.

With its multiple use, ecosystem-based perspective, the National Ocean Council should oversee the development of a flexible process—which is adaptive and based on best available science—to design and implement marine protected areas. Regional ocean councils, or other appropriate entities, can provide a forum for applying the process developed by the NOC, with broad stakeholder participation.

Strengthening and Streamlining the Federal Agency Structure

Although improved coordination is a vital aspect of the new National Ocean Policy Framework, changes to the Federal agency structure itself will also be needed. The proliferation of Federal agencies with some element of responsibility for ocean and coastal activities immediately suggests that some consolidation is possible. Combining similar ocean and coastal functions and programs could improve government performance, reduce unnecessary overlaps, facilitate local, State, and regional interactions with the Federal Government, and begin to move the Nation toward a more ecosystem-based management approach.

However, the complex Legislative and Executive Branch process for making such changes compels a cautious, methodical, multi-phased approach for improving the Federal structure.

Strengthening NOAA—Phase I

NOAA's mission is to understand and predict changes in the Earth's environment and to conserve and manage ocean and coastal resources to meet the Nation's economic, social, and environmental needs. Since its creation, NOAA has made significant strides in many areas, despite programmatic and functional overlaps and frequent disagreements and disconnects among its five line offices. Although the organization has evolved over time, including the recent creation of a sixth line office to improve integration on specific issues, these changes take time and results can be hard to quantify.

There is widespread agreement that NOAA needs to manage its current activities more effectively. Moreover, if the recommendations in the Commission's preliminary report are implemented, NOAA will be required to handle a number of new responsibilities. A stronger, more effective, science-based and service-oriented ocean agency—one that contributes to better management of oceans and coasts through an ecosystem-based approach—is needed.

NOAA's three primary functions can be summarized as follows:

(1) *Assessment, prediction, and operations* for ocean, coastal, and atmospheric environments, including mapping and charting, satellite-based and in situ data collection, implementation of the Integrated Ocean Observing System, data information systems, and weather services and products.

(2) *Marine resource and area management*, including fisheries, ocean and coastal areas, vulnerable species and habitats, and protection from pollution and invasive species.

(3) *Scientific research and education*, including a focus on applied research, the availability of scientifically valid data, and promotion of educational activities.

One of the critical objectives for a strengthened NOAA is improved performance within these categories and smoother interactions among them. For example, resource management decisions should be based on the best available science, research itself should be planned to support the agency's management missions, and research in different areas—sea, land, and air—should be connected and coordinated. Changes of this nature will likely require adjustments to the internal operation of the agency, including possible additional changes to the current line office structure.

These changes can be promoted by codifying the establishment and functions of the National Oceanic and Atmospheric Administration through passage of an organic act for the agency. The act should ensure that NOAA's structure is consistent with the principles of ecosystem-based management and with its primary functions: assessment, prediction, and operations; management; and research and education. NOAA will require budget support commensurate with its important, varied, and growing responsibilities.

Reviewing NOAA's Budget

NOAA's placement within the Department of Commerce has an unusual history and continues to be questioned by many observers. If nothing else, this affiliation has distinct budgetary implications. As part of DOC, NOAA's budget is reviewed within the Office of Management and Budget's General Government Programs, along with other DOC programs with fundamentally different characteristics and missions. NOAA's OMB review also fails to consider its ocean and atmospheric programs in context with other Federal resource management and science programs. To support the move toward a more ecosystem-based management approach, NOAA's budget should be reviewed within OMB's Natural Resources Programs, along with the budgets of more similar departments and agencies.

Consolidating Ocean and Coastal Programs—Phase II

As I have said, many agencies across the Federal Government—in addition to NOAA—administer ocean- and coastal-related programs. Although I have focused on NOAA as the primary ocean agency, the other agencies should also be strengthened in similar ways.

However, even solid performance within each agency will not eliminate the many similar or overlapping activities. In some cases, programmatic overlap can provide useful checks and balances as agencies bring different perspectives and experiences to the table. In other cases, the number of separate agencies addressing a similar issue is not helpful. Such fragmentation diffuses responsibility, introduces unnecessary overlap, raises administrative costs, inhibits communication, and interferes with the development of a comprehensive management regime that addresses issues within an ecosystem-based context.

The Commission's preliminary report presents specific recommendations on program consolidation in areas such as nonpoint source pollution, area-based ocean and coastal resource management, vessel pollution, invasive species, marine mammals, aquaculture, and satellite-based Earth observing. Using these recommendations as a starting point, the Assistant to the President, with advice from the National Ocean Council and the Presidential Council of Advisors on Ocean Policy, should review Federal ocean, coastal and atmospheric programs, and recommend further opportunities for consolidation.

Programs not suitable for consolidation—such as security-related programs that cannot be transferred without harm to the overall enterprise—should continue to be coordinated through the National Ocean Council and the regional ocean councils. However, in most cases, judicious consolidation of ocean- and coastal-related functions will improve policy integration and program effectiveness.

Presidential Reorganization Authority

The recommended program consolidation will not be easy within the current legislative process. The creation and reorganization of agencies is often contentious, lengthy, and uncertain, involving multiple committees in both houses of Congress.

Recognizing this shortcoming, Congress has several times in the past chosen to give the President limited reorganization authority. Renewing this authority by allowing the President to propose agency reorganization, with an expedited and limited congressional review and approval process, would provide an excellent mechanism to achieve reorganization of Federal ocean- and coastal-related agencies in a timely fashion.

*Managing all Natural Resources in an Ecosystem-based Management Context—
Phase III*

Strengthening the performance of ocean, coastal, and atmospheric programs through coordination and consolidation are important steps in moving toward an ecosystem-based management approach. By immediately establishing the National Ocean Council and strengthening NOAA, followed by the consolidation of suitable ocean and coastal programs and functions, the Nation will be poised to take a further step in strengthening the Federal Government structure.

Based on a growing understanding of ecosystems, including recognition of the inextricable links among the sea, land, air, and all living things, a more fundamental reorganization of Federal resource agencies will eventually be needed. Consolidation of all natural resource functions, including those involving oceans and coasts, would enable the Federal Government to move toward true ecosystem-based management. This could be implemented through the establishment of a Department of Natural Resources or some other structural unification that brings together all of the Nation's natural resource programs.

Science-Based Decision: Advancing Our Understanding of the Oceans

Ecosystem-based management provides many potential benefits, but also imposes new responsibilities on managers. The need to collect good information and to improve understanding is perhaps foremost among these new responsibilities. Despite considerable progress over the last century, the oceans remain one of the least explored and most poorly understood environments on the planet.

Greater knowledge can enable policymakers and managers to make wise, science-based decisions at the national, regional, State, and local levels. However, existing research and monitoring programs, which tend to be agency-specific and single issue oriented, will need to be reorganized to support ecosystem-based management. The current mismatch between the size and complexity of marine ecosystems and the fragmented research and monitoring programs for coastal and ocean ecosystems must be resolved.

The nation also lacks effective mechanisms for incorporating scientific information into decisionmaking in a timely manner. As knowledge improves, it must be translated into useful terms and actively incorporated into policy through an adaptive process. To make the translation effective, local, State, regional, and national managers need avenues to communicate their information needs and priorities to the research community.

In addition to these practical needs, ocean science and technology will continue to be an integral part of the overall U.S. basic research enterprise and future discoveries will undoubtedly contribute greatly to society. Fundamental knowledge about the oceans is essential to understanding the Earth's environment and how it changes over time, assessing and predicting the status of marine resources, finding beneficial new uses of ocean resources, and protecting national security.

Federal Leadership in Ocean Science and Technology

Our Commission defines ocean science and technology broadly to include: exploration of new ocean environments; basic and applied research to increase understanding of the biology, chemistry, physics, and geology of the oceans and coasts, their interactions with terrestrial, hydrologic, and atmospheric systems, and the interactions between ocean and coastal regions and humans; and the development of new methodologies and instruments.

Today, 15 Federal agencies support or conduct diverse activities in ocean science, technology, assessment, and management. The heads of these agencies direct the National Oceanographic Partnership Program (NOPP), which coordinates national oceanographic research and education. NOPP has provided a useful venue for agencies to support a small number of ocean science and technology projects, but it has not realized its full potential as an overarching mechanism for coordination among Federal agencies and State, local, academic, and private entities.

Under the proposed National Ocean Policy Framework, the National Ocean Council's Committee on Ocean Science, Education, Technology, and Operations (COSETO) will assume leadership of NOPP to implement a broad national strategy for ocean research, education, observation, exploration, and marine operations. NOPP's existing offices and committees will be incorporated within this structure.

Ocean.US, the lead office for planning the Integrated Ocean Observing System (IOOS), and the Federal Oceanographic Facilities Committee which provides advice on oceanographic facilities, will both report to COSETO.

Creating a National Strategy for Ocean Science and Technology

The United States needs a national strategy for ocean and coastal research, exploration, and marine operations that can help meet the ocean resource management challenges of the 21st century and ensure that useful products result from Federal investments in ocean research. Much more needs to be known about how marine ecosystems function on varying spatial scales, how human activities affect marine ecosystems and how, in turn, these changes affect human health. Coordinated and enhanced research activities and marine operations are needed to:

- understand biological, physical, and chemical processes and interactions
- maintain overall ecosystem health and biological diversity
- observe, monitor, assess, and predict environmental events and long-term trends
- explore the ocean depths for new resources
- map ocean and coastal areas for safe navigation and resource management

Furthermore, the ocean and coastal environment is rife with conflicts among competing users and between groups of people applying different sets of values to the same issues. To resolve these conflicts, information is needed not only about the natural environment but also about relevant social, cultural, and economic factors.

Better coordination and increased support of ocean science and technology activities nationwide will help the United States to address numerous management challenges, and will position the Nation to quickly tackle new issues as they emerge.

Advancing Ocean and Coastal Research

The United States has a wealth of ocean research expertise spread across a network of government and industry laboratories and world-class universities, colleges, and marine centers. With strong Federal support, these institutions made the United States the world leader in oceanography during the 20th century. However, a leader cannot stand still. Ocean and coastal management issues continue to grow in number and complexity, new fields of study have emerged, new interdisciplinary approaches are being tried, and there is a growing need to understand the ocean on a global and regional scale. All this has created a corresponding demand for high-quality scientific information. And while the need for increased information continues to grow, the Federal investment in ocean research has stagnated in recent decades.

The current annual Federal investment in marine science is well below the level necessary to address adequately the Nation's needs for coastal and ocean information. Unless funding increases sharply, the gap between requirements and resources will continue to grow and the United States will lose its position as the world's leader in ocean research.

Congress should double the Federal ocean and coastal research budget over the next five years, from the 2004 level of approximately \$650 million to \$1.3 billion per year. As part of this increase, the National Ocean Council or Congress should:

- fund the research component of the regional ocean information programs to provide practical, management-oriented information at regional, State, and local levels;
- create a national program for social science and economic research to examine the human dimensions and economic value of the Nation's oceans and coasts, with funding of at least \$8–10 million a year;
- establish a joint Oceans and Human Health Initiative funded at \$28 million a year;
- significantly increase the budget of the National Sea Grant College Program.

To ensure that increased investments are used wisely and that important research activities continue, Federal agencies will need to create long-term strategic plans. A mechanism is required to coordinate federally-funded ocean research, support long-term projects, and create partnerships throughout all agencies and sectors. Transparent and comprehensive research plans would achieve these goals and ensure that research results can be translated into operational products in a timely manner. The National Ocean Council should develop a national ocean research strategy that reflects a long-term vision, promotes advances in basic and applied ocean science and technology, and guides relevant agencies in developing ten-year science plans and budgets.

Ocean Exploration

About 95 percent of the ocean floor remains unexplored, much of it located in harsh environments such as the polar latitudes and the Southern Ocean. Experience teaches us, however, that these vast and remote regions teem with undiscovered species and resources. On virtually every expedition, oceanographers discover fascinating new creatures. Advances in deep-sea technologies have also made it easier to locate shipwrecks and historical artifacts lost in the ocean depths, such as the stunning discovery of the *RMS Titanic* in 1985. The continued exploration of marine archaeological sites will help us to better understand human history and our global cultural heritage.

Very little is known about the ocean depths due primarily to the lack of a long-term, large-scale national commitment to ocean exploration. In 2000, recommendations from the President's Panel on Ocean Exploration led to the establishment of the Office of Exploration within NOAA, at a modest funding level of \$4 million in Fiscal Year 2001, and \$14 million in each of Fiscal Years 2002 and 2003. This program is helping NOAA to fulfill its applied science, environmental assessment, and technology development responsibilities; although the program's small budget and agency-specific focus limit its effectiveness.

NOAA and NSF, by virtue of their missions and mandates, are well positioned to lead a global U.S. ocean exploration effort. NOAA currently runs the Office of Ocean Exploration, but NSF's focus on basic research provides an excellent complement to NOAA's more applied mission. Working together, the two agencies have the capacity to systematically explore and conduct research in previously unexamined ocean environments. To succeed, coordination, joint funding, and interactions with academia and industry will be essential. Congress should appropriate significant funding for an expanded national ocean exploration program and the National Oceanic and Atmospheric Administration and the National Science Foundation should be designated as the lead agencies. An expanded national ocean exploration program will require a budget of approximately \$110 million annually, plus additional funds for required infrastructure.

Mapping, Charting, and Assessments

The need for routine mapping, monitoring, and assessment of U.S. waters has grown significantly in the past two decades. Accurate, up-to-date maps and charts of harbors, coastlines, and the open ocean are necessary for many activities, including shipping, military operations, and scientific research. In addition, expanded regulatory regimes rely heavily on routine assessments of living and nonliving marine resources and water quality. Modern sensor technologies, which can detect new variables in greater detail in the water column and seafloor, have improved our ability to follow changing ocean and terrestrial dynamics. But as these new technologies are implemented, they need to be calibrated against previous methods, as well as with each other, to provide useful environmental characterizations and ensure the consistency of long-term statistical data sets.

At least ten Federal agencies, almost all coastal states, and many local agencies, academic institutions, and private companies are involved in mapping, charting, and assessing living and nonliving resources in U.S. waters. However, different organizations use varying methods for collecting and presenting these data, leading to disparate products that contain gaps in the information they present. Ideally, a variety of information (*e.g.*, bathymetry, topography, bottom type, habitat, salinity, vulnerability) should be integrated into maps using Global Positioning System coordinates and a common geodetic reference frame. In addition, these maps should include living marine resources, energy resources, and environmental data when available, to create complete environmental characterizations necessary for developing and implementing science-based ecosystem-based management approaches.

Coordination of the many existing Federal mapping activities will increase efficiency and help ensure that all necessary surveys are conducted. Drawing upon the mapping and charting abilities found in the private sector and academia will also be necessary to achieve the best results at the lowest cost.

The National Ocean Council should coordinate Federal ocean and coastal resource assessment, mapping, and charting activities with the goal of creating standardized, easily accessible national maps that incorporate living and nonliving marine resource data along with bathymetry, topography, and other natural features.

Achieving a Sustained, Integrated Ocean Observing System

About 150 years ago, this Nation set out to create a comprehensive weather forecasting and warning network and today most people cannot imagine living without constantly updated weather reports. Recognizing the enormous national benefits that have accrued from the weather observing network, it is time to invest in a simi-

lar observational and forecasting capability for the oceans. This system would gather information on physical, geological, chemical, and biological parameters for the oceans and coasts, conditions that affect—and are affected by—humans and their activities. The United States currently has the scientific and technological capacity to develop a sustained, national Integrated Ocean Observing System (IOOS) that will support and enhance the Nation's efforts for:

- improving the health of our coasts and oceans;
- protecting human lives and livelihoods from marine hazards;
- supporting national defense and homeland security efforts;
- measuring, explaining, and predicting environmental changes;
- providing for the sustainable use, protection, and enjoyment of ocean resources;

The National Ocean Council should make the development and implementation of a sustained, national Integrated Ocean Observing System a central focus of its leadership and coordination role. The United States simply cannot provide the economic, environmental, and security benefits listed above, achieve new levels of understanding and predictive capability, or generate the information needed by a wide range of users, without implementing the IOOS.

The IOOS is based on two components: (1) open ocean observations conducted in cooperation with the international Global Ocean Observing System (GOOS) and (2) a national network of coastal observations conducted at the regional level. The coastal component will include the U.S. exclusive economic zone, the Great Lakes, and coastal and estuarine areas.

A strong national governance structure is required to establish policy and provide oversight for all components of the IOOS and to ensure strong integration among the regional, national, and global levels. Interagency coordination and consensus through the National Ocean Council and Ocean.US will be essential. While regional systems will retain a level of autonomy, achievement of the IOOS with nationwide benefits will require the regional systems to follow some national guidelines and standards. In addition, developers of the IOOS must ensure that the global component is not minimized and that the connectivity with the GOOS, including U.S. funding and leadership, remains strong and viable.

Formalizing Ocean.US

Ocean.US has made significant progress as the lead organization for the design and implementation of the national IOOS. However, a fundamental problem current exists in that Ocean.US has a number of responsibilities without any real authority or control over budgets. Its ephemeral existence under the Memorandum of Agreement which created it, its dependence on personnel detailed from the member agencies, and its lack of a dedicated budget severely detract from its stature within the ocean community and its ability to carry out its responsibilities. Congress should formally establish Ocean.US under the National Ocean Council structure so that it may effectively advise the NOC and achieve its coordination and planning mandates. The office requires consistent funding and dedicated full-time staff with the expertise and skills needed to ensure professional credibility. In addition, outside experts on rotational appointments could help Ocean.US better meet its responsibilities.

Coordinating Regional Observing Systems

Ocean.US envisions the creation of a nationwide network of regional ocean observing systems that will form the backbone of coastal observations for the IOOS. Although Ocean.US has proposed the creation of Regional Associations, coordinated through a national federation, as the governing bodies of the regional systems, this concept is unnecessarily narrow. To fully address the needs of coastal managers, ocean observations need to be integrated into other information gathering activities such as regionally-focused research, outreach and education, and regional ecosystem assessments. Thus, the proposed regional ocean information programs provide a more comprehensive mechanism for developing and implementing regional ocean observing systems, in coordination with their broader responsibilities. Regular meetings among all the regional ocean information programs and Ocean.US will be important for providing regional and local input into developing requirements of the national IOOS.

Reaching Out to the User Community

The IOOS must meet the needs of a broad suite of users, including the general public. To get the most out of the IOOS, resource managers at Federal, State, regional, territorial, tribal, and local levels will need to supply input about their information needs and operational requirements and provide guidance on what output

would be most useful. Other users, including educators, ocean and coastal industries, fishermen, and coastal citizens, must also have a visible avenue for providing input. Ocean.US and the regional ocean information programs will need to devote significant time and thought to proactively approaching users and promoting public awareness of the enormous potential of the IOOS.

Planning Space-based Observations

An integral part of the national IOOS are the space-borne sensors that provide comprehensive, real-time, widespread coverage of ocean conditions and features. However, implementing sustained observations from space requires intense planning with long lead times. Given the cost, the time frame for constructing and launching satellites, and the inability to modify satellites once in orbit, five- to ten-year plans are required to ensure that satellite observations will be available on a continuous basis and employ the most useful and modern sensors. Ocean.US and NOAA must work with NASA to ensure that ongoing satellite operations are fully integrated into the national IOOS.

Both NOAA and NASA currently operate civilian, space-based, Earth observing programs that measure terrestrial, atmospheric, and oceanic variables. NOAA's primary mission in this area is to provide sustained, operational observations for monitoring and predicting environmental conditions and long-term changes, with a focus on weather and climate. In contrast, NASA's mission is to advance research efforts and sensor development. A NASA project can last from a few days to a few years, and NASA has repeatedly asserted that it is not in the business of providing data continuity. In many instances, the lifetime of a NASA satellite, and its continued ability to collect and transmit data, outlasts its funding, resulting in premature termination at odds with the pressing demands for data in the operational context. Thus NASA's efforts have not, and will not, result in the sustained capabilities needed for the national IOOS.

Congress should transfer the operation of NASA's Earth environmental observing satellites, along with associated resources, to NOAA to achieve continuous data collection. NOAA and NASA should work together to plan future missions and then ensure the smooth transition of each Earth environmental observing satellite after its launch. By consolidating Earth, and particularly ocean, observing satellite missions in NOAA, more seamless, long-term planning will be possible, resulting in a smooth concept-to-operations data collection process.

Information Product Development

To justify large Federal investments in the IOOS, the system must result in tangible benefits for a broad and diverse user community, including the general public, scientists, resource managers, emergency responders, policymakers, private industry, educators, and officials responsible for homeland security. National Weather Service and commercial meteorological products have applications ranging from scientific research to human safety, transportation, agriculture, and simple daily forecasts. Similarly, IOOS products should be wide-ranging and based on the needs of regional and local organizations and communities, as well as national needs. The regional ocean information programs should help produce information products of benefit to regional, State, and local managers and organizations. These regional programs will also provide important feedback to national forecasters and modelers about ways to make national IOOS products more useful.

Funding the IOOS

To fulfill its potential, the IOOS will require stable funding over the long haul. The lack of long-term funding for existing regional ocean observing systems has contributed to their isolation and piecemeal implementation. But consistent funding will help ensure that the American public receives the greatest return for its investment in the form of useful information, reliable forecasts, and timely warnings. The estimated start-up costs for the implementation of the national IOOS over the first five years is close to \$2 billion.

Continuous improvements to IOOS observation and prediction capabilities will also require sustained investments in technology development. Considering the costs of sensor development, telecommunications, computer systems, and improvements in modeling and prediction capabilities, annual costs for operating, maintaining, and upgrading the national IOOS are estimated to be \$650–\$750 million a year.

Whole Earth Observations

The IOOS cannot exist as a stand-alone system, developed without considering associated observations. Rather, it should be integrated with other environmental observing systems to link weather, climate, terrestrial, biological, watershed, and ocean observations into a unified Earth Observing System. The National Ocean

Council should oversee coordination of the IOOS with other existing and planned terrestrial, watershed, atmospheric, and biological observation and information collection systems, with the ultimate goal of developing a national Earth Observing System. Such a system would improve understanding of environmental changes, processes, and interactions, making ecosystem-based management possible.

Enhancing Ocean Infrastructure and Technology Development

A robust infrastructure with cutting-edge technology forms the backbone of modern ocean science. It supports scientific discovery and facilitates application of those discoveries to the management of ocean resources. The nation has long relied on technological innovation, including satellites, early-warning systems, broadband telecommunications, and pollution control devices to advance economic prosperity, protect life and property, and conserve natural resources. Ocean research, exploration, mapping, and assessment activities will continue to rely on modern facilities and new technologies to acquire data in the open ocean, along the coasts, in polar regions, on the seafloor, and even from space.

The three major components of the Nation's scientific infrastructure for oceans and coasts are:

- *Facilities*—land-based laboratories and ocean platforms, including ships, airplanes, satellites, and submersibles, where research and observations are conducted;
- *Hardware*—research equipment, instrumentation, sensors, and information technology systems used in the facilities; and
- *Technical Support*—the expert human resources needed to operate and maintain the facilities and hardware as well as participating in data collection, assimilation, analysis, modeling, and dissemination.

The number and types of assets included in the national ocean science infrastructure are extensive and cover a wide range of Federal, State, academic, institutional, and private-sector entities.

Together, they represent a substantial public and private investment that has made possible great strides in modern oceanography over the last 50 years. But a recent assessment of these assets revealed that significant components of the U.S. ocean infrastructure are aged or obsolete and that, in some cases, current capacity is insufficient to meet the needs of the ocean science and operational community. The National Ocean Council's Committee on Ocean Science, Education, Technology, and Operations should develop a national ocean and coastal infrastructure and technology strategy to achieve and maintain an appropriate mix of federally-supported, modern ocean facilities that meet the Nation's needs for quality resource management, science, and assessment.

Funding Needed Assets

There are currently several critically needed components of the ocean science and technology infrastructure, including:

- Surface vessels, such as new University National Oceanographic Laboratory System vessels and fishery research ships
- Undersea vehicles, including an array of manned, remotely operated, and autonomous submersibles
- Aircraft, both manned and unmanned
- Modern laboratories and instrumentation
- Dedicated ocean exploration platforms
- Telecommunications technology
- Environmental and biological sensors

Congress should establish a modernization fund to support these critical ocean infrastructure and technology needs. Such a fund would be used to build or upgrade facilities and acquire related instrumentation and equipment. It would also provide a mechanism to coordinate similar equipment purchases across agencies, where feasible, creating significant economies of scale. Current and future spending priorities for the fund should be based on the National Ocean Council's ocean and coastal infrastructure and technology strategy.

Transferring Technology

The development of needed ocean technologies—whether identified by the national strategy or through interagency communication—requires directed funding and coordination. Federal agency programs will benefit by having a centralized office re-

responsible for accelerating the transition of technological advances made by Federal and academic laboratories into routine operations.

NOAA should create, and Congress should fund, an Office of Technology to expedite the transition of experimental technologies into operational applications. This office should work closely with academic institutions, the regional ocean information programs, the National Science Foundation, the U.S. Navy, the National Aeronautics and Space Administration, and other relevant agencies to achieve this mission.

Modernizing Ocean Data and Information Products

Ocean and coastal data are essential for understanding marine processes and resources. They are the foundation for the science-based information on which resource managers depend. But storing and processing large amounts of data, and converting them into information products useful to a broad community of end users, remains a huge challenge.

There are two major challenges facing data managers today: the exponentially growing volume of data, which continually strains data ingestion, storage, and assimilation capabilities; and the need for timely access to these data by the user community in a variety of useful formats. Meeting these challenges will require a concerted effort to integrate and modernize the current data management system. The ultimate goal of improved ocean data management should be to effectively store, access, integrate, and utilize a wide and disparate range of data needed to better understand the environment and to translate and deliver scientific results and information products in a timely way.

Interagency Coordination

An interagency group, dedicated to ocean data and information planning, is needed to enhance coordination, effectively use existing resources for joint projects, schedule future software and hardware acquisitions and upgrades, and oversee strategic funding.

Congress should amend the National Oceanographic Partnership Act to create and fund Ocean.IT as the lead Federal interagency planning organization for ocean and coastal data and information management. Ocean.IT should consist of representatives from all Federal agencies involved in ocean data and information management, be supported by a small office, and report to the National Ocean Council's Committee on Ocean Science, Education, Technology, and Operations.

Ocean.IT should coordinate the development of a viable, long-term data management strategy which includes:

- The implementation of an interagency plan to improve access to data at the national data centers, Distributed Active Archive Centers, and other discipline-based centers. This plan will need to be appropriately integrated with other national and international data management plans, including those for the Integrated Ocean Observing System and Global Ocean Observing System.
- Opportunities to partner with the private sector to enhance environmental data and information management capabilities.

This organization should not have an operational role, but instead should be responsible solely for interagency planning and coordination, similar to the role of Ocean.US for the IOOS.

Informational Product Development

Compared to a few decades ago, an impressive array of data and information products for forecasting ocean and coastal conditions is now available from a wide range of sources. A mechanism is now needed to bring these data together, including the enormous amounts of information that will be generated by the national IOOS, and use these data to generate and disseminate products beneficial to large and diverse audiences.

The National Oceanic and Atmospheric Administration and the U.S. Navy should establish a joint ocean and coastal information management and communications program to generate information products relevant to national, regional, State, and local needs on an operational basis. This program should build on the Navy's model for operational oceanography and take advantage of the strengths of both agencies to reduce duplication and more effectively meet the Nation's information needs. This partnership will also allow for the prompt incorporation of classified military data into informational products without publicly releasing the raw data. A NOAA-Navy joint program would rapidly advance U.S. coastal and ocean analyses and forecasting capabilities using all available physical, biological, chemical, and socioeconomic data.

Interactions between private companies and the NOAA-Navy national ocean and coastal information management and communications program could lead to the production of a wide range of general and tailored forecast and warning products. An interface between national forecasters at the NOAA-Navy program and the regional ocean information programs would also help identify ocean and coastal informational products of particular value at the regional and local levels.

Promoting Lifelong Ocean Education

Education has provided the skilled and knowledgeable workforce that made America a world leader in technology, productivity, prosperity, and security. However, the emergence of rampant illiteracy about science, mathematics, and the environment now threaten the future of America, its people, and the oceans on which we rely.

Testing results suggest that, after getting off to a good start in elementary school, by the time U.S. students graduate from high school their achievement in math and science falls well below the international average. Ocean-related topics offer an effective tool to keep students interested in science, increase their awareness of the natural world, and boost their academic achievement in many areas. In addition, the links between the marine environment and human experience make the oceans a powerful vehicle for teaching history, culture, economics, and other social sciences. Yet teachers receive little guidance on how they might use exciting ocean subjects to engage students, while adhering to the national and State science and other education standards that prescribe their curricula.

In addition, a 1999 study indicated that just 32 percent of the Nation's adults grasp simple environmental concepts, and even fewer understand more complex issues, such as ecosystem decline, loss of biodiversity, or watershed degradation. It is not generally understood that nonpoint source pollution threatens the health of our coastal waters, or that mercury in fish comes from human activities via the atmosphere. Few people understand the tangible value of the ocean to the Nation or that their own actions can have an impact on that resource. From excess applications of fertilizers, pesticides, and herbicides on lawns, to the trash washed off city streets into rivers and coastal waters, ordinary activities contribute significantly to the degradation of the marine environment. Without an acknowledgement of the impacts associated with ordinary behavior and a willingness to take the necessary action—which may incur additional costs—achieving a collective commitment to more responsible lifestyles and new policies will be difficult.

Excellent lifelong education in marine affairs and sciences is essential to raising public awareness of the close connection between the oceans and humans, including our history and culture. This awareness will result in better public understanding of the connections among the ocean, land, and atmosphere, the potential benefits and costs inherent in resource use, and the roles of government and citizens as ocean stewards.

Ocean Stewardship

To successfully address complex ocean- and coastal-related issues, balance the use and conservation of marine resources, and realize future benefits from the ocean, an interested, engaged public will be needed. The public should be armed not only with the knowledge and skills needed to make informed choices, but also with a sense of excitement about the marine environment. Individuals should understand the importance of the ocean to their lives and should realize how individual actions affect the marine environment. Public understanding of human impacts on the marine environment should be balanced with recognition of the benefits to be derived from well-managed ocean resources. Because of the connection among the ocean, the atmosphere, and the land, inland communities need to be just as informed as sea-side communities.

Science Literacy

Ocean-related education has the potential to stem the tide of science illiteracy threatening to undermine the Nation's health, safety, and security. Children have a natural curiosity about the world around them and this allure could be parlayed into higher achievement in other subjects as well. The influence of the ocean on nearly every aspect of daily life, and the central role it plays in the development of the nation, make ocean-based studies ideal for enhancing student performance in areas such as geography, history, economics, policy, and law. Strengthening science literacy, therefore, encompasses not only natural sciences, but a full suite of social sciences.

Future Ocean Leaders

The nation needs a diverse, knowledgeable, and adequately prepared workforce to enhance understanding of the marine environment and make decisions regarding

complex ocean- and coastal-related issues. The education of the 21st century ocean-related workforce will require not only a strong understanding of oceanography and other disciplines, but an ability to integrate science concepts, engineering methods, and sociopolitical considerations. Resolving complex ocean issues related to economic stability, environmental health, and national security will require a workforce with diverse skills and backgrounds. Developing and maintaining such a workforce will rely, in turn, on programs of higher education that prepare future ocean professionals at a variety of levels and in a variety of marine-related fields.

Coordinating Ocean Education

Although not all ocean-related Federal agencies have a specific education mission, most have made efforts to reach out to students, teachers, and the public to inform them about ocean issues, sometimes by adding ocean-related components to larger science and environmental education efforts. And while it is valuable for ocean-related information to be included as part of broader environmental and science education efforts, it is also important to support educational efforts that focus specifically on oceans, coasts, and the human relationship with them.

Federal programs can provide many opportunities for ocean-related education, but ultimately education is a State responsibility, and control is exerted primarily at the local level. Therefore, the interaction between education administrators at the State, district, and individual school levels and Federal agencies will be fundamental to the success of any effort to use ocean-based examples to enhance student achievement. Aquariums, zoos, and other informal education centers also provide the public with opportunities to learn about the marine environment and should be integral components of a national effort to increase ocean-related education.

Despite the existence of many positive efforts, ocean education remains a patchwork of independently conceived and implemented programs and activities. These efforts cannot provide the nationwide momentum and visibility needed to promote sustained ocean education for students, teachers, and the general public. Within the Federal Government, there is little discussion of ocean education, even among those agencies with the greatest responsibility for ocean issues. Different programs and funding mechanisms are not coordinated and resources are seldom leveraged. Even within individual agencies, offices that have education components often do not collaborate or communicate.

To strengthen ocean education and coordinate Federal education efforts, the National Ocean Council should establish a national ocean education office (Ocean.ED) under its Committee on Ocean Science, Education, Technology, and Operations. This office should coordinate and integrate Federal agency programs and leverage resources; serve as a central, visible point of contact for K–12, university-level, and informal education partners; and work with all parties to develop coherent, comprehensive planning for ocean education efforts.

To fulfill its coordination activities, Congress should provide dedicated funding for Ocean.ED operations and program implementation. However, this national effort is not meant to replace other successful programs and activities, but rather provide a mechanism for communication, coordination, and joining of forces.

Developing Ocean Curricula

The value of ocean-based learning must be recognized within local school districts to create a demand for ocean-related education products. Federal, regional, State, and local education professionals need to advocate for the inclusion of ocean-based examples in State and local education requirements and testing. Collaborative efforts will be needed to develop research-based, ocean-related curricular materials that are aligned with State and national educational standards and meet the needs of teachers. Ocean.ED, working with State and local education authorities and the research community, should coordinate the development and adoption of ocean-related materials and examples that meet existing education standards.

Teaching the Teachers

Higher expectations for our youth mean higher expectations for teachers as well. Students cannot achieve without instruction by capable teachers who are knowledgeable in the topics being presented. Thus, improving the quality of science and math education must begin with improving preparation of undergraduates studying to be teachers (referred to as pre-service teachers) and professional development for certified teachers in the classroom (referred to as in-service teachers).

The ocean research community is brimming with potential for engaging K–12 educators in the excitement and satisfaction of the scientific enterprise, and the Nation's research infrastructure provides significant opportunities for formal preparation, hands-on involvement, and teacher certification. Although several public and private sector programs can provide teachers with research experience in ocean-re-

lated topics, access to these programs is quite limited, very few have long-term, stable funding, and the different efforts are poorly coordinated. Ocean.ED, working with academic institutions and local school districts, should help establish stronger and more effective relationships between the research and education communities to expand professional development opportunities for teachers and teacher educators.

Bringing Oceans Education to All Students

Through field and laboratory experiments, oceans offer a natural avenue for students to gain first-hand exposure to science while developing an awareness of the importance of the ocean. Not all students are near, or able to travel to, the shore, but new ocean research technologies represent a tremendous and virtually untapped avenue to overcome this limitation, allowing students anywhere to be involved in real oceanographic investigations. The same remote-access technologies that make advanced ocean research possible can also help students and teachers participate in collecting, analyzing, and distributing ocean data. Enabling students to interact with practicing scientists, even if they are thousands of miles away, can help create a lifelong affinity for learning.

Social, economic, and cultural factors can also play an influential role in inhibiting a student's access to education opportunities, especially science-based opportunities. These factors are unusually strong among minority students and other groups that have been traditionally underrepresented and underserved in scientific fields, including marine sciences. Repairing this broken link will depend on exposing minority students to ocean-related studies early in their education, continuing that exposure throughout their school years, and demonstrating the possibilities and rewards of a career in ocean-related fields.

Federal agencies and academic institutions should find ways to provide all students with opportunities to participate in ocean research and exploration, virtually or in person, including summer programs, field trips, remote participation in ocean expeditions, and, most important, after-school activities. Mentoring, especially near-peer guidance, is critical and should be a component of any student-oriented program. Ocean.ED should promote partnerships among school districts, institutions of higher learning, aquariums, science centers, museums, and private laboratories to develop more opportunities for students to explore the marine environment, both through virtual means and hands-on field, laboratory, and at-sea experiences. Ocean.ED should also ensure that ocean-based educational programs and materials acknowledge cultural differences and other aspects of human diversity, resulting in programs that expose students and teachers from all cultures and backgrounds to ocean issues.

Drawing Students into the Field of Ocean Science and Management

The ocean community must compete with countless other professions in attracting the talent it needs. Success lies, in part, in promoting marine-related career opportunities among undergraduate students from a broad range of disciplines. First-hand experiences in marine fields can be influential in demonstrating the possibilities and rewards of an ocean-related career.

Intellectually stimulating and financially attractive options for pursuing graduate studies in an ocean-related field must follow, so a student's developing interest in ocean studies is not overshadowed by other professions that actively pursue, encourage, and support their future leaders. Ocean sciences have another potentially important role to play at the undergraduate level. Marine science courses can be attractive options for non-science majors who need to fulfill science requirements for graduation, presenting an excellent opportunity to raise general ocean awareness.

The National Oceanic and Atmospheric Administration, National Science Foundation, and Office of Naval Research should support colleges and universities in promoting introductory marine science courses to expose students, including non-science majors, to these subjects.

Training Ocean Professionals

Because ocean science is fundamentally interdisciplinary, well-trained ocean professionals can find excellent careers in many areas including engineering, economics, education, law, management, policy, science, and technology. Individuals considering or pursuing graduate studies in a marine field should be aware of these options, and exploration of nontraditional marine areas should be encouraged. Equally important, professionals educated and trained in other fields should be made aware of the exciting opportunities available to them in marine-related fields.

Ocean.ED should guide and promote the development of the Nation's ocean-related workforce by:

- promoting student support, diversified educational opportunities, and investment in innovative approaches to graduate education that prepare students for a broad range of careers in academia, government, and industry;
- encouraging graduate departments of ocean sciences and engineering to experiment with new or redesigned programs that emphasize cross-disciplinary courses of study.

Complementing the need to create an adequate workforce is the need to sustain and enhance that workforce through professional development and continuing education opportunities. Learning does not stop once the formal education process is complete; ocean professionals in all fields must be provided the means and liberty to continually build upon their knowledge and skills throughout their careers.

Informing the Public

Public information needs are as varied as our population is diverse. Some individuals will benefit from detailed information on how specific issues directly affect their jobs or business. Others may need information presented in a language and media tailored to their culture and community. Still others seek advice on how to alter their own activities to support responsible ocean stewardship. This information is as critical for those who live in the heartland as for those who live near the shore.

Informal education requires outreach programs, in partnership with local communities, to make contact with individuals where they live and work, regarding issues that affect how they live and work, in a style that speaks to them. Information supplied to the public should be timely and accurate. It should also be supported by a system that allows for follow-up and the acquisition of additional information or guidance. Ocean.ED, working with other appropriate entities, should enhance existing and establish new mechanisms for developing and delivering relevant, accessible information and outreach programs to enhance community education.

Regional Outreach—Connecting the Research and Education Communities

Collaboration between the research and education communities must be improved if ocean-based information, including ocean data and new discoveries, is to be transformed into exciting and accessible materials to stimulate student achievement and enhance public awareness. Some efforts do exist to make these connections, most notably through the Centers for Ocean Sciences Education Excellence (COSEE) and National Sea Grant College Program.

COSEE

The COSEE network, supported primarily through NSF, includes regional centers and a central coordinating office that work to integrate oceanographic data and information into high-quality curricular materials, to provide ocean scientists with opportunities to learn more about educational needs and requirements, to provide K–12 teachers with the knowledge and skills they need to effectively incorporate ocean-related information into their lessons, and to deliver ocean-related information to the public. Though recognized as a model for enhancing education and bringing accessible ocean-related information to the public, COSEE currently has only seven regional centers, each serving a limited number of schools in its area. The program does not have the level of committed, long-term support required to fully realize its potential.

While COSEE is currently a National Science Foundation program, placing it within the National Ocean Council (NOC) structure would capitalize on the tremendous potential to enhance and expand the program. The NOC and the NSF should relocate COSEE within the larger NOC structure as a program to be organized, overseen, and funded through Ocean.ED. In addition, the number of COSEE regional offices should be tripled to 21 with each center receiving at least \$1.5 million a year for an initial five-year period.

National Sea Grant College Program

The National Sea Grant College Program was created by Congress in 1966 as a partnership between the Nation's universities and NOAA. Sea Grant programs sponsor research, education, outreach, and technology transfer through a network of Sea Grant Colleges and research institutions.

Sea Grant has forged connections between the research and education communities since its inception. Its programs provide K–12 teacher preparation and professional development programs consistent with State education standards, offer hands-on educational experiences for students, and develop research-based curricular and communications materials for students and the public. The Sea Grant

network relies on longstanding local partnerships, with many connections to populations that have been traditionally underrepresented and underserved by the ocean community.

Despite its successes, however, Sea Grant is currently an underutilized resource. The existing Sea Grant network requires increased funding to expand its roles and responsibilities, particularly in education and outreach. In particular, Sea Grant extension and communications programs, familiar to many resource managers and others in coastal communities, should become the primary mechanisms for delivering and interpreting information products developed through the regional ocean information programs

Specific Federal Responsibilities

Each Federal agency with ocean-related responsibilities—most notably NOAA, NSF, and Office of Naval Research—has a responsibility to help ensure a vibrant ocean-related workforce. These agencies need to develop interrelated and cross-cutting educational opportunities at the undergraduate, graduate, and postdoctoral levels.

National Oceanic and Atmospheric Administration

NOAA should be particularly concerned with creating a pipeline of students in areas it identifies to be of critical importance to the agency. Opportunities should include both research experiences, especially exposure to mission-oriented research, and experiences beyond the research arena. Student exposure can begin as early as the junior or senior level in high school, continuing through postdoctoral education. A range of programs will help identify and recruit the best and brightest to careers in marine-related fields and ensure a continuing source of essential human capital. At the graduate and postdoctoral levels, NOAA should support fellowships and traineeships that emphasize interdisciplinary approaches and real-world experiences beyond the university setting.

NOAA should establish a national ocean education and training program, patterned after the National Institutes of Health model, within its Office of Education and Sustainable Development to provide diverse, innovative ocean-related education opportunities at the undergraduate, graduate, and postdoctoral levels.

In addition, NOAA should establish competitive “Distinguished Professorships in Marine Studies” within Sea Grant Colleges or other leading institutions of higher education with a demonstrated commitment to marine programs. Disciplines of interest to NOAA for such professorships could include fisheries science, climate research, atmospheric studies, and marine resource economics, policy, aquaculture, genomics, education, and ecosystem studies. The intent would be to create a cadre of distinguished NOAA endowed chairs at universities around the Nation.

National Science Foundation

At the undergraduate level, NSF’s Research Experience for Undergraduates program could be expanded to include more marine-related experiences. At the graduate and postdoctoral levels, opportunities could include fellowships that encourage cross-disciplinary research, interdisciplinary traineeships, and master’s degree fellowships. Programs such as NSF’s Integrative Graduate Education and Research Training program, Centers for Learning and Teaching, and Graduate Teaching Fellows in K–12 Education should be supported and enhanced both within NSF and adopted by other Federal ocean agencies. The National Science Foundation’s Directorates of Geosciences, Biological Sciences, and Education and Human Resources should develop cooperative programs to provide diverse educational opportunities at the undergraduate, graduate, and postdoctoral levels in a range of ocean-related fields.

Office of Naval Research

The success of the Navy depends on a well-developed understanding of the environment in which it operates. Understanding the ocean environment—including the atmosphere above it, the seafloor beneath it, and the coastlines that encircle it—will always be a core naval requirement. Thus the Navy should play a central role in ensuring support for the education of future generations of ocean professionals. The Office of Naval Research should reinvigorate its support of graduate education in ocean sciences and engineering. This could be partly accomplished by increasing the number of ocean-related awards made under ONR’s National Defense Science and Engineering Graduate Fellowship Program.

Specific Management Challenges

Although the areas I discussed—improved governance through a new National Ocean Policy Framework, the incorporation of scientific information in decision-

making, and broad public education—represent the overarching areas that this Nation must address using the guiding principles I mentioned earlier, the U.S. Commission on Ocean Policy did not stop there in its deliberations and recommendations. The Commission also addressed a wide range of specific ocean management challenges—challenges that will continue to be addressed individually, but which now must also become part of more ecosystem based management approach, applying the guiding principles throughout the management process. These individual ocean and coastal management challenges include: Linking the management of coasts and watersheds; Protecting life and property from natural hazards; Restoring and conserving habitat; Better managing sediments and shorelines; Supporting marine commerce and transportation; Reducing water pollution from all sources, including from vessels and through the introduction of marine debris; Preventing the introduction of invasive species; Sustainably managing our fisheries; Protecting marine mammals and other marine species; Conserving corals and corals reefs; Enabling the environmentally-sound development of marine aquaculture; Understanding and safeguarding Oceans and Human Health; and, developing offshore energy resources and marine minerals.

Improving Management of Coasts and Watersheds

Let me begin by addressing some of the issues in our coastal areas. While coastal counties (located entirely or partially within coastal watersheds) comprise only 17 percent of the land area in the contiguous United States, they are home to more than 53 percent of the total U.S. population. Coastal population trends indicate average increases of 3,600 people a day moving to coastal counties, reaching a total population of 165 million by 2015. These figures do not include the 180 million people who visit the coast every year.

Population growth and tourism bring many benefits to coastal communities, including new jobs and businesses and enhanced educational opportunities. The popularity of ocean and coastal areas increases pressures on these environments, creating a number of challenges for managers and decisionmakers. Increased development puts more people and property at risk from coastal hazards, reduces and fragments fish and wildlife habitat, alters sedimentation rates and flows, and contributes to coastal water pollution.

The pattern of coastal growth—often in scattered and unplanned clusters of homes and businesses—is also significant. Urban sprawl increases the need for infrastructure such as roads, bridges, and sewers, degrading the coastal environment while making fragile or hazard-prone areas ever more accessible to development. Because of the connections between coastal and upland areas, development and sprawl that occur deep within the Nation's watersheds also affect coastal resources.

To reap economic benefits and mitigate pressures associated with growing coastal development, State and local governments need more Federal support to enhance their capacity to plan for and guide growth, and to employ watershed management approaches.

A complex combination of individuals and institutions at all levels of government make decisions that cumulatively affect the Nation's ocean and coastal areas. These institutional processes determine where to build infrastructure, encourage commerce, extract natural resources, dispose of wastes, and protect or restore environmental attributes.

Although most coastal management activities take place at State and local levels, coastal decisionmaking is also influenced by Federal actions, including funding decisions and standard setting. Of the many Federal programs that provide guidance and support for State and local decisionmaking, some address the management of activities and resources within designated geographic areas, while others address the management of specific resources, such as fisheries or marine mammals.

The Coastal Zone Management Act (CZMA) is the Federal Government's principal tool for fostering comprehensive coastal management. The CZMA created the Coastal Zone Management Program (CZM Program), a unique partnership between the Federal and coastal state governments, whose goal is to balance the conservation of the coastal environment with the responsible development of economic and cultural interests. The tools, assistance, and resources provided by the CZMA have enabled States and territories to increase their management capacity and improve decisionmaking to enhance the condition of their coastal areas.

However, the CZM Program can be strengthened in a number of ways, including by developing strong, specific, measurable goals and performance standards that reflect a growing understanding of the ocean and coastal environments and the need to manage growth in regions under pressure from coastal development. A large portion of Federal funding should be linked to program performance with additional incentives offered to States that perform exceptionally well. In addition, a fallback

mechanism is needed to ensure that national goals are realized when a State does not adequately participate or perform. Finally, the landside boundaries of State coastal management programs should also be reconsidered. At a minimum, each State should set the inland extent of its coastal zone based on the boundaries of coastal watersheds.

In addition to the CZM Program, other Federal area-based coastal programs include NOAA's National Estuarine Research Reserve System and National Marine Sanctuaries Program; EPA's National Estuary Program; and Fish and Wildlife Service's Coastal Program and Coastal Barrier Resources System. These programs have made significant progress in managing coastal resources in particular locations, working with communities and decisionmakers in those areas, and fostering improved coordination between different levels of government. However, because these programs generally operate in isolation from one another, they cannot ensure effective management of all ocean and coastal resources or achievement of broad national goals. As NOAA is strengthened through the multi-phased approach described earlier, consolidation of area-based coastal resource management programs will result in more effective, unified strategies for managing these areas, an improved understanding of the ocean and coastal environment, and a basis for moving toward an ecosystem-based management approach.

Federal programs related to transportation, flood insurance, disaster relief, wetlands permitting, dredging, beach nourishment, shoreline protection, and taxation also exert a profound influence on the coast. While these laws and policies address specific issues, and have each provided societal benefits, in many cases Federal activities under their purview have inadvertently led to degradation of coastal environments. For this reason, policies should be re-evaluated to ensure consistency with national, regional, and State goals aimed at achieving economically and environmentally sustainable development.

Linking Coastal and Watershed Management

For well over a decade there has been a growing interest in watershed management. This approach addresses water quality and quantity issues by acknowledging the hydrologic connections between upstream and downstream areas and considering the cumulative impacts of all activities that take place throughout a watershed. Watersheds are optimal organizing units for dealing with the management of water and closely related resources. The benefits of a watershed focus have also been recognized at the state, regional, national, and international levels through successful efforts such as the Chesapeake Bay Program, the Delaware River Basin Commission, and the bi-national Great Lakes Commission. At the Federal level, EPA has supported efforts to address a variety of problems at the watershed level.

Many watershed groups are formed at the local level by community members concerned about water quality or the health of fish and wildlife populations. Often, these groups work to improve watershed health through partnerships among citizens, industry, interest groups, and government. However, the environmental and political characteristics of the Nation's watersheds vary tremendously, and watershed management initiatives can differ widely in size and scope. As interest in watershed management continues to grow, so does the need for a framework to guide such initiatives and evaluate their effectiveness.

The Federal Government can play an important role by helping to develop this framework and by providing assistance to States and communities for watershed initiatives. Congress should amend the Coastal Zone Management Act, the Clean Water Act, and other Federal laws where appropriate, to provide better financial, technical, and institutional support for watershed initiatives and better integration of these initiatives into coastal management.

Assessing the Growing Cost of Natural Hazards

The nation has experienced enormous and growing losses from natural hazards. Conservative estimates, including only direct costs such as those for structural replacement and repair, put the nationwide losses from all natural hazards at more than \$50 billion a year, though some experts believe this figure represents only half or less of the true costs. More accurate figures for national losses due to natural hazards are unavailable because the United States does not consistently collect and compile such data, let alone focus on specific losses in coastal areas. Additionally, there are no estimates of the costs associated with destruction of natural environments.

Many Federal agencies have explicit operational responsibilities related to hazards management, while numerous others provide technical information or deliver disaster assistance. The nation's lead agencies for disaster response, recovery, mitigation, and planning are the Federal Emergency Management Agency (FEMA) and

the U.S. Army Corps of Engineers (USACE). These agencies implement programs that specifically target the reduction of risks from natural hazards. NOAA and USFWS also have a significant influence on natural hazards management.

Opportunities for improving Federal natural hazards management, include: Amending Federal infrastructure policies that encourage inappropriate development; Augmenting hazards information collection and dissemination; Improving the National Flood Insurance Program (NFIP); and Undertaking effective and universal hazards mitigation planning.

Conserving and Restoring Coastal Habitat

The diverse habitats that comprise the ocean and coastal environment provide tangible benefits such as buffering coastal communities against the effects of storms, filtering pollutants from runoff, and providing a basis for booming recreation and tourism industries. These habitats also provide spawning grounds, nurseries, shelter, and food for marine life, including a disproportionate number of rare and endangered species.

As more people come to the coast to live, work, and visit, coastal habitats face increasing pressures. Most human activities in coastal areas provide distinct societal benefits, such as dredging rivers and harbors to facilitate navigation, converting forests and wetlands for agriculture and development, and building dams for flood control and hydropower. But these activities can also degrade coastal habitats and compromise their ability to adapt to environmental changes.

Conserving valuable ocean and coastal areas protects significant habitat and other natural resources. Millions of coastal acres have been designated for conservation by various levels of government, and the tools for implementing conservation programs are found in a multitude of statutes. A number of Federal programs aim to preserve the natural attributes of specific areas while providing varying levels of access to the public for educational, recreational, and commercial purposes. In addition, nonregulatory conservation techniques—including fee simple land acquisition, the purchase or donation of easements, tax incentives and disincentives, and tradable development rights—play a special role in enabling willing landowners to limit future development on their land for conservation purposes. Land acquisition and easements are often implemented through partnerships among governments, nongovernmental organizations such as land trusts, and the private sector. Funding and support for continued conservation of coastal and estuarine lands is important to ensure the ability to maintain critical habitats and the benefits they provide.

Conservation is cost-effective, avoiding the much larger expense and scientific uncertainties associated with attempting to restore habitats that have been degraded or lost. Even so, once critical habitat has been lost, or the functioning of those areas diminished, restoration is often needed. Habitat restoration efforts are proliferating in response to heightened public awareness of and concern for the health of the Nation's oceans and coasts.

Restoration efforts, particularly large-scale projects, are challenging in a number of ways. First, the success of these efforts requires an understanding about how to recreate natural systems and restore historical ecosystem functions, a field still in its infancy. Second, these efforts cross political boundaries and affect a broad range of human activities, requiring support and intense coordination among a wide range of governmental and nongovernmental stakeholders. While some restoration projects have been successful, continued progress will depend on sustained funding, government leadership and coordination, scientific research, and stakeholder support.

In addition to the large-scale, regional restoration efforts, there are numerous small-scale efforts that collectively make significant contributions. These activities often demonstrate the power of public-private partnerships, bringing together community members, government agencies, and businesses to solve common problems. However, as long as each project continues to be planned and implemented in isolation, its overall impact will be constrained.

Currently the many entities that administer conservation and restoration activities operate largely independently of one another, with no framework for assessing overall benefits in an ecosystem-based context. The multitude of disjointed programs prohibits a comprehensive assessment of the progress of conservation and restoration efforts and makes it difficult to ensure the most effective use of limited resources. An overarching national strategy that sets goals and priorities can also enhance the effectiveness of individual efforts and provide a basis for coordinating measures and evaluating progress of both habitat conservation and restoration activities.

Managing Sediment and Shorelines

Sediment in Great Lakes, coastal, and ocean waters is composed of inorganic and organic particles created through erosion, decomposition of plants and animals, and human activities. Sediment may be carried by wind or water from upland areas down to coastal areas, or may originate in the marine environment. Once sediment arrives at the ocean, it is transported by wind, waves, and currents in dynamic processes that constantly build up and wear away cliffs, beaches, sandbars, inlets, and other natural features.

From a human perspective, sediment has a dual nature—desirable in some locations and unwanted in others. Sediment can be used to create or restore beaches and to renew wetlands and other coastal habitats. Such activities are referred to as beneficial uses. Undesirable sediment can cloud water and degrade wildlife habitat, form barriers to navigation, and contaminate the food chain for marine plants, animals and humans.

The dual nature of sediment as both a threat and a resource to humans and the environment makes its management particularly challenging. To complicate matters further, the natural processes that create, move, and deposit sediment operate on regional scales, while management tends to focus on discrete locations—a single beach, wetland, or port. In addition, the policies that affect sediment location, transport, and quality fall under the jurisdiction of diverse programs within multiple agencies at all levels of government. This complex governance approach makes it difficult to manage sediment at the appropriate scale and in consonance, rather than in conflict, with natural processes.

Coastal stakeholders have increasingly recognized the need to develop more proactive and preventive strategies. However, their absence from broad watershed planning efforts—where decisions about land use and water management could reduce excess and contaminated sediments at their source—makes such change difficult to realize. The nation needs both a better understanding of the interactions between human activities and sediment flows, and a better mechanism for involving all potentially affected parties.

Moving toward an ecosystem-based management approach is a critical step. Participation by Federal, State, and local entities in watershed management efforts, along with key stakeholders such as coastal planners and port managers, is one way to diminish upland sources of excess and contaminated sediment that harm the marine environment. Ecosystem considerations should be included in the process for permitting any activity that alters sediment flows.

Dredged materials have long been used to create new land for commercial, residential, and infrastructure developments, as well as to bolster beaches and barrier islands to protect against storm and erosion hazards and enhance tourism and recreation. Since the 1970s, these beneficial uses of dredged materials have also included environmental enhancement, such as restoration of wetlands, creation of wildlife habitat, and improvement of fish habitat. Surprisingly, navigation-related dredged materials do not find their way into beneficial use projects as often as perhaps they should. This is due in part to sediment contamination, but also to USACE policies that favor disposal in open waters or in upland dump sites. These policies may be unnecessarily foregoing opportunities to support economic growth or environmental protection and may have serious unintentional consequences for aquatic ecosystems. A more accurate system for selecting and ranking projects would be based on a comparative net economic and environmental return for the United States rather than a narrow cost-benefit analysis for a specific project.

Finally, the characterization, containment, removal, and treatment of contaminated sediment continue to be technically difficult and prohibitively expensive, and point to the importance of adopting an adaptive management approach to the problem. Scientifically sound methods for identifying contaminated sediment and developing innovative technologies to improve dredging and treatment of this material are critical steps toward improving the economic and ecological health of coastal areas. To be successful, these efforts will require new resources and effective regional planning.

Supporting Marine Commerce and Transportation

As the world's largest trading nation, the United States imports and exports more merchandise than any other country and has one of the most extensive marine transportation systems in the world. U.S. marine import-export trade is an essential and growing component of the national economy, accounting for nearly seven percent of the Nation's gross domestic product. Domestically, coastal and inland marine trade amounts to roughly one billion tons of cargo, worth more than \$220 billion a year. The marine transportation system itself is a highly complex public-private sector partnership consisting of an interconnected mix of waterways, ports and ter-

minals, water-based and land-based intermodal connections, vessels, vehicles, equipment, personnel, support service industries, and users.

For the Nation's marine transportation system to meet current and future demands, ongoing maintenance, improvement, and expansion will be required. A key prerequisite for a robust system is better coordination, planning, decisionmaking and allocation of resources at the Federal level. In particular it will be essential to enhance the connections between this system and other modes of transportation, such as highways, railways, and airports. At the same time, in moving toward an ecosystem-based management approach, planning for the movement of cargo and passengers should be coordinated with the management of many other ocean and coastal uses and activities, and with efforts to protect the marine environment.

Within the Federal Government, responsibilities for marine commerce and transportation are spread among numerous agencies, primarily the U.S. Department of Transportation (DOT), U.S. Coast Guard, USACE, NOAA, U.S. Customs Service, and EPA. These agencies have many roles, including vessel traffic management, national security, marine safety, waterway maintenance, environmental protection, and customs. These responsibilities are poorly coordinated and do not mesh well with the structure and function of such system. Statutory, regulatory, and policy differences among Federal agencies with roles in marine transportation lead to fragmentation, competition, and in some cases, an inability to work collaboratively due to conflicting mandates. National leadership and support will be needed to achieve better integration within the Federal Government, better links with the rest of the Nation's transportation infrastructure, and coordination between marine transportation and other important ocean and coastal uses and activities. The logical agency to assume this responsibility, as it does for the highway, aviation, and railway systems, is DOT.

Even with one clearly mandated lead Federal agency, coordination will be needed among the Federal and non-Federal participants in the marine transportation system. Given the significance of domestic and international trade to the Nation and the complexity of the components that make up the system the Interagency Committee for the Marine Transportation System (ICMTS) should be strengthened, codified and placed under the oversight of the National Ocean Council. And because marine transportation involves many actors outside the Federal Government, the Marine Transportation System National Advisory Council should be maintained to coordinate among non-Federal participants in the marine transportation system and a venue for providing input to the Federal Government on important national issues.

An important step in allowing the U.S. marine transportation system to grow, while minimizing increased congestion, delays, and costs to U.S. businesses and consumers, is to improve the movement of cargo into and out of ports. Existing intermodal connections are inadequate to meet the expected increase in foreign and domestic trade. The nation's transportation infrastructure is largely an agglomeration of competing transportation modes, each focusing on its own priorities. While this approach has produced an extensive infrastructure, a national strategy is needed to enhance the connections among these modes, including the Nation's ports, and ensure greater overall effectiveness.

DOT, working with the ICMTS, should draft a new national freight transportation strategy to support continued growth of the Nation's economy and international and domestic trade. Based on the new strategy, investments should be directed toward planning and implementation of intermodal projects of national significance. In developing the national freight transportation strategy, DOT should emphasize strategic planning with States, regions, and the public sector as is already being carried out for the U.S. highway system.

Planning for the future of the U.S. marine transportation system requires accurate and timely information, including estimates of the volume of current and future cargo transportation, their origins and destinations, and the capacity of the various transportation modes. Such information is essential to understand the strengths and weaknesses of the current system and the challenges and opportunities for improving its effectiveness. DOT, working with other appropriate entities, should establish a national data collection, research, and analysis program to provide a comprehensive picture of freight flows in the United States and to enhance the performance of the Nation's intermodal transportation system. DOT should periodically assess and prioritize the Nation's future needs for ports and intermodal transportation capacity to meet expected growth in marine commerce.

Finally, natural disasters, labor disputes, terrorist attacks, ship collisions, spills of hazardous materials, and many other human and naturally caused events can disrupt the flow of marine cargo and passenger services, causing severe economic and social ramifications nationally and internationally. Diminished port capacity

could also affect vital military operations. In developing a national freight transportation strategy, DOT should work closely with the U.S. Department of Homeland Security and the FEMA to incorporate port security and other emergency preparedness requirements. The strategy should focus on preventing threats to national security and port operations and on response and recovery practices that limit the impacts of such events, including an assessment of the availability of alternative port capacity.

Coastal and Ocean Water Quality

Coastal and ocean water quality is threatened by multiple sources of pollution, including point and nonpoint source pollution, atmospheric deposition of pollutants, vessel pollution, invasive species, and trash being washed into the ocean and onto beaches. Addressing these multiple pollutants will require development of an ecosystem-based and watershed management approach that includes a variety of management tools, coordination, and ongoing monitoring.

Addressing Coastal Water Pollution

Coastal waters are one of the Nation's greatest assets, yet they are being bombarded with pollution from all directions. The heavy concentration of activity in coastal areas, combined with pollutants flowing from streams far inland and others carried through the air great distances from their source, are the primary causes of nutrient enrichment, hypoxia, toxic contamination, sedimentation, and other problems that plague coastal waters.

Any solution must be founded on an ecosystem-based and watershed management approach involving a broad range of agencies, programs, and individuals. The complex array of laws, agencies, and programs that address water pollution, and the number of parties involved, will require greatly enhanced coordination among Federal agencies, primarily EPA, NOAA, USDA, and USACE. Greater coordination is also needed between the Federal Government and managers at the State, territorial, tribal, and local levels, watershed groups, nongovernmental organizations, private stakeholders, and the academic and research communities. Solutions will also require a substantial financial investment and will take time.

Reducing Point Sources of Pollution

Over the last few decades, great strides have been made in controlling water pollution from point sources, although further improvements could be realized through increased funding, strengthened enforcement, and promotion of innovative approaches such as market-based incentives. The Commission also addresses several specific point sources of pollution, including wastewater treatment plants, sewer system overflows, septic systems, industrial facilities, and animal feeding operations.

Increasing the Focus on Nonpoint Sources of Pollution

While considerable progress has been made in reducing point sources of pollution, further progress toward improving coastal water quality will require significant reductions in nonpoint sources as well. This pollution occurs when rainfall and snowmelt carry pollutants over land, into streams and groundwater, and down to coastal waters. Ninety percent of impaired water bodies do not meet water quality standards at least in part because of nonpoint source pollution. The majority of the nonpoint source pollution entering rivers, estuaries, coastal waters, and ultimately the oceans is from agricultural and stormwater runoff.

To address nonpoint source pollution, the NOC should establish significant reduction of nonpoint source pollution in all impaired coastal watersheds as a national goal, and set measurable objectives to meet water quality standards. The nation has a number of opportunities to reduce the impacts of nonpoint sources of pollution on coastal waters. Because agricultural runoff contributes substantially to nonpoint source pollution, USDA should align its conservation programs and funding with other programs aimed at reducing nonpoint source pollution, such as those of EPA and NOAA. Other opportunities for the Nation to reduce nonpoint source pollution include coordination of Federal nonpoint programs so they are mutually supportive, more targeted and aggressive use of state revolving loan funds, broader implementation of incentives and disincentives, and improved monitoring to assess compliance and overall progress. State and local governments also have important roles to play in land use planning and stormwater management decisions.

Watersheds are often the appropriate geographic unit for addressing water-related problems and collaborative watershed groups have had significant successes in addressing nonpoint source pollution. Therefore, the NOC and regional ocean councils should strengthen the ability of collaborative watershed groups to address problems

associated with nonpoint source pollution by developing and implementing strategies to provide them with adequate technical, institutional, and financial support.

Addressing Atmospheric Sources of Pollution

Atmospheric deposition of pollutants can also harm water quality, aquatic resources, and human health. To address atmospheric deposition, EPA, States, and watershed groups should explore regional approaches for managing atmospheric deposition, particularly when it affects water bodies in states far from the source.

Creating a National Water Quality Monitoring Network

Pollution of the Nation's coastal waters has led to beach closures, oxygen depletion, health impacts from toxic contamination, and many other problems. Despite these threats to coastal waters, there is no national network in place to monitor water quality changes and their causes, facilitate estimates of their economic impact, and measure the success of management efforts. Increased monitoring is needed not only along the Nation's coasts, but also inland where pollutants make their way downstream, ultimately impacting coastal waters. A national water quality monitoring network is essential to support the move toward an ecosystem-based management approach that considers human activities, their benefits, and their potential impacts within the context of the broader biological and physical environment. An essential step toward controlling pollution will be to strengthen and coordinate monitoring efforts to provide decisionmakers with necessary information.

A number of monitoring efforts are currently conducted by Federal agencies, State governments, research institutions and academia, nongovernmental organizations, and individual volunteers. Existing monitoring programs vary in many respects, including sampling design and intensity, parameters tested, analytical methodology, data management protocols, and funding. Even when the same properties are measured, different data management protocols may make the integration of that information difficult. Consequently, while a number of monitoring programs exist, they are not designed to support a comprehensive and coordinated national monitoring network.

Ensuring Comprehensive, Coordinated Coverage

The nation's coastal margin is the most densely populated and developed region of the nation, and its waters have been significantly degraded by pollution. Yet in recent years, due largely to lack of funding, monitoring has been extremely sparse along the coasts. Much remains unknown about the status of coastal waters, and increased monitoring will be required to make informed management decisions about this economically and ecologically valuable region. Yet the close connections between coastal and upstream waters dictate that any water quality monitoring network must be national in scope. NOAA, EPA, and USGS should lead the effort to develop a national water quality monitoring network that coordinates existing and planned monitoring efforts, including Federal, State, local, and private efforts. The network should include a federally-funded backbone of critical stations and measurements needed to assess long-term water quality trends and conditions.

Because of the inherent overlap between inland, coastal, and open-ocean monitoring and observing, the national water quality monitoring network should be closely linked with the Integrated Ocean Observing System (IOOS) and ultimately with a broad Earth observing system. NOAA should ensure that the water quality monitoring network includes adequate coverage in both coastal areas and the upland areas that affect them, and that the network is linked to the IOOS, to be incorporated eventually into a comprehensive Earth observing system.

Creating an Effective Monitoring Network and Making Data Accessible and Useful

In addition to coordinating existing monitoring efforts, an effective national water quality monitoring network should have specific goals and objectives, reflect user needs, and be helpful in assessing the effectiveness of management approaches. The overall system design should determine what and where to monitor, including definition of a set of core variables. Technical expertise will be needed to standardize procedures and establish quality control and data management protocols. The network should be periodically assessed and modified as necessary. Most important, the data collected through the national monitoring network should be useful to managers and stakeholders in evaluating management measures, determining best management practices, and making continual improvements in reaching ecosystem goals. This data should also be translated into timely and useful information products that are readily accessible to decision makers and the public. The design and implementation of the national monitoring network will require not only Federal coordination, but also significant input from the States.

Limiting Vessel Pollution and Improving Vessel Safety

The benefits from vessel activities are significant—ships carry more than 95 percent of the Nation's overseas cargo—but these operations also present safety, security and environmental risks that must be effectively addressed.

Success in addressing these concerns will depend on a broad domestic and international framework comprised of three key components. The first component is a strong voluntary commitment on the part of vessel owners and operators to build a workplace ethic that incorporates safety, security, and environmental protection as important and valued aspects of everyday vessel operations. Reliable means of measuring the success of these efforts, as reflected in crew and company performance, are essential and should include extensive use of third-party audits. The U.S. Coast Guard, through incentives and partnership programs, should encourage industry partners to develop stronger voluntary measures, particularly those that reward crew member contributions, as part of a continuing long-term effort that focuses on building a culture of safety, security, and environmental compliance.

The second key component is effective oversight and control by the primary vessel regulator, the vessel's flag state. Foreign flag vessels, subject primarily to the jurisdiction and control of other governments, carry more than 90 percent of international commercial freight entering and departing the United States and account for 95 percent of passenger ships and 75 percent of cargo ships operating in U.S. waters. Although many flag states take their responsibilities seriously, oversight and enforcement vary dramatically. Over the past decade, the International Maritime Organization has developed guidelines to improve flag state oversight and enforcement. However, implementation of these measures has met with mixed results. Mounting international security concerns have made effective flag state oversight and control more urgent today than ever before. The United States should work with other nations to accelerate efforts at the International Maritime Organization to enhance flag state oversight and enforcement. Initiatives should include expeditious promulgation of a code outlining flag state responsibilities, and development of a mandatory external audit regime to evaluate performance and identify areas where additional technical assistance can be used to best advantage.

The third key framework component is effective control over vessels visiting U.S. ports. The Coast Guard currently carries out a port state control program that allocates limited inspection resources to the highest-risk vessels, based on an assessment of the vessel owner, flag state, classification society, performance history, and vessel type. Performance-based vessel inspections, while the most effective means of verifying compliance, are resource intensive. These inspections have played a critical role in identifying and correcting potential problems, and in assessing the effectiveness of overall efforts to improve safety and environmental compliance. Concerns have been expressed in Congress and elsewhere about the adequacy of Coast Guard resources to meet new security demands while fulfilling other important responsibilities. Congress should provide the U.S. Coast Guard with the resources necessary to sustain and strengthen the performance-based inspection program for marine safety and environmental protection while also meeting new vessel security inspection and other maritime security requirements. In addition, the Coast Guard should work at the regional and international levels to increase effective coordination and vessel information sharing among concerned port states.

In addition to outlining a framework to address vessel safety, security and environmental concerns, our report also recommends more comprehensive approaches to address waste stream, oil and air pollution from commercial and recreational vessels. Recommendations include: establishing a uniform national regime to deal with cruise ship waste streams; ratifying and working to strengthen MARPOL Annex V1 air emission standards; developing comprehensive policy guidance and contingency plans for vessels seeking places of refuge in the United States; developing a long-term plan that identifies and addresses the greatest risks associated with marine oil transportation systems; and updating and accelerating efforts to reduce recreational vessel pollution. We also place particular emphasis on the use of market-based mechanisms and incentives to reduce pollution and encourage appropriate voluntary actions.

Preventing the Spread of Invasive Species

The introduction of non-native marine organisms into ports, coastal areas, and watersheds has damaged marine ecosystems around the world, costing millions of dollars in remediation, monitoring, and ecosystem damage. Invasive species policies are not keeping pace with the problem primarily because of inadequate funding, a lack of coordination among Federal agencies, redundant programs, and outdated technologies.

Making Prevention the First Line of Defense

The discharge of ballast water is considered a primary pathway for introduction of non-native aquatic species. Exchanging ballast water in the middle of the ocean to reduce the risk of transferring organisms from one ecosystem to another is the primary management tool currently available for ships to control the introduction of invasive species.

To better control the introduction of invasive species, the U.S. Coast Guard's national ballast water management program should: apply uniform, mandatory national standards; incorporate sound science in the development of a biologically meaningful and enforceable ballast water treatment standard; include a process for revising the standard to incorporate new technologies; ensure full consultation with EPA; and include an interagency review, through the NOC, of the policy for ships that declare they have no ballast on board.

While ballast water is considered a primary pathway, there are also other important ship-related sources of non-native aquatic species, including ships' hulls, anchors, navigational buoys, drilling platforms, and floating marine debris. Other pathways include intentional and unintentional human introductions of fish and shellfish, and illegally released organisms from the aquaculture, aquarium, horticulture, and pet industries. There is increasing concern that an expanding trade through the Internet and dealers of exotic pets is exacerbating the invasive species problem.

To address these pathways of introduction, the NOC, working with the Aquatic Nuisance Species Task Force and the National Invasive Species Council, should coordinate public education and outreach efforts on aquatic invasive species, with the aim of increasing public awareness about the importance of prevention.

Accelerating Detection and Response

Only the most draconian prevention strategy could hope to eliminate all introductions of non-native species and thus prevent the possibility of an invasion. Yet no effective mechanism is in place for rapidly responding to newly discovered aquatic invasions when they do occur. Therefore, the National Invasive Species Council and the Aquatic Nuisance Species Task Force, working with other appropriate entities, should establish a national plan for early detection of invasive species and a system for prompt notification and rapid response.

Improving the Control of Invasive Species

As biological invasions continue, there is a pressing need to improve the control of invasive species by reducing the overlaps and redundancies caused by the involvement of so many agencies with insufficient interagency coordination. The NOC should review and streamline the current proliferation of Federal and regional programs for managing marine invasive species, and coordinate Federal, regional and State efforts.

The study of marine biological invasions is a relatively new research area and little is understood about how or why certain species become invasive, what pathways of introduction are most important, and whether certain factors make an ecosystem more susceptible to invasions. To better understand marine biological invasions, the NOC should coordinate the development and implementation of an interagency plan for research and monitoring to understand and prevent aquatic species invasions.

Reducing Marine Debris

The trash and other waste that drifts around the global ocean and washes up on the Nation's shores poses a serious threat to fishery resources, wildlife, and habitat, as well as human health and safety. Approximately 80 percent of debris is washed off the land, blown by winds, or intentionally dumped from shore, while 20 percent comes from vessels and offshore platforms.

NOAA currently addresses marine debris as a part of several other efforts, but there is a need to coordinate, strengthen, and increase the visibility of the marine debris efforts within NOAA by creating a centralized marine debris program within the agency. This program should be coordinated with EPA's marine debris activities, as well as with the significant efforts conducted by private citizens, state, local, and nongovernmental organizations.

Interagency Coordination

Although strengthening NOAA's work on marine debris through establishment of an office within the agency is an important step, an interagency committee under the NOC is needed to unite all appropriate Federal agencies around the issue. Such a committee could support existing marine debris efforts by agencies and nongovernmental organizations, and should expand and better coordinate national and international marine debris efforts, including: public outreach and education; partner-

ships with state and local governments, community groups, nongovernmental organizations, and industry; and monitoring, identification and research.

Eliminating Derelict Fishing Gear

Whether intentionally discarded or unintentionally lost during storms or fishing operations, derelict fishing gear poses serious threats, entrapping marine life, destroying coral reefs and other habitat, and even posing danger to humans. Although derelict fishing gear is a worldwide problem, currently no international treaties or plans of action address it. A strong need exists for the U.S. Department of State and NOAA, working with the United Nations Food and Agriculture Organization, to develop a plan of action to address derelict fishing gear, to be implemented on a regional, multi-national basis. In addition, within the United States, a public-private partnership program is needed to prevent, remove, and dispose of derelict fishing gear.

Ensuring Appropriate Port Reception Facilities

Under requirements for port reception facilities in Annex V of MARPOL, member nations must provide waste disposal facilities in their ports to receive waste from ships. Despite this requirement, many ports do not have adequate facilities. In addition, Annex V calls for the designation of Special Areas that receive a higher level of protection than is required in other ocean areas. Special Areas have been designated for many parts of the world, however, for a Special Area to receive extra protection, there must first be a demonstration of adequate port reception facilities. Some important Special Areas, such as the Wider Caribbean, are not yet eligible to receive extra protection because of inadequate port reception facilities. Therefore, the U.S. Department of State should increase efforts to ensure that all port reception facilities meet the criteria necessary to allow implementation of Special Areas protections.

Enhancing the Use and Protection of Ocean Resources

The ocean's biological and mineral resources are of enormous value to the nation, not only for their direct economic output, but also for their incalculable aesthetic importance.

The commercial fishing industry's total value exceeds \$28 billion annually, with the recreational saltwater fishing industry valued at around \$20 billion. NOAA estimates that U.S. coral reefs cover approximately 7,600 square miles. In 2001, coral reefs in the Florida Keys alone supported \$105 million in income and more than 8,000 jobs. Further, approximately one-half of all federally-managed commercial fish species depend on coral reefs for at least part of their life cycle. Currently, energy development in Federal waters accounts for more than 30 percent of domestic oil production and 25 percent of natural gas, with a total annual value of between \$25—\$40 billion, and a contribution of about \$5 billion in royalties to the U.S. Treasury.

In order to provide for sustainable use, management needs to be strengthened in a broader context that looks at impacts of management decisions on the ecosystem as a whole.

Fisheries Management

The last 30 years has seen the evolution of an industry from being largely unregulated but with seemingly boundless potential, to one that is highly regulated and struggling to regain its potential as we move toward a sustainable, ecosystem-based fisheries management regime.

In 1976, based in part on the recommendations of the Stratton Commission, Congress approved the Magnuson-Stevens Fishery Conservation and Management Act to manage and assert U.S. control over fishery resources within 200 nautical miles of the coast. Eight Regional Fishery Management Councils (RFMCs) were created to develop management plans for fisheries in Federal waters. The Act required regional plans to be consistent with broad national guidelines, but otherwise granted considerable flexibility to the RFMCs. The regional flexibility that had been seen as a great strength of the new law now showed its downside as some RFMCs set unsustainable harvest levels, leading to the collapse or near-collapse of several important fisheries.

In the over 30 years since the Stratton report, some fishery management bodies have revealed fundamental weaknesses in the system that led to overexploited stocks and ecosystem degradation in some regions. However, the management practices in some regions, particularly the North Pacific, protected fisheries from over-exploitation and served as a model for many of the Commission's fisheries recommendations. The Commission fishery recommendations can be grouped into six areas: strengthening the link between science and management, clarifying jurisdic-

tion representation, expanding the use of dedicated access privileges, improving enforcement, and strengthening international management.

The link between fishery management decisions and peer-reviewed scientific info must be strengthened, including developing an expanded research program that is more responsive to managers' needs. To accomplish this, a number of management improvements are needed. RFMCs should be required to rely on the advice of their Scientific and Statistical Committees (SSCs), especially when setting harvest levels. RFMCs should not be allowed to approve measures less conservative than recommended by the SSC. SSC members should be nominated by the RFMCs and appointed by the NOAA Administrator. To ensure that SSC members are of the highest quality, their credentials and potential conflicts of interest should be reviewed by an external organization. To ensure sufficient external review of the scientific advice of the SSCs, NOAA should develop a standardized, independent peer-review process for implementation by all RFMCs. To ensure that needed conservation measures are implemented in a timely manner, default measures should be developed that would go into effect with a lack of action on the part of the RFMCs. Finally, to ensure that manager's have the information they require, NOAA's process for developing research plans should incorporate manager's priorities to the extent practicable. An expanded cooperative research program and increased emphasis on in-season recreational fishery data collection should be an important component of this effort.

Responsibilities and jurisdiction of the various Federal and interstate fishery management entities need to be clarified, and the representation on the Federal regional fishery management councils need to be broadened. To ensure that jurisdictional confusion does not lead to delaying conservation measures, Congress should assign a lead management authority among the various Federal and interstate management authorities, based primarily on proportion of catch occurring within each entities jurisdiction. To ensure that the RFMCs have appropriate representation, particularly as we move toward ecosystem-based management, the governors should be required to submit a broader slate of candidates to be appointed by the NOAA Administrator. To ensure that RFMCs members have the necessary knowledge to properly manage fisheries, members should be required to take a training course. Finally, to ensure that all interstate fishery commissions have the necessary means to manage the fisheries under their jurisdiction, Congress should grant authority similar to the Atlantic Coastal Fisheries Cooperative Management Act to the Gulf and Pacific States Commissions.

To reverse existing incentives that create an unsustainable "race for the fish," fishery managers should explore widespread adoption of dedicated access privileges to promote conservation and help reduce overcapitalization. Congress should amend the Magnuson-Stevens Fishery Conservation and Management Act to affirm that fishery managers are authorized to institute dedicated access privileges, subject to meeting national guidelines; and every Federal, interstate, and State fishery management entity should consider the potential benefits of adopting dedicated access programs. In addition, Congress should directly address overcapitalization by revising Federal programs that subsidize overcapitalization, as well as work with NOAA to develop programs that permanently address overcapitalization in fisheries.

Fishery enforcement must be improved through adoption of better technology, such as Vessel Monitoring Systems (VMS) and better cooperation among Federal agencies and States. Funding should be increased for Joint Enforcement Agreements between NOAA's National Marine Fisheries Service and coastal states as the best method of restoring the enforcement presence of the Coast Guard diminished because of the increased need for maritime security following the 9/11 terrorist attacks. The expanded use of VMS is another cost effective way of increasing enforcement capabilities.

Fishery management needs to continue the move toward ecosystem-based management in order to improve management, reduce conflicts between socio-economic impacts and biological sustainability, and provide a proper forum to address difficult management issues. In particular, issues such as habitat damage and bycatch should be approached from an ecosystem basis and management plans should be designed to reduce impacts from these factors.

Because many of the stocks targeted by U.S. fishermen traverse international waters, it will be impossible to conserve some stocks without the aid of other countries. In addition, many endangered species such as sea turtles and whales travel the high seas. To promote international cooperation to conserve living marine resources, the Commission makes the following recommendations. The U.S. should work to encourage other countries to adopt and enforce existing international agreements to promote worldwide adoption of sustainable fisheries practices, in particular the Fish Stocks Agreement and the United Nations Food and Agriculture Organization's

Compliance Agreement. The National Ocean Council should recommend effective methods to promote adoption of other important international conservation agreements, such as the Code of Conduct for responsible fisheries. In addition, the United States should continue to press for the inclusion of environmental objectives—particularly those specified in international environmental agreements—as legitimate elements of trade policy.

Marine Mammals and Endangered Species

Because of their intelligence, visibility and frequent interactions with humans, marine mammals hold a special place in the minds of most people and are afforded a higher level of protection than fish or other marine organisms. The American public has also consistently been supportive of efforts to prevent species from becoming endangered or extinct from human-caused activities. Because of the concern that the American public has shown for marine mammals and endangered species, specific legislation was enacted to provide them greater protection. The Marine Mammal Protection Act and the Endangered Species Act are landmark laws that have protected marine mammals and populations in danger of extinction since their passage. However, both Acts need to move toward a more ecosystem-based regime to improve protections for these populations.

The biggest threat to marine mammals worldwide today is their accidental capture or entanglement in fishing gear (known as “bycatch”), killing hundreds of thousands of animals a year. Commercial harvesting contributed to major declines in the populations of marine mammals but only a few nations still allow hunting for purposes other than subsistence. Hunters from those nations continue to kill hundreds of thousands of seals, whales, dolphins, and other marine mammals each year while legal subsistence hunting accounts for thousands more. Other potential causes of death and injury to marine mammals, such as ships strikes, pollution and toxic substances, and noise from ships and sonar, cause many fewer deaths than bycatch and hunting.

The threats to endangered marine species such as sea turtles and sea birds are myriad and not easily categorized. One factor that is common to declines in many species is the destruction or degradation of their natural habitat. Thus the successful recovery of a species depends to a large degree on protection or restoration of this habitat.

One of the critical components to improving protections for protected species is expanding the knowledge base. We know very little about the basic biology for these species, particularly marine mammals. The lack of basic scientific information has perhaps contributed to the frequent mismatch between causes of impacts to marine mammal populations and the amount of management attention paid to them. For example, the top two impacts to marine mammals by orders of magnitude are bycatch and hunting, yet most recent attention is being paid to other causes. Under ecosystem-based management, the most critical impacts should be addressed first. However, our overwhelming lack of knowledge of marine mammal and endangered species makes it difficult to properly rank and address impacts to these species. As the foundation to improving management, the Commission recommends an expanded research, technology, and engineering program, coordinated through the National Ocean Council, to examine and mitigate the effects of human activities on marine mammals and endangered species. In particular, Congress should expand Federal funding for research into ocean acoustics and the potential impacts of noise on marine mammals. The U.S. should increase efforts to extend the benefits of the expanded research program to other countries.

Another important component to improving protections for protected species will be to clarify and coordinate Federal agency actions. The Commission recommends that jurisdiction for marine mammals be consolidated within NOAA, and that the NOC improve coordination between NOAA and the Fish and Wildlife Service with respect to the implementation of the Endangered Species Act, particularly for anadromous species or when land-based activities have significant impacts on marine species.

The MMPA, with limited exceptions, prohibits the hunting, killing, or harassment of marine mammals. One of the exceptions authorizes the issuance of permits for the unintentional and incidental taking of small numbers of marine mammals provided it has only a negligible impact on the species. This provision has been problematic because terms such as small numbers and negligible impact are not defined in the Act, resulting in a lack of clarity about when a permit is necessary and under what circumstances it should be granted. Congress should amend the Marine Mammal Protection Act to require the NOAA to more clearly specify categories of activities that are allowed without a permit, those that require a permit, and those that are prohibited. Specifically, Congress should amend the Marine Mammal Protection

Act to revise the definition of harassment to cover only activities that meaningfully disrupt behaviors that are significant to the survival and reproduction of marine mammals.

As an adjunct to clarifying allowed and permitted activities, the permitting process itself should be streamlined. Specifically, programmatic permitting should be used where possible to simplify agency permitting.

Coral Communities

Tropical and deepwater coral communities are among the oldest and most diverse ecosystems, rivaling tropical rainforests in biodiversity and economic value. But, tropical coral reef health is rapidly declining, with pristine reefs being rare or non-existent and possibly one-third of the world's reefs severely damaged. The existing management structure is inadequate and agencies and laws overseeing coral reef management have made little progress in actually protecting corals. Immediate action is needed to avoid irreversible harm.

In the short-term, the Coral Reef Task Force (CRTF) should be strengthened by placing it under the NOC, and adding the U.S. Department of Energy and the U.S. Army Corps of Engineers. The strengthened CRTF should begin immediate development of actions to reverse impacts of coastal pollution and fishing on coral communities. The EPA and USDA, at the minimum, should be charged with implementing the coastal pollution reduction plan and NOAA should be charged with implementing the plan for reversing impacts from fishing. In addition, the CRTF's area of responsibility should be expanded to include deepwater coral communities as well.

In the long-term, the Congress should enact a "Coral Protection and Management Act" that provides direct authority to protect and manage corals, and provides a framework for research and cooperation with international protections efforts. This legislation should include the following elements: support for mapping, monitoring, and research programs; support for new research and assessment activities to fill critical information gaps; liability provisions for damages to coral reefs similar to those in the Marine Protection, Research, and Sanctuaries Act; support for outreach activities to educate the public about coral conservation and reduce human impacts; and, support for U.S. involvement, particularly through the sharing of scientific and management expertise, in bilateral, regional, and international coral reef management programs.

As the world's largest importer of ornamental coral reef resources, the United States has a particular responsibility to help eliminate destructive harvesting practices and ensure the sustainable use of these resources. Many of these resources are harvested by methods that destroy reefs and overexploit ornamental species. A balance is needed between sustaining the legitimate trade in ornamental resources and sustaining the health and survival of the world's coral reef resources. The U.S. should develop domestic standards for the importation of coral species, to ensure that U.S. citizens do not indirectly promote unsustainable practices in coral harvesting countries.

Aquaculture

Marine aquaculture has the potential to supply part of the ever increasing domestic and worldwide demand for seafood. However, there are two major concerns that need to be addressed: environmental problems with existing aquaculture operations, particularly net-pen facilities, and a confusing, inconsistent array of State and Federal regulations that hinder private sector investment.

To oversee a comprehensive and environmentally sound management regime, Congress should amend the National Aquaculture Act to designate NOAA as the lead Federal agency for implementing a national policy for environmentally and economically sustainable marine aquaculture and create an Office of Sustainable Marine Aquaculture in NOAA.

This new NOAA office should develop a single, multi-agency Federal permit for the aquaculture industry and ensure aquaculture facilities meet State and national environmental standards to lessen impacts from escapement and disease and protect the sustainability and diversity of wild stocks.

Furthermore, the permitting and leasing system and implementing regulations should: reflect a balance between economic and environmental objectives consistent with national and regional goals; be coordinated with guidelines and regulations developed at the State level; include a system for the assessment and collection of a reasonable portion of the resource rent generated from marine aquaculture projects that use ocean resources held in public trust; require applicants to post a bond to ensure that any later performance problems will be remedied and that abandoned facilities will be safely removed at no additional cost to the taxpayers; and, require

the development, dissemination, and adoption by industry of best management practices that are adaptable to new research and technology advances.

Enhanced investments in research, demonstration projects, and technical assistance can help the industry address environmental issues, conduct risk assessments, develop technology, select species, and improve best management practices. It is also vital for developing fair and reasonable policies, regulations, and management measures. Most of the Federal research to support marine aquaculture has been carried out under the auspices of NOAA's National Sea Grant College Program, which funds primarily university-based research. Congress should increase funding for expanded marine aquaculture research, development, training, extension, and technology transfer programs in NOAA. The Office of Sustainable Marine Aquaculture should set priorities for the research and technology programs, in close collaboration with academic, business, and other stakeholders.

Because the U.S. market for seafood is one of the largest in the world, we can use our market power as a positive force for promoting sustainable, environmentally sound aquaculture practices not only in the U.S., but the world as well. The U.S. should work to ensure that all countries adhere to aquaculture standards such as are in the UN FAO Code of Conduct for Responsible Fisheries.

Oceans and Human Health

Beneficial and harmful links between human health and ocean health exist. While several important medical treatments are based on chemicals discovered in marine animals, increasingly common phenomena such as harmful algal blooms have demonstrated ability to negatively impact human health. The health of marine ecosystems is affected by human activities such as pollution, global warming, and fishing. But in addition, human health depends on thriving ocean ecosystems. A better understanding about the many ways marine organisms affect human health, both for good by providing drugs and bioproducts, and for bad by causing human ailments, is needed.

Congress should establish an oceans and human health initiative to create a competitive grant program and coordinate Federal activities. Existing programs at NOAA, NSF and the National Institute of Environmental Health Sciences should be coalesced in this initiative. This initiative should be expanded to include other pertinent agencies such as the EPA and FDA.

New knowledge and technologies are needed to detect and mitigate microbial pathogens. These methods must be quick and accurate so that information can be communicated to resource managers and the coastal community in a timely manner. As they are developed, technologies need to be integrated into biological and biochemical sensors that can continuously monitor high-risk sites. It is important that site-specific sensor data and satellite sensor data be incorporated into the IOOS. To accomplish this task, the National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support the development and implementation of improved methods for monitoring and identifying pathogens and chemical toxins in ocean waters and organisms.

Offshore Energy and Mineral Resources

Oil and gas development on the Outer Continental Shelf (OCS) provides over a quarter of our domestic oil and gas reserves, and contributes thousands of jobs and billions of dollars to our economy. In addition to its responsibilities for living marine resources, the Federal Government also exercises jurisdiction over nonliving resources, energy and other minerals located in the waters and seabed of the more than 1.7 billion acres of OCS. Offshore oil and gas development has the most mature and broadest management structure of all such resources. Although controversial in many areas, the process for oil and gas leasing and production is well institutionalized, reasonably comprehensive, and could be a model for new ocean-based renewable energy projects as part of a coordinated offshore management regime.

MMS's Environmental Studies Program (ESP) is a major source of information about the impacts of OCS oil and gas activities on the human, marine, and coastal environments. Since 1986, annual funding for the program has decreased, in real dollars, from a high of \$56 million to approximately \$18 million in 2003. The erosion in ESP funding has occurred at a time when more and better information, not less, is needed. There continues to be a need to better understand the cumulative and long-term impacts of OCS oil and gas development, especially in the area of low levels of persistent organic and inorganic chemicals, and their cumulative or synergistic effects.

The U.S. Department of the Interior should reverse recent budgetary trends and increase funding for the Minerals Management Service's Environmental Studies

Program. The development of technologies and exploratory activities moving into very deep waters requires an increase in the MMS environmental studies program to keep track of new and emerging environmental issues. In addition to this program, the development of the IOOS could provide better information that can improve management of offshore resources. Industry and Federal agency partnerships should allow use of industry facilities to be incorporated into the IOOS.

To make certain that the Federal-State partnership is strengthened and that critical marine ecosystems are protected, more investment of the resource rents generated from OCS energy leasing and production into the sustainability of ocean and coastal resources is necessary. Specifically, some portion of the revenues received by the Federal Government annually for the leasing and extraction of nonrenewable offshore resources need to be allocated to all coastal states for programs and efforts to enhance the conservation and sustainable development of renewable ocean and coastal resources. Congress should ensure that revenues received from leasing and extraction of oil and gas and other new offshore uses are used to promote sustainable development of renewable ocean and coastal resources through creation of a grant program to all coastal states, with a larger share going to OCS producing States.

Conventional oil and gas are not the only fossil-based fuel sources located beneath ocean floors. Methane hydrates are solid, ice-like structures composed of water and natural gas. They occur naturally in areas of the world where methane and water can combine at appropriate conditions of temperature and pressure, such as in thick sediments of deep ocean basins, at water depths greater than 500 meters. The estimated amount of natural gas in the gas hydrate accumulations of the world greatly exceeds the volume of all known conventional gas resources. Conservative estimates reveal the quantity is enough to supply all of the Nation's energy needs for more than 2,000 years at current rates of use. However, there is still no known practical and safe way to develop the gas and it is clear that much more information is needed to determine if methane hydrates can become a commercially viable and environmentally acceptable source of energy. The National Ocean Council (NOC), working with the U.S. Department of Energy and other appropriate entities, should determine whether methane hydrates can contribute significantly to meeting the Nation's long-term energy needs. If such contribution looks promising, the NOC should determine how much the current investment in research and development efforts should be increased.

There is continued interest in offshore renewable technologies as a means of reducing U.S. reliance on potentially unstable supplies of foreign oil, diversifying the Nation's energy mix, and providing more environmentally benign sources of energy. As long as Federal agencies are forced to bootstrap their authorities to address these activities, the Nation runs the risk of unresolved conflicts, unnecessary delays, and uncertain procedures. What is urgently needed is a comprehensive offshore management regime, developed by the National Ocean Council, which is designed to review all offshore uses in a greater planning context. A coherent and predictable Federal management process for offshore renewable resources that is able to weigh the benefits to the Nation's energy future against the potential adverse effects on other ocean users, marine life, and the ocean's natural processes, should be fully integrated into the broader management regime. Congress, with input from the National Ocean Council, should enact legislation providing for the comprehensive management of offshore renewable energy development as part of a coordinated offshore management regime. Specifically, this legislation should: streamline the process for licensing, leasing, and permitting renewable energy facilities in U.S. waters; subsume existing statutes, such as the Ocean Thermal Energy Conversion Act, and should be based on the premise that the oceans are a public resource; and, ensure that the public receives a fair return from the use of that resource and development rights are allocated through an open, transparent process that takes into account State, local, and public concerns.

Advancing International Ocean and Science Policy

The United States has traditionally been a leader in international ocean policy-making and has participated in the development of many international agreements that govern the world's ocean areas and resources. That leadership must be maintained and reinvigorated. The international ocean challenges of the 21st century will require improved collaboration among domestic and international policymakers to establish ambitious objectives and take the actions necessary to achieve them.

The United States can best advance its own ocean interests and positively contribute to the health of the world's oceans by first ensuring that U.S. domestic policies and actions embody exemplary standards of wise, sustainable ocean management. The new national ocean policy framework will be instrumental in setting this

positive tone for the international ocean community. The Commission also recommends several specific actions to maintain and reinvigorate the leadership of U.S. in global ocean issues:

U.S. Accession to the United Nations Convention on the Law of the Sea

The United States should accede to the United Nations Convention on the Law of the Sea—the preeminent legal framework for addressing international ocean issues. Until that step is taken, the Nation will not be able to fully participate in bodies established under the Convention that make decisions on issues of importance to all coastal and seafaring nations, or to assume its important leadership role and protect United States interests as the law of the sea evolves.

Enhanced Coordination Among U.S. Ocean-Related Federal Agencies

Within the U.S. Government, the U.S. Department of State is the lead agency for most ocean-related international negotiations. However, the role of more specialized agencies is extremely important due to the science and resource focus of many multilateral ocean issues. Consistent involvement of a wide range of experts is essential both to establish international standards that reflect U.S. interests, and to ensure that subsequent actions by the United States and others are in accordance with those standards.

A new mechanism is needed to provide the optimum degree of coordination among U.S. agencies sharing responsibility and knowledge of international ocean issues. An interagency committee should be established under the auspices of the National Ocean Council to enhance coordination and collaboration among U.S. Government agencies, strengthening U.S. performance at international negotiations and improving implementation of international ocean policy.

Successful national and international ocean policy depends on sound scientific information. It is essential, therefore, to ensure that U.S. policymakers benefit from timely advice and guidance from the U.S. marine scientific community. This, in turn, requires procedures that both give scientists the opportunity to provide input and policy makers the chance to carefully consider their recommendations. The State Department should increase its internal training and scientific support to ensure better integration of ocean-related scientific expertise in policy and program development and implementation. In addition, the Department should develop more effective mechanisms to facilitate input from other government agencies and the broader scientific community.

Building International Capacity in Ocean Science and Management

Implementation of international ocean policy and improved management of ocean and coastal resources worldwide are affected by the adequacy of the science and management capacity of every coastal nation. To maintain progress on a global scale, the United States and other capable nations must assist coastal nations of more limited means. To be most effective, assistance should be science-based and developed within the context of an ecosystem-based approach. The U.S. Department of State should offer strong support for U.S. scientists conducting research programs around the world. Existing international partnerships should be strengthened and new partnerships promoted to facilitate the conduct of international research.

Capacity-building efforts should be concentrated on issues that have been identified as particularly critical for the health of an ecosystem or marine species, and have the greatest potential for positive impacts. In most instances, effective capacity-building will require long-term efforts to change detrimental practices and build support for new, sustainable management approaches. These efforts will require a funding commitment sufficient to make the changes needed to preserve or rebuild healthy ecosystems. As part of its international leadership role, the United States should increase its efforts to enhance long-term ocean science and management capacity in other nations through funding, education and training, technical assistance, and sharing best practices, management techniques, and lessons learned.

Implementing a New National Ocean Policy

To implement the blueprint for a new national ocean policy outlined in our report, several key elements are required: the will to move forward, the actors to carry out the changes, and the resources to support sustainable management of our oceans and coasts. Congress and the President have already demonstrated political will by enacting the Oceans Act of 2000 and appointing the U.S. Commission on Ocean Policy. Our preliminary report specifies who should carry out each recommendation and discusses what the costs will be and how they can be covered.

Who Should Take Action

In our report, we make 198 specific recommendations to implement a more coordinated and comprehensive national ocean policy. One of our goals was to ensure that every recommendation was aimed at a clear responsible party who could take action and be held accountable over time. As you read the report, you will see the recommendations grouped according to subject area. However, to highlight the assignment of responsibility, we also present a summary of all 198 recommendations, organized by the primary actors, in Chapter 31.

In brief:

- We include 54 recommendations for Congress, 69 for Executive Branch leaders, and 125 for Federal Government agencies.
- Of the 69 recommendations for Executive Branch leaders, 8 recommendations are for the President, 45 for the new National Ocean Council, 13 for the offices under the NOC's Committee on Ocean Science, Education, Technology, and Operations, 2 for the Assistant to the President, and 1 for the Presidential Council of Advisors on Ocean Policy.
- Of the 125 recommendations aimed at Federal Government agencies, 44 are for NOAA, 20 for EPA, 10 for the U.S. Coast Guard, 9 for NSF, 9 for the Department of the Interior, 8 for the U.S. Navy, 8 for the Department of State, 6 for the Department of Transportation, 5 for NASA, 3 for the National Institute of Environmental Health Sciences, 2 for the U.S. Army Corps of Engineers, 2 for the Department of Agriculture, and 1 for the Department of Labor.

(Note that some recommendations include more than one actor. As a result, the breakdown by organization adds up to more than 198.)

Although we have avoided targeting States (and local, territorial, and tribal governments) as the primary actors in our recommendations, they have a critically important role to play in the new National Ocean Policy Framework—through establishment of regional ocean councils, and in areas such as coastal development, water quality, education, natural hazards planning, fishery management, habitat conservation, and much more. States should also participate in the design and implementation of regional ocean observing systems and their integration into the national IOOS, as well as other research and monitoring activities.

How Can the Needed Changes be Achieved: Costs and Revenues

The recommendations I've just alluded to outline a series of ambitious proposals for improving the use and protection of the Nation's oceans and coasts. But meaningful change requires meaningful investments. In the case of the ocean, such investments are easy to justify.

As I explained earlier and as we discuss in more detail in the preliminary report, more than one trillion dollars, or one-tenth of the Nation's annual gross domestic product, is generated each year within communities immediately adjacent to the coast. By including the economic contribution from all coastal watershed counties, that number jumps to around five trillion dollars, or fully one half of our Nation's economy. Those contributions are threatened by continued degradation of ocean and coastal environments and resources.

Modest levels of new funding will reap substantial dividends by supporting new management strategies to sustain our ocean and coastal resources and maximize their long-term value.

Costs

From the start, this Commission pledged to be clear about the costs of its recommendations. In keeping with that goal, the final report will include a complete accounting of the startup, short-term, and continuing costs associated with each issue area, including an analysis of Federal, State, and local budget implications to the extent possible.

At this stage, I am able to provide a rough estimate of overall new Federal spending associated with the Commission's preliminary recommendations. The Commission continues to refine its calculations and the information on which they are based, and will have more detailed costs and revenue estimates in the final report to the Congress and the President.

The total estimated additional cost for initiatives outlined in our report will be approximately:

- \$1.2 billion in the first year
- \$2.4 billion in the second year
- \$3.2 billion per year in ongoing costs thereafter

A few special investments are worth highlighting:

- Creation of the National Ocean Council and related elements, with first-year costs of \$1 million and ongoing annual costs of \$2 million.
- Expansion of ocean education programs, with first-year costs of \$7 million, second year costs of \$251 million, and ongoing annual costs of \$246 million.
- Establishment of an integrated ocean observing system, with first-year costs of \$290 million, second-year costs of \$312 million, and ongoing annual costs of \$652 million.
- Increased ocean science and exploration, with first-year costs of \$230 million, second-year costs of \$395 million, and ongoing annual costs of \$760 million.
- Dedicated Federal support for needed State actions, with first-year costs of \$500 million, second-year costs of \$750 million, and ongoing annual costs of \$1 billion.

In view of the value generated by the ocean and coastal economy, we believe these are very reasonable investments.

Revenue: Creation of an Ocean Policy Trust Fund

Mindful of intense budgetary pressures at both Federal and State levels—and sensitive to the hardship associated with unfunded Federal mandates—the Commission set out to identify appropriate sources of revenue to cover the cost of its recommendations. A logical, responsible funding strategy is outlined in the preliminary report and will be developed further in the final report.

The Commission proposes creation of an Ocean Policy Trust Fund composed of rents generated from permitted uses in Federal waters. The Fund would include Outer Continental Shelf oil and gas revenues that are not currently committed. It would support the additional responsibilities we suggest for Federal agencies and prevent the creation of unfunded mandates to states.

The critical nature of the Nation's oceans assets and the challenges faced in managing them make it clear that the time has come to establish an Ocean Policy Trust Fund in the U.S. Treasury to assist Federal agencies and State governments in carrying out the comprehensive ocean policy recommended by this Commission.

The Fund would include Federal revenues from Outer Continental Shelf oil and gas development that are not currently committed to other funds. The Land and Water Conservation Fund, the National Historic Preservation Fund, and the OCS oil and gas revenues given to coastal states from the three mile area seaward of their submerged lands would not be affected. After those programs were funded, in accordance with law, the remaining OCS monies would be deposited into the Ocean Policy Trust Fund.

Additional funds may also become available based on new offshore activities. In several sections of the preliminary report we discuss revenues that may be generated from permitted uses of Federal waters. In general, when a resource is publicly-owned, its use by private profit-making entities should be contingent on a reasonable return to taxpayers. Creating a link between permitted activities in Federal waters and the cost of associated regulatory and management responsibilities is logical and well justified by precedents in Federal land management.

Approximately \$5 billion is generated annually from OCS oil and gas revenues. Protecting the three programs noted above would remove about \$1 billion. Thus, some \$4 billion would remain available for the Ocean Policy Trust Fund each year under current projections. At this time it is not possible to specify the amount of revenue that might be produced by emerging uses in Federal waters, nor predict when they may begin to flow.

The report recommends that a portion of the revenues received from the use of offshore resources be granted to States for the conservation and sustainable development of renewable ocean and coastal resources. OCS oil and gas producing States should receive a larger portion of such revenues to address the impacts on their States from extraction activities in adjacent Federal offshore waters.

In the Commission's view, Trust Fund monies should be used exclusively to support improved ocean and coastal management consistent with the Nation's new coordinated and comprehensive national ocean policy. Such funds would be used to supplement—not replace—existing appropriations for ocean and coastal programs, and to fund new or expanded duties.

Closing Statement

What I have presented to you today is a broad overview of the Commission's preliminary report—the culmination of two and a half years of work by 16 dedicated commissioners, 26 world-class science advisors, and a tireless staff of experts. To

create this report, the Commission heard testimony and collected other information that shaped our understanding of the most pressing issues facing our Nation's oceans and coasts.

The Commission balanced environmental, technical, economic, and scientific factors in making its recommendations. These bold recommendations for reform call for immediate implementation, while it is still possible to reverse distressing declines, seize exciting opportunities, and sustain the oceans and their valuable assets for future generations. Clearly, the Commission's recommendations will require some new investments. However, without major change, the tremendous potential of our oceans and coasts to American prosperity will continue to deteriorate.

It has taken more than 35 years for the Nation to refocus its attention on these vital resources. Our report provides a blueprint for the 21st century to achieve a future where our oceans and coasts are clean, safe, and sustainably managed and continue to contribute significantly to the well being of all the Nation's citizens. The time to act is now and everyone who cares about the oceans and coasts must play a part. Leadership from this Committee and others in Congress, and from the White House, will be essential and we look forward to working closely with all of you in the months and years to come.

The CHAIRMAN. Thank you, Admiral Watkins. Senator Stevens is required to go to another meeting and he'd like to make a comment or ask a question and we'd like to recognize him.

Senator STEVENS. I just want to make a statement. We do have a hearing at 2 p.m. on the financial aspects of this proposal, all of the recommendations. It will be, I hope, we want to confine that to the requirements for financing for the future to carry out your recommendations, so I look forward to seeing you at 2 p.m. That hearing's in room 138 of the Dirksen Building.

The CHAIRMAN. Thank you, Senator Stevens. So you're going to have a full day today.

Senator STEVENS. Well, that's so they can go home tonight.

The CHAIRMAN. Again, I want to thank you and members of the Commission. In the course of our questions by the members, if any of the members of the Commission choose to add or would like to respond, or Admiral, if you feel that one of the commissioners is qualified, might add something, please call on them. I've never known you to need to call on anyone, but perhaps this will be different.

Admiral WATKINS. Are you saying I talk too much, Mr. Chairman?

The CHAIRMAN. No, sir. Admiral, I'd like you and any other member of the Commission to talk about climate change. Obviously in the report you talk about the potential of climate change to significantly alter the distribution of microorganisms in the oceans. We had a hearing not long ago where one of the witnesses talked about the Great Barrier Reef dying. I'm a frequent swimmer and diver and I believe in various parts of the world I've seen massive impact of climate change. Senator Stevens, who just left, knows very well the effect on Native Alaskan villages because of increasing water levels.

I would just like a general assessment of how serious the problem is, and I'd be glad to hear from any of the other commissioners as well, and about how urgent it is that we take some kind of action and what action that might be. Thank you.

Admiral WATKINS. Mr. Chairman, I was Secretary of Energy at the time that the Nation was preparing for its first meeting on sustainable development in Rio de Janeiro. I thought our preparations were very poor. I don't think the United States came out with their

head high in a leadership role. And one of the problems was that we didn't have a scientific, science and technology component to advocacy. We had an advocacy stream only pushing things, and we have rejected everything so far rather than trying to come to a common approach internationally on collaborative research to understand the oceans, and I think it's time to do that.

And the climate change issue is powerful enough to drive some of these recommendations we make all by itself. And the way the Commission has approached this is we've noted throughout our report that climate change impacts every topic in our report—from health and safety of humans, health of environment, fisheries, distribution of marine organisms, including pathogens.

And as you know, just a one to two degree increase in surface water temperature off Bangladesh, all the research studies have shown the direct proportion of that to malaria ashore, and we've seen it during the El Niño events in Africa, what happens there, droughts and floods and so forth. We can predict those things to some reasonable percent of accuracy if we get on with an observing system that makes some sense, and of course, we put a lot of strength on that in our report.

We discuss the importance of the Integrated Ocean Observing System in the opening remarks, talking about its component of the Earth-observing system, which has to be brought together. And I think if the United States takes a leadership role in this area, it will be doing something great for mankind in addition to doing something great for our own country.

So we believe very strongly that we have to have real time monitoring, we have to have real time assessment of what's going on out there, and the most complicated area of all the Integrated Ocean Observing Systems is the coastal component, which we have not invested in much in recent years. When the Russians went away, so did the interest, and that was deep ocean. So now we've got a real challenge on our hands to recoup some of the losses we could have had with a greater investment.

The CHAIRMAN. Could I ask again, Admiral, how serious do you think the problem is?

Admiral WATKINS. I think it's a serious problem. I think if you want to have a gut grabber, read the Abrupt Climate Change Report coming out of the Woods Hole Oceanographic Institution recently. The 40 percent loss of ice depth in the Arctic is significant. The freshening of that water could well change the entire ocean circulation flow because of the salinity changes, and so those things—and they've happened in times past. The coring of the ice in Iceland has demonstrated this.

So we have some serious problems. They may not be tomorrow. Tomorrow may be OK from today, but 10 years from tomorrow, 20 years from tomorrow won't, and we have to start now to understand that. So I think it's very serious, and it's not that we're going to change nature, but we can optimize its benefits and mitigate its hazards that are just hanging out there right now unattended to. So in a way the climate change issue could drive all of these actions, because they're all interconnected with understanding and decisionmaking that makes some sense. Today it's advocacy, and

that won't sell, I don't think, alone. We have to have alternatives and we have to have a balanced approach.

You told us in Oceans Act of 2000 to balance economy with science and technology and with environment and we've done that, we've been true to that. And so I think this climate change issue is extremely important and it's throughout our report, but we're not the commission for climate change. We're the commission to say what is the oceans component, and we've given you that.

The CHAIRMAN. I thank you, Admiral. Would any of the other commissioners like to comment on that issue?

Mr. HERSHMAN. The issue of immediacy came to our attention in the Northwest, the Washington coast, when in 1998, because of an El Niño situation, a low atmospheric pressure situation and a storm created some enormous wave action, which created great erosion problems. And what the scientists are saying is that that series of events was a sort of perfect storm of activities combining, and any modest increase of sea levels in general will create enormous kinds of erosion problems and demands for funding to protect coastal areas.

And so the policy issues involving hazards are only aggravated extensively when you add the climate change and sea rise issue on top of that, so it's a local issue as well.

The CHAIRMAN. Thank you. Dr. Sandifer?

Dr. SANDIFER. Mr. Chairman, thank you, sir. In addition, in this report I believe more than anywhere else you will find a call for adding, building new biological mechanisms of observation and adding them to the Integrated Ocean Observing Systems, so we can get a much better handle on not only what's happening in the physical environment, but how that translates into impacts on coastal resources, living resources, ocean resources, and then how those translate into impacts on humans.

We also promote an effort linking the ocean's activities, ocean health to human health, and part of that specifically addresses the relationship of climate change to the transfer of diseases and invasive species through the marine environment. So I think the Admiral is absolutely correct. We have recognized this throughout the report, tried to address it as best we could within the context of the ocean commission that we were given, and I really think that this place more than anywhere else we push the need for adding biological observations on top of the physical and getting a much more complete picture than you would otherwise get.

The CHAIRMAN. Thank you. And I just have one additional comment on this issue, and it's not exactly—this is no way a criticism. We keep observing and observing and observing and making more plans and spending more money on observing and gathering data. At some point, we're going to have to act. Does it take the Great Barrier Reef to die before we say, "we've observed this." How much data have to be accumulated? The National Academy of Sciences has stated there is overwhelming—I'll try to, I'll put the exact word that they use—evidence that climate change is taking place, and this administration is going to have some really great observations and the first report is going to be in the year 2012.

So I'm certainly not complaining to you, because I think you all have done an outstanding job. But at some point we have to make

a recommendation as to what actions we need to take. And you know why we won't? Because it's going to cost money and it's going to change our lifestyles.

Admiral WATKINS. Mr. Chairman, we do make a recommendation on what could be done. It's not just observations and data. You know, some place there has to be a virtual common data center that integrates the various databases that are all over the place. We've got county databases, we've got State databases, we've got NOAA databases, Navy databases. They don't talk to each other. And we have recommended in here very strongly that the National Ocean Council has a responsibility to set up a virtual common data center, and bring these things together. They can do it down at Stennis in Mississippi. They have the capability of doing it, the Navy can do it today. They can take disparate databases, bring them together, and generate products out of there that the regions want. The regions have to say, we need this information to run the Southeast region, we need it in the Northeast region, in Alaska, and others. Those are maybe different priorities and different requirements. They can demand that of the scientific community, and through the databases extract that.

This would also apply to education. We can have complete curricula and information passed directly to our teachers who are ill prepared to teach about the oceans, and give them, hand it on a silver platter, what comes out of a database that's integrated. And that's the best information available worldwide. We need to couple that internationally. We've said that all in the report. If you want to do this, you can't just observe. You've got to take data, you've got to convert it to products, you've got to assess that. Everybody has to have access. We can't get wound up on intellectual property rights and all that other nonsense. We have to move out. Other than that, Mr. Chairman, that's about all I can say at this point. I agree with you.

The CHAIRMAN. I thank you, Admiral, and I appreciate the work that you've done and that you continue to do. And finally, I hope that in your report you might address in some way the astonishing 20 percent of the NOAA oceans and fisheries program funding that is earmarked. Earmarking \$676 million of its budget is really a remarkable thing, and of course, it's grown from like 1 percent. If we don't do something about it, it will be all earmarked before those pork-barreling organizations finish their work.

But I hope that you would be able to address the impact of pork barrel spending and earmarks on this issue, and I'm sure that Senator Hollings will agree with me. Thank you.

Senator Hollings.

Senator HOLLINGS. I'm a disciple of Senator Stevens.

[Laughter.]

Senator HOLLINGS. Admiral Watkins and each of you on the Commission, you all have worked hard, diligently, extensively, professionally, and you've got a heck of a good report. At the time, we had to struggle here at the Committee level over a four-year period to get the Commission started under the Oceans Act, and one of the things that we had to go along with including in the bill was the Governor's report. I questioned that at that time. We have that requirement now in the commission process, that's why it's still an

interim report so that a draft can be submitted to the Governors. And now I'm looking at that requirement and saying, well, maybe that's good because we in the Congress also really want to look at this draft report, because in essence the report has gotten a lot of little problems coordinated and everything else of that kind attended to, recommended for, but like Bossy the cow, you give us a full pail and then kick it over with the National Ocean Council, over at the White House. Boy oh boy, that's a non-starter, if I have ever seen one.

You have all the Cabinet members with their particular interests jumping on whoever's to be in charge of the National Ocean Council. The Cabinet members will attend, but they'll bitch, they'll fuss, they'll speak up when their departments have an issue. They won't have any ideas for really strengthening oceans policy, or having a lead agency. You keep talking about NOAA being strengthened into the lead agency. But you can bet your boots that it won't happen with that council. Well, right to the point, you're talking about science. I've been down to the Antarctic. I've looked up at the ozone in the atmosphere, and I've seen the beginning, as the scientists have described it, of climate and weather. And yet you say you're going to have that ocean policy council guide the effective use of science and ocean policy, whereas the science resides in NOAA, and politics is at the White House. Here again, I'm going to hear the same thing I've heard for 30 years; you will politicize scientific endeavors and those kinds of issues.

Let me get right to the point and I want all of you to look at this in the summer when you review comments from the Governors. I harken back to Russell Train, head of the Environmental Protection Agency. In 1976, we introduced a bill creating a Department of Oceans and Environment. We were trying to do all the things that you folks are trying to do with this Council. If you ever could get, as the Stratton Commission recommended, the Coast Guard as a lead agency of a Department of Oceans and Environment, you can also get the climate programs, you can get the environment and oceans programs, and you can get the Coast Guard itself, which is either neglected in Transportation or now neglected in Homeland Security. We can't get more money for the Coast Guard from this Administration and the Department of Homeland Security. You have to experience these things to understand them.

I just heard you talk about unfunded mandates. We just voted on an unfunded mandate with respect to port security. This Committee has reported out a port security bill, has passed three readings in both houses, and the President has signed it into law. We tried to put the money to it. It was voted down in this committee. Oh, we'll demonstrate and flagellate and get up and headline, but we don't make headway.

Now, let's get right to the budget, because my time is limited and I want to yield, but that Ocean Policy Council, to me, takes away from what we've got now. NOAA has Admiral Lautenbacher, a good leader. He's out there in Tokyo representing our Nation and getting our international partners to work together on an Earth observation system.

If you look at page 374 of your document, you finesse the one thing I wanted to find out; namely, the budget. I know you have

a hearing on it today all, but if you turn to page 374, you have all the items listed there, the council, education, exploration, Federal support for states and everything else, and you've got many blanks to fill in regarding funding estimates. You've got to provide details. And don't worry about sticker shock. This crowd still gives \$15 million to the oceans and \$15 billion to space. You can't catch up with that spacecraft. We know far more about the surface of the moon than we do about the surface of the Earth itself. Seven-tenths of the Earth's surface is the ocean—Admiral, you know the statistic way better than me.

Admiral WATKINS. Are you suggesting, Senator Hollings, that we move some money from space to the oceans? We're all for it. Thank you very much.

Senator HOLLINGS. You don't have to move the money from anywhere. You just have to direct us and we're going to have to find it, but you've got to determine the needs and what would be a good start. Don't you all worry, up here now it's all tax cuts, tax cuts, tax cuts, and we can't find money. We don't have it for real security, much less false security. We don't have it for the Coast Guard. We don't have it for all of these other things and we don't have it for Iraq and Afghanistan. I just got back from Afghanistan. We spent \$120 billion so far, I think, in Iraq, and they're begging for \$5 billion in Afghanistan. The President's budget is \$1.2 billion. Afghanistan's got 4 million more people. They're begging for more money—we in the Congress put it up to 2 million, we can't get it up to 5, which they could use immediately to win that operation. The people like us there, we've got NATO there. But we don't have any money for that.

Those are all the endeavors of government, so you should look at the organization, whether NOAA needs to be an agency. Mind you me, the Stratton Commission came out and called for an independent ocean agency with the Coast Guard as the lead entity. We have a Secretary Evans who works with NOAA and lets Admiral Lautenbacher run with the ball, but I can never forget one good close friend and no finer fellow than Malcolm Baldrige. He was a cow puncher. He didn't know where any oceans were or anything else like that, and he thought it was a sort of insult to give him that kind of endeavor because he was interested in business, the Baldrige award and those sorts of things, and he did an outstanding job.

But folks, we have an opportunity here. You see the House members interested, you see the Senate leadership now coming from the Foreign Relations Committee and the other Appropriations Committees, you see Senator McCain, and they're all interested in this. So you all need to go back and look at this document during the summer and forget about an ocean council, because it's at the White House. That's the place to get it lost, I can tell you that right now. You're transferring the decisions on science, you're transferring everything there, where nothing happens, and that's disorganizing the good work that NOAA's doing now.

Go ahead, call for a Secretary of the Oceans and move the Coast Guard over to the new Department, where they can get the proper attention. They not only guard security, they guard the fisheries, they guard energy development, they guard coastal development,

the Navy, recreational and commercial boats, and everything else of that kind.

So thank you, Mr. Chairman, you or any of the other members can comment, but those are the things that are running through my mind right now. Having been in this game, it is hard to support the Council and the trust fund. You all haven't gotten to the Budget Committee yet. There isn't going to be a trust fund, I can tell you that. You can't set aside that money. To get the money, it's going to be tough. Let's list what funding we need in each one of those entities, because you all have spent way more time than anybody else thinking about the issues. List that down for us and see if you can't better organize this National Ocean Council.

Admiral WATKINS. Senator Hollings, we've spent two and a half years. We threw out the concept of a leadership position in the White House to integrate 15 Federal agencies and independent agencies over there in some cohesive fashion. If you look in our report, you'll see the functions performed by all of those agencies that are connected with the oceans. We heard a plea everywhere we went across the country that we're not being heard at the local level—I mean, from the local level to the Federal level. We have a discontinuity between what you drive down to us and what we think is reasonable to do, plus the fact we can't, we don't have the dough to carry it out either.

So we set up, we said, there should be a leadership position in the White House that brings all of these disparate groups together, so if somebody comes up with an estuarine package to clean up things as they've done in the Northwest, 25 different entities out there come together and get slam-dunked in NOAA because OMB says there ain't no money for that. Now, we've got to get away from that. We don't think the examiner, the budget examiner for NOAA should be other than the natural resources examiner. Why do we have the commerce examiner doing that? He doesn't know about Integrated Ocean Observing Systems. He doesn't know about bringing agencies together in the ocean matters.

So we have—our framework doesn't just stick with the ocean council. It says, put a bunch of advisers who represent the regions for the first time to share information and demand that they be heard. So you can't separate the ocean council from all of the other six elements of that framework that we've defined.

And we also have a step-change approach. We're not saying this is the last thing we want to do in this country. We're saying it's the first step, immediate step, and if you spend too much time on reorganizing all of the agency, we'll lose the energy and the specificity that we need to get on with real issues out there. We have real non-point pollution problems. We have real point source pollution problems. We have a lot of things we need to act on and we don't want to devote all of our attention to arguing when some kind of hierarchical system should be back here.

So we've said, set up a leadership. As it went on, we said, what is the leadership? The leadership is going to be the President, who tells the assistant to the President, I want to do something for the ocean. I want to get some dough in there in the next budget, I want you to work with the Hill and get it. That's what George Bush did for me when I was Secretary of Energy. Department of Defense

hated the \$6 billion that I wanted to steal from them for cleaning up the waste of nuclear weapons, and George Bush said, do it, and then we did it.

Senator HOLLINGS. Give him a Cabinet position at the Secretary level. You're right, that's what we need.

Admiral WATKINS. That's what we need. And so if the President wants to do this, then I think the Congress, if they do it first and set up an organizational structure where integrated budgets can come up here, so if he says, all right, I want to put \$700 million next year into oceans, you come back, Mr. OMB, and give me the programs out of those agencies through the National Ocean Council, and we'll ask the Congress. Because we then have the degree of specificity such as support to integrate the ocean-observing system, and that means new sensors of all kinds have to be developed in our research laboratory.

So it's not going to work by itself. It works because the President says, I want to make a commitment to this. Otherwise it won't work, I agree with you, if there's no commitment. And we were asked the other day, well, what happens if we leave 60 committees that ocean policy has to go before the Senate and the House. I said, if the Executive Branch moves, my guess is that they'll move very nicely up here and respond to integrated budget submissions and all the other things, because they're interested in this. We find a lot more interest here on the Hill on what we're doing than any place else in the country, and the Governors feel the same way. We've talked to the Governors, we've been out there talking to them. I've been up to Massachusetts, down to Florida, and they're very anxious to see themselves plugged into a system that has some kind of coordinated loop in it that makes some sense.

So we don't say this is everything, but we said it's a concept, and if you're not going to do this, who is going to head this monster in Washington and bring these people together? So we don't think of this alone, but we think with the President's interest in it that we can do this and do it smoothly, and we move to a strengthened NOAA, moving more functions in in Phase II from other agencies, and eventually maybe somebody will sit back and say, haven't we developed a concept for the long haul that brings land, ocean, and atmosphere together? It's called natural resources, and so that's been debated up here in the 1970s; you were involved in some of those bills. And they make some sense for the long haul, but not today, not immediately. Let's go through this in a step-by-step process. We don't think the National Ocean Council is everything at all, but linked to all the other things we're recommending and linked to the seven-point program and framework, we think it makes a lot of sense, and it stood the test of two and a half years, because these commissioners didn't agree with it either at the outset. But over time it seems to have stood the test that we have put on it in case study after case study that it will work. Now, there may be a better model.

Senator HOLLINGS. It won't happen unless you change the Council and establish a department and put environmental issues in there and then you'll get all of these things together.

Thank you, Mr. Chairman.

The CHAIRMAN. Do you want to respond to that, Admiral? Dr. Rosenberg?

Dr. ROSENBERG. Thank you, Mr. Chairman. Senator Hollings, I think that your point about the National Ocean Council being the overall leader in some ways is correct, but we're not suggesting that this does not include a greatly strengthened NOAA, nor a consolidation of programs from other agencies, nor are we suggesting that the National Ocean Council be the implementing entity.

But at some point, no matter how much you consolidate, how much you strengthen NOAA, even if NOAA was a department, you're still going to have to coordinate with the Navy, you're going to have to coordinate with other programs in EPA, you're going to have to coordinate with the National Science Foundation. I don't think that those programs can be consolidated with respect to ocean activities in a single agency.

NOAA still has to be the lead for implementation. They still have to be the manager. They still have to be the lead for applied science, and we are still recommending that NOAA be strengthened. But you still have to have that coordination at the Federal level and at the regional level. Now, there may be a way to do that without a council, but it's unclear to me that you could actually be as effective without getting people to sit at the table to at least explain their programs. And having spent 10 years in NOAA and being a great supporter of NOAA for those 10 years, I think it's a great agency and it does need strengthening. But to be the lead on its own and then go and talk to the Navy, with respect to Admiral, or to go and talk to the National Science Foundation and expect that you can do that on an equal footing on an ad hoc basis, I just don't think is feasible as you try to work through the various issues.

I worked on fisheries issues. We would have to deal with the Navy on a whole number of protected species concerns. That's going to happen no matter how much you strengthen NOAA. You still are going to have to deal with the Navy or the National Science Foundation or the National Institute of Health or EPA. If you had a formal structure by which those issues were considered at the highest level, then at least as an employee in NOAA, I would have a hope of being able to get those issues heard fully.

So I think the report does lay out a path to a much stronger NOAA, and ultimately to a Cabinet-level or an independent agency, but if we don't have that coordination now, then I think it's going to be very, very hard to make any progress on the recommendations in the report. Thanks.

The CHAIRMAN. Senator Lautenberg.

Senator LAUTENBERG. Thanks, Mr. Chairman. Admiral, you've had a glorious career and your mission has been to protect our country and our citizens. What you're doing now in my view is an extension of that same thing, and that is to try and save lives and save a way of life, et cetera, that is rapidly disappearing in front of us because we're not taking any action. At this point, with this report you're kind of like the Paul Revere of the ocean assault, and we just don't get the message here.

And, Senator Hollings, I suggest that you extend your retirement date by a couple years and just give us a chance to get used to your

not being here. We won't take a vote on it until we have full committee, but we're sure going to miss your voice, including your accent, Senator Hollings, but your knowledge is particularly significant.

Dr. Rosenberg just said something about the Navy being included, and if one looks at the report issued in the last couple of months by the Pentagon about the significance of our defense posture as a result of global climate change, the forecasts are so grim. We're not talking about 100 years away. That report says that by the year 2007, parts of the Netherlands are going to be inundated with water, and that can create a very difficult situation there. But when you go into the Indian Ocean areas, lower lands, the prospects are terrible.

And the Defense Department is trying to prepare itself for the day when famine and riots and so forth will overtake parts of the world, assailing our borders and our coastlines. No place will be exempt. And so no matter how strongly you make the case, Admiral and your colleagues, you've all done a terrific job, the report that's released is excellent, we have to just bring things together.

For instance, if we look at what's happened by way of comparisons between agencies that administer the Endangered Species Act, the Fish and Wildlife Service has listed 1,500-plus species as endangered, while the National Marine Fisheries Service has listed only 19 marine species as endangered. Did your Commission assess whether the NMFS is doing a good job of protecting endangered and threatened marine species?

Admiral WATKINS. I'd like Dr. Rosenberg to take that. He is our special commissioner for the fisheries issue and I think he can shed some light on that.

Dr. ROSENBERG. Thank you, Senator. I do think the National Marine Fisheries Service is doing a good job with endangered species. I think it is a much more difficult job in the ocean, partly for the reasons that have been described here, and that is we know so little. Our research budgets have been so constraining that what we know about marine species is much less than what we need to know. Most of the listed species, of course, that have been listed by the National Marine Fisheries Service are so-called anadromous species like salmon that spawn in fresh water, as well as sea turtles and some of the marine mammal populations.

But I actually think that there is an understanding gap in the marine environment and that contributes to this. I also think that the impacts on land, of course, are much greater, much more advanced than they are in the ocean, so I don't think it's a matter of they have not been careful in examining endangered species issues. I think they've worked with the information at hand and it is a much more difficult environment to work in. That's part of the reason that the budget needs to be much greater. It also is part of the reason that we need to strengthen the other actions so that we don't end up using Endangered Species Act as a way to manage, because it's of course the very last way we actually want to manage any of those species.

Senator LAUTENBERG. Admiral, in the recommendations on the trust fund that perhaps revenues from offshore oil and gas operations can be used, but they are used elsewhere now. And the ques-

tion is, where do we go? And I think the question's been raised by Senator Hollings and Senator McCain, where do we go to get the revenues? I am very involved in environmental programs and we have one, Superfund, that was financed and moving well and we cut out the financing there. Has anybody got any ideas where we go to get the funding for this program?

Admiral WATKINS. Let me tell you, Senator Lautenberg, we always have a hard time when it comes to who's going to fund this thing. We get those questions all the time. We've looked at the existing laws that deal with the revenue stream from oil and gas revenues. Those are Federal waters, some returned to the American public, the taxpayer, by setting up the necessary fund to see that those monies are allocated properly and they come back into the country at about \$5 billion a year just from the oil and gas primarily, there are some other revenues.

All right, \$1 billion of those we wouldn't touch. The \$1 billion or \$1.1 billion now that are allocated, you leave it alone. We want to make a run on the remainder to say, let's help the states ourselves get on with carrying out a national ocean policy. Now, I recognize how you score those things in the Budget Committee, and I know they're all part of the appropriations process. You've got to consider where we are. We're just saying that's a legitimate revenue stream for these purposes—to feed back and improve the conservation initiatives, try to carry out our coastal ocean policy and so forth.

So, it won't be done, it won't be voted. Well, what will be voted? We can only recommend. We're not the authorizers and the approvers up here. So we're giving you an idea that seems to have merit, to follow the highway trust fund concept. This is as big a deal as the highway trust fund in my opinion, in our opinion, of the Commission. So we didn't think it was illogical to have some kind of a thing that's allocated, approved by the Congress, allocated through the National Ocean Council, given to OMB, and they have some kind of review of that. And you all have the oversight over here anyway to take a look at that.

So it's, I'm going to say, similar to a little gimmick. I know everybody makes a run on that account, they want to have those revenues, and I recognize that. But we think it's a logical one for the oceans, because that's what's intended right now—to feed back to the producing states for the most part some revenue streams that can help them out in all of the other issues that the state has to face regarding offshore oil production, for example, in the Gulf.

Senator LAUTENBERG. Mr. Chairman, one closing statement, and that is, if you don't see it, we don't pay a lot of attention to it around here. We take a very short-sighted view of things. And the long-range implications of this constant destruction of the ocean and its environment are going to cause a crisis that we never could have imagined will exist.

And, Mr. Chairman, I think that we ought to give Admiral Watkins, as far as we can, a medal for public service for this duty. Thank you.

Admiral WATKINS. Dr. Ballard is our expert on undersea observations and I'd like him to—

Dr. BALLARD. Thank you, although I'm only a commander, sir. Senator, when we talk about where our revenue's going to come

from to support work in the oceans, I think it's important to realize that before our country benefited from the revenues of the Kenecott copper mines, Alaska, before we benefited from the corn fields of Missouri, before we benefited from the ranches in North Dakota and South Dakota, we had the Lewis and Clark Expedition. And I think you need to realize how much of our territories—when President Reagan signed that exclusive economic zone, we doubled the size of America, the majority of it being under water, and we have yet to do Lewis and Clark expeditions of half our country, let alone the rest of the world.

As I came flying down this morning for the hearing, I was reading this most recent issue of *Oceanography*, which is the official magazine of The Ocean Society, which consists of all the major ocean experts on our planet, and they made an interesting comment at the very beginning of this that I'd like to read into the record. And that said that public opinion polls find that people in the United States favor ocean exploration over space exploration by a ratio of 2-to-1, and yet as Senator Hollings pointed out, NOAA's budget for ocean exploration is one-tenth of one percent of NASA's budget.

It also goes on to show a map, in this recent issue, of Mars and a map of the ocean floor, and it says in this issue that these images have the same horizontal and vertical scale, yet the horizontal resolution of Mars in the horizontal context is 15 times better than the horizontal resolution of Earth. It goes on to say that the vertical accuracy of the maps between Mars and Earth, Mars is 250 times more accurate. I just let that just sit there.

And so I just think that if you want economic revenue, let's get on with the exploration and find out what our planet has.

Senator LAUTENBERG. Thanks, Mr. Chairman.

The CHAIRMAN. Senator SNOWE.

Senator SNOWE. Thanks, Mr. Chairman. Admiral Watkins, I think there's no question that your Commission, the report, and all of you will help us to advance some of the critical issues facing the ocean. So many of your recommended activities are going to be essential for preventing the further degradation of the ocean and the marine environment.

But first we do have to start with what you say is one of the major priorities, and that is creating a whole new framework to coordinate these activities. How do you visualize this happening? For example, for the National Ocean Council, is there a concern that it might be duplicative of any existing agencies, or that it would conflict with what NOAA is doing presently?

Admiral WATKINS. It's really an amalgam of existing agencies. It doesn't take a rocket scientist to know that in order to be able to have an integrated budget, you need to be able to bring all of the various budgeteers to the table, and that's the Secretaries and the heads of the independent agencies, and so it has to be done that way. And it has to have guidance from the Office of Management and Budget that allows them to come in and integrate their various programs, which would be really important for the Integrated Ocean Observing System. You integrate those programs, star those items that are coming up in the budget submission every year, and say, if you're going to touch those, let us know because you're tak-

ing a serious link out of the chain of the integration. NASA has its role, EPA has its role, NOAA has its role, Navy has its role. Make sure they're coming in in some kind of integrated program for an integrated comprehensive ocean policy execution.

That can be done in my opinion. As I said earlier, it takes the President to do that. Initially the President can bring that together by executive order, but we're saying that's not good enough. We're saying the Congress should authorize that so it doesn't change from Administration to Administration and we set this up in a cohesive way. It's not unapplicable to many other issues.

Let's take human health. Most every department has a component for human health. Do we integrate all those? Why is NIH going up exponentially and the others staying constant? I don't know. Does somebody really adjudicate that, say that's the right priority? I don't think so.

And so my feeling is that we have a lot of work to do at the executive level to integrate our budgets to carry out these many functions, which we can't separate from department to department to department. They're all the same. NOAA has a wonderful thing on floats, on floats that bob up and down—the Argo floats go down to 2,000 meters, come up and report salinity and temperature and wind conditions. It's very important. That's now going worldwide. Well, who's on those buoys? Who's riding on the buoys? Is NIEHS on the buoy? No. OK, well, who integrates those things? Who demands that, when we go up front and design these things? Well, National Ocean Partnership Program under an act passed by the Congress in 1997 allows them to do that. But do they get support from OMB and the White House? No.

So we're at about \$25 million a year. We've been there for years and years. We don't do anything. Now is the time to do something and use those bodies, like the National Ocean Council, which is the same people that appear before the National Ocean Partnership Program. They're the Secretaries of the agencies. But can they do the job without high level acceptance? No.

And so it takes that kind of initiative, and I think the Congress, with their zeal to get on with something like this, can put pressure on the White House to say this is a good idea. You get the executive order going for the feds, and that's the locals too in the local regions, they don't talk to each other either, but he can demand that and he can pull the Federals together, so when the voluntary councils that we're proposing out in the region areas come together, they can have somebody to talk to that makes some sense, and then vector that up to the White House and the Presidential Council of Advisers and say, we demand to be heard on these issues.

And I think your Gulf of Maine Ocean Observing System is an embryo of what ought to be done nationwide. That is a Federal to State relationship which is working, but at a modest level. It ought to be moved more rapidly, and we're recommending that in the coastal component of the IOOS.

Senator SNOWE. And I congratulate you on that. I think it's an excellent idea, and I'm just delighted that you have included a proposal to create a national system. Obviously it's going to require a significant investment.

Admiral WATKINS. And we've outlined all that investment. Centers know, you know, and Senator Hollings is right, you know. Where is the money going to come from? I don't know. We think we know. It's not going to come from the states. They're saying they're broke. Our country's saying they're broke. We think this is every bit as important as a few billion dollars going into other efforts, maybe that we can shift a little priority here at this point.

Senator SNOWE. Well, with respect to the council, do you think that the breadth of activities that would be assigned to the council would overwhelm it in any way?

Admiral WATKINS. I don't think so, because I think we'd probably never meet in the council in the plenary session, I doubt it. That's called a Cabinet meeting. What you do is say specific issues. Let's say the Coral Reef Task Force, who do they talk to? Well, you bring those agencies that are involved in coral reef health together, maybe there are five of them, and they talk to that group.

So that's what I see as a mechanism to keep working this problem. We have the Arctic Commission. Who do they talk to? I don't know. They haven't been very effective over the years. We have a standing commission there. We have many others. They need a place to go. And we haven't upset any of the existing structure in the Office of Science and Technology Policy, the National Ocean Partnership Program. They're all factored into our framework, so that we're not upsetting anything and spending all of our energies on trying to reshuffle things around. We're just saying, just do it right over there and get a commitment and get the right people in the Office of Management and Budget responding to the President and the President has a feeling, a visceral feeling that this is an important national commitment.

Senator SNOWE. And what was the thinking behind the Commission's recommendation for a council as opposed to creating a whole new agency?

Admiral WATKINS. We're not against a new concept of an agency. We have set out a three-step program that says what we can do immediately with the existing structure, what we then can do by reshuffling functions from other agencies that ought to be in NOAA for the most part—some of NOAA ought to be in Interior, some of EPA ought to be in NOAA. That comes in what we'd call phase II.

For Phase III we're saying, somebody's going to say, voila, you've got land, ocean, and atmosphere coming together for the first time. Land is interior. EPA is the regulatory body. They have research bases that are very much in the game here of monitoring all this. So we're not against that. But to do that now, in the aftermath of Homeland Security, and to spend all our energies on reorganization when in the meantime things are going down the drain out there in the field—they need help now and we think we can do it now as well as transition over time. Maybe in 5 to 7 years you all say, let's get a task force together, go back and see what the lessons learned were out of the Ocean Policy Act of 1994, or 2004 rather.

And so that may lead to something better, but we think it ought to go in that form, because I don't think we're ready to go to an independent department. I don't think we're ready at all. We're not up to ecosystem-based management in NOAA. We think your organic act ought to be passed this year. It ought to define what we

mean by that. We don't have to tell them exactly how to organize in there, but we've made some recommendations and principles in here. We're willing to work with the staffs up here. We've got some things in our back pocket that say exactly how you write the bill that we didn't put in the report because we knew it would be so controversial. We're ready to work up here with you in any way, and we've done a lot of thinking about this ecosystem-based management and how to put it into our Federal Government, which is vertically standpipe oriented that can't hack it. They can't do the job for a lot of reasons; budget preparation things and all that kind of thing constrain us.

We haven't done all we can do in the global climate change program and that's an expensive program, and Chairman McCain talked about that. Is that adequate today? We don't think so. We don't even think it's close. And the Integrated Ocean Observing System is a major component of that and there's a lot of dough that has to go into that, and a lot of our recommendations, that takes up quite a sizable chunk, and we're giving NOAA the responsibility to run that. But they can't run it unless they've got the authority to do so.

Senator SNOWE. Thank you.

The CHAIRMAN. Senator Breaux.

Senator BREAUX. Thank you, Mr. Chairman, and let me thank you, Admiral Watkins, for your continued leadership in the area of ocean policy. We've worked together many times in the past. And thanks to all the commission members who have given their valuable time and expertise in this area, as well as many of the commission members who are not with us today who served on this important commission. Also recognize Dr. Tom Kitsos, who served as your executive director for the excellent work I know he did in helping to prepare this. He is a true expert in this area in his own right.

I would think that—I mean, you had a monumental task. You're dealing with approximately 75 percent of the surface of the Earth, which is the oceans of the world. And the last time I was talking to Senator Hollings, it's like *déjà-vu* all over again. Thirty years ago, I guess, we received the Stratton Commission report with new ideas and here we are 30 years later, same committee in the same room continuing to talk about what do we need to do about the oceans.

I think part of the responsibility for highlighting the necessity for giving greater attention to the oceans is not in a council or anywhere else. It's here with us in the Congress. We have the ability as political leaders to make this one of the top issues in the country. That's part of our responsibility and part of this committee's responsibility. If you're not going to get strong leadership from the Administration, any Administration, talking bipartisan here, then Congress has to step up to the plate and talk about these ideas, talk about these problems, and hopefully this report will be the basis for Congressional hearings to really get people interested in this even if you don't live near an ocean. That's somewhat of a problem and the Chairman of this committee is an insular state, obviously, in Arizona, but he has given a great deal of attention

and we need more insular members that are also concerned about the ocean.

Now, with regard to the report, a couple of areas, I'm pleased that you looked at the hypoxia problems. Louisiana drains, two-thirds of all of North America comes right down the Mississippi River and right past the City of New Orleans and dumps billions of gallons of water every hour into the Gulf of Mexico. And as a result of that, every year 12,000 square miles of the ocean dies because of the extra nutrients that are dumped into that area, and you all have talked about looking at this, that this cannot continue, and the fact that the non-point source pollution is occurring up and down that river.

This is a hard thing for us to get resolved. Farmers don't want to be restricted in what they drain off their agricultural areas that go into the Mississippi River and the other tributaries and end up creating the algae problems we have in the Gulf and destroying everything in a 12,000 mile area.

And looking at this and the work that's being done, we have the Louisiana consortium that is looking at it, we have another Mississippi River Basin Alliance that's working on it. Are things being done in your opinion that would be the right things that we should be doing with regard to killing this large portion of the Gulf of Mexico every year?

Admiral WATKINS. Senator Breaux, you've identified an issue which came before the commission in New Orleans when we held hearings down there, and we were overwhelmed with the kind of actions that you have to take to deal with this issue. We had presentations from a senior official in the State of Iowa that fully recognized what they were doing up there. If the Congress passes a \$6½ billion farm subsidy to generate more ethanol, what do you think that does to the nutrients flowing into the Mississippi?

The farmers are doing the best they can to prevent that kind of nutrient flow. They are also sensitive to the environment and good water conditions, but these are the kind of things that need attention across the board. What have we just done to ourselves? There are 41 states and two Canadian provinces that feed the dead zone in the Mississippi. We're sending this report to all Governors because they're all involved in this, not just the 35 Governors in the coastal states.

And so we know you have a huge problem. This is why we say regional councils become important, because the regional councils are made up of the kinds of people you had to pull together just for that one issue. But the councils are needed for a lot of other issues, not the same people necessarily, but the same group of people have to come together and deal with it.

So we're very sensitive to that issue. We're very sensitive to the Chesapeake Bay, the Northwest, the Columbia River—many of the other estuarine situations are unhealthy as well. You are really in the middle of a humdinger down there, and we know it. We're sensitive to it; we think what you're doing is the best you can and we think you need help, and we think some of this revenue stream ought to go back and help solve those problems in the states that are involved in the dead zone in the Gulf.

Senator BREAUX. Well, I'm glad you all addressed it. It's going to help us use what you all have said about it. It's incredibly important. I like also that you all had recommended that a portion of the OCS revenues, we worked on this for 100 years that I've been around it seems like, is trying to say that as we develop the offshore resources, there is a particular need for the offshore states who bear the brunt of the infrastructure requirements to be able to try and have some of those offshore revenues delegated to coastal restoration and dealing with the problems that we're talking about. I'm very pleased that you all have recommended that concept.

The final thing I'd say is one that I disagree with you on is the recommendation on the fisheries financing programs. You all have made a recommendation in the report, *Recommendation 1916*, that recommends that Congress repeal the fisheries finance program, the capital construction funds, and other programs that encourage overcapitalization in the fishing areas.

Well, all of those programs that provide assistance, financial assistance, in the fishing areas, all have requirements that they not loan money or make investments that would overcapitalize a particular fishing area. That's already a requirement. So I'm not sure whether I'm misreading what the report said or what, because my recommendation is you don't wipe out the whole program, you just make sure that the program is not utilized to overcapitalize a particular area that the program is designed to benefit.

These programs have gone a long way to help legitimate fishing operations, and the requirements already say you cannot make these guarantees or loans if in fact they would contribute to the overcapitalization of an industry in this particular area.

Admiral WATKINS. I'm going to ask Dr. Sandifer to take that.

Dr. SANDIFER. Thank you, sir. Senator Breaux, we simply tried to identify—perhaps the recommendation wording needs some work—we simply tried to identify the problem that has been pervasive in some areas of fisheries, where the capitalization funds have ended up not meeting all the goals of reducing overcapitalization in those fisheries, or overcapacity, with the result of negative impacts on the fishermen, as well as on the fish stocks.

Senator BREAUX. But the answer is not to kill the program. The answer is to strengthen the requirements that you cannot use the money to overcapitalize an industry that's already overcapitalized.

Dr. SANDIFER. And that may be the best way to go—

Senator BREAUX. Is that an amendment to your recommendation?

Dr. SANDIFER. I'll leave that for us to discuss at an appropriate time, Senator, as we get all of the comments back. But again, the issue was to try to figure better ways to reduce overcapitalization with the least impact both on the fisherman, on the taxpayer, on the resources.

Senator BREAUX. Well, there's a way to do that without ending the programs. Thank you all for your good work.

The CHAIRMAN. Senator Cantwell.

**STATEMENT OF HON. MARIA CANTWELL,
U.S. SENATOR FROM WASHINGTON**

Senator CANTWELL. Thank you, Mr. Chairman. Gentlemen, it's good to see all of you. I'm assuming there are some women on this commission. Maybe that speaks to task that we need to accomplish, we need to get more women.

Admiral WATKINS. We have two wonderful members of our commission that are women, and both of them are out talking to the Governor of California, talking to the Governor of New Jersey, talking to the Governor of New York and couldn't be with us today. They were with us yesterday and the day before that, so they are here in spirit with us and they've been great contributors to our work.

Senator CANTWELL. Thank you. I know we are concerned about healthy oceans, so Admiral Watkins, thank you, and Professor Hershman, thank you for being here, and I know we have another representative from the State of Washington, Bill Ruckelshaus, who isn't here as well, so I thank you for your hard work.

As we move forward in talking about this regional approach, I wanted to bring up a particular issue as it relates to the North Pacific Northwest Fish Council and the issue of overfishing and how to base important decisions on good science. It seems in the report, because obviously yours is not the only report that's out there in the sphere of what to do about oceans, you more or less hold up the North Pacific Council as a good council that has made good progress in the issue of dealing with fisheries management. I don't want to overstate that, so I want to have a little more dialogue about whether that is in fact the case. Do you think that the North Pacific Council has worked well juxtaposed to the councils in other parts of the country, and where does that take us if we are going to then move to this larger regional approach as you're suggesting?

Admiral WATKINS. Let me ask Dr. Rosenberg. He was up in the Northwest recently at a AAAS conference. A lot of this was debated there. Bill Ruckelshaus was there of our commission, and I think that he can best answer this. Ed Rasmuson, one of our commissioners from Alaska.

Mr. RASMUSON. Senator Cantwell, I'm from Alaska and I'm also on the North Pacific Fisheries Management Council, and it's specifically mentioned in the report as a commission that works well, and we have four members from the State of Washington, one from Oregon, and the other members are from Alaska.

The report further states that the tools are in place to regulate our offshore fisheries, they just need to be adopted and used as they were originally intended to be. What we particularly make an emphasis on is to place more recommendations in sound science that comes to the recommendation to the SSC, and that's where we're trying to strengthen the commissions.

I think that when we finally go through the reorganization of the Magnuson-Stevens Act, we'll see a lot of these, hopefully, recommendations coming through with the reauthorization. But it works well because your state and our states have a very vital interest in it and it's a big economic driver of both of our states. As a result, we take a very keen interest in it, because for us, our State, it's over 20 percent of our economic growth product. And you

have some very large companies residing in the State of Washington, so they pay attention to it. We make sure that we have a very healthy fishery.

Dr. ROSENBERG. Senator, I think the report is clear that the North Pacific Council has been quite successful in managing, particularly the target species that are the subject of the fishery, in other words, the commercial fisheries. They also have been more successful in terms of research funding than probably any other area. Senator Stevens has left, but that certainly is clear, and has made a huge difference in dealing with some of the issues in the North Pacific and shouldn't be lost in the discussion.

I think the challenge is to, first of all, move toward a stronger ecosystem-based management approach. In other words, link together the different pieces of management, not just in fisheries but also in other areas, and that's perhaps a greater challenge in the lower 48 than in Alaska, even simply because of the more complicated management problems in coastal developments and so on in States with higher population, the coastal areas.

So while the North Pacific Council and the Fishery Management Council system has some good lessons for us with regard to creating regional management and ecosystem-based management, we're recommending some significant advances or strengthening of not only the fisheries council system, but the overall management system for coastal and ocean activities, and that's what that whole theme of ecosystem-based management is about.

Senator CANTWELL. What is the key issue in which you would distinguish the North Council from other councils? Where did they fail? Was it on science or was it on coming together with a decision-making process on various harvest levels?

Dr. ROSENBERG. I think there are two things that have—well, perhaps three things—that have distinguished the North Pacific Council. One is on a science basis, at least in the last, well, since the Magnuson Act, now Magnuson-Stevens Act, was passed. The North Pacific Council has adhered very closely to the science advice on the target species, in other words, the most commercially important species. That has not been the case over the history of all of the councils. I served on two councils and my colleagues on the councils might not like me to say that, but I'm afraid it is the case. It's also the case in State commissions that the science advice has not been adhered to in many cases. That's not the situation in the North Pacific for a number of reasons.

I think that the North Pacific Council also had a different history to deal with than many of the other councils in terms of initially a largely foreign fishery that was Americanized as part of the Magnuson Act originally in 1976. That's very different from New England, my home area, where you had a very long fishery tradition and a lot more vested interests, or the South Atlantic and some of the fisheries issues for Senator Hollings, or in the Gulf and so on where there are much more complicated problems with a number of vessels.

And so—and third I think that the North Pacific Council has at least recently used one of the tools that we recommend in our report, that is dedicated access privileges, more effectively than most any other council in the country for rather particular legal reasons.

It's probably been more advanced there than elsewhere, and I think that that has enabled them to do some things with regard to allocation between user groups that have not been enabled in other areas.

Senator CANTWELL. Did you want to add something?

Mr. RASMUSON. One other—I'd like to further elaborate just real quickly. The North Pacific Fisheries Council got a jump start on everybody else because the INPFC, the International Pacific Fisheries Commission, was folded into the North Pacific fisheries in 1976. It was chaired by my father for 20 years and their main interest was regulating the fisheries in the North Pacific vis-à-vis the Japanese. And as a result, they took the whole council and moved it into the fish council and adhered to those particular points that my colleague is reiterating. So we had a framework already involved that was there.

Senator CANTWELL. Well, thank you, gentlemen. You've actually made the point that I wanted to make. I'm sure we're going to continue to have a debate about the councils, and while some people will propose various changes to those councils. As far as improvements go, you're bringing up the point that I think we in the Northwest know well, and that is, whatever species issue it is, whatever environmental issue it is, it has to be based on good science.

So as we move forward with the Magnuson Act reauthorization and began looking at that, we should keep in mind that the essence of what you want to do on regionalism, what we want to do is make sure that science is adhered to. So thank you.

The CHAIRMAN. Senator Nelson.

**STATEMENT OF HON. BILL NELSON,
U.S. SENATOR FROM FLORIDA**

Senator NELSON. Thank you, Mr. Chairman. One of your key recommendations is the idea of ecosystem management rather than uncoordinated policies that don't recognize the connection between all of the ecosystems, and this has been a concept that has been employed very successfully in the Florida Keys national marine sanctuary. It uses ocean zoning to govern those marine systems and they reach out to all of the relevant government agencies and employs a science-based management to balance human activities.

And so I just wanted to point that out that it can serve as a model to be duplicated in other areas across the country, and I commend you for bringing that out in your report.

I want to ask you about the Coastal Zone Management Act, which is very important to us in Florida because it is another tool since Floridians do not want oil drilling off of our coast. It is a tool that is utilized, and I want to confirm with you all that this report does not recommend weakening a state's ability to object to drilling off of its coast.

Admiral WATKINS. I'm going to ask Professor Marc Hershman to talk about that.

Mr. HERSHMAN. Senator, one of the great innovations of the Coastal Zone Management Act was what's called the Federal consistency requirements, and this in effect gives the states a chance to require that they interact with Federal agencies on their policies

on the ocean area beyond the 3-mile limit, or in the case of Florida, beyond the 9-mile limit.

This has been applied now for over 30 years and it's been very contentious with respect to the offshore oil issue. As you're probably aware, many lawsuits, much political debate and dialogue, additions to appropriations bills and that sort of thing. But in the long run, across all the issues between Federal and State agencies, this is considered an intergovernmental mechanism that has a very positive record, and the report is that this is working the way it is intended, that is, because the State governments have the ability to in some cases veto and in some cases require full consideration of State interests by the Federal agencies, that it has created the dialogue that's necessary to resolve some of these issues.

That's not saying there aren't remaining ones, and I think there may still be issues in offshore oil, perhaps dumping of dredged materials and issues like that in which there is still considerable debate between the states and the Federal Government. But there is a mechanism in place that now has a 30-year history for sorting that out in a constructive dialogue. That is not affected in any of our recommendations. We identify it, discuss it, and indicate that this is an important intergovernmental tool.

Senator NELSON. So your report does not weaken a state's ability through the Coastal Zone Management Act to object to activities off its shore?

Mr. HERSHMAN. No, it does not. It acknowledges its role and also has many recommendations to strengthen the Coastal Zone Management Program. There's a whole chapter 9 that deals with that.

Senator NELSON. That's very good for you to underline that particular point of strengthening the Coastal Zone Management Act. Thank you for that clarification.

Let me quote to you another part from your report on the issue of climate change, "the specter of abrupt change and a growing awareness of the impacts climate change could have on coastal development, terrestrial and marine populations, and human health calls for a significant improvement in climate research, monitoring, assessment, and prediction capabilities." That's from your report.

The Pew Report says, "the one thing that can directly limit the effects of climate change on the marine environment is to reduce our emissions of greenhouse gases that contribute to this problem. Only then can we assure coming generations and ourselves that the recommendations we offer will yield the bountiful seas we envision." That's the Pew Report.

Do you all agree with the Pew Report on that issue?

Admiral WATKINS. We didn't really address the issue on the Kyoto protocol, CO₂ reduction and so forth. We felt that that is a decision that is going to be outside the purview of any of the direction we received in the Oceans Act of 2000. We agree that there is an impact. You know the arguments between whether it is anthropogenic or natural variability. Nobody has really come out in a uniform way and said, other than the globe is warming, OK, one or two degrees at the low edge of the projections by mid-century. That's enough to change a lot of things in the world. It's enough to change the world ocean circulation business. It affects climate all over.

So we recognize that, but for us to take a position on how much CO₂ reduction we should have would be beyond the scope of our text, much as offshore moratoria. We don't get into that. Those are political decisions that have to be made at a higher level. Also, there are different scientific programs that are going on in the atmosphere that we're not directly connected with. Are we worried about climate change? You better believe it. Are we saying that we need the assessment and the monitoring system and the kinds of tools we need out there to know what's going on in real time? You better believe it.

So we are connected in a lot of ways, and maybe we can bring to the table a better debate about anthropogenic versus natural variability, which seems to always be fighting each other. The degree to which the oceans contribute here—the oceans contribute so much, they give us our oxygen, they give us our life, and we know that. So we don't want to destroy, we don't want to stop the Gulf-stream. That's not a good idea. And if 40 percent of the ice that was lost in the freshening of the ocean of the Arctic and we don't study the Arctic, we're not doing enough research in the Arctic now, and yet it's key to climate change understanding.

So we have a lot of things we have to do and they're in our report.

Senator NELSON. And I thank you, and of course, you understand that I have a vested interest in this coming from the State of Florida, which has more coastline than any other state, of which we want our oceans healthy.

Let me ask you one more question, Mr. Chairman, if I may. Up in the panhandle of Florida just recently, over 100 dolphins have washed up on shore and basically we don't know what has caused their death. When you go in and examine them, there doesn't seem to be any particular reason. Now, the question is, do we have enough money to go in there and find out? What does your report recommend to combat marine mammal mortality?

Dr. ROSENBERG. Thank you, Senator. I think we don't have a specific recommendation that would say for stranding mortality, such as the dolphins in the panhandle, this should be the investment, but it's very clear that we have within the broader research program a need to address issues such as marine mammal mortality. We recommended specifically, for example, an increased emphasis on sound in the ocean, which is potentially one of the major drivers for things such as marine mammal strandings, dolphin or otherwise.

We also have recommendations for a major increase in funding for oceans and human health. Well, human health is an important attribute, but many of the factors that affect human health also affect mammal health in general in the oceans. Clearly, the marine mammal conservation areas need greater attention. We do have a chapter on marine mammals and endangered species, which incidentally includes sea turtles as another incredibly important group of species at risk, and there is a research imperative here as well as a management imperative. I hope that's adequately addressed and it's understood in the marine mammal chapter, but it's understood when we're talking about major increases in research funding that cuts across a broad range of issues, including those things

such as ocean health-related issues, marine mammal mortalities and sound in the ocean.

Dr. SANDIFER. Senator, to follow up a little bit, in addition we called in our marine mammals chapter for specifically more research on basic biology and understanding of marine mammals so we would have a clearer understanding of what may be driving these kinds of mortality events, understanding the population biology so we can do more to protect them.

We also have in the oceans and human health area and a couple of other places we talk about harmful algal blooms. In the case that you just mentioned in the panhandle, it appears very likely that a bloom of a toxic alga that was undetected ended up at least resulting in contributing significantly to that mortality event. That means that we need to do a better job of building the detection and prediction capabilities for what's happening with the harmful algal blooms and the toxins and where they might come ashore and things that we have not yet had the attention paid to that needs to.

And as Dr. Rosenberg said, we are recommending increase in funding across the board for these kind of resource-based research activities along with the basic sciences. There is no separation in our minds. Part of the increase would go into basic understanding, like exploration that Dr. Ballard talked about, and part would go into dealing with just this kind of problem, the answer to which appears to be growing. We are paying significant attention to those things.

The CHAIRMAN. I want to thank the Commission and—Senator Hollings?

Senator HOLLINGS. One more time, Admiral Watkins and each of the commissioners, you all have done an outstanding job. But to go right to Admiral Watkins, when I talked about this solution of a National Ocean Council, you ran a touchdown on everything that we agree upon. You and I agree on the need, you and I agree on the lack of one agency talking to the other, we agree on the need for coordination, we agree on the importance of the oceans, we agree on the importance of monetary and the financial issue.

I wish you were all up here at this desk. You folks are professional, you're experts, you know what you're talking about, you've given a lot of time to it, and we are in agreement with it. But Admiral Watkins, you were passionate about your answer to my comments and we agree on all that, but you are almost sissy in the recommendation. Listen to this recommendation, no kidding.

Admiral WATKINS. I've never been called a sissy before, Senator Hollings.

[Laughter.]

Admiral WATKINS. You and I have been friends for many years. I would never call you a sissy.

Senator HOLLINGS. This concerns the recommendation about your council—I'm glad you have the summer. Count me in as one of the Governors. A council composed of Cabinet Secretaries of departments and directors of independent agencies. You'll never get a quorum for that. I can tell you the Secretary of Defense will never attend. The Secretary of State, he'll never come, although we have all kinds of law of the sea issues and everything, but he'll say,

“I’ve got work to do, I can’t go to that.” In the office of the assistant to the President, we already have telecommunications assistants, we have economic assistants, we have scientific assistants. In fact, the scientific assistant to the President some years back was so inadequate and ineffective that we organized a national technology assessment board. I was on the original membership of that board that was to assist the President.

If you think this helps you with the OMB—the President’s worried about spending, so the assistant to the President on oceans comes in and says, “Mr. President, but the oceans need so and so, the OMB fellow said no, we can’t afford that,” he’s going to go along with his OMB. You have got to give this thing another look—make me not be a sissy myself. I hadn’t recommended the department, because I’m a realist too, and that’s what you all are trying to do is be realistic and I acknowledge that.

But listening to you, you’re going to have to get a department. You can get President McCain to appoint a new Secretary—

[Laughter.]

Senator HOLLINGS. As a Secretary, I can always get the President’s ear, not as an assistant to the President. He’ll be down in the cellar of the Old Executive Office Building. You can’t find those assistants, no kidding. Let’s get into the real world. But if I’m a Secretary, I say, now, “Mr. President McCain, you’ve gotten me to serve and you’ve given me this job, but we are in real trouble, we have these needs.” I can at least get the President to call up OMB and say “change that thing around now and let’s get at least half of what they want.”

Incidentally, you have all been in government one way or the other and you’re not going to shoot the moon, but give us a dollar figure on what you think is a realistic need for ocean spending, something reasonable to get the job done. We’re not going to get it, don’t worry about it. We’re the authorizing committees and we never get what we want out of appropriations, but we at least find out what the needs are from you folks who spent 2 years on it. And please do that and think about that department idea. Get us organized. That’s what you’re talking about, and you’re not going to get it organized with an ocean council and an assistant over there in the bottom of the OEOB and there will be no quorums, I can tell you that.

The CHAIRMAN. Thank you, Mr. Secretary.

[Laughter.]

Admiral WATKINS. I would disagree with you, because I don’t expect the Secretary of Defense to attend any of the meetings, but I do expect somebody at the third or fourth echelon level who has the ear of the Secretary and is authorized to go over there. I had the same thing with global climate change when I was Secretary of Energy. I didn’t go to those meetings and yet it was set up for all the Cabinet Secretaries involved in climate change to be there. But I had a person down at the third echelon that knew what he was talking about in science and technology, he’d come up and brief me as to what he was going to take to that council meeting, and I said, go for it, you got my blessing on it.

But you set up the thing so that at least you give some respect to say Secretary Rumsfeld that he might be interested in the

oceans. But that trickles down to maybe it's Admiral Lohr, who is the JAG official over there for ocean policy, maybe he comes to the meeting. That's all right, as long as the Secretary knows it and knows what he's going to say over there.

So I don't necessarily write off the Ocean Commission as being an outfit that just can't maneuver. I believe it can, as long as the President says so.

The CHAIRMAN. Admiral, I would also assert that the reason why what you're doing can be enormously effective is because of the warnings that you are sounding about the conditions of our oceans. It's gotten a lot of attention, and I hope that when your final report comes out it will get much more attention. Every newspaper in America that I know of has covered your preliminary conclusions, and I believe your conclusions are so alarming to many that your recommendations will be and should be taken very seriously. I think that's part of this equation.

And I know from having been involved in this issue, not nearly to the degree that Senator Hollings has or you have, we're talking about some very, very serious consequences unless action is taken immediately. If we can make the American people and the Congress and the Administration aware of the dire situation we face, which is what I get out of your report, then hopefully that can be transferred into both reorganizations such as Senator Hollings is recommending, but also sufficient funding.

And it is a disgrace if the inequities between space and oceans are \$16 billion to some million or whatever it is, and hopefully we can get attention on this issue. And already I think your commission has performed a signal service and contribution by what you've said already.

Senator Cantwell, did you want to—

Senator CANTWELL. If I could make a final request, because I know this is a draft report and you have an opportunity to consider other issues in your final version. I would just, adding on to the previous comments about atmospheric issues, that we have a specific issue we're dealing with in the State of Washington with the Southern Resident orca population. Most people know orcas as Free Willy, they are an icon to us in the Northwest, and it looked like we are losing that resident population. It has already been declared an endangered species by the state and it is currently being considered by NOAA for Federal listing as an endangered species.

One of the number one issues related to the orca's decline is PCBs. It is an atmospheric issue and it will take international cooperation to address. Believe it or not, it's air from Asia, China in particular, coming over and polluting our ocean. So in your final recommendations, I would appreciate it if you would consider beefing those up—I mean, you approached the atmospheric issue from a regional perspective, but we need to focus on an international solution as well. If you would consider beefing up that section of your report about atmospheric deposition, I think it would be greatly received by the Northwest.

The CHAIRMAN. Are there any final comments that you, Admiral, or any other members of the Commission would like to make?

Admiral WATKINS. We'll take Senator Cantwell's comment into consideration. I thought we had well covered the atmospheric depo-

sition of contaminants that affect the water systems of our country. If we haven't, we'll go back and take a look and see what we have said there, and perhaps there is some way to strengthen it. But I don't think there's any question on the Commission's part that that's a key part of non-point source pollution, point source pollution and so forth, I mean, the mercury in the water and so forth. So we understand all that and I thought we had covered it pretty well.

But anyway, we want to thank you, Mr. Chairman, for allowing this hearing this morning before this important committee and you can be assured that this is a dedicated commission. They were set up by the Congress primarily and you're the ones that gave us 12 out of 16 of these commissioners. It's the right way to do business up here, pick out people who know what they're talking about, give two of those names to the President, ask him to pick one of them and we don't care which one, and that's what we are. And I think we've done a good job and I think our commissioners deserve a lot of credit for having what I would say is a very ecumenical approach to this, very unbiased. Sure they defended their region of the country, and properly so, but we were able to find balance and consensus throughout this. It was very difficult, and I think that what we've got here is an excellent start and I hope that the Congress would move now even on the preliminary report. The final report to the President may not be a lot different from this; I don't see how it could be. We have to listen to the Governors' input and we'll see—if there's a common thread across those Governors' input, we'll put it in. If not, I'll just tell the President in the forwarding letter, Mr. President, you've got 18 Governors that have serious reservations about voluntary regional councils, and we'll have to say you'll have to do the best you can, but we still think it's the right idea.

So those are the kind of things that we're not jousting with within the commission as we move to the final phase. This will be on the President's desk on July 23. That will drive my executive director here today nuts, but we're going to do it. We have to get it on the President's desk. He has 90 days to come back to the Congress by the Oceans Act of 2000 and that takes it to October 23, which is an interesting time of the year here. And we want to get this in this Administration, get this action started so the next session of Congress, if we can't get anything done this time, is going to launch off on a series of things that can be very helpful to the Nation.

The CHAIRMAN. I know you'll bring the two women commissioners with you at our next appearance as well.

Admiral WATKINS. We will.

The CHAIRMAN. Thank you, Admiral, and Secretary Hollings. We'll be looking forward to your report. Thank you. This hearing is adjourned.

[Whereupon, at 11:30 a.m., the hearing was adjourned.]

A P P E N D I X

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. ERNEST F. HOLLINGS TO ADMIRAL JAMES D. WATKINS

Question 1a. One of the most important recommendations made by this Commission—and there are very many—is on page 73, where it recommends that Congress should: “. . . solidify NOAA’s Role as the Nation’s lead civilian ocean agency through the enactment of an organic act.”

The Commission also recommends that NOAA’s structure be “consistent with the principles of ecosystem-based management” and cover 3 areas—

- Assessment, prediction, and operations for ocean, coastal, and atmospheric environments.
- Management of ocean and coastal areas and living and nonliving marine resources.
- Research and education on all aspects of marine resources.

I couldn’t agree with you more! But, on page 48, you recommend that a “National Ocean Council” should:

“Guide the effective use of science in ocean policy”

“Develop principles and goals for governance of oceans and coasts”

“Make recommendations . . . on carrying out national ocean policy”

“Assess the state of the Nation’s oceans and coasts”

Aren’t these squarely in NOAA’s area of expertise? What is NOAA’s role?

Answer. While the Commission views NOAA as the Nation’s lead Federal agency for oceans and coasts, it doesn’t view NOAA as the *only* federal agency with a leadership role in the marine environment. Also, the Commission has highlighted the need to move towards an ecosystem-based management approach, one that integrates land, sea and air, which will require greater emphasis on interagency cooperation. Where appropriate, NOAA should be designated as the lead agency for core ocean and coastal related activities. However, there will likely be cases where another Federal agency may have an equal or greater role. NOAA’s role is to facilitate the development and implementation of a national ocean policy, relying on both internal as well as external resources and expertise.

Question 1b. Aren’t we subjecting every decision of our stronger NOAA to a “group think,” lowest common denominator approach?

Answer. The successful development and implementation of a national ocean policy will require the collective participation of the full suite of Federal agencies that have responsibilities or mandates that impact the marine environment and resources. The process of reconciling competing mandates priorities among the various agencies is one of the principle roles of the National Ocean Council (NOC) and, in particular, the Assistant to the President. Such a process will require compromises by each of the players in order to strike the necessary balance of social, economic, and ecologic objectives. The Assistant to the President—who would chair the NOC—and other key cabinet officials, will be responsible for ensuring that national policies endorsed by the President represent far more than the “lowest common denominator.”

Question 1c. Doesn’t this also raise the concern that there will be *more* politics in our scientific decisions, not less?

Answer. The Commission’s recommendations include the establishment of a Committee on Ocean Science, Education, Technology and Operations (COSETO). COSETO, an interagency entity chaired by the Director of the Office of Science and Technology Policy, will be the scientific advisory body to the NOC. COSETO’s recommendations and guidance to the NOC will represent the best collective judgment of the Federal Government’s scientists, with the advice of their nongovernmental colleagues. Its advice will be the foundation upon which policy decisions are made.

Given our recognition of the complexity and interrelated nature of interactions in the marine ecosystem, it is imperative that we establish management entities that are capable of working across scientific disciplines and coordinating multiple agency efforts to ensure that science plays a stronger role in the development of policy.

Question 2a. I am glad that the Commission has suggested strengthening NOAA, but the Report at this point is a little slim on how we might help with that. Did the Commissioners have further recommendations that might help us strengthen the Agency's national stature and leadership? Will the final version have more information? For example, could the Agency work better if there were only 3 line offices, organized along these three mission areas?

Answer. The Commission believes that NOAA's entire structure, leadership, and staff should be oriented to support the effective exercise of the three functions identified in chapter 7 of the report. Beginning with a strengthened science program and a more service-oriented approach, NOAA should be organized not only to improve its efficiency, but also to promote inclusiveness and a commitment to meaningful partnerships with other agencies, states, the private sector, and the academic community.

Question 2b. Would regionally-based science centers, built around the existing laboratory system, help to strengthen the agency's national profile and visibility?

Answer. Ideally, efforts to meet regional information needs should be carried out under the guidance of regional ocean councils. However, because the process to develop these councils is voluntary and may take time to implement, in the interim these efforts should be undertaken by some other entity, as determined by each region. The organization tasked with meeting these needs should draw on existing governmental and nongovernmental institutional capacity in the region and be guided primarily by the needs of the users in the region. Each region should also collaborate with others, as appropriate, to address issues that transcend regional boundaries. In our Final Report, the Commission states that pending the creation of a regional ocean council, the governors in each region should select a suitable entity to operate a regional ocean information program that carries out research, data collection, information product development, and outreach based on the needs and priorities of ocean and coastal decision makers.

Question 2c. What recommendations are there to strengthen NOAA's infrastructure—labs, ships, buoys, etc.?

Answer. The Commission report generally does not identify or recommend agency specific infrastructure needs. Instead it calls for the development of a national ocean and coastal infrastructure and technology strategy—developed through the National Ocean Council's Committee on Ocean Science, Education, Technology, and Operations—to guide individual agency plans for facility (land-based and remote platforms) construction, upgrade or consolidation.

Question 2d. Which other Federal agency programs could be brought into NOAA that would really help raise NOAA's stature in the scientific and resource communities?

Answer. The Commission recommends that the Assistant to the President, with advice from the National Ocean Council (NOC) and the President's Council of Advisors on Ocean Policy, review Federal ocean, coastal, and atmospheric programs, and recommend opportunities for consolidation of similar functions as part of the Phase II strengthening of the Federal agency structure. While deferring this process to the NOC, the Commission believes that programs appropriate for consolidation can be found in several departments and agencies, including DOI, EPA, USACE's Directorate of Civil Works, and NASA. These agencies carry out important functions related to managing and protecting marine areas and resources, conducting science, education, and outreach, and carrying out assessment and prediction in the ocean, coastal, and atmospheric environments.

Question 2e. Can you provide the Committee with a list of candidate programs that would help guide us in assessing further consolidation?

Answer. Additional discussion of possible candidates for program consolidation can be found throughout this report, including in Chapter 9 (area-based ocean and coastal resource management), Chapter 14 (nonpoint source pollution), Chapter 16 (vessel pollution), Chapter 17 (invasive species), Chapter 20 (marine mammals), Chapter 22 (aquaculture), and Chapter 26 (satellite Earth observing operations).

Question 3a. On page 74 of the report, the Commission recommends that NOAA "strengthen its performance" in 18 different areas, including some very resource-intensive areas that we have struggled with. These include:

- Ocean Exploration
- Mapping and Charting

Domestic and international fishery management
 Marine mammal and other marine species protection
 Coastal and watershed management
 Habitat conservation
 Invasive species control
 Natural hazards planning and response
 Data and information Management and communication

Is the funding NOAA received in FY2004 sufficient to meet any of these needs?
 Answer. Given the current state of the ocean and the general agreement that our understanding of ocean and coastal processes is limited and the management of marine resources is lacking, the current level of funding for NOAA and other Federal agencies ocean and coastal science, management and education activities is inadequate.

Question 3b. If not, did you include the cost of NOAA's meeting all these requirements in your \$3.2 billion estimate for annual increased costs on page 374?

Answer. The Commission's Final Report estimates that the Nation needs to invest an additional \$3.9 billion per year in our oceans, and the annual cost to improve NOAA programs is included in that total. It is important to note that while the Commission recommends that a strengthened NOAA expand its role as the Nation's lead Federal agency for oceans, funding is needed for a wide array of programs throughout the Federal Government.

Question 3c. Could the Commission provide us with your estimates of what it might cost to strengthen NOAA's performance in each of these 18 areas within the next 5–10 years (including costs of some of the programs recommended for moving to NOAA)?

Answer. Chapter 30 and Appendix G in the Final Report provide first year and outyear budget estimates for each of the Commission recommendations. However, the funding levels presented in the Final Report are by no means definitive or authoritative, and the outyear estimates are not based on 10-year projections, but are intended to set the stage for ongoing discussion.

Question 3d. Given that NOAA will be the lead civilian ocean agency, is it accurate to assume that most of the funding increases would be for NOAA? If not, why not, and which agency would be involved?

Answer. We have not provided a breakdown of funding by agency, although each recommendation is assigned to one or more primary actors in Chapter 31 and its cost estimated in Appendix G. In some areas, such as pollution control, marine transportation, or fisheries enforcement, agencies outside NOAA have primary roles. One of the roles of the National Ocean Council will be to determine the appropriate roles of individual agencies in respects to various ocean and coastal programs and to make recommendations for an integrated budget submission to the Office of Management and Budget. So, while we anticipate significant new funding for NOAA, the distribution of funding will rely heavily on the respective roles of the various agencies.

Question 4. From the President's most recent biennial budget report to Congress (called for in the Oceans Act of 2000): for FY 2005, the following 5 Federal agencies have the largest budgets for "ocean and coastal activities" (—which of course wouldn't include atmospheric programs):

Department of Homeland Security (CG)	\$2.68 Billion
Department of Commerce (NOAA)	1.644 Billion
Department of Defense	1.385 Billion
EPA	827 million
Agriculture Department	661 million

In Oceans Act, we also directed the Commission to conduct "a review of existing and planned ocean and coastal activities of Federal entities" —

- Does the President's Report appear to accurately depict the relative roles of each agency in ocean and coastal activities?
- Has the Commission prepared its own list of the various ocean and coastal programs conducted by other Federal agencies? If not, will it be in the Final Report?
- If neither the Commission nor the President has compiled accurate information on the amount we are spending on ocean and coastal activities—and where we are spending it—how would you recommend we get this information?

Answer. The Final Report does not contain one comprehensive list of Federal entity ocean and coastal activities. Rather, information about these activities is included throughout the issue-specific chapters of the report. The Commission also recommends that the newly created Assistant to the President, as head of the National Ocean Council (NOC), consult with the Office of Management and Budget and NOC members to prepare in-depth biennial reports that identify ocean- and coastal-related programs and recommend appropriate funding levels for these activities (Recommendations 4-4 and 30-2).

Question 5a. Also, I am puzzled that the Commission's recommendations do not appear to be closely linked to the size of the programs—or the magnitude of some of the problems. For example, there are 40 recommendations for NOAA, but only 10 for DOD (limited to education), and 2 for USDA. Given that DOD has been in the hot seat with respect to marine mammal deaths, and polluted runoff from farms is identified by the commission as a huge problem, this seems surprising. Can you explain how you conducted your review of the programs of agencies other than NOAA?

Answer. The Commission collected information from the Federal agencies through a variety of channels, including senior administration representative participation in our public meetings, formal and informal meetings and conversations with agency personnel, information provided in the Federal Ocean and Coastal Activities Report issued by OMB in March 2003, as well as information taken from websites and conversations with various state and nongovernmental constituents of programs and agencies.

The number of Commission recommendations reflect the extent of ocean and coastal activities conducted by Federal agencies, and not the size of the agencies. The relatively low number of recommendations directed at USDA and DOD compared to other agencies does not discount the importance of their roles in improving the health of the Nation's ocean and coastal resources, and closer review of the Final Report will demonstrate a broader recognition of these agencies' involvement than indicated in the Preliminary Report.

Question 5b. Where are the results of these reviews reflected in your Report? Will it be in the final report?

Answer. The results of these reviews are reflected in the explanatory text of the report and our recommendations; there is not a separate compilation with descriptions of each program provided in the report.

Question 5c. Is there a need for continuing independent review of Federal ocean and coastal programs and funding? Given that OMB has not performed as well as we would like on the Ocean Budget report, would it be appropriate to establish an independent body within the Federal Government specifically to gather this sort of information?

Answer. There remains a need to prepare comprehensive reports of these activities, including appropriate funding levels, on an ongoing basis, as required in the Oceans Act of 2000. The Commission recommends that the newly created Assistant to the President, as head of the National Ocean Council (NOC), consult with the Office of Management and Budget and NOC members to prepare these reports (Recommendations 4-4 and 30-2).

Question 6a. The Commission makes a number of important recommendations on the management of marine mammals and endangered marine species, including placing the protection of all marine mammals under NOAA. However, some parts of this chapter appear incomplete or weak. The Commission recommended that Congress amend the Marine Mammal Protection Act (MMPA) to require the Marine Mammal Commission (MMC) to coordinate with all relevant Federal agencies, while remaining independent. What motivated this recommendation?

Answer. The MMC is charged with reviewing and making recommendations on domestic and international actions and policies of all Federal agencies with respect to marine mammal protection and conservation. It also manages and funds a research program to support management activities. Although the Commission's independence has been essential to its functioning, establishment of the National Ocean Council will provide it with a venue to coordinate with other Federal agencies involved in marine mammal research and management. Thus, the motivation for this recommendation is to ensure that the MMC is brought fully into the Federal inter-agency coordinating mechanism established under the National Ocean Council.

Question 6b. I did not find any discussion of the need for more routine and robust scientific information on marine mammal and endangered species stocks, which has been documented in other reports to Congress (e.g., 2001 NAPA study, MMC reports). Why not?

Answer. Chapter 20 of the Final Report has been expanded and now discusses the importance of increased research and education on marine mammals as well as protected and endangered species. Recommendation 20–8 states that NOAA and DOI should develop expanded research programs focusing on research, monitoring and assessment, as well as advanced technology and engineering programs to eliminate or mitigate human impacts.

Question 6c. I was pleased to see that the Commission recommended that Congress amend the MMPA to place all marine mammals under NOAA's authority. What problems did the Commission identify with the split in jurisdiction? (U.S. Fish and Wildlife Service handles some marine mammals like manatees, and NOAA handles others, like whales)?

Answer. As noted, the management of marine mammals is currently divided between NOAA and USFWS. This split was intended to be temporary and makes little sense. The original Congressional committee reports that accompanied the MMPA in 1972 show that Congress did not intend marine mammal jurisdiction to be permanently divided between NOAA and USFWS. Rather, House and Senate committees anticipated the creation of a new Department of Natural Resources that would combine NOAA and USFWS. The report stated that if the proposed new department did not become a reality, they would reexamine the question of jurisdiction and consider placing the entire marine mammal program within a single department. Nevertheless, the jurisdictional split remains today and has resulted in the establishment of separate marine mammal programs and increased efforts to facilitate coordination.

Question 6d. I was a bit surprised that the Commission did not offer any direction on some of the major risks to marine mammals, such as vessel strikes (This is the biggest source of mortality for of Northern Atlantic Right Whales, and only about 300 individuals remain in the stock). Why?

Answer. Many human activities can harm individual marine animals, including, but not limited to; coastal development, offshore oil and gas exploration, vessel traffic, military activities, and marine debris. Understanding the danger of these activities is critical to focus attention, research, technology development and enforcement efforts where they are most needed. Increased research into impacts on marine mammal (including Northern Atlantic Right whales), sea turtles, and other protected species populations will allow for more comprehensive, ecosystem-based management—recall that the ecosystem-based management focuses significantly on managing the impacts of human behavior and activities. Furthermore, for activities where interaction with protected populations is likely and unavoidable, better scientific data will lead to more effective permitting procedures and the development of technological solutions to minimize impacts.

Question 6e. Only one specific recommendation for increased funding is included—for additional research on the impacts of noise on marine mammals. Is that all that NOAA is going to need to solve all these problems?

Answer. The Commission agrees there is need for a better understanding of the effect of sound on marine mammals. Currently, the U.S. Navy and, to a lesser extent, the Minerals Management Service, are the only Federal agencies with significant marine mammal acoustic research programs, including studies to examine the impact of noise on marine mammals. Expanded research efforts and data dissemination are needed to understand marine mammal interactions with sound and reduce or prevent the negative impacts of human-generated noise on these animals. In recommendation 20–9 the Commission recommends that a consortium of Federal agencies, including The National Science Foundation, National Oceanic and Atmospheric Administration, U.S. Geological Survey, and Minerals Management Service expand research on ocean acoustics and the potential impacts of noise on marine mammals. These additional sources of support are important to decrease the reliance on U.S. Navy research in this area. The research programs should be complementary and well coordinated, examining a range of issues relating to noise generated by scientific, commercial, and operational activities. This research is necessary to assist policymakers in making judgments and determinations on the appropriateness of human noise generating activities in the proximity of marine mammals.

Question 6f. I was surprised that the Report did not really discuss endangered sea turtles and the need to bring other countries in line with conservation requirements—even though lawsuits regarding turtles have shut down U.S. fishing fleets while foreign fleets are decimating them. Can the Commission comment on that problem?

Answer. In its Final Report, the Commission expanded Chapter 20 to address issues associated with the conservation of sea turtles and the need for international

cooperation to reduce the impacts of human activities on marine species at risk in foreign and international waters (see recommendation 20–10).

Question 7a. The Commission recommends that funding oceans and human health programs should be doubled to \$28 million annually. However, the draft report notes that the annual economic losses from harmful algal blooms alone total close to \$50 million with a likely multiplier effect bringing losses to \$100 million. Given statistics such as these, do you feel that \$28 million annually is sufficient funding for oceans and human health programs?

Answer. We recommend a doubling of the existing budget of \$14M for research on Oceans and Human Health. As the program expands, additional future investments may be warranted. In the final report we also added a recommendation on seafood safety (Rec. 23–5) with an estimated cost of \$10M per year. It should be noted that the funding levels presented in the Final Report are by no means definitive or authoritative, but the Commission believes they will be helpful in setting the stage for ongoing discussions.

Question 7b. Can I assume correctly that this \$28 million also includes funding for research regarding pharmaceuticals, nutrients, and other industrial products derived from marine organisms?

Answer. \$28M is an estimate for the *federal* research investment. Private investments by industry or other research institutions are not incorporated into our funding recommendation. Again, as this program matures it is likely that the investment of additional resources will be necessary and beneficial.

Question 7c. Do you think this level of funding is sufficient considering Japan has spent close to \$1 billion dollars annually for the last decade?

Answer. Again, the funding levels presented in the Final Report are by no means definitive or authoritative, but the Commission believes they will be helpful in setting the stage for ongoing discussions.

Question 7d. The draft report notes that only 2 percent of the 4 billion lbs. of imported seafood is inspected upon its arrival to the U.S.—the GAO recently said it was not even that much! Will the \$28 million cover any costs needed to inspect a greater portion of the imported seafood, especially when considering that many of the exporting countries have lower food safety standards than the U.S. and many use hormones and antibiotics that are illegal in the U.S.? Did the Commission look at this issue at all?

Answer. The Commission considered the issue of seafood safety and added an expanded section on this topic in the final report in Chapter 23. We estimate an annual cost of approximately \$10M for improved inspections, which is separate from the research costs discussed above. We also note that the spending recommended to improve water quality and monitoring will contribute to improved seafood safety and other human health concerns.

Question 8a. The Report recommends that Congress establish and appropriate significant funding (\$110 million) for an expanded national ocean exploration program. The Commission also discusses the need for dedicated ocean exploration platforms, such as submersibles and ships. Would the \$110 million estimate include costs for NOAA vessels?

Answer. No, that figure is for grants and operating expenses. We provide a separate estimate of \$160M to construct needed infrastructure for the Exploration program (Recommendation 27–4).

Question 8b. What are the “hot spots” for discovering new drugs and cures?

Answer. The potential of the ocean in terms of bioprospecting is vast, and there is no easy answer as to where to search for promising new compounds. Much research has been conducted on tropical and temperate, shallow-water species, but there is still much to be done. Invertebrates from the deep present a relatively new source of compounds that should be explored. In addition, all bacteria hold the potential to biosynthesize molecules that can be utilized for human medicines, whether they come from the water column, bottom substrate, symbiotic organisms, or sediments (even deep sediment cores). Virtually everywhere we can look, we should.

Question 8c. Roughly 95 percent of the ocean remains unexplored. In your opinion Dr. Ballard, where should a national ocean exploration program direct its efforts in the short term? Which ocean environments and regions should be a priority and why?

Answer. The Commission did not discuss priorities for the national ocean exploration program since these priorities would most likely change depending on the time it takes to establish the program. However, the NOC or COSETO would be nicely positioned to discuss priorities when the time comes.

In addition, the commission recommends that the COSETO should determine national oceanographic research priorities, and ideally the Nation's exploration and research priorities should be complementary. So, it would be logical for the same interagency group to discuss and decide upon both.

Question 8d. Back in 2000, the President's Panel on Ocean Exploration called for \$75 million for ocean exploration. The Commission recommends \$110 million, plus infrastructure such as ocean exploration platforms. How did the Commission arrive at this figure?

Answer. As with all our cost estimates, we used a combination of sources including the report from the President's Panel, a more recent study by the National Research Council, and communication with knowledgeable experts.

Question 9a. The Report recommends a coordinated mapping and charting effort, led by NOAA, to address the backlog of hydrographic surveys, surveys of the U.S. Continental Shelf, and the lack of integrated maps. In addition, the Report suggests the National Ocean Council should make recommendations on consolidation of certain federal, nonmilitary mapping and charting activities within NOAA. What are some of the agency mapping programs or activities that may be appropriate for consolidating within NOAA?

Answer. In its Final Report, the Commission acknowledges that there are a multitude of Federal agencies involved in mapping and charting. However, instead of recommending the consolidation of various programs or activities at this time, the Commission emphasize the importance of coordinating these activities through the Federal Geographic Data Committee (Recommendation 25-7). More intensive Federal coordination and evaluation of these programs may result in recommendation for consolidation as part of Phase II, as discussed in Chapter 7, Strengthening the Federal Agency Structure.

Question 9b. Additional resources may be needed to address survey needs, infrastructure needs, and integrate maps. Of the \$650 million increase proposed for ocean research, does this include increases for mapping and charting at NOAA?

Answer. In the Final Report, the cost of mapping and charting the Nation's coasts and EEZ is estimated at \$50M in year one and \$200 million per year in ongoing costs (Recommendation 25-7). This amount includes infrastructure-related costs, as well as costs associated with the development of integrated maps. The cost for these activities and programs is separate from the \$650M for research called for in Recommendation 25-1.

Question 10. Recommendation 28-5 says the Navy should periodically declassify appropriate naval oceanographic data and make it available for civilian use. What kind of problems and delays did you identify regarding declassification of naval data? What were the specific roadblocks and your recommendations to fix them?

Answer. Based on concerns voiced by a variety of stakeholders, governmental and nongovernmental, about the lack of access to naval data, the Commission is recommending that the Navy engage in a more regular process to review and declassify military data.

Question 11a. The Commission calls for the establishment of a national Integrated Ocean Observing System (IOOS) with NOAA as the lead agency for implementing and operating the IOOS. Ocean.US, with National Ocean Council oversight, would be responsible for planning of the system. If NOAA is in charge, what is the National Ocean Council's role? Why?

Answer. The role of the NOC is one of general oversight for Ocean.US and the entire IOOS multi-agency system. The NOC members should be briefed on and approve IOOS plans, funding and any expenditures of money, since the NOC represents the interest of all of the Federal agencies and will be provided with advice from the President's Council of Advisors on Ocean Policy. However, since the NOC is not an operational group, the Ocean.US office will be in charge of the daily tasks needed to implement and coordinate the IOOS.

Question 11b. The Report also recommends funding of \$650 million for implementation of [the IOOS] system. However, implementation of IOOS will require a tremendous investment in data archiving, assimilation, modeling and distribution systems. NOAA's data holdings alone are projected to grow by a factor of 100 by 2017, and only 4 percent of NOAA's digital data archive is available online. Yet the Report only proposes collaborative efforts between agencies as a way of addressing these gaps, and the creation of a task force to develop a plan for modernizing data management systems. Does the \$650 million estimate [for IOOS] include funds to address data management needs in the future?

Answer. Yes, data management costs are included in the estimates in the final report. The first year start-up costs alone include \$18 million for developing data

communications and data management systems (See Table 26.4 of the Final Report).

Question 11c. Shouldn't the Commission propose funding to address this critical need now so as to ensure the end-to-end needs of IOOS are met?

Answer. Yes, these are issues that need to be addressed as the system develops. The funds for them are an essential part of the start-up and ongoing costs. In addition, Ocean.US has already drafted their final Data Management and Communications (DMAC) Plan and these systems, and their associated costs will need to be continually updated as the complete IOOS progresses.

Question 12a. The Commission has made the development of national ocean education a priority in the draft report. The Report stresses the importance of informal education and public outreach, and recommends the establishment of a national ocean education coordinating office (Ocean.ED) under a National Ocean Council (NOC) subsidiary committee called the Committee of Ocean Science, Education, Technology, and Operations (COSETO). The Report also recommends that NOAA establish a national ocean education and training program to provide diverse, innovative ocean related opportunities to college and graduate school students. Why does the Commission believe that an interagency program such as Ocean.ED would be the best way to further and strengthen ocean education?

Answer. Despite the existence of many positive efforts, ocean, coastal and watershed education remains a patchwork of independently conceived and implemented programs and activities. These uncoordinated efforts cannot provide the nationwide momentum and visibility needed to promote sustained ocean education for students, teachers, and the general public. Within the Federal Government, there is little discussion of ocean education, even among those agencies with the greatest responsibility for ocean issues. Different programs and funding mechanisms are not coordinated and resources are seldom leveraged. Even within individual agencies, offices that have education components often do not collaborate or communicate.

A national ocean education office, like Ocean.ED, would be able to coordinate and integrate Federal agency programs, leverage resources, serve as a central point of contact for K-12, university-level, and informal education partners, and work with state and local education experts and others to develop a vision, strategy, and coherent, comprehensive plans for national ocean education.

Question 12b. Given that ocean education is part of NOAA's mission, that the Report recommends that the Ocean.ED office be funded through a NOAA line item, and that the Report recommends that NOAA create an ocean education and training program, why shouldn't a strengthened and better funded NOAA be the lead agency with respect to Ocean.ED?

Answer. While NOAA will play an essential role in promoting and supporting increased ocean education, Ocean.ED is needed to coordinate activities across government agencies and departments, including the Department of Education. Having a central interagency office will also provide states and other non-federal organizations a central contact point for ocean education related questions and ideas.

Furthermore, while Ocean.ED will focus on ocean-related education, these efforts will have a greater chance of success if they are linked with efforts to improve education in other subjects, including natural sciences, technology, engineering, math, and a range of social sciences. Therefore, Ocean.ED will have a broader mandate than the ocean education and training program within NOAA.

Question 13a. Recognizing the significant growth and congestion issues facing the Nation's Marine Transportation System (MTS), the Commission wisely recommends the need to address intermodal connections—key choke points where cargo is transported from vessels to railways, highways or airports. The Commission also recommends improved coordination among the various agencies with oversight of the MTS. The Commission specifically calls for the codification of the existing Interagency Committee on the Marine Transportation System, which is comprised of 18 Federal agencies, and names the U.S. Department of Transportation (DOT) the lead agency on marine transportation issues. Besides port security, what is the single greatest challenge facing the marine transportation system today and how does the Report address this?

Answer. One of the larger problems facing the Nation's marine transportation system (MTS) is the inadequacy and lack of integration among intermodal facilities, a situation that is exacerbated by the lack of Federal coordination. The Commission recommends that DOT be designated the lead Federal agency for planning and oversight of the MTS, codifying the MTS, and developing a new national freight transportation strategy that links the MTS to other components of the transportation infrastructure (highways, railways and airports). A further element of the strategy

should include emergency preparedness, which will allow the Nation to respond in a coordinated and rational manner in the event of a natural or manmade disaster.

Question 13b. The Report offers several recommendations to study, analyze, or develop strategies regarding a number of MTS issues. What specific, short-term actions can the Nation take to ensure that our port infrastructure is capable of handling increasing cargo volume and the ever-larger vessels moving through U.S. ports?

Answer. In addition to initiating the development of a national freight strategy, there should be a focus on developing regional dredging and sediment management plans to facilitate the maintenance and, where appropriate, deepening of shipping channels to the Nation's ports.

Question 13c. The report recommends that DOT work closely with the U.S. Department of Homeland Security on port security issues. Why didn't the Commission recommend that the U.S. Coast Guard retain its co-chair position on the Interagency Committee on the Marine Transportation System? (The report recommends that DOT chair the Interagency Committee when it is codified. Presently, the Interagency Committee is chaired by Coast Guard and DOT's Maritime Administration. Coast Guard has responsibility for port security in the U.S.)

Answer. Throughout the report the Commission recommends that, where appropriate, one Federal agency be designated as the lead entity. The intent of this recommendation is to minimize the confusion when multiple Federal agencies are involved in an activity, such as marine transportation or marine aquaculture. There is no desire to minimize the role of the Coast Guard in the MTS, and the codification of the MTS will should result in a formalized structure that will solidify the role and responsibilities of the agency.

Question 14. The draft Report states that coral reefs have tremendous economic benefits, providing a worldwide total of \$375 billion a year in goods and service. However, many of our Nation's reefs are in a state of emergency. Two-thirds of all reef fish species are overfished, and during the 1990s, white band disease killed 90–96 percent of the most common near-shore species of coral. Did the Commission perform any estimates regarding how much revenue has been lost due to coral reef degradation? Can we assume that the full economic potential of our coral reefs is not fully realized?

Answer. The Commission did not estimate economic losses associated with the degradation of coral reefs or other marine resources. Given the substantial decline in the health of coral reefs around the Nation and world, and the disproportionate level of biodiversity and productivity associated with coral habitat, it is difficult to judge the full economic and ecologic effect of these losses. However, we can assume that their economic potential has been substantially impaired. The importance of restoring and protecting coral resources, both tropical and coldwater, cannot be overstated.

Question 15a. The Commission recommends strengthening the permitting and leasing system for offshore oil and gas development. However this change is recommended without amending the Coastal Zone Management Act or the Outer Continental Shelf Lands Act. Why has the Commission decided these laws should remain unchanged? Would NOAA have a central role in reviewing proposed uses for environmental and ecosystem effects?

Answer. The Commission has not made a recommendation to strengthen the permitting and leasing system for offshore oil and gas development. It does recommend that the National Ocean Council and Regional Ocean Councils establish a balanced, ecosystem-based offshore management regime that coordinates both existing as well as emerging offshore activities. It also suggested that the OCSLA statutory and regulatory regime for oil and gas exploration and development is comprehensive and broad and could serve as a model for individual and perhaps a comprehensive regime taking into consideration a number of different variables associated with both new and emerging offshore issues. The Commission does recommend strengthening the CZMA with respect to the development of state management plans that are consistent with national and regional goals. NOAA will continue to play a central role in reviewing proposed uses in offshore waters through its extensive statutory responsibilities associated with the CZMA, ESA, MMPA, MSFCMA and consulting role under numerous other statutes and regulations.

Question 15b. Does the Commission feel that the Federal-state revenue sharing program will have any significant effect on the Federal budget? In times of deficit such as these, would the program have to be altered, with a higher percentage of revenues going back to the Federal Government?

Answer. The proposed Federal-state revenue sharing program will impact the Federal budget since oil and gas revenues are not a new funding source, but would

result in the redirection of these funds to ocean and coastal related activities. The Commission feels strongly that revenues generated in offshore waters should be used to protect, maintain and restore the Nation's coastal and ocean resources and environment. The design of such a funding regime is clearly within the jurisdiction of Congress; however, the dedication of a stable revenue stream for ocean and coastal programs and activities is of critical importance if the Nation is to successfully make the transition toward ecosystem-based management. Also, most of the money in the Ocean Policy Trust Fund, recommended by the Commission, would go to Federal agencies to implement the Commission's recommendations.

Question 16. The report recommends a modernization fund for critical ocean infrastructure and technology (such as ships, submersibles and environmental sensors). How much money out of the proposed \$760 million in annual ocean science, research and education funding should be directed to this fund?

Answer. Infrastructure and technology are considered separately from research in the report and are assigned a separate budget. To upgrade and modernize science-related infrastructure (Recommendation 27-4), we estimate a cost of approximately \$200M per year. However, Chapter 27 does not attempt to provide a comprehensive review of all marine-related infrastructure and technology needs and costs. Rather, it highlights several key areas where improvements in Federal planning, coordination and investment are sorely needed. Thus, we have not included an estimate for the cost of upgrading the operational ocean and coastal infrastructure of the Federal Government, such as agency fleets, satellites, laboratories, and other Federal facilities. (See Appendix G, 27-5.)

Question 17a. The Report recommends that state coastal zone boundaries be expanded landward to encompass coastal watersheds. Can you elaborate on the effect that extending the coastal zone boundaries will have on state enforceable policies and Federal consistency? Did the Commission intend to require the states to expand all current CZMA requirements up the watershed or were more gradual, voluntary models in mind for these upland areas?

Answer. Because of the interrelated nature of coasts and upland watersheds, activities in coastal watershed areas have the potential to affect the health of ocean and coastal resources. For this reason, the Commission recommends extending the boundaries of state coastal management programs under the CZMA to include these coastal watersheds (Recommendation 9-1). It will be up to each state—in consultation with the National Oceanic and Atmospheric Administration, the administering agency of the CZMA—to determine how best to incorporate the management of these new areas in their coastal programs and policies.

Question 17b. What types of incentives will be provided to states to implement conservation measures in coastal and upland watersheds?

Answer. The Commission stresses the importance of improving the linkage between watershed and coastal area management, including recommending that state coastal management programs extend their boundaries under the CZMA to incorporate coastal watersheds (Recommendation 9-1). The Commission also recommends that the CZMA be amended to create a dedicated funding program to support partnerships among state and local governments and private-sector partners to perform coastal and estuarine land conservation activities throughout the areas included in the state programs (Recommendation 11-1).

Question 18. The report recommends that states provide periodic assessments of their coastal resources—in essence a “State of the Coast” report for each state. Will the funding for these assessments come from the doubling of the science funds that the Commission proposes or from the Ocean Policy Trust Fund? Do you have an estimate of what these assessments will cost?

Answer. These assessments would be funded by existing state funding and the \$1 billion allocated to states from the Ocean Policy Trust Fund, complemented by information collected with or by Federal agencies and private partners. The cost for the assessment will vary by state and the geographic area they must cover.

Question 19. The Report recommends changes to Federal infrastructure programs to discourage development in fragile coastal areas. How can we be successful in linking transportation and other Federal infrastructure investment to state and local growth management plans?

Answer. An overarching theme of the Commission's report is the need to move toward ecosystem-based management of the Nation's ocean and coastal resources, which includes coordinating the efforts of multiple entities within a geographic area to better consider the cumulative impacts of their activities. An important step in coordinating these efforts is to establish national, regional, and state goals aimed at achieving economically and environmentally sustainable development (see Recommendation 9-3). Regional coordination of Federal agency activities, along with

the establishment of regional ocean councils and regional ocean information programs, as recommended in Chapter 5, would greatly improve Federal project planning and implementation.

Question 20a. The Commission raised a number of important points in its discussion of international oceans policy, and generally supported the need for the U.S. to work with other countries to ensure that the U.S. and global marine ecosystems are well-managed. It also recommended that an existing inter-agency working group, led by State Department, be brought under the leadership of the proposed White House NOC.

However, the discussion and recommendations fell short of addressing some of the pressing international issues and improvements in the interagency process, that are necessary to ensure that U.S. international oceans policy is effective. For example, while the Commission reiterated its strong recommendation that the U.S. accede to the UN Convention on the Law of the Sea (UNCLOS), it did not discuss any of the recent international fisheries treaties that have been negotiated, nor the need for strong international agreements on marine mammals and turtles.

Answer. Chapters 19 and 20 in the Final Report have been expanded to include discussions on managing international fisheries, including recommendations for strengthening, and where appropriate, expanding these agreements to provide the necessary protection for endangered or threatened marine resources.

Question 20b. The Commission recommended that an existing inter-agency working group, led by the State Department, be brought under the proposed National Ocean Council. It also recommended that the expertise of the resource agencies be more effectively brought to bear on the shaping on U.S. international positions. Could you elaborate on the need for these proposals?

Answer. Within the U.S. government, the U.S. Department of State is the lead agency for most international negotiations. However, the role of more specialized agencies is extremely important due to the scientific and resource focus of many multilateral ocean issues. For example, living marine resources are primarily the responsibility of the National Oceanic and Atmospheric Administration; the U.S. Coast Guard generally takes the lead in developing and enforcing vessel safety and environmental protection regulations; the U.S. Environmental Protection Agency does the same in mitigating pollution from land-and water-based sources; and the U.S. Trade Representative has a role in the interface of international trade and ocean policy. Consistent application of a wide range of expertise is essential both to establish international ocean standards that reflect U.S. interests, and to make certain that subsequent actions by the United States and others are in accordance with those standards. A new mechanism is needed to provide improved coordination among U.S. agencies that share responsibility for, and knowledge about, international ocean issues. Since the early 1970s, various interagency groups have attempted to address these issues, most recently as a subcommittee under the National Security Council's (NSC's) Global Environmental Affairs Policy Coordinating Committee. While the NSC subcommittee should continue to focus on specific security-related issues, the National Ocean Council will be a better home for a broad interagency committee dealing with all facets of international ocean policy.

Question 20c. I was also pleased to see recognition by the Commission that conservation and environmental objectives are legitimate elements of international trade policy. Do you also agree that conservation and environmental objectives are legitimate elements of domestic trade measures, as we have done with the shrimp-turtle law that has been upheld by the WTO?

Answer. In its Final Report, the Commission clarifies that the U.S. should continue to press for the inclusion of environmental objectives—particularly those specified in international agreements—as legitimate elements of trade policy.

Question 20d. This is consistent with the Law of the Sea as well, as I recall? (NB: The State Department has said this in Senate FRC hearings). I was surprised that the Commission did not discuss in this section the need for strong international agreements on marine mammals and turtles. What can the Commission tell us about this problem? What about the need to develop international institution capacity, since neither the FAO, the IWC or the IMO really deal with these issues across the board?

Answer. As mentioned above, the Final Report discusses the need for improved international efforts to protect marine mammals, turtles, seabirds and other protected species. Chapter 29 also includes a recommendation (29-8) specifically directed at building international capacity.

RESPONSES TO WRITTEN QUESTIONS SUBMITTED BY HON. TRENT LOTT TO
ADMIRAL JAMES D. WATKINS

Question 1. Admiral, the Commission report advocates requiring governors of states with representation on Regional Fisheries Management Councils to provide the Secretary of Commerce with a Council nomination choices that represent both commercial and recreational fishing interests. I certainly think that is appropriate for the Gulf of Mexico, where the catch is evenly split between those groups. However, different regions have different levels of recreational and commercial participation. Would you support a goal or requirement that the distribution of recreational and commercial appointees on a region council more accurately reflect the distribution of the fishing catch between those two sectors?

Answer. The Commission recommends that Governors be required to submit a broad slate of candidates for each vacancy. This process will help ensure that RFMC membership is balanced among competing user groups and other interested parties, and that fishery management plans reflect a broad, long-term view of the public's interests. Identifying the best mix of council members will require knowledge of the Federal fishery management process and an understanding of other factors affecting ocean ecosystems. This expertise resides in the NOAA Administrator, not the Secretary of Commerce, who is currently responsible for appointing RFMC members.

Question 2. The report recommends strengthening the application of the Magnuson-Stevens Act national standards to regional council fisheries management plans, but I think does not account enough for the real differences in each region's fisheries. After all, that is why the Magnuson-Stevens Act established regional fisheries management councils. Admiral, do you agree that the councils need to have flexibility to manage their fisheries to account for regional-specific situations?

Answer. The Commission fully appreciates and supports the need for regional flexibility. However, the uneven application of the current national standards by the regional fishery management councils in the past, and the impact this had had on fisheries resources, indicates a need for clearer guidance on the parameters within which the Councils can operate.

Question 3. Admiral, I understand the Commission's interest in an ecosystem-based approach to coastal and ocean management, however, I have some concerns. The designation of an ecosystem should be limited to as narrow an area as possible. Otherwise, we end up with the same problem as trying to identify essential fish habitat under the 1996 amendments, which turned out to be the entire Gulf of Mexico for many species. If the entire EEZ and landside watershed is an ecosystem, you aren't going to manage fisheries better, you'll make it too complex to manage anything. Do you agree?

Answer. In its recommendation that the Nation move toward an ecosystem-based management approach, the Commission recognized the need to better define what constitutes an ecosystem. The designation of Large Marine Ecosystems (LMEs), which are generally congruent with the jurisdictions of the Regional Fishery Management Councils, provides a logical starting point for regional discussions on how best to manage areas—or ecosystems—with these LMEs. However, determining the relative size of the ecosystem to manage will depend significantly upon the geographic extent of the impact(s) of the activity under consideration. This point further emphasizes the need for flexibility in evaluating and implementing regionally-based ecosystem management strategies.

Question 4. Admiral, the Gulf of Mexico red snapper fishermen support the idea of an IFQ system to manage that fishery, but they have been concerned about whether the imbalanced Gulf Council would create a fair system. That is why I insisted in 1996 that they participate through referendum in the decision on whether to use IFQs, including whether they approve of what kind of IFQ system the regional council comes up with. Do you support giving fishermen this kind of direct voice in the use of IFQs?

Answer. The Commission believes that IFQs or other Dedicated Access Privileges should only be adopted after adequate public discussion and close consultation with all affected stakeholders, to ensure community acceptance of a dedicated access plan prior to final Regional Fishery Management Council approval. This process may, or may not require a referendum.

Question 5. Admiral, It's clear that NOAA is difficult to manage. On the one hand, the Congress directs NOAA spending to a degree not experienced by any other agency, and on the other hand, it constantly has to fight lawsuits protesting its decisions, mostly filed by environmental groups. Maybe better use of science will help, but many of these lawsuits are related to the quality of NOAA's process for making and documenting its decisions. While organizational changes such as those the Com-

mission advocates would elevate the importance of NOAA programs, it seems to me that the problems may run deeper into the organization's bureaucracy. How do the Commission's recommendations address these concerns?

Answer. The Commission does not offer specific recommendations addressing NOAA's internal bureaucracy or organizational decisionmaking processes. However, the Commission does strongly believe that NOAA's entire structure, leadership, and staff should be oriented to support the effective exercise of the three functions identified in Chapter 7 of the report. Beginning with a strengthened science program and a more service-oriented approach, NOAA should be organized not only to improve its efficiency, but also to promote inclusiveness and a commitment to meaningful partnerships with other agencies, states, the private sector, and the academic community. The realignment of NOAA's organization to address its core functions, and greater emphasis on cooperative interaction with its partners, should help minimize existing internal procedural and organizational concerns.

Question 6. Admiral, the Commission visited NASA's Stennis Space Center in Hancock County, Mississippi. Stennis is home to more than 30 resident agencies, many of which actively support missions aligned with the Commission's recommendations, including the Navy, NOAA, universities, and private sector technology firms. Stennis has the largest contingent of oceanographers in the world, as well as facilities for the transmission, management, and storage of large volumes of data. There is also technology development and remote sensing expertise. Do you think that Stennis would be a suitable location from which to manage and store coastal and ocean observation data nationwide?

Answer. Chapter 28 recognizes the unique capabilities at Stennis and the Commission recommends (Recommendation 28-2) that NOAA and the Navy establish an information management partnership that marries the strengths of the two agencies. The facilities, expertise and capabilities at the Stennis Space Center suggest that it would be a suitable location to store and manage ocean and coastal observation data nationwide and this role should be more fully considered as part of the development of a National Virtual Ocean Data System (Recommendation 28-3).

