



CAPITOL HILL
OCEAN WEEK

— 2007 —

Summary Report



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Symposium Overview

In its seventh year, Capitol Hill Ocean Week (CHOW) was integral in carrying forward the momentum of President Bush's declaration of June as National Ocean Month. Capitol Hill Ocean Week took place June 5-7, 2007 in Washington, DC, and again was a symposium designed to bring together various constituents from the ocean community and encourage dialogue between these stakeholders. The symposium helped to impart significant ocean issues before the nation's leaders in order to help protect and manage our ocean, coasts, and Great Lakes for future generations. Specific session topics included:

- **A Legislative Agenda: Charting the Course**, which focused on the outlook for ocean-related legislation and where such legislation falls on the list of priorities for the 110th Congress.
- **Hydrography: It's Not Just for Charting Anymore**, which focused on various ways in which hydrography provides essential data for a variety of scientific, environmental, public safety and security needs.
- **Sounds in the Sea: Acoustics and Marine Mammals**, which focused on the impacts of ocean acoustics on marine mammals and the latest findings regarding the scope of impact and ways to reduce the negative effects.
- **Census of Marine Life: Incorporating Biological Data in Ocean Observatories**, which focused on the importance of incorporating biological data in ocean observatories, which is essential in understanding the overall health and sustainability of ocean ecosystems.
- **The Economics of Coastal Communities**, which focused on the contribution of coastal communities to the nation's economy and the nuances that make them unique from other areas.
- **Ecosystem-based Management: A Comprehensive Approach**, which highlighted how ecosystem-based management is being effectively used and developed.
- **NOAA Past and Present: A Conversation with NOAA's Administrators**, which featured a discussion from several NOAA Administrators about the key issues of their terms.

- **Ocean Management: Planning for the Future**, which explored comprehensive, area-based ocean planning and management tools as a means to ensure sustainable use of our ocean resources.

Many of these sessions featured a Member of Congress or high-level stakeholder official to provide an overview of the discussion topic, as well as a panel of experts from the federal government, academia, industry, and non-profit organizations to address their varying perspectives on the importance of marine conservation to the future economic prosperity, health, and environmental stability of the United States.

This summary report captures the highlights of all of the panelists' presentations, as well as their challenges and recommendations.

The National Marine Sanctuary Foundation coordinated Capitol Hill Ocean Week in partnership with Members of the Senate Commerce, Science and Transportation Committee, the House Natural Resources Committee, the House Science and Technology Committee, the National Marine Sanctuary Caucus and the House Oceans Caucus. Federal partners included the U.S. Environmental Protection Agency, the U.S. Department of Interior's Minerals Management Service, and several offices within the U.S. Department of Commerce's National Oceanic and Atmospheric Administration, including the Office of National Marine Sanctuaries, the Office of Marine and Aviation Operations, the National Marine Fisheries Service, the Office of Coast Survey, the National Undersea Research Program and the Office of Oceanic and Atmospheric Research.

The National Marine Sanctuary Foundation is grateful for the support of the many sponsors of Capitol Hill Ocean Week 2007, including:

Presenting Sponsor: Pacific Life

Co-Hosts: Cruise Industry
Charitable Foundation

Stewards: Monterey Bay Aquarium
MOTE Marine Laboratory, Inc.
The Ocean Foundation
The Pew Charitable Trusts

Conservationists: Alfred P. Sloan Foundation
Chevron
Keith Campbell Foundation for the Environment
Mystic Aquarium & Institute for Exploration/ Immersion Presents
National Geographic Society
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Benefactors: Consortium for Oceanographic Research and Education
Joint Ocean Commission Initiative
National Ocean Industries Association

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Personal Watercraft Industry Association
Northrop Grumman Corporation
The Ocean Conservancy
SeaWeb

Contributors: Marine Conservation Biology Institute
The Nature Conservancy
Noblis
Sanctuary Friends Foundation of the Florida Keys
Woods Hole Oceanographic Institution

Keynote Remarks

The Honorable Leon Panetta, *Leon & Sylvia Panetta Institute for Public Policy*

Mr. Panetta shared his observations on ocean policy from a vantage point that includes 16 years as a Member of Congress, service in the executive branch of government as the White House Chief of Staff, and as Chair of the Pew Oceans Commission and co-Chair, with Admiral James D. Watkins, of the Joint Ocean Commission Initiative (JOCI). He noted that while much progress has been made in the past several years, much work remains to be done. Threats from overfishing, pollution, coastal development and lack of a comprehensive ocean governance structure represent a real crisis. Mr. Panetta suggested that it is necessary to convince people that these issues relate to our lives directly and improvements are needed as much for the sake of saving ourselves as for saving the ocean.

He noted JOCI's *Sea to Shining Sea Report*, issued in June of 2006 at the request of several U.S. Senators who wanted a list of ten key actions that could be taken for ocean conservation. Progress has been made in some key areas, including the June 15, 2006 designation of the Northwestern Hawaiian Islands Marine National Monument (now known as the Papahānoumokuākea Marine National Monument), a presidential statement in support of ratifying the Law of the Sea Treaty; the development of a National Science Foundation report on ocean research, legislative activity at the state level to address ocean management; and several key pieces of federal legislation such as the Magnuson-Stevens Fishery Conservation and Management Act, and bills on marine debris and tsunamis.

Mr. Panetta suggested that some priorities for the 110th Congressional session should include a focus on ocean governance and the creation of a national ocean policy, the establishment of an organic act for NOAA, reauthorization of the Coastal Zone Management Act; legislative language codifying the President's Committee on Ocean Policy, development of a management regime for offshore resources, and a permanent trust fund to help mitigate damage being done to the ocean. Mr. Panetta also reiterated the need for the U.S. Senate to ratify the Law of the Sea Treaty, noting that the United States is the only industrialized country in the world that is not a signatory. With respect to the legislative focus on climate change, Mr. Panetta suggested that any legislation dealing with global warming must include consideration of the ocean's role in it.

Lastly, Mr. Panetta emphasized the importance of providing adequate funding for the science, research and education needed to avert the crisis facing the ocean. He noted that in recent years, funding for these efforts has gone down, not up. He suggested specific funding levels, including \$750 million for research efforts, \$85 million for governance and coastal management, \$289 million for monitoring and observing systems and \$42 million for education and outreach. When compared to the approximately \$138 billion dollars that are produced from ocean-related industries, Mr. Panetta noted that these funds constitute a very small investment for a potentially large return to the nation.



A Legislative Agenda: Charting the Course

This panel was sponsored by *The Pew Charitable Trusts*.

Moderator: *Lori Arguelles, National Marine Sanctuary Foundation*

Panelists: *Amy Fraenkel, Majority Senior Counsel, U.S. Senate Committee on Commerce, Science and Transportation—Subcommittee on Oceans, Atmosphere, Fisheries and Coast Guard*

Jean Flemma, Majority Professional Staff, U.S. House Committee on Natural Resources—Subcommittee on Fisheries, Wildlife and Oceans

Amy Carroll, Minority Professional Staff, U.S. House Committee on Science and Technology—Subcommittee on Energy and Environment

Robert Howarth, Deputy Director, Office of Congressional and Legislative Affairs, U.S. Department of the Interior

Christopher Mann, Senior Officer, Pew Environment Group, The Pew Charitable Trusts

Eric Webster, Director, Office of Legislative Affairs, National Oceanic and Atmospheric Administration

Kevin Wheeler, Director of External Affairs, Consortium for Oceanographic Research and Education

Panel Overview

Panelists, including congressional staff, federal agency representatives, and members of the ocean constituency, discussed the outlook for ocean-related legislation and where such legislation might fall on the list of priorities for the 110th Congress.

LORI ARGUELLES: Ms. Arguelles provided a general overview of the panel topic and introduced each of the panelists.

AMY FRAENKEL: Ms. Fraenkel noted that the outlook for the oceans in this congressional session is excellent, with the strong leadership of Senators Inouye and Stevens (Chairman and Vice Chairman of the U.S. Senate Commerce, Science and Transportation Committee), more active involvement on the part of the U.S. House of Representatives, an increased focus on ocean-related legislation from the Bush Administration, and continued interest from the constituent community. On the agenda this session are bills dealing with invasive species, coastal and ocean observing, coral reefs, coastal lands protection, ocean exploration and mapping, hydrographic services, coastal management, aquaculture, marine sanctuaries, and funding issues. Also on the agenda are bills dealing with climate change research, adaptation to address the impacts of climate change, and ocean acidification, as well as Coast Guard programs including Deepwater.

JEAN FLEMMMA: Ms. Flemma noted that House Natural Resources Committee Chairman Nick Rahall has restored significant authority to subcommittee chairs, including Fisheries, Wildlife and Oceans Subcommittee Chair Madeleine Bordallo, which bodes well for the work of the subcommittee. Priorities for the subcommittee include implementation of the Magnuson-Stevens Fishery Conservation and Management Act, the “Oceans-21” legislation, and the recommendations from the Joint Ocean Commission Initiative. Global warming and ocean acidification, and incentives to help mitigate impacts are also a priority. Reauthorization of some key pieces of legislation, including the Coastal Zone Management Act and the National Marine Sanctuaries Act, are on the agenda, as is a bill to expand the boundaries of the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries. Other issues of interest include the establishment of a National Coastal and Ocean Observing System, ocean mapping and exploration, coral reef conservation, offshore aquaculture, and illegal trade and trafficking of fish and wildlife.

AMY CARROLL: Dr. Carroll noted that despite recent changes in Republican leadership on the House Science and Technology Committee and Energy and Environment Subcommittee, there is still strong interest in ocean issues. The committee's jurisdiction includes research and development programs within the National Science Foundation, NASA, the Department of Energy's Office of Science, EPA, and all of NOAA, with the exception of fisheries management. So far, the committee's focus has been on climate change, including holding hearings on all three reports from the U.N. Intergovernmental Panel on Climate Change and focusing on reauthorizing the global change research program. The committee is also focusing on innovation, including passing bills that authorize portions of the President's American Competitiveness Initiative, which would include doubling the budgets of several research agencies. Other priorities include earth observing satellites and the need for additional programmatic and funding efforts, legislation relating to ocean and geothermal renewable energy, the ocean exploration bill, the NOAA Organic Act, and hurricane research.

ERIC WEBSTER: Mr. Webster noted that NOAA has been very proactive in proposing ocean-related legislation, including language for an aquaculture bill, which would address both domestic and imported fish; the reauthorization of the Hydrographic Services and Improvement Act; and the reauthorization of the Coral Reef Conservation Act. Legislation that is pending includes the NOAA Organic Act; and the reauthorization of several pieces of legislation including the Coastal Zone Management Act, the National Marine Sanctuaries Act, the National Sea Grant College Program Act, and the Marine Mammal Protection Act. Mr. Webster noted that while authorizing language is important, commensurate funding to carry out these programs is vital. He also mentioned the importance for NOAA, as part of the Department of Commerce, to focus on ways to link oceans and related programs to commerce and trade issues.

ROBERT HOWARTH: Mr. Howarth noted that despite its name, the Department of the Interior actually plays a vital role in ocean, coastal and Great Lakes conservation. The National Park Service, U.S. Fish and Wildlife Service, and Minerals Management Service, together manage more than 35,000 miles of coastline, and 1.8 billion underwater acres of outer continental shelf lands. With respect to legislative and governance efforts, Mr. Howarth noted that the Interior Department is involved in the Ocean Action Plan, and works on a regional level in a number of areas. The Department is also specifically involved in the reauthorization of the Coral Reef Conservation Act, seeking specifically to address damages and to set aside funds for emergency response efforts.

CHRISTOPHER MANN: Mr. Mann noted that in 2003 the Pew Charitable Trusts changed its tax status from a private foundation to a public charity, thus enabling use of resources in advocacy and policy matters. He further noted the May 15, 2007 announcement of Pew's merger with the National Environmental Trust yielding a staff of 80 and operational revenues of \$70 million dollars—about half of which is devoted to ocean issues. Pew will focus on global climate change, degradation and destruction of large wilderness ecosystems, and the destruction of the world's oceans with a particular focus on fisheries and their impact to marine biodiversity. Mr. Mann echoed the call for reauthorizing the National Marine Sanctuaries Act, the Coastal Zone Management Act, and ratifying the Law of the Sea Treaty, and noted that Pew has launched new initiatives to reform CAFE (Corporate Average Fuel Economy) standards and the 1872 Mining Act. Pew will also closely follow implementation of the Magnuson-Stevens Fishery Conservation and Management Act and the Administration's proposed aquaculture legislation. Pew will become involved in other ocean policies when the timing and issues are appropriate.

KEVIN WHEELER: Mr. Wheeler noted the title of his presentation ‘Oceans 11’ is a reflection of the many priorities generated by the Consortium for Oceanographic Research and Education (CORE), which represents the leading academic institutions with ocean interests. CORE is also one of the founding members of the Friends of NOAA Coalition, which represents both ‘wet’ and ‘dry’ organizations interested in seeing NOAA funded more fully. CORE’s areas of focus include advocating for competitive research, infrastructure and education. CORE’s priorities include ocean literacy, innovation and competitiveness, the Ocean Research Priorities Plan, ocean observing initiatives and remote sensing, climate change, oceans and human health, ocean exploration, a NOAA Organic Act, UNOLS fleet renewal and operations, marine mammals, and ecosystem-based management. CORE is interested in particular bills that deal with some of these issues, such as Oceans-21 and IOOS, and also the appropriations that would fund the agencies that have related responsibilities.

CHALLENGES

- Funding levels for NOAA and other agencies with ocean-related jurisdiction are inadequate to support their legislative mandates.
- There will likely not be enough time to adequately consider the long list of ocean-related items during this session of Congress.
- Negotiations need to be improved between Congress and Administration on certain legislation.
- There are inadequate authorities for agencies to enforce violations to certain management responsibilities.

RECOMMENDATIONS

- Increased cooperation between both chambers of Congress is necessary in order to move critical ocean-related legislation.
- Incorporate the ocean’s role in climate change in related legislation.
- Enhance partnerships between regional and federal agencies regarding ocean issues.
- Implement major recommendations from the two ocean commissions.
- Continued pressure is needed from constituent groups to keep Congress focused on important ocean issues.

The challenges and recommendations section of this summary do not necessarily reflect the consensus of the entire panel, but individually identified challenges and recommendations. For additional information on each panelist’s key points, please go to <http://www.nmsfocean.org/chow2007/>.

Hydrography: It's Not Just for Charting Anymore

This panel was sponsored by NOAA's National Ocean Service, Office of Coast Survey.

Moderator: John H. Dunnigan, Assistant Administrator for Ocean Services and Coastal Zone Management, NOAA's National Ocean Service

Panelists: Larry Mayer, PhD, Director, Center for Coastal and Ocean Mapping, University of New Hampshire
Scott Rainey, Chairman, Hydrographic Services Review Panel
Tom Skinner, Project Manager, Durand & Anastas Environmental Strategies, Inc.
Captain Carlos E. Tejada, Naval Attaché, Embassy of Colombia
Rear Admiral Richard D. West (USN Ret.), President, Consortium for Oceanographic Research and Education

Panel Overview

Panelists representing various sectors discussed how hydrography provides essential data for a variety of scientific, environmental, public safety and security needs.

JOHN DUNNIGAN: Mr. Dunnigan noted that applications of the science of hydrography result in services that affect the economic and environmental security of the nation daily. Over the past 200 years, since President Thomas Jefferson created the Office of Coast and Geodetic Survey in 1807, hydrography has grown to be an internationally recognized activity. Mr. Dunnigan noted that the International Hydrographic Organization works to develop standards for international tools needed to support life, the safety of life at sea, and global maritime commerce.

LARRY MAYER: Dr. Mayer provided a brief history of the technology involved in hydrography, noting that for about 4,000 years technology remained static through the use of lead lines. In the 1940's echo sounders were developed, which provided single points of reference through the use of sonar until multi-beam sonar technology came into use recently, offering broad, high-resolution coverage of wide swaths of the seafloor. These advances in technology have led to new perspectives of the sea floor and ocean processes. Seafloor mapping has become particularly important in the context of the Law of the Sea Treaty, which helps determine jurisdiction over the seabed and its contents and permits coastal states to extend their jurisdiction beyond the 200 nm Exclusive Economic Zone if their continental shelves meet certain geological and morphological criteria. Dr. Mayer noted that a U.N. study has estimated that the area of possible extension for the U.S. contains resources valued at more than \$1.3 trillion.

TOM SKINNER: Mr. Skinner focused his talk on the applications of hydrographic data to coastal management, specifically as it relates to wetlands restoration, emergency planning and response, fisheries management, and insurance adjusting. He noted many successes in utilizing this information, including: wetlands restoration efforts in Baltimore, where data provided information on where to plant specific types of vegetation; shrimp fishery management efforts in Maine which are informed by data buoy information on salinity levels, river flow and water temperature; and efforts in the Gulf of Maine to help explain and predict the spread of red tide, or paralytic shellfish poisoning. He further noted the benefits of hydrographic data from a series of buoys that will be located in the Stellwagen Bank National Marine Sanctuary and will help ships avoid striking and potentially killing the highly endangered North Atlantic right whale. Mr. Skinner noted that greater awareness and use of hydrographic information can also have a profound impact in the recreational boating community, which could help reduce the nearly 100,000 insurance claims made by recreational boaters annually, at a cost of \$450 million each year.



RICHARD WEST: Admiral West noted that much of his personal experience with hydrography stems from his years of service in the U.S. Navy, both as navigator and commanding officer of several ships, and as the Oceanographer of the Navy. Admiral West noted the value of hydrographic data to both war and peace time efforts, with a particular need for real-time information. Under his watch, the Navy transitioned from paper to digital navigation charts, which yielded many advantages, including a significant reduction in paperwork. Such charts have many applications for homeland security and defense, as part of an Integrated Ocean Observing System, and for identifying hazards to navigation.

CARLOS TEJEDA: Captain Tejada focused his presentation on the importance of hydrography to other areas such as tourism, especially in the Meso-American region. He specifically noted the increase in tourists using cruise lines to explore destinations in this region and the need to provide accurate and up-to-date data for ship pilots to use. He cited examples of outdated information and poor accuracy in the Caribbean region. Tourism is a critical activity for countries in the Caribbean region and many of their economies depend on it. Increased ship-based tourism in regions that don't invest in accurate hydrographic charts means the potential for ship groundings and environmental disasters increases. That can have a negative result for the visitor experience, the local economy, and the environment. Captain Tejada suggested that quality, updated hydrographic information should be a fundamental underpinning of a country's economic structure—one that can yield significant economic benefits.

SCOTT RAINEY: Mr. Rainey shared his perspective as Chairman of the Hydrographic Service Review Panel, noting that the panel has identified five priorities for NOAA, including: 1) aggressively map the nation's shorelines and navigationally significant waters; 2) integrate coastal mapping efforts and ensure federally maintained channels, approaches, and anchorages are surveyed to the highest standards; 3) modernize heights and implement real-time water level and current observing systems at major commercial ports; 4) strengthen NOAA's navigational services, emergency response and recovery capabilities; and, 5) disseminate NOAA's hydrographic services, data, and products to achieve the greatest public benefit. Mr. Rainey noted that these priorities will have benefits throughout NOAA, and underscored that hydrographic work is not just for charting.

CHALLENGES

- There is a lot of data, especially data gathered by NOAA, that is not particularly user-friendly in its raw form.
- NOAA's lingering 'stovepipe' mentality presents barriers to truly integrating hydrographic services and providing value-added benefits for a wider array of users.
- Navigational charts are only as good as the data collected, and NOAA has more territory to cover than resources to deploy.
- NOAA does not currently have adequate funding to meet many of the critical recommendations outlined below.
- Hydrographers often use technical terms that don't allow their end users to understand the relevance of hydrography to their needs. Customers in the tourism sector are an example.

RECOMMENDATIONS

- NOAA needs additional staff to help process relevant raw data sets for multiple applications.
- NOAA should provide a more comprehensive approach to hydrographic services, in keeping with the 'One NOAA' philosophy of the agency. For example, data should be collected in a way that can be used for multiple purposes, or "Map once, Use Many Times."
- NOAA should aggressively map the nation's shorelines and navigationally significant waters.

- NOAA should increase its hydrographic surveying capability to 10,000 square nautical miles annually.
- NOAA should replace aging, single-purpose hydrographic ships with modern multi-purpose vessels.
- NOAA should integrate coastal mapping efforts and ensure federally maintained channels are surveyed to the highest standard.
- NOAA should modernize heights and implement real-time water level measurements in all major ports.
- NOAA should strengthen its navigation services, emergency response and recovery capabilities and disseminate its hydrographic data and products to achieve the greatest public benefit.

The challenges and recommendations section of this summary do not necessarily reflect the consensus of the entire panel, but individually identified challenges and recommendations. For additional information on each panelist's key points, please go to <http://www.nmsfocean.org/chow2007/>.

Sounds in the Sea: Acoustics and Marine Mammals

This panel was sponsored by *Pacific Life*.

Moderator: **Brandon Southall**, *Director, Ocean Acoustics Program, NOAA NMFS Office of Science and Technology*

Panelists: **Jean-Michel Cousteau**, *President, Ocean Futures Society*
Roger L. Gentry, *Program Manager, Joint Industry Program*
Robert C. (Bob) Gisiner, *Science Program Director, Marine Mammal Commission*
John Hildebrand, *Professor, Scripps Institution of Oceanography*
Kathy Metcalf, *Director, Maritime Affairs, Chamber of Shipping of America*
Peter L. Tyack, *Senior Scientist, Woods Hole Oceanographic Institution*
David Wiley, *Research Coordinator, Stellwagen Bank National Marine Sanctuary*

Panel Overview

The impact of human-generated sound on marine mammals has generated increasing attention and concern in recent years. Panelists discussed the latest scientific findings regarding the nature and scope of various impacts and ways to reduce the negative effects.

BRANDON SOUTHALL: Dr. Southall provided context for the panel discussion by noting that people make sounds in the water, either on purpose or as a side effect of what they do, and these actions can impact marine mammals, which also use sound for very important activities. The convergence of human-generated sound with the underwater acoustic environment can affect animals in certain circumstances, but not in every instance. Scientists are focusing on learning more about when these sounds are actual threats, and what reasonable actions can be taken to mitigate the effects. One recent product arising from the limited available field and lab data is an effort to develop marine mammal noise exposure criteria, although this effort is admittedly limited by the lack or absence of key information. Additional efforts are underway to improve and apply passive acoustic monitoring technologies, use controlled exposures of sound to safely measure key behavioral variables, and explore the costs and benefits of potential vessel-quieting technologies to address chronic noise sources.

BOB GISINER: Dr. Gisiner shared his perspective as the outgoing manager of the Marine Mammal Program at the Office of Naval Research, as well as his new role as scientific director at the Marine Mammal Commission. He noted first and foremost the need to pay attention to sound in the ocean, which is challenging for humans, who are land-based creatures much more reliant on their sense of sight than their sense of sound. He highlighted some of the emerging new technologies and scientific discoveries that can aid in researching the impacts of sound on marine mammals and mitigating those impacts, including the use of radar, passive acoustics, undersea gliders, and tracking tags to learn about the biology and ecology of marine animals.

JEAN-MICHEL COUSTEAU: Mr. Cousteau prefaced his remarks with a note of appreciation for the role of a navy, noting that his father served in the French Navy for many years. However, he expressed concern about the U.S. Navy's use of sonar, particularly LFA (low-frequency acoustics), and its resulting impacts on marine mammals. He provided land-based equivalents of the sound decibel levels that are being experienced in the underwater environment and posited that active sonar can kill whales, dolphins, other marine mammals, and turtles, and may also affect the swim bladder in fish as well as their larvae. He advocates for the end of the Navy's active sonar program in regions where there are marine mammals. The testing can happen in designated areas.

KATHY METCALF: Ms. Metcalf shared her perspective as the author of the shipping industry's caucus report to the Marine Mammal Commission, noting that the industry is working toward being proactive on this issue, which requires a change in culture. She shared her belief that

it is better to be proactive and identify problems and possible solutions before encountering a catastrophic emergency. Making sense of the plethora of information available is a challenge, as information for its own sake is not valuable unless you learn something from it. From an industry perspective, Ms. Metcalf pointed out the need for the issues to be made simple and clear, something that doesn't always happen when scientists are involved. She also pointed out the need to reach out to industry and help them navigate the waters, not by pushing for action, but by demonstrating that it is in their interest to move forward by their own momentum.

JOHN HILDEBRAND: Dr. Hildebrand noted that sound in the terrestrial and ocean environments act very differently and that much more is understood about the former than the latter. He discussed three main sources of human-caused sounds in the ocean: noise caused by commercial ships, noise from sonar of all varieties, and noise from seismic exploration. He discussed the different characteristics of these types of noises and the techniques scientists use to measure them. He concluded by noting that more research is needed to better characterize noise sources, how these sounds are propagated, and their effect on animals.

ROGER GENTRY: Dr. Gentry noted his former affiliation with NOAA as the previous director of the Ocean Acoustics Program and emphasized the importance of investing in acoustics research. He reiterated his recommendations to NOAA that the agency become the lead in resolving underwater noise issues and partner with other agencies who produce noise, such as the U.S. Navy and the Minerals Management Service. He also recommended that NOAA become a major funder of ocean noise research, which should be directed at assessing the global trends in noise, supporting research on the effects of noise on animals, and using the data to write science-based noise exposure criteria for animals.

DAVID WILEY: Dr. Wiley described the scientific methodology used in the Stellwagen Bank National Marine Sanctuary, located off the coast of Massachusetts. The sanctuary contains an extremely busy shipping lane and is also a key seasonal feeding area for many whales, including the highly endangered North Atlantic right whale. Dr. Wiley explained the use of acoustic recording units to measure underwater sound, the U.S. Coast Guard's Automatic Identification System to track ships, and D-tags on whales to visualize their underwater behavior. He illustrated how information from these three sources helped determine that the shipping lane coincided directly with the feeding grounds for many whales—thus increasing the possibility of ship strike and acoustic impact to animals in the sanctuary. As a result of this research the shipping lanes were moved, reducing the risk on ship strike and the number of whales exposed to high levels of noise.

PETER TYACK: Dr. Tyack described the tagging technology that he and his colleagues have used to track beaked whales, a species about which little is known. As a result of the tags, more is known about their social interactions as well as the actual types of sounds they make, which are much more intricate and varied than previously recorded. Beaked whales have been susceptible to strandings, and while there is a connection between Navy mid-frequency sonar and these strandings, there is still much to be learned about why beaked whales display such sensitivity. Dr. Tyack posits that it may be related to the beaked whales mistaking the sonar sounds as predators, in this case the sounds of killer whales. More research needs to be done to test this theory. Dr. Tyack suggests that research should be conducted by an independent marine mammal research program, which should initiate an open call for peer-reviewed proposals.

CHALLENGES

- There are a large number of species to consider, studying them is often logistically very difficult, and research funding is highly limited both in magnitude and time; these and other factors limit the scientific data upon which to base recommendations for mitigating noise in the ocean.
- Issues related to underwater sound and marine mammals tend to have strong emotions attached to them and facts are often not clearly presented by the media.
- The unique characteristics and vastness of the ocean, and the complexity of underwater sound, make these issues difficult for the public and policymakers to understand. The same principles that apply on land don't necessarily apply underwater, and there are significant limitations in generalizing from limited information.
- In certain cases, there is relatively more information, but not always clear agreement on defining effects and how to interpret and/or apply the information.
- There are significant limitations in estimating criteria for the levels of noise exposure for animals in the sea.
- Many complex factors mean that the onset of effects may be highly variable, delayed or not outwardly evident, non-linear as a function of exposure, and difficult to monitor—especially over large areas.
- There are virtually no current methods or measurements available for determining long-term or cumulative effects of sounds on animals.

RECOMMENDATIONS

- Based on strategic planning and coordination among the relevant federal agencies, Congress should significantly increase funding for research on marine acoustics and the effect of noise on marine mammals. A broad, integrated research program is needed that would utilize open calls for proposals, scientific peer review, and optimize partnerships among funders and researchers.
- There should be particular attention to acoustic technologies that will provide scientific data on the unique biological characteristics of the underwater environment and how acute and chronic human sources may be affecting it.
- There are a number of federal agencies that should continue to play a key role in this issue; NOAA should play an increasingly large role, while collaborating with the Navy and other agencies, in resolving underwater noise issues due to its inherently broad scientific and management mandate.
- As is the case for people, noise exposure criteria for marine animals should be based on increasingly sophisticated and controlled scientific measurements of the effects of noise on hearing, behavior, and physiology; policy guidelines for regulating underwater sound should be developed by strongly considering science-based exposure criteria.
- Mitigation measures need to be developed for various specific sources based on scientific information and they must be tested and validated in realistic field conditions.
- In order to thoroughly address marine noise issues, interdisciplinary teams involving the study of hearing, behavior, physiology, ecology, risk assessment, physical acoustics, and cumulative impacts should be utilized.

The challenges and recommendations section of this summary do not necessarily reflect the consensus of the entire panel, but individually identified challenges and recommendations. For additional information on each panelist's key points, please go to <http://www.nmsfocean.org/chow2007/>.

Census of Marine Life: Incorporating Biological Data in Ocean Observatories

This panel was sponsored by the *Alfred P. Sloan Foundation & the Consortium for Oceanographic Research and Education*.

Moderator: **Paul A. Sandifer**, *Senior Scientist, NOAA National Ocean Service*

Panelists: **Steven Bograd**, *Research Oceanographer, NOAA/NMFS Southwest Fisheries Science Center*

Churchill B. Grimes, *Director, NOAA/NMFS Southwest Fisheries Science Center, Fisheries Ecology Division*

Mark E. Luther, *Associate Professor, University of South Florida*

Panel Overview

Biological data are essential to understanding the overall health and sustainability of our Nation's ocean ecosystems, as well as the entire global marine ecosystem. Panelists discussed the importance of incorporating these data in ocean observatories.

PAUL SANDIFER: Dr. Sandifer, a member of the U.S. National Committee for the Census of Marine Life, introduced the CoML program, noting that it is global in scope, involving more than 80 countries and more than 2,000 scientists. Biodiversity is a focus of the first decade-long census effort, and an essential factor to understand in order to better manage for sustainable ecosystems and ecosystem services. Dr. Sandifer stressed the importance of collecting biodiversity data, and introduced each of the speakers. Their subsequent individual presentations and panel discussion centered around how ocean observing systems can be used to gather information on biodiversity.

CHURCHILL GRIMES: Dr. Grimes focused his remarks on the need to gather higher resolution biological information for the purposes of fishery management, efforts for which NOAA is responsible under the Magnuson-Stevens Act, the Marine Mammal Protection Act and the Endangered Species Act. As fisheries management moves toward a more ecosystem-based management approach, such information is more vital than ever. Dr. Grimes discussed CoML's Pacific Ocean Shelf Tracking (POST) project, as a means, through electronic tagging and acoustic listening curtains, to gather immense amounts of relevant data. This data, gathered through POST as a function of an Integrated Ocean Observing System (IOOS), could be used to better determine the migratory behavior of fish, understand adult distribution and dispersal as it relates to reproduction, assess stock structure and connectivity, estimate survival rates, and understand habitat utilization. Significant issues impeding integration of electronic tagging into IOOS include data management and sharing and data analysis. Dr. Grimes suggested that a comprehensive IOOS might involve satellite remote sensing, coastal radar to map currents, ships to tow nets, hydroacoustics to measure fish distribution and abundance, LYDAR, autonomous underwater vehicles, mooring buoys, and electronic tags.

STEVEN BOGRAD: Dr. Bograd showcased tagging technology used in CoML's Tagging of Pacific Predators (TOPP) project to make the case that marine predators can be an essential component of ocean observing systems. Using data collected from tagged elephant seals, Dr. Bograd displayed visualizations of their distribution, which also provided information on their biology, movements, and habitat utilization. He noted that a tremendous amount of real-time data can be gathered by tagging apex marine predators, such as elephant seals, turtles, and sharks, at a relatively low cost—especially compared to the cost of ship time. As a result of the TOPP project, Dr. Bograd said contributions are being made to marine ecology, oceanography, ocean observations and ultimately to ecosystem management and conservation.

MARK LUTHER: Dr. Luther focused his presentation on the technologies needed to make advances in ocean observing systems and their application not just to fisheries management, but also to maritime transportation and other sectors for decision makers. He noted the work of the Ocean Observatories Initiative, which is focusing on basic research into transformational technologies that will provide better data and measurements. He noted the development of the Alliance for Coastal Technologies, which fosters and tests new sensors and other technologies such as oxygen sensors, chlorophyll fluorometers and turbidity sensors.

CHALLENGES

- Multiple users of an Integrated Ocean Observing System would have multiple needs, and addressing all of these needs in one system may be difficult.
- Ownership of data produced from an acoustic tag is unclear.
- Ship time can be difficult to secure and is an expensive way of collecting data.
- Currently, there is insufficient research focused on transformational technologies for new sensor tools, particularly those dealing with biological observations that are not yet operational.
- Present sensor technology is prone to several challenges, including biofouling, the need to introduce reagents in a stable and sustainable manner, and the large size of many acoustic tags.

RECOMMENDATIONS

- A comprehensive IOOS should include satellite remote sensing, coastal radar to map currents, ships to tow nets, hydro-acoustics to measure fish distribution and abundance, LYDAR, autonomous underwater vehicles, mooring buoys and electronic tags, and emerging in situ and remote sensing methods to collect biodiversity data.
- Truly effective use of acoustic tagging data must involve resolution of data management and sharing issues and will require some advances in data analysis and presentation.
- Apex Marine Predators, such as elephant seals, turtles, and sharks, should be tagged and used as a tool to gather data in an Integrated Ocean Observing System.
- New sensor technologies and better means of transition of technologies from research to operations are required to make routine biological measurements a part of operational ocean observing systems.

The challenges and recommendations section of this summary do not necessarily reflect the consensus of the entire panel, but individually identified challenges and recommendations. For additional information on each panelist's key points, please go to <http://www.nmsfocean.org/chow2007/>.

The Economics of Coastal Communities

This panel was sponsored by *The Ocean Foundation*.

Moderator: *Linwood Pendleton, Senior Fellow and Director of Economic Research, The Ocean Foundation*

Panelists: *The Honorable Tom Allen, U.S. House of Representatives (D), Maine, 1st District*

Michael L. Andrews, Vice President, The Nature Conservancy

Daniel J. Basta, Director, NOAA Office of National Marine Sanctuaries

MaryLou Foley, Public Relations, Outrigger Hotels and Resorts

Bob Holston, Owner, Dive Key West, Inc.

Craig Hooks, Director of the Office of Wetlands, Oceans, and Watersheds, US Environmental Protection Agency

Judith Kildow, Director and Principal Investigator, National Ocean Economics Program, The Monterey Bay Aquarium Research Institute

Panel Overview

Coastal economies are the most vibrant in the nation, including fisheries, tourism, recreation, ocean-related employment, retail development, and more. Panelists discussed the contribution of coastal communities to the nation's economy and the nuances that make them unique from other areas.

LINWOOD PENDLETON: Dr. Pendleton provided context for the panel discussion by noting that coastal economies are important for many reasons, some which are well researched and understood, and others which are not. A great deal of effort has gone into understanding the economic value of commercial fisheries, but less is known about the value of non-fishing types of economic uses such as tourism and recreation. Greater understanding of these economic indicators is vital, especially when considering the fact that half of the nation's housing is in the coastal zone and nearly half of the nation's jobs and GDP are generated in the coastal zone.

TOM ALLEN: Congressman Allen expressed concerns about the issue of access to the waterfront for coastal businesses, in Maine and elsewhere. He highlighted legislation he has introduced to provide grants to help protect working waterfronts. In Maine, the Congressman noted that working waterfronts, which provide access for commercial and recreational fishing, boat-building, tourism, and a host of other businesses, are critical to the state's economy and provide \$750 million in revenue each year and support 35,000 jobs. Of Maine's 5,300 miles of coastline, currently only 20 miles are available and appropriate for working waterfront access, and many of these areas are under threat of conversion to private residential use. Congressman Allen also noted his National Integrated Coastal and Ocean Observing System Act, which seeks to create the same kind of integrated data gathering and observing systems that currently exist for weather, and construct an appropriate system for ocean observations. Ocean observing systems can greatly impact the economies of coastal communities because they are used by fishermen and others to better plan for and detect oceanic weather patterns.

BOB HOLSTON: Mr. Holston shared his perspective as the owner of a dive shop in Key West, Florida and as the President of the Keys Association of Dive Operators, noting that the dive industry is an integral part of tourism in the Florida Keys. More than one million divers and snorkelers visit the Florida Keys each year, making it the number one dive destination in the world. The Florida State Department of Commerce estimates the dive industry generates in excess of \$1 billion per year, when travel-related expenses are included. Mr. Holston noted that with so much at stake economically, it is vital to protect and enhance the natural resources that divers come to enjoy. He noted several programs the dive industry undertakes to help enhance the coral reef ecosystem, including involving divers in water quality sampling.



MARYLOU FOLEY: Ms. Foley shared her perspective as Director of Public Affairs for Outrigger Hotels and Resorts, which owns a number of properties in Hawaii and throughout the Pacific. She noted that tourism is the number one industry in Hawaii, with more than seven million visitors in 2006, which generated \$12 billion. However, climate change and other factors such as aging or limited infrastructure and non-biodegradable trash are posing threats to the natural resources upon which these coastal communities rely. Visitor education programs, such as those undertaken by Outrigger with NOAA's National Marine Sanctuary Program, need to be replicated and enhanced.

MIKE ANDREWS: Mr. Andrews shared his perspective as the Chief Conservation Officer for The Nature Conservancy, and began by noting some of the many benefits that nature provides people, including production of food and other materials, regulating services such as water quality, flood control and cultural values. He noted that the shorelines and coastal areas are among the most complex ecosystems anywhere and the challenges facing them are equally complex and will require solutions that are more comprehensive than just buying land and building fences around land to protect biodiversity. He highlighted two Nature Conservancy projects to illustrate these principles, one in the Penobscot Bay area of Maine and the other the Puget Sound area of Washington State.

CRAIG HOOKS: Mr. Hooks shared his perspective as Director of the Office of Wetlands, Oceans, and Watersheds at the U.S. Environmental Protection Agency noting that clean water is essential for healthy ecosystems. EPA's efforts to enhance clean water in coastal communities include a focus on better management, increased efficiency, and greening of infrastructure. Green infrastructure can be cleaner, cheaper and smarter, and include green roofs and pocket wetlands, all of which can help communities control storm water and combined sewer overflows, comply with permits and the Clean Water Act, protect sources of clean drinking water, keep beaches and shellfish beds open, and save money on traditional steel and concrete treatment technologies.

DANIEL BASTA: Mr. Basta opened his remarks by questioning whether or not the techniques currently applied to valuing coastal economies are adequate for the current challenges and trade-offs that are a part of today's equation. He notes that cost-benefit relationship thinking, a traditional method of evaluating resources, is not necessarily applicable in the natural resource world. He posited that opportunity costs as well as non-use values (including existence value) should be included in our economic understanding and evaluation of marine resources – especially sanctuaries. He concluded by noting that until improved methods can be applied to valuing the oceans, marine protection will be under-valued with the result that few marine areas are likely to be protected effectively over time.

JUDY KILDOW: Dr. Kildow shared her perspective as a social scientist at the Monterey Bay Aquarium Research Institute's National Ocean Economics Program, noting that 45% of the U.S. economy is generated from coastal counties, making these regions very important and powerful players. As for the future, Dr. Kildow noted that as a whole, manufacturing and production are giving way to service industries, tourism and transportation. In the coastal zone, the difference in real estate property valuation can be as much as 226% for a piece of coastal property vs. one just half a mile inland. Second homes on the coast are also having a major impact on coastal communities, which has an impact on local infrastructure such as schools. By pointing out that natural resource assets and services, unlike those market-based economic activities discussed above, are mostly undervalued, Dr. Kildow concurred with Mr. Basta that current methods of valuing these resources are inadequate for the task.

CHALLENGES

- The high price of ocean-front property is driving people who work the water front to move inland because they can't afford the coastal homes.
- The public, especially the public that enjoys the coast but does not live nearby, doesn't really understand the natural resource challenges that coastal communities face, and since they are not residents, don't see the long-term implications of their use of the resources.
- Because political incentives are often focused on the present, there exists a lack of political will to make management choices that are costly in the short-term, but ensure long-term economic sustainability and resilience of coastal communities.
- Climate change is having a very real impact on many natural resource-based economies as coral reefs are bleaching and dying. Abundance and distribution of fish stocks are also changing, impacting recreational fishing and diving. Sea level rise also poses threats to beachfront areas and low-lying atolls.
- Coastal communities often have aging or limited infrastructure that results in raw sewage being leaked into the very resource that visitors come to enjoy.
- When ecosystems are degraded, the poorest people are often those most negatively affected.
- Threats to water quality in coastal areas often come from upstream activities.
- Current methods for the valuation of coastal resources are inadequate for the complex nature of the task. Too much emphasis is placed on coastal activities for which readily available economic information exists, while more difficult to measure, but equally important activities are often overlooked.

RECOMMENDATIONS

- A federal grants program should be enacted to help protect working waterfronts.
- The dive industry and the federal government should collaborate on creative means to get the public more involved in protecting and preserving the marine environment, including funding these efforts.
- Visitor education programs, such as those being undertaken by Outrigger and NOAA's National Marine Sanctuary Program, should be replicated and enhanced.
- Coastal economies need to be made more resilient by diversifying coastal economic activity so as not to depend on just a handful of economic activities.
- Areas adjacent to the coasts need to be closely watched and managed to monitor the potentially damaging impacts of coastal development, pollution, and increasing pressures from development and activity happening in inland areas of coastal watersheds.
- Population growth should be constructively managed and diverted into inland areas to help manage the challenges in coastal communities.

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Ecosystem-based Management: A Comprehensive Approach

This panel is sponsored by NOAA National Undersea Research Program.

Moderator: *Steven Murawski, Director of Science Programs, NOAA Fisheries and NOAA Ecosystem Goal Lead*

Panelists: *The Honorable Wayne T. Gilchrest, U.S. House of Representative (R), Maryland, 1st District*
Peter J. Auster, Associate Research Professor, University of Connecticut
Steve Gittings, Science Coordinator, NOAA National Marine Sanctuary Program
Jo-Ann C. Leong, Director and Professor, Hawaii Institute of Marine Biology
Elliott Norse, President, Marine Conservation Biology Institute
Patten D. (Pat) White, Commercial Fisherman; Commissioner, Atlantic States Marine Fisheries Commission

Panel Overview

Ecosystem-based management: What is it and how can it be applied? Panelists used case studies to illustrate how ecosystem-based management is being effectively used and developed.

STEVE MURAWSKI: Dr. Murawski provided context for the panel discussion by providing the following working definition of ecosystem-based management: One that provides a comprehensive framework for marine and coastal resource decision making and considers a wide range of relevant ecological factors. He noted the charge to panelists was to answer a series of questions including, what is ecosystem-based management and why is it important? How can ecosystem-based management be applied and on what scale? What happens next with respect to the legislative, science and management priorities? He noted that the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act provided a range of new authorities under which to pursue ecosystem-based management, which he states must be flexible and not fall into a one-size fits all approach. If executed properly ecosystem-based management will provide clearer information, utilizing more pioneering research to allow managers to deal with complex systems more holistically.

WAYNE GILCHREST: Congressman Gilchrest encouraged the panelists and participants to continue sharing information with Congress, as it can truly make a difference in the development of policy and legislation. He noted that data shows that a healthier ecosystem will be more resilient against change, sharing personal anecdotes about his experiences on the Chesapeake Bay. He expressed concern that the impacts of climate change need to be factored into ecosystem health. He also discussed the Magnuson-Stevens Fishery Conservation and Management Act, noting that in earlier iterations of the bill there was even greater emphasis on ecosystem-based management, which was not included in the final bill. However, he fought for strong provisions to end overfishing, which were included. He expressed regret that a definition of ecosystem-based management was not included in the Act, and also noted that a regional approach to the concept would have been ideal.

PAT WHITE: Mr. White shared his perspective as a member of the Pew Ocean Commission and lobsterman from Maine, noting that he sees signs that fisheries can be rebuilt, but not without rethinking how we govern and manage ocean resources. In addition to pressures from fishing, Mr. White noted that pollution and development are having a significant impact on estuaries and oceans and these issues all need to be addressed through improved ocean governance. With respect to ecosystem-based management, he noted that fishermen have always known and respected the interconnection of species that constitute an ecosystem. He highlighted the importance of looking beyond stock assessment models of individual species

and looking at the broader connections. In many cases, fishermen no longer have the ability to move between fisheries as they have in the past.

Mr. White called for national legislation to foster regional ecosystem-based collaborations.

PETER AUSTER: Dr. Auster discussed the information he thinks decision-makers need to conserve and consider the sustainable use of the biological diversity in the ocean. He started by highlighting the multiple pieces of legislation that manage some aspect of the ocean with that same goal. Instead of this piecemeal approach, Dr. Auster suggests that managing on an ecosystem scale would actually result in long-term and sustainable use of natural resources on the planet, and would require integration across governance programs. Using the Gulf of Maine as a model marine ecosystem, Dr. Auster demonstrated that there are still many unknown species, especially those microbial in size, inhabiting a given ecosystem. Regardless of such missing information, he noted the progress that is being made towards better managing and understanding ecosystems and discussed some of the techniques that can improve these efforts even more. Dr. Auster pointed out our need to consider various species and habitats, spatial and temporal variability, species-to-species interactions, and different thresholds of impact. Such considerations are especially needed in complex areas of the ocean and on a regional scale. One example he described was a landscape approach to modeling marine ecosystems, which would account for the ecological goods and services derived from the ocean. In general, there is still a need to develop more tools and research to better monitor and manage ecosystems and the suite of biodiversity within them.

STEVE GITTINGS: Dr. Gittings focused his remarks on ecosystem-based management within national marine sanctuaries, noting that boundaries of ecosystems don't necessarily jive with the 'artificial' boundaries of sanctuaries, since these boundaries are often set for political or other reasons. However, the same principles apply and any positive outcomes of proper management, which could include higher abundances or diversity for example, should have spill over effects outside the sanctuary's boundary into the larger ecosystem. Within the National Marine Sanctuary System, ecosystem-based management efforts are focused on classifying, characterizing and monitoring change, and then using that information to inform management and regulatory decisions. Dr. Gittings provided several examples, including work in the Stellwagen Bank National Marine Sanctuary, which has resulted in a modification of shipping transit lanes, benefiting both industry and the species within the sanctuary, particularly North Atlantic right whales. He also noted the sanctuary program's involvement in land-based ecosystem management through partnership with other local, State and Federal agencies, all of which is done to protect ocean ecosystems.

JOANN LEONG: Dr. Leong highlighted the Hawaii Institute of Marine Biology's (HIMB) work on ecosystems in the Northwestern Hawaiian Islands, an area which includes the Papahānoumokuākea Marine National Monument. HIMB scientists are using genetic technologies to determine the "connectivity", i.e. success of larval recruitment between the different atolls and reefs in the monument, so that management can determine whether a reef ecosystem can recover from a natural disaster, ship grounding, etc. Acoustic tagging studies indicate that top predators have ranges far larger than previously estimated and the technology has the power to identify spawning grounds for pelagic marine fishes. HIMB scientists are taking baseline measurements, identifying threats, monitoring change and providing information for management decisions. In addition, they are looking at linkages between the species in the northwestern islands and the main eight Hawaiian islands. In conclusion, Dr. Leong noted that management units must be species specific, and ecosystem-based management requires an understanding of all contributors.

ELLIOTT NORSE: Dr. Norse began his remarks by recalling the ‘frontier’ mentality of the old west, using buffalo as an example of a once abundant species that was brought to near extinction, in part, through technological advances. He posited that the oceans are the last frontier and species within the ocean may face the same fate as the buffalo. Dr. Norse posited that important lessons can be learned from the land-based frontier analogy, noting that land managers have zoning authority, a principle which should apply in the ocean arena as well. Ideally, according to Dr. Norse, marine spatial planning would be based on zoning that includes areas where any legal use is OK, areas where extraction is allowed in a way that does not degrade habitat, areas where visitation is allowed, but no extraction occurs, and areas that are completely off limits due to their fragility.

CHALLENGES

- There is no clear, consistent, widely-adopted definition of ecosystem-based management.
- Ecosystem-based management cannot be pursued under the guise of a ‘one-size-fits all approach.’
- Ecosystems are complex, adaptive systems that are inherently unpredictable.
- A ‘piecemeal’ approach to management has led to degradation in the ocean and along coastlines.
- It is challenging to balance the needs of the ecosystem with the people who wish to benefit from it.
- In order to conserve biological diversity, it is necessary to know what is contained in an ecosystem, and much more research is needed to accomplish this goal.
- Shifting focus from one fishery to another can mean that previously underutilized species become so over-utilized that they end up in threatened or endangered status.
- There is a lack of knowledge about ecological interactions between species that affect the ecosystem as a whole.

RECOMMENDATIONS

- Future legislation should codify a definition of ecosystem-based management.
- Ecosystem-based management should be approached on a regional level, allowing for greater flexibility in appropriate management strategies.
- An ecosystem research initiative should be developed, funded and implemented.
- Congress should pass legislation to create a national framework for regional collaborations and coordination of ecosystem-based management efforts.
- Land-based ecosystem management principles should be applied to the management of the ocean.
- More research is needed in specific areas such as natural variations, pressure-response relationships and the links between habitat attributes and goods and services.
- Ecosystem-based management should evolve into spatial management based on zoning.
- Should move ahead with ecosystem approaches to management using the information at hand, rather than waiting for perfect knowledge, as this is still an improvement over the status quo.

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NOAA Past and Present: A Conversation with NOAA's Administrators

Moderator: Vice Admiral Conrad C. Lautenbacher, Jr., USN (Ret.),
*Undersecretary of Commerce for Oceans and Atmosphere and
NOAA Administrator*

Panelists: William E. Evans, *Professor Emeritus, Texas A&M University*
Scott Gudes, *Staff Director, Senate Budget Committee*
Robert White, *Director, The Washington Advisory Group*

Panel Overview

For more than 30 years, NOAA has provided sound science, strong stewardship, and essential services to the nation. NOAA's administrators, past and present, discussed the key issues of their terms and provided current perspective on resolution of these issues.

CONRAD LAUTENBACHER: In addition to moderating the panel, Vice Admiral Lautenbacher shared his perspective as the current NOAA Administrator, noting that this year marks a significant milestone in NOAA's history as it celebrates the 200th anniversary of the establishment of the Coast and Geodetic Survey, the oldest office in NOAA. The Vice Admiral noted that NOAA's budget has grown, although perhaps not as much or as quickly, as some might like. With respect to infrastructure, he highlighted management changes designed to mitigate or 'remove' the traditional 'stovepipes' within NOAA by moving to a matrix management approach. With respect to programmatic efforts, the Vice Admiral highlighted NOAA's move toward ecosystem-based approaches to management of natural resources, and an increased focus on and investment in ocean observations.

ROBERT WHITE: Dr. White recalled several critical factors that led to the formation of NOAA, including the Stratton Commission and one of its key goals which was to balance the attention provided to both atmospheric and oceanic science and research. Dr. White noted that over the past three decades significant advances have been made in atmospheric and oceanic research, advances which have transformed the services and products provided by NOAA. For example, just 50 years ago there were no weather or ocean satellites and weather maps were plotted by hand, whereas today they are computer generated. Dr. White highlighted the impact such technological advances have had on NOAA's mission, but noted that NOAA's transformation has also involved a globalization of its mission in many ways. Climate change and stewardship of the natural environment, along with environmental and economic sustainability, are critical issues which NOAA will need to address today and into the future.

WILLIAM EVANS: Dr. Evans focused his remarks on several fishing issues, which were prominent in the 1980's, and to some extent, remain so today, including whaling, overfishing, bycatch reduction, fisheries observers, enforcement, and the need for increased research and funding. With respect to commercial whaling, Dr. Evans highlighted some successful efforts undertaken through the International Whaling Commission, but noted that Iceland, Japan and Norway continue to try to pursue commercial whaling today, in many cases under the guise of research. He discussed some successes in the creation of the fisheries observer program and in the development of some bycatch reduction devices, like TEDS, but noted that there is still much work to be done. Inadequate financial resources for enforcement and research remain perpetual problems. Finally, he discussed his and NOAA's involvement with the EXXON Valdez disaster and the positive that came out in the way of the Oil Pollution Act of 1990 (OPA 90).





SCOTT GUDES: Mr. Gudes recounted three key issues that were addressed during his tenure as Acting NOAA Administration during the transition from the Clinton Administration to the Bush Administration including budgeting, and infrastructure. Mr. Gudes recalled establishing mechanisms to instill more discipline in the internal NOAA budgeting process. He also highlighted several initiatives addressing infrastructure investments, noting that NOAA's best asset is its people. With that principle in mind, Mr. Gudes engaged in efforts to instill a 'One NOAA' philosophy that is still present in the agency today. He highlighted an increased investment in ocean programs, including the establishment of the NOAA Office of Exploration, and also highlighted a number of infrastructure projects, including new buildings and ships, and an effort to reform NOAA's grant making process. Mr. Gudes also recalled that the terrorist attacks on September 11, 2001 occurred on his watch. He discussed NOAA's response in assisting Federal law enforcement agencies and in jump-starting the Federal Air Marshall Program.

Ocean Management: Planning for the Future

This panel was sponsored by *MOTE Marine Laboratory, Inc.*

Moderator: *Kacky Andrews, Executive Director, Coastal States Organization*

Panelists: *The Honorable Sam Farr, U.S. House of Representatives (D), California, 17th District*

Billy D. Causey, Regional Director, Southeast Atlantic, Gulf of Mexico, and Caribbean Region, NOAA Office of National Marine Sanctuaries

Mike Chrisman, Secretary of Resources, State of California

Tom Fry, President, National Ocean Industries Association

Kameran Onley, Assistant Deputy Secretary, U.S. Department of the Interior

James Sanchirico, Senior Fellow, Resources for the Future

Vikki Spruill, President & CEO, The Ocean Conservancy

Panel Overview

With the myriad uses of the oceans continually expanding, this panel explored whether comprehensive, area-based ocean planning and management are the best way forward to ensure sustainable use of our ocean resources for the future.

KACKY ANDREWS: As moderator, Ms. Andrews provided the overall context for the panel discussion. She recognized that our nation's management of marine resources had not kept pace with the increasing challenges. In addition, she pointed out some of the new challenges that are on the horizon, such as offshore alternative energy, aquaculture and, most importantly, climate change. Though she noted that, fortunately, many states and federal agencies are working to address management issues, she questioned whether or not it would be enough. Ms. Andrews directed the panelists to share their perspectives on management strategies and asked them what improvements they hoped to see in five years.

KAMERAN ONLEY: Ms. Onley began her presentation by highlighting the Department of the Interior's ocean management responsibilities, noting that one-tenth of the Department's budget is spent managing these resources, which include 35,000 miles of coastline, 169 island and coastal refuges, 74 coastal parks, and 1.8 billion underwater acres of outer continental shelf, in addition to other co-managed areas. With respect to managing these areas, Ms. Onley posited that regional and local approaches are needed to solve problems with ocean governance and highlighted examples such as the Gulf of Mexico Alliance. She also noted that including a broad spectrum of state, tribal and federal agencies as well as the public is critical to advancing regional and local partnerships.

MIKE CHRISMAN: Secretary Chrisman highlighted several of California's innovative ocean management strategies, including the 2004 ocean action plan that laid out measurable actions in the areas of governance, stewardship, research, education and outreach, and also established the California Ocean Protection Council, which is charged with implementing many of these actions. Secretary Chrisman noted many lessons learned along the way, including the need to involve multiple stakeholders in local efforts. He noted several successes thus far, including the adoption of a network of 29 marine protected areas along the Central California coast, with more to be considered in the future along the remainder of the coast. Secretary Chrisman emphasized the goal of these efforts is to result in more effective, efficient and innovative approaches to setting and reaching the goals of ocean management and stewardship in the future.



SAM FARR: Congressman Farr emphasized the importance of a comprehensive plan for ocean governance, noting that such a plan should include the types of regional area-based management concepts used on land. He noted the increased interest in developing the ocean and its resources for economic gain, and pointed out the land-based corollaries for economic development which include things like residential and industrial zoning as well as areas set aside for parks and 'green' space. Congressman Farr pointed out that, currently, no such plan exists and there is a vital need to fill that void. He highlighted the ocean governance activities taking place in California, where the coastal zone is the biggest economic zone in the state, and suggested that federal efforts should follow suit.

BILLY CAUSEY: Dr. Causey provided specific examples of marine zoning activities in the Florida Keys National Marine Sanctuary, which features five different types of marine zones including sanctuary preservation areas, special use research-only areas, ecological reserves, wildlife management areas and existing management areas, the first three of which are no-take areas. Dr. Causey noted that several of these marine zoning tools actually manage the mode of access; for example, there may be no motorized zones, but people can still access them in other ways. He noted that there was strong public participation in the creation of these zones, and that once established, there was strong compliance. Dr. Causey recommended that some critical factors in their success included strong participation from the public, a clear process, use of science, and respect for various jurisdictions.

TOM FRY: Mr. Fry acknowledged the difficulties of zoning in both the terrestrial and marine environment, but noted that there is an opportunity to fill the void in the marine environment. He used the principles involved in the development of the Outer Continental Land Shelf Act as an example, noting that it has been an open and cooperative process that has taken into account such critical factors as safety, resource sufficiency, and intergovernmental coordination. Given the many varied potential uses of the marine environment for oil and gas development, fishing, tourism and recreation, scientific research and protection of special areas, Mr. Fry highlighted the need for better coordination and noted some progress already being made with respect to management at the federal level.

VIKKI SPRUILL: Ms. Spruill began her presentation with a discussion of climate change and its impact on the ocean, noting that appropriate effort must be given to addressing and mitigating its impacts. She noted that such efforts are vital and should be undertaken at the federal and state levels, highlighting work the Ocean Conservancy has undertaken in conjunction with California, Florida and Massachusetts. Ms. Spruill called on President Bush to consider a mission to Planet Earth to 'restore our oceanic life support system,' noting the Administration's \$230 billion plan to return to the Moon and to Mars, at a time when ocean observing satellites above earth are deteriorating. In conclusion, she noted the connection between climate change and its effects on the ocean, which would, in turn, affect any management regime that is considered.

JAMES SANCHIRICO: Dr. Sanchirico shared his perspective as an academic and economist, and began by highlighting four issues in the zoning debate: 1) overuse of ocean resources can lead to long-term resource loss; 2) resource use conflicts; 3) allocation conflicts; and, 4) uncertainty and cumulative impacts. To address these issues, Mr. Sanchirico focused research efforts on addressing these issues, noting that zoning involves not just separation of activities, but also potential rationing.

CHALLENGES

- Turf battles, real or perceived, can present real barriers to better ocean governance and collaborative management.
- Federal ocean governance efforts lag behind those being undertaken in many states.
- Arbitrary political boundaries dividing states and nations aren't always consistent with ecological needs that provide natural boundaries for management purposes, particularly marine zoning.
- A comprehensive ocean planning and management regime does not currently exist.
- Climate change is one of the most compelling issues of our time, and its impacts on ocean resources are uncertain.

RECOMMENDATIONS

- Ocean governance should emphasize and take into account regional and local needs.
- Entities involved in governance at all levels need to look at the bigger picture and not focus on protecting their own jurisdictions.
- Involve the public openly and actively in processes involving ocean governance, and particularly marine zoning.
- Apply principles of land-based management in the ocean, where applicable.
- Help stakeholders understand that marine zoning is not just about 'no-take' areas.
- Impacts of climate change must be factored in when thinking about ocean management and governance.
- Scientific data should be incorporated into decisions regarding ocean planning and management.

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