



CAPITOL HILL
OCEAN WEEK

— 2006 —

Summary Report



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Symposium Overview

In its sixth year, and following closely on the success of the first ever Conference on Ocean Literacy (CoOL), Capitol Hill Ocean Week (CHOW), was integral in carrying forward the momentum of National Ocean Week, declared by President Bush. Capitol Hill Ocean Week took place June 13-14, 2006 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 identify significant ocean issues before the nation's leaders in order to help protect and manage our ocean, coasts, and Great Lakes for future generations.

Morgan Gopnik, Senior Vice President for Conservation at The Ocean Conservancy, the symposium's presenting sponsor, opened the conference by speaking about a major upcoming accomplishment for the ocean community. She discussed the Smithsonian Ocean Hall in the Museum of Natural History opening in the fall of 2007, and acknowledged the collaborative efforts involved with the Ocean Hall and Capitol Hill Ocean Week, commending the community on their work to ensure the success of both endeavors.

Sarah Cooksey, President of the newly formed Coastal States Stewardship Foundation, with the mission to 'support healthy coastal ecosystems and prosperous coastal communities for the benefit of current and future generations' also helped to open Capitol Hill Ocean Week by highlighting the important role citizens of the U.S. coastal zone play in protecting and managing the ocean.

Panelists discussed major issues and opportunities for managing and protecting our ocean, coastal and Great Lakes resources, offering their insight on how best to proceed in advancing this agenda. Sessions included:

- *State and Federal Role in Management of Ocean Resources: Addressing Emerging Demands for Liquid Natural Gas and Offshore Windfarms*, which focused on the benefits and challenges associated with construction and use of offshore energy facilities to diversify the nation's energy portfolio.
- *A Legislative Agenda for the Ocean: Perspectives from Capitol Hill and Beyond*, where panelists

discussed a variety of legislation and congressional activities underway to promote effective management of the nation's ocean resources.

- *Keeping Our Oceans Clean: From Marine Debris to Invasive Species* panelists discussed the negative affects marine debris and invasive species create for our nation's economy and fragile ecosystems while highlighting ways to best combat these ongoing problems.
- Panelists on *New Views of Ocean Life: Advances in Visualization from the Census of Marine Life* described the opportunity that visualization technology provides to engage the public in scientific research.
- *From Vision to Venture: The Business Case for Ocean Observation* addressed the importance of creating a robust Integrated Ocean Observing System and the roles various ocean stakeholders can play in helping to ensure its success.
- *Innovations from the Gulf of Maine: Bringing New Ideas to an Old Ecosystem* discussed the importance of a regional ecosystem-based approach to managing ocean and coastal resources.

Most 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, health, and environmental prosperity 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, in partnership with members of the Senate Commerce, Science and Transportation Committee; the Senate Commerce, Science and Transportation Committee National Ocean policy Study; the House Resources Committee; the House Science Committee; and the House Oceans Caucus coordinated Capitol Hill Ocean Week. Federal partners included the U.S. Environmental Protection Agency; and several National Oceanic and Atmospheric Administrations offices, including the National Marine Sanctuary

Program, the Office of Oceanic and Atmospheric Research, the Office of Protected Resources and the Office of Marine and Aviation Operations. The National Marine Sanctuary Foundation is grateful for the support of the many sponsors of Capitol Hill Ocean Week, including:

Presenting Sponsor The Ocean Conservancy

Gold Sponsor Cruise Industry Charitable Foundation
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Contributors

National Estuarine Research Reserve Association
SeaWeb

State and Federal Role in Management of Ocean Resources: Addressing Emerging Demands for Liquid Natural Gas and Offshore Windfarms

This panel was sponsored by Shell and co-hosted by the Coastal States Organization, Joint Ocean Commission Initiative and Coastal States Stewardship Foundation



Moderator: Dr. Tom Kitsos, Ocean Policy Consultant

Panelists: **Mr. Paul Kelly**, Joint Ocean Commission Task Force, *Joint Ocean Commission Initiative*
Dr. Walter Cruickshank, Deputy Director of the Minerals Management Service, *U.S. Department of the Interior*
Mr. Richard Hoffman, Director, Division of Gas – Environment & Engineering, *Office of Energy Projects, Federal Energy Regulatory Commission*
Mr. William Cooper III, Executive Director, *The Center for Liquefied Natural Gas*
Mr. Greg Watson, V.P. for Sustainable Development, *Massachusetts Technology Collaborative*
Mr. Eddie Fisher, Director of Coastal Stewardship, *Texas General Land Office*

Panel Overview

Given the importance of energy policy under the current Administration, the panel considered the significance of Liquefied Natural Gas (LNG) and wind energy, and their associated use of ocean resources, in diversifying the nation's energy supply.

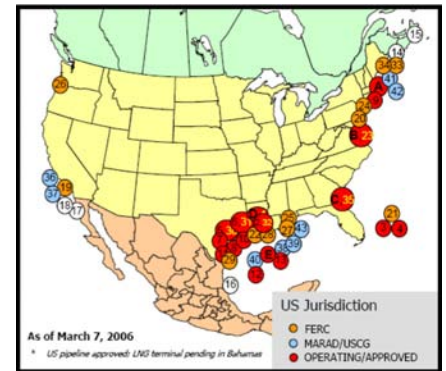
TOM KITSOS: Dr. Kitsos opened the panel by outlining the issue of offshore energy, including both alternative energy in the form of wind and a new awakening for natural gas in the form of liquefied natural gas. He asked panelists to consider the 200-mile exclusive economic zone from the perspective of the U.S. Commission on Ocean Policy and Pew Ocean Commission recommendations and try to analyze progress made over the last few years regarding agency coordination on offshore energy issues.

PAUL KELLY: Having worked on the Outer Continental Shelf Lands Act Amendments in 1978, Mr. Kelly possessed a unique understanding of the conflicts arising between states and the federal government on the issue of offshore energy production. Using this knowledge and his experience as a member of the U.S. Ocean Commission and the Joint Ocean Commission Initiative, Mr. Kelly discussed governance issues related to offshore energy development, especially in the case of wind energy. He explained how heightened interest in renewable energy sources among policymakers and the public, along with improved technology and federal tax credits for wind energy are increasing the potential for offshore areas to play a significant role in energy production for the United States. With the breadth of agencies involved in the offshore wind energy debate, Mr. Kelly pointed out the need for a well-coordinated procedure to analyze and permit wind energy facilities. He finished by noting the improvement in jurisdictional distinction resulting from the Energy Policy Act of 2005, granting Minerals Management Service expanded authority in the area of offshore energy development.

WALTER CRUICKSHANK: Dr. Cruickshank used his time to identify the Department of the Interior's (DOI) role in energy regulation and its new authorities for regulating offshore renewable energy. He pointed out that DOI manages lands and facilities accounting for approximately 35% of the country's energy production, with almost 10% of this responsibility related to wind energy. Dr. Cruickshank expected the renewable portion of DOI's portfolio to grow in coming years, especially based on the Energy Policy Act of 2005, granting DOI's

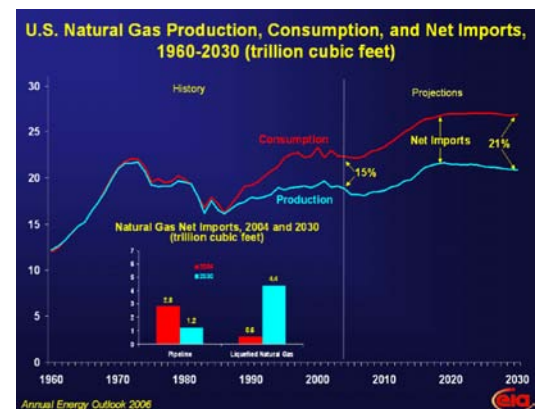
Mineral Management Service (MMS) the authority to develop a framework for offshore renewable energy production. This framework will include creation of a robust permitting process and provisions to provide fair returns on investments to the public for offshore facilities. Dr. Cruickshank also discussed the development of an Environmental Impact Statement to ensure future regulations related to offshore energy management, facility siting, and operation don't jeopardize marine and coastal environments. The final portion of the new governance program, he stated, will include plans to convert oil and gas platforms in support of other activities including aquaculture, research, communication and deepwater exploration. Finally, Dr. Cruickshank described the efforts at the MMS to begin a digital mapping initiative for the outer continental shelf, called a Marine Cadastre, to identify the boundaries for all ocean and coastal operations. This map will be used in offshore facility planning.

RICHARD HOFFMAN: Mr. Hoffman began his presentation by highlighting the important role natural gas plays in energy production for the United States. He described natural gas as the preferred form of fuel by nearly every approved power plant, with all proposals being approved at the state level for approximately the last six years. He also pointed out that 96% of all natural gas is found outside of North America, highlighting the need to import this resource. The two main issues with Liquefied Natural Gas (LNG) terminals, according to Mr. Hoffman, are safety and environmental impacts. From LNG's infancy in 2002, Mr. Hoffman discussed the five terminals in operation today and eight approved facilities, five of which are under construction. He noted that 19 other facilities are proposed around the country and along our coasts. Of these facilities, the Federal Energy Regulator Commission (FERC) has jurisdiction over all onshore terminals and those operating in state waters, while the Coast Guard handles offshore facilities. Mr. Hoffman described how the permitting process for these facilities is run under the Energy Policy Act of 2005, and noted the requirement that stakeholder discussions take place prior to application submission in order to accelerate the permitting process. Finally, Mr. Hoffman discussed FERC's role as lead agency for NEPA and for coordinating all federal authorizations, the authorization of emergency response plans, and the development of a cost-sharing plan to handle costs associated with safety and security issues at each facility.



Proposed and Approved LNG terminals as of March 7, 2006

BILL COOPER: Mr. Cooper began his talk by discussing the role of The Center for Liquefied Natural Gas, a group composed of a broad coalition of energy providers, trade associations and end users. The Center ensures access to reliable information regarding Liquefied Natural Gas (LNG) and promotes rational issue discussion. Mr. Cooper explained that LNG is transported in specifically designed tankers and mentioned the impressive record of LNG transport, with no major incident in its 40-year history involving well over 80,000 carrier voyages covering more than 100 million miles. With most LNG terminals in the US achieving a capacity of at least a billion cubic feet of natural gas a day, Mr. Cooper stated enough of the resource could exist to supply energy to approximately 4.3 million homes each day, meaning LNG provides energy at a rate comparable to other fuels with a smaller environmental footprint. He highlighted the largest issue with offshore facilities is the use of open loop or open rack vaporizers, an increasingly controversial technology. Mr. Cooper assured the audience that scientific assessments from both the government and private sectors conclude there will be minor adverse environmental



impacts related to the use of this type technology, but that many misconceptions surround its use. Even with this challenge, Mr. Cooper expressed his belief that LNG will be both effective and successful, comprising a significant portion of the nation's energy portfolio in the future.

GREG WATSON: Mr. Watson discussed both the challenges and opportunities offshore wind energy may offer the nation. He explained the regional aspect of offshore wind energy development and noted that decreased availability of land for wind projects will create a need for offshore facilities. The novelty of wind facilities in the U.S., he explained, grants an opportunity for technological leadership in an emerging industry. In addition, our energy policy, including production tax credits, renewable portfolio standards and system benefits charge programs, encourages the production of renewable energy. Mr. Watson highlighted the availability of a steady, less turbulent wind source offshore and offshore wind energy's typical location in close proximity to population centers, further supporting the development of offshore wind energy. Conversely, he also stated that the United States is limited by the number of offshore sites compatible with this type of development, based on current technology and limits within the ocean environment. Due to the increased sophistication of wind turbines, wind has become the fastest-growing source of electricity; however the immensity of the turbines makes it increasingly difficult to site these projects. Mr. Watson ended by describing an effort between the U.S. Department of Energy (DOE), General Electric (GE) and the Massachusetts Technology Collaborative to develop an outline for the next generation of offshore wind turbines that will make better use of this renewable resource; determine how best to make it work; engage stakeholders, policy makers, and engineers; and address environmental concerns. A report titled, 'A Framework for Offshore Wind Development in the United States' has been published with their findings.

EDDIE FISHER: Mr. Fisher explained the role of the office in managing public and submerged lands for Texas, including 367 miles of Gulf coastline, and more than 3,000 miles of shoreline. Mr. Fisher discussed the unique position of the Texas General Land Office, as compared to similar state agencies across the country, based on its expanded offshore governance that includes 10.35 miles of submerged



Artist's rendering of Proposed 150 MW offshore wind farm located approximately seven miles offshore of Galveston Island, on an 11,355-acre lease, partnership with Galveston-Offshore Wind, LLC □ a subsidiary of W.E.S.T., LLC out of New Iberia, Louisiana

land, compared to three miles for most other states. He spoke to the large concentration of Liquefied Natural Gas (LNG) facilities proposed and under construction in Texas and suggested reasons for this included the large petrochemical refining capabilities of the area, and the proximity to pipeline distribution hubs for nationwide natural gas transport. In addition to current interest related to LNG facilities in the area, Mr. Fisher described two leases the Texas General Land Office has issued for offshore wind energy development. Because Texas is in the middle of major waterfowl migratory paths, the Office is requiring a study of the effects these proposed facilities may have on migratory birds. Finally, Mr. Fisher proposed a state goal – for Texas is to be a leader in the field of offshore wind energy development.

CHALLENGES

- There are competing demands for new sources of energy and management of ocean resources.
- Domestic supply is not large enough to satisfy growing demands for natural gas.
- Dense population and high land values make it difficult to develop large utility-scale projects on land.
- Current technology and limitations from the ocean environment leave relatively few sites compatible with offshore wind energy development.
- Turbine size, vibrations and seafloor installation can create adverse implications for marine life and waterfowl.
- Competing demands for offshore space from liquefied natural gas, wind energy, transportation, aquaculture, and other activities can strain marine environments.

RECOMMENDATIONS

- There should be a well-coordinated interagency regulatory process for reviewing and permitting offshore energy projects.
- The nation should take into consideration Liquefied Natural Gas' production capability and small environmental footprint to meet the growing demand for energy in the United States.
- An Offshore Wind Collaborative should be established to coordinate interests, advance technology, and plan for increased development of offshore wind energy facilities.
- Knowledge of wind availability, water depth, and wave heights should be expanded to further understand the technological restraints and structural hurdles to developing our wind energy needs.
- Offshore interests should look for opportunities to resolve conflicts and competing activities and identify potential synergies.
- Energy policy should support technology and approaches that reduce the footprint of offshore activities to minimize interference with shipping lanes and other marine activities and resources.

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/chow2006/index.html>.

A Legislative Agenda for the Ocean: Perspectives from Capitol Hill and Beyond

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

Panelists: **The Honorable Wayne T. Gilchrest**, U.S. House of Representatives, *Maryland*
The Honorable Sam Farr, U.S. House of Representatives, *California*
Ms. Margaret Spring, Senior Counsel, *Senate Commerce, Science, Transportation Subcommittee on Fisheries and the Coast Guard*
Ms. Gabrielle Batkin, Professional Staff, *Senate Appropriations Committee, Subcommittee on Commerce, Justice and Science*
The Honorable Mike Chrisman, Secretary, *California Resources Agency*
Mr. Roger Rufe, President, *The Ocean Conservancy*

Panel Overview

The U.S. Commission on Ocean Policy's *An Ocean Blueprint for the 21st Century* and Pew Oceans Commission's *America's Living Oceans* made hundreds of recommendations for improving the way our nation manages its ocean and coastal resources. Participants discussed how these recommendations are being considered and responded to, particularly in the legislative arena.

KACKY ANDREWS: Ms. Andrews highlighted the exciting time for ocean policy in Washington, DC and out in the states with the U.S. Commission on Ocean Policy and Pew Ocean Commission reports and the Joint Ocean Commission Initiative priorities. These documents include hundreds of recommendations of how to improve the way our nation manages its coastal and ocean resources. Ms. Andrews asked panelists to address how governments are responding, particular in the legislative arena, to these recommendations.

WAYNE GILCHREST: Congressman Gilchrest discussed the need for humans to recognize their ability to become more compatible with nature. He recognized the challenge in giving policy-makers an understanding and passion for healthy ecosystems. Congressman Gilchrest stressed the importance of using and responding to the Joint Ocean Commission Initiative framework. He specifically mentioned the need to move forward on Magnuson Stevens Act Reauthorization, Law of the Sea, and coral reef legislation, while gaining a better understanding of global warming and the acidification of the world's ocean. He asked everyone in the room to support Congress and advance these issues. Finally, Congressman Gilchrest expressed the difficulty the House of Representatives has with effectively addressing ocean policy, since ocean policy is fragmented amongst many committees and jurisdictions.

SAM FARR: Congressman Farr began by mentioning the frustrating lack of progress on environmental issues, here in Washington, DC. He explained that for 2006 it would be even more difficult due to the focus on the reelection campaigns in the various districts. However, Congressman Farr reminded everyone that politics is local, which is where people who support environmental protection can make real impacts on what ultimately happens in Washington so that we can start to see changes. He recognized that it is sometimes difficult for the public to make oceans a priority when ocean problems do not seem to be as important to their lives in the short-term, such as crime, the state of local school systems, and front-page news. Congressman Farr highlighted the fact that Congress can only move when the public demands action, and so, establishing a critical mass around ocean and coastal issues means working together--urging that ocean stakeholders work to keep ocean issues on the "front-page," so to speak. He also urged those advocacy groups present to prioritize recommendations on ocean and coastal management for Congress to consider, and make sure that talent and concerns among the ocean community reach the political leadership. In conclusion, Congressman Farr voiced his continued support for increased funding for NOAA's ocean programs.

MARGARET SPRING: Ms. Spring discussed the role of the Senate Commerce, Science, and Transportation Committee, and Committee Vice Chair, Senator Innouye, in creating the Oceans Act of 2000, which directed the establishment of the U.S. Commission on Ocean Policy. She suggested that broad support for careful management of the oceans is possible if there is an understanding that oceans and coastal areas both sustain and affect life on earth. Ms. Spring believed the Oceans and Human Health Act helped highlight this message and will go far to support important interdisciplinary research among ocean scientists and medical researchers that will be needed in the United States in order to help stakeholders, citizens and decision-makers to fully understand the importance of our oceans to public health and welfare. Next, Ms. Spring discussed the activities of the Committee, and its four subcommittees covering oceans and atmospheric matters, to address many of the Joint Ocean Commission Initiative recommendations. To address ocean policy and governance, she stated that the National Ocean Policy Study Subcommittee planned to hold a hearing and take a comprehensive look at options for ocean governance at both the federal and state levels. On Fishery Management Reform, Ms. Spring discussed the Committee's efforts to achieve final passage of its Magnuson-Stevens Fishery Conservation and Management Reauthorization Act, and specifically the desire to include a component related to international overfishing. She also reported that the Committee, to support ocean research and education and the President's Competitiveness initiative, created legislation to form additional programs for NASA, NSF, and other agencies. Since national security is a topic that has not relented since 2001, and there are other issues taking precedence, Ms. Spring said Members were pleased with the Committee's activity and accomplishments this Congress, including legislative action on fishery management, marine debris (S. 362), tsunami warnings (S. 50), and coastal land protection (S. 362).

MIKE CHRISMAN: Secretary Chrisman began his presentation by acknowledging the role of the Coastal States Organization in advancing ocean and coastal management for the nation. He highlighted a National Ocean Economic study that determined the ocean-dependent industry in California alone contributed approximately \$43 billion to California's national economy in 2002. He highlighted the Governor's concurrence with the preliminary findings of the U.S. Commission on Ocean Policy report, leading the Governor to call for greater federal involvement in the protection of these resources. In addition, Secretary Chrisman described the state of California Ocean Action Plan and some major activities that have been completed since its release. These include signing of the California Ocean Protection Act, and creation of the California Ocean Protection Council. In addition, Secretary Chrisman mentioned the importance of legislation on issues such as bottom trawling, the prohibition of certain air and water discharges from cruise ships, and regulation of water quality monitoring in the San Francisco Bay. The California Ocean Protection Council has approved over \$17 million in ocean and coastal projects dealing with coastal water quality issues, marine research, sea floor mapping, ecosystem based management, invasive species management, market-based fisheries approaches, environmental review of aquaculture and many more. Another \$21 million have been committed to developing an oceans current monitoring system, working with observing systems around the country. Secretary Chrisman believes the timing is right to keep moving forward on these important issues and encouraged everyone to show support for these projects on local, regional and national scales.

GABRIELLE BATKIN: Attending on behalf of Senator Mikulski, Ms. Batkin spoke of Senator Mikulski's efforts in 2005 to review the 300 recommendations from the U.S. Commission on Ocean Policy's *An Ocean Blueprint for the 21st Century* and Pew Oceans Commission's *Americas Living Oceans* for all sectors of government, determining how best to attack each issue. Ms. Batkin explained that after researching these recommendations, Senator Milkulski and a group of Senate colleagues asked the Joint Ocean Commission Initiative (JOICI) for a top 10 list of critical areas where the nation could begin addressing the issues it faces in protecting our ocean. Ms. Batkin announced the release of this JOICI report, *From Sea to*

Shining Sea: Priorities for Ocean Policy Reform and Senator Milkulski's hope to use this document as a navigational chart for the future of ocean policy. Ms. Batkin spoke about the numerous funding recommendations in the report, specifically related to research, exploration and observation. Ms. Batkin then mentioned the difficult budget situation and the challenge in progressing if there is not support from the Administration. However, Ms. Batkin stated that the Subcommittee hopes to celebrate some budget success this year.

ROGER RUFÉ: Mr. Rufe began by praising the states for leading the charge to implement the recommendations from the Commission on Ocean Policy and Pew Oceans Commission reports, and for taking the initial steps toward regional governance structures. He spoke about the great opportunity the *Sea to Shining Sea* report from the Joint Ocean Commission Initiative (JOCI) offered, and commended Senator Milkulski's energy with moving forward to tackle these recommendations. Mr. Rufe called for stakeholder groups to compromise on the Magnuson Stevenson Reauthorization Bill so it could move forward in the Senate and provide rules for managing our fisheries over the next 10 years. He then discussed areas within the Magnuson Stevens Reauthorization, specifically Senate bill 2012 introduced by Senator Stevens, which could be strengthened according to JOCI. For one, JOCI would like to see increased value and use of science in managing fisheries. They would also like language to ensure councils adhere to scientific advice they receive when setting annual catch limits. In addition, JOCI believes in a more balanced representation on fisheries councils to include additional individuals from the public sector, private sector and environmental community. Finally, Mr. Rufe addressed some of the troubling aspects of the House Magnuson Stevens Reauthorization Act submitted by Congressman Pombo, including exceptions to the 10-year rebuilding plan and the lack of compliance with the National Environmental Policy Act.

CHALLENGES

- The House of Representatives is divided between many jurisdictions and committees. This makes it hard to effectively deal with ocean issues.
- The ocean stakeholder community does not have a unified voice and prioritized list of issues.
- States need sufficient federal funding and technical assistance to meet on-the-ground demands of ocean and coastal management.
- NOAA does not have adequate funding to exercise its responsibilities for ocean management in the future.

RECOMMENDATIONS

- Groups with similar interests and desires for protecting the environment, and most specifically the oceans and coasts, should join together and prioritize activities for the coming years.
- The ocean community should work to support Magnuson Stevens Act Reauthorization and develop effective and agreeable provisions to ensure the bill's passage.
- State and local efforts should be used as models for the federal government.
- A coordinated and better-funded program for research monitoring and ocean observation must be developed and supported.



- NOAA should take on the responsibility of appointing scientific advisors to the fisheries councils.
- The ocean community should support a NOAA Organic Act.

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/chow2006/index.html>.

Keeping Our Oceans Clean: From Marine Debris to Invasive Species

Moderator: Mr. John H. Dunnigan, Assistant Administrator for Ocean Service and Coastal Zone Management, NOAA

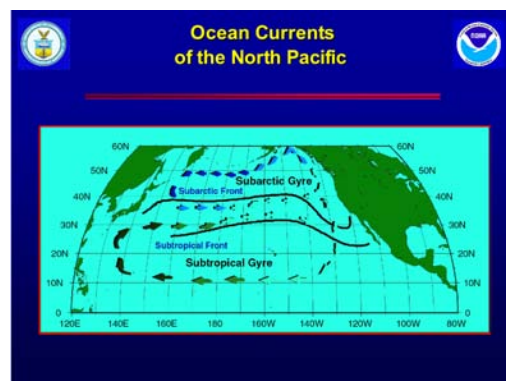
Panelists: Ms. Aulani Wilhelm, Acting Reserve Manager, *Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve*
Dr. Mary Donohue, Deputy Director, *University of Hawaii Sea Grant*
Ms. Maurya Falkner, Marine Invasive Species Program Manager, *California State Lands Commission*
Ms. Seba Sheavly, President, *Sheavly Consultants*
Ms. Vicki Matter, Director Constituency Development, *The Ocean Conservancy*
Ms. Erica Raitt, Legislative Program Manger, *The Ocean Conservancy*

Panel Overview

The focus of the panel was marine debris and invasive species, addressing the impacts both have on our ocean and coastal resources. The panel spoke to the question of how best to investigate marine environments for exotic and invasive species and addressed not only how the ecosystem responds to marine debris but also the way people interrelate with the coast, focusing on the ways marine debris can affect those encounters. Finally, panelists suggested ways stakeholders can work together to minimize the negative affects associated with marine debris and invasive species, while preventing these significant problems in the future.

JACK DUNNIGAN: Mr. Dunnigan opened by discussing the importance of marine debris and invasive species programs to NOAA. He highlighted the fact that identifying an invasive species involves understanding the ecology and the ecosystem of a particular region. He noted the importance of addressing not only the ecosystem and ecological services of a region when discussing invasive species and marine debris, but also the economic effects that result in order to develop practical solutions. Mr. Dunnigan recognized Congress for addressing the marine debris aspects of Hurricane Katrina and noted NOAA's commitment to working with partners to identify and remove debris. Finally, he spoke of NOAA's marine debris program including research, detection, data collection, and abatement.

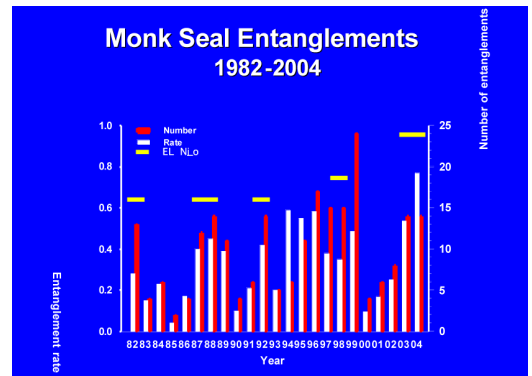
AULANI WHILHELM: Ms. Wilhelm started her presentation by stating that coral reefs are inextricably linked to the marine debris discussion in the Northwestern Hawaiian Islands. President Clinton, realizing the importance of reef ecosystems, established the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve by Executive Order in December 2000, protecting a biologically diverse and important natural and cultural resource. Ms. Wilhelm then described the unfortunate challenges the Northwestern Hawaiian Islands face in terms of marine debris, stating that 'virtually anything that floats you can find there.' The major problem is the threat these items present for curious wildlife and the persistence of these items in the environment. Ms. Wilhelm said that, while remote, the Northwestern Hawaiian Islands are not immune to the impacts of man and upwards of 80 tons of debris accumulates each year. This accumulation destroys reefs, starves birds, and creates a navigational hazard. Ms. Wilhelm explained that procedures to deal with this problem began as a multi-agency effort in 1996 and includes cleanup, research on accumulation rates, at-sea detection, and public



'Subtropical gyre' currents bring debris from around the Pacific Rim and circle it around this area until the appropriate weather systems and storms move it into the reefs and onto the islands.

outreach and education efforts. She explained a growing effort to turn debris into electricity, rather than transport it to a landfill. Since 1996, 544 tons of marine debris has been removed, equivalent to 110 elephants and enough to generate electricity for over 185 homes a year.

MARY DONOHUE: Dr. Donohue began her presentation by noting that the problem with marine debris is well illustrated in the Hawaiian archipelago. Dr. Donohue then discussed some of the projects underway and their importance in mitigating the source of marine debris, a necessary step to solving this problem. To do this, Dr. Donohue explained science must deliver creative solutions to inform policy and develop mitigation. The major issues with marine debris that Dr. Donohue pointed out were degraded aesthetic value resulting in decreased economic value, habitat damage, increased transport of alien species, and vessel safety hazards. The problem spans the food chain and affects each one of us as large amounts of money is spent to mitigate the problem. Dr. Donohue then explained efforts to discover the origin of the problem. Scientific research is performed and characteristics on net construction, for example, is documented and input to a debris database currently housed by NOAA's National Marine Fishery Service. Dr. Donohue explained the database is then queried to discover more information, identify the most common use for the net and determine the source fisheries. These fisheries can then be appropriately targeted when developing mitigation efforts. Dr. Donohue concluded by stating that using oceanography in a more sophisticated fashion can even allow us to detect possible patterns in marine debris accumulation and deposit. For example, Hawaiian monk seal entanglement is cyclical and coincident with periods of El Niño, an important piece of information for resource managers. In the accompanying graph, elevated periods of entanglement coincide with El Niño years, indicated by the yellow horizontal bars. Such research allows wildlife managers to be more effective, e.g. by increasing patrols for entangled seals in years expected to be characterized by El Niño.



*The number and rate (percent of total population) of Hawaiian monk seals (*Monachus schauinslandi*) entangled in marine debris each year from 1982 to 2004. Entanglement data from 1982 to 1998 modified from Henderson (2001).*

MAURYA FALKNER: Ms. Falkner focused her presentation on ship-borne vectors of invasive species introduction. Besides damaging ecosystems, Ms. Falkner pointed out that invasive species have the potential to be very expensive. The zebra mussel, for example, is probably the best known invasive and populates the Great Lakes region. Without a predator, the cost to control this species is about five billion dollars annually. In 1999, Ms. Falkner explained, California legislature passed the Ballast Water Management for Control of Non-indigenous Species Act, establishing the first mandatory, statewide, multi-agency program to control the introduction of non-indigenous species via ballast water. The Act applied it to all vessels over 300 gross registered tons. Under the Act, the Board of Equalization, fee collectors for the program, the State Water Board and The Department of Fish and Game monitored progress. Ms. Falkner explained that after reviewing the state reports, it was clear California had to maintain the program, instead of phasing it out in 2004 as outlined in the Act of 1999. The most significant change in the new Act is the inclusion of coastal traffic, and the development of discharge standards for ballast water. Ms. Falkner briefly discussed the recommendations put forth for performance standards and a report being compiled to look at vessel fouling. Next steps are to determine if there is a treatment technology that can be placed onboard to meet a performance standard. Finally, Ms. Falkner addressed California State Lands Commission involvement due to its jurisdiction over submerged and titled lands out to three nautical miles. Inspectors from the Commission spend a great deal of time educating the industry on why ballast water management is important and addressing compliance which, according to Ms. Falkner, has been integral to the program's success.

SEBA SHEAVLY: Representing the American Plastics Council, Ms. Sheavly discussed her work on marine debris monitoring and other marine conservation efforts. She stated that marine debris is a global issue and affects all major water bodies. While technological advances in plastics material development and its applications have improved, she explained these same materials and advances have played a role in some of the environmental problems associated with improper waste management. Because plastics are highly buoyant materials, they can travel on ocean currents for thousands of miles, posing a threat to sensitive marine habitats and wildlife. Ms. Sheavly pointed out that marine debris has the potential to affect the economies and inhabitants of coastal and waterside communities worldwide. Ms. Sheavly then described a triple alliance between industry, the conservation community, and government agencies formed over 20 years ago with the mission to educate industry employees and consumers on the problems of marine debris. Early marine debris prevention activities by the plastics industry included researching the degradability of six-pack rings, a system to apply resin identification codes to assist in recycling and the creation of “Operation Clean Sweep”, an onsite containment program for resin pellets. This was a unique effort because it collaborated with the industry, involving those at the source of the problem. She closed with noting that ‘ultimately, marine debris is a behavior issue, not a material issue. Controlling and reducing marine debris in the environment is a very significant, but achievable challenge.’

VICKI MATTER: Ms. Matter began by highlighting the September 2005 20th anniversary of International Coastal Cleanup. She announced that over 448,000 people, representing 80 countries participated and cleaned marine debris from inland areas, local waterways, and shorelines to remove 8.2 million pounds of debris covering 18,000 miles. Ms. Matter pointed out that people are drawn to the ocean for many different reasons, exploring it both above and below the surface. This draw, she said, has also caused constraints on our ocean resources and is now challenging marine ecosystems. The International Coastal Cleanup works to engage communities and people and prevent marine debris through a hands-on experience. The hope for Ms. Matter is that the time an individual gives to clean the coast turns into changed behavior throughout the year.

ERICA RAITT: Ms. Raitt began by explaining that many laws exist to address certain aspects of marine debris, with no current federal program dealing solely with the problem. The U.S. Commission on Ocean Policy’s *An Ocean Blueprint for the 21st Century* report called for creation of a marine debris program focusing on reduction of derelict fishing gear. Ms. Raitt explained that The Ocean Conservancy strongly supports Senator Inouye’s Marine Debris Research, Prevention, Reduction Act, S. 362, as a first step to fill gaps in the current federal program. It would establish a program within NOAA to identify, map, prevent and remove marine debris, aiding with development of strategies to deal with the problem at its source. Ms. Raitt explained that the bill would also establish an interagency committee on marine debris to improve federal coordination, answering another Commission recommendation and allowing a forum for the pursuit of international action. Ms Raitt announced that the bill passed through the Senate by unanimous support last year and is in the House, although the version reported out of the House Resources Committee was a weaker version of the bill. Ms. Raitt then discussed invasive species and pointed out two major proposals in the Senate to address aquatic invasive species, the Ballast Water Management Act, S. 363, introduced by Senators Inouye and Stevens and the National Aquatic Invasive Species Act, S.770, sponsored by Senator Levin. The Ballast Water Act is intended to address ballast water from ocean going ships and amends the National Invasive Species Act existing framework on ballast water management for implementing control technologies nationally. She closed by stating that the public must remember the cost of failing to regulate invasive species is far higher than costs associated with regulation.

CHALLENGES

- Marine debris creates an overwhelming management responsibility in the Northwestern Hawaiian Islands and removing it can cause even greater damage.
- The sources of the marine debris problem need to be addressed.
- Abandoned and lost fishing gear still catches target species effectively and since it is not counted or included in any fishery management model. Since this uncounted catch can range from 10 to 50 percent or more of the total allowable catch for one year, overestimates of maximum sustainable yield for affected species are likely.
- Marine debris is an international problem thus; it also requires a diplomatic solution.
- The process of identifying appropriate taxonomists to classify invasive species is expensive and time consuming.
- Recreational vessels and fishing vessels are hugely unregulated with regard to hull fouling, and very little is known about their ability to transport exotic organisms.

RECOMMENDATIONS

- At-sea detection of marine debris and fishing nets should be considered to find ways of preventing these materials from entering the ocean in the first place.
- The role of marine debris as vectors of alien species must be studied to prevent the introduction of potentially invasive species to regions where this debris collects.
- Increased international and industry participation is needed to effectively deal with marine debris.
- There is a need for a strong, well-funded, enforceable program that is protective of state lands and waters against invasive species.
- Industry should be educated on the true nature of plastic materials and their behavior in the environment.
- Current government programs to expand research efforts, build partnerships with industry, and develop education and outreach efforts for dealing with marine debris and invasive species should be maintained.
- A hands-on experience can help the public change their behavior, think differently about the choices they make and further enjoy the oceans.

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/chow2006/index.html>.

New Views of Ocean Life: Advances in Visualization form the Census of Marine Life

This panel was sponsored by the Alfred P. Sloan Foundation

Moderator: **Dr. Andrew A. Rosenberg**, Professor Ocean Processing Analysis Lab,
University of New Hampshire

Panelists: **The Honorable Vernon J. Ehlers**, U.S. House of Representatives, *Michigan*
Dr. Patrick N. Halpin, Gabel Associate Professor of the Practice of Marine Geospatial Ecology and Director of the Geospatial Analysis Program,
Duke University, Nicholas School of the Environment and Earth Sciences
Dr. Russ Hopcroft, Associate Professor Institute of Marine Science,
University of Alaska Fairbanks
Dr. Nicholas C. Makris, Professor, *Massachusetts Institute of Technology*

Panel Overview

The panel focused on new views of ocean life, particularly the use of visualization technology to promote greater understanding of marine and coastal environments.

ANDEW ROSENBERG: The panel's moderator, Dr. Rosenberg, noted that discussion of visualization was timely considering the recently released Joint Ocean Commission Initiative priority within *From Sea to Shining Sea* in support of innovation and competition in ocean-related research and education. Census of Marine Life (CoML) efforts in visualization, signal processing, and comprehensive integration, he said, will be important in development of the Nation's ocean research agenda. Overall, Dr. Rosenberg explained that CoML addresses three topics, the history of marine animal populations and human effect on the ocean, surveys of marine life living in the ocean today and projections of future populations of marine animal populations. Finally, he highlighted that CoML has developed an Ocean Biogeographic Information System to build a database of knowledge around the three Census topics.

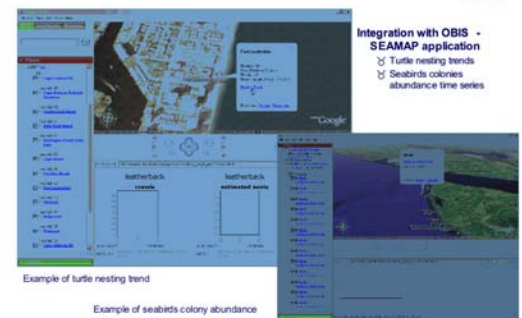
VERNON EHLERS: Congressman Ehlers began by highlighting the importance of scientific research in policy-making and of educating Congress to support ocean, coastal and Great Lakes Issues. He also reminded all of us to include the Great Lakes, and their extensive coastline, when discussing ocean issues. From the Joint Ocean Commission Initiative (JOCI) report *From Sea to Shining Sea*, Congressman Ehlers pointed out that some of the bills discussed during CHOW and some the Congressman is supporting are mentioned as top priorities by the JOCI. The Congressman then announced the passage of the NOAA Organic Act out of the House Subcommittee on Environment, Technology and Standards for the Science Committee.

PAT HALPIN: Dr. Halpin focused on the Ocean Biogeographic Information System (OBIS) and SEAMAP, which maps marine mammals, sea turtles and seabirds. He explained that visualization is a media used to create good science and the use of pictures to help communicate science. He explained that OBIS is a large global initiative in the mid-phase of a 10-year program with the main portal located at Rutgers University. A series of field projects gather information and feed into this global network. Dr. Halpin described OBIS-SEAMAP efforts to map distribution and movement of marine mammals, sea turtles and seabirds, and is an information system with a digital archive that is growing rapidly. The easiest data to aggregate and put online comes from North American and European waters. Dr. Halpin pointed out that the site where the information can be accessed also has a great deal of ancillary information, acting as an educational and outreach tool. In order to make the system work and deliver useful information to end users, a lot of effort is placed on creating an open source design to work seamlessly between different sites. The website where information is stored is built around Google Earth since people are familiar with the application. In

addition to archived data sets, Dr. Halpin said, the project is tracking animals and data that are uploaded daily to provide live tracks via satellite tags. Dr. Halpin then showed an example of how this information can be used. By looking at a probability distribution for marine mammals managers can know when, based on past experience and the time of year, there may be a higher risk of marine mammal ship strikes. The maps then allow resource managers to determine ways to avoid the animals and communicate the information to the transportation and shipping communities.

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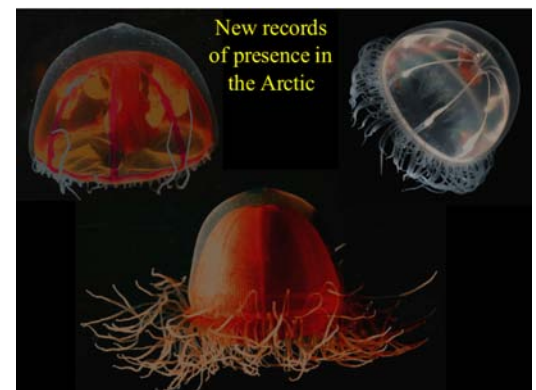
Data viewing (3)



Screen shots from OBIS - SEAMAP

RUSS HOPCROFT: Dr. Hopcroft began by discussing research projects in Alaska, particularly a cruise funded by NOAA's Office of Ocean Exploration. He highlighted the importance of gathering more information about the Arctic Ocean as part of the Census of Marine Life. To begin studying the area in more detail, Dr. Hopcroft and others used a remotely operated vehicle (ROV), about the size of a small car and operable to a depth of 9,000 feet. With a high definition video camera on board and 16 specialized samplers, some capable of collecting even the most delicate animals, the expedition was very visual and an excellent tool for engaging the public. To increase awareness of the oceans, he noted, there is a need to produce good imagery to accompany the science. Dr. Hopcroft concluded by saying there were many new species sampled on the cruise previously unknown in the Arctic. These species were recorded during approximately two-dozen ROV dives, highlighting the need for additional research.

NICHOLAS MAKRIS: Dr. Markis discussed a new remote sensing technology, enabling

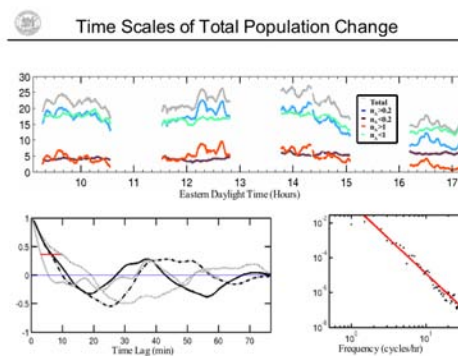


Three species of jellyfish known from other oceans, but not previously recorded as occurring in the Arctic. Each species is about an inch in size.

scientists to see fish populations over the scale of thousands of square kilometers instantaneously. He explained that the conventional method for surveying fish in the ocean involves the use of a slow-moving research vessel with a downward directed beam that interacts with fish schools. Where it encounters a school, an echo returns the signal. This delivers information at one point in time over a very thin transect. The new technology Dr. Makris described involves the use of two vessels, one transmitting sound over a very large area. These sound waves are reflected by schools of fish and received by a towed instrument. Within 40 seconds of sending a signal, ships are capable of covering a circular region 60-kilometers in diameter. In twice that time, the signals can produce information for a circular regional 120-kilometers in diameter, about the size of Connecticut. Dr. Makris explained that the sound is 'trapped' by the atmosphere and sea floor and therefore spreads in a plane, rather than a 3-D sphere. This intensifies the signal such that less powerful sources are required to cover a great distance. This type of technology makes it possible for scientists to observe the structure of both small and large schools of fish. Because of the large scale of the measurements it is possible to observe behavior patterns related to predators and time, providing new information for resource managers.

CHALLENGES

- Often, people do not have the bandwidth to deal with the types of videos and images produced through CoML visualizations.
- Scientists are not quick to update their data if they are working to get published and this can create a lag in the OBIS-SEAMAP database.
- The equipment to produce scientific visualizations is very expensive and therefore, creates limitations on the amount of research that can be completed with these tools.



Three species of jellyfish known from other oceans, but not previously recorded as occurring in the Arctic. Each species is about an inch in size.

RECOMMENDATIONS

- The information in the Census of Marine Life must be easily used, readily available and user friendly in order to succeed in becoming a public product.
- Information should be produced in a way that is accessible to those individuals with a non-scientific background, including policy makers at many levels.
- The Census of Marine Life should have all its data, and as much of the imagery as is practical, available to the public.

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/chow2006/index.html>.

From Vision to Venture: The Business Case for Ocean Observation

This panel was sponsored by HARRIS Corporation

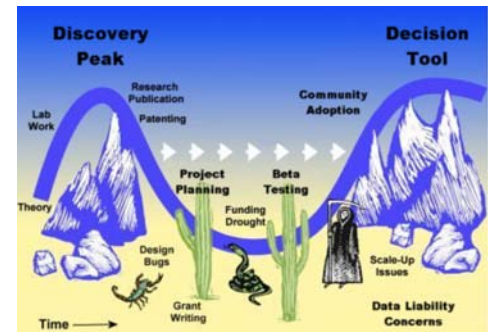
Moderator: Dr. Andrew Clark, President, *HARRIS Corporation Maritime Communications*

Panelists: **Dr. Mary Altalo**, Director, *Ocean.US*
Dr. Don Wright, SURA Fellow for Coastal Research,
Southeastern University Research Association
Mr. Paul Kirchner, Executive Director – General Counsel,
American Pilots' Association
Mr. Hauke Kite-Powell, Research Specialist, *Marine Policy Center,*
Woods Hole Oceanographic Institute
Mr. Scott J. McFarland, P.E. Civil Earth Observation Business Programs,
Boeing Company

Panel Overview

This panel focused on the transitioning of research to operational applications (crossing the “Valley of Death”), specifically in the area of ocean observing techniques and technologies. Private-Public Partnerships are key and there remains a need to better leverage the capabilities of private companies to effectively accomplish this vital transition. Talks focused on the value ocean observing systems provide to decision-makers and made a case for the economic opportunity provided for both the public and private sector in developing these systems.

ANDREW CLARK: Dr. Clark, the panel’s moderator, discussed both the multi-agency U.S. Integrated Ocean Observing System (IOOS), as well as NSF’s Ocean Observatories Initiative (OOI) and how OOI should serve as a proving ground for some of the technologies developed for IOOS. He described a number of the methods employed by industry to rapidly move ideas to the marketplace and suggested some of these techniques might similarly be applied in the transition from ocean observing research to applications.

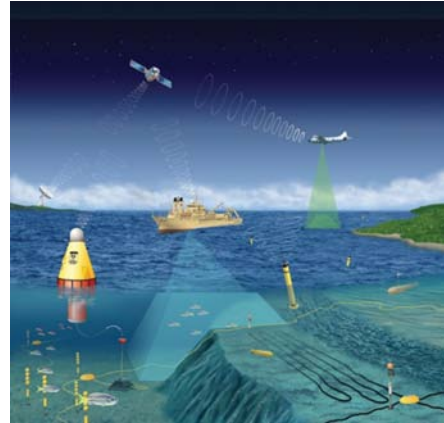


“Valley of Death” Transition from Research to Applications in the Academic Environment.

MARY ALTALO: Dr. Altalo discussed the efforts Ocean.US is bringing forth to support the Integrated Ocean Observing System (IOOS). Dr. Altalo painted a picture of what the Integrated Ocean Observing product will be and what contributions are necessary to create the product. Dr. Altalo mentioned that many of these systems are already functioning. She described the role of Ocean.US to integrate systems, develop a plan for these systems, and ensure the systems will seamlessly integrate into international efforts. NOAA, the Department of the Interior, NSF, the Department of Defense, the Corps of Engineers, the Coast Guard, USGS, NASA, the EPA and the Center for Disease Control are all contributors to IOOS, serving as members of the Ocean.US board, and working to provide IOOS product information configured to serve societal goals. She stressed the importance in remembering that although global in scale, IOOS has a regional component and contains observations and information at the watershed level. Integration will be across government, private, state and university partners and the private sector is playing a very significant role in the accumulation and transfer of information products. Dr. Altalo concluded by acknowledging that support of these efforts can be beneficial from a business perspective. For one, it leverages and aligns existing systems, letting us selectively tap existing information for dual use. Secondly, it standardizes U.S. components for entry into the global systems, making things interoperable and provides

economic security. Finally, the integration of observing systems provides situational awareness and is extremely important to U.S. critical infrastructure.

DON WRIGHT: Dr. Wright explained that, for the research community, the focus of an Integrated Ocean Observing System (IOOS) is broad and scientific groups are anticipating potentials of the system that will exist in FY 2010, 2012, and 2014. He discussed the synergy between IOOS and ORION, the Ocean Research Interactive Observatory Network initiative within NSF. Interoperability between the two programs will serve the education, research and operational communities. He stressed the importance of a system for the academic community and operational users that serves all needs, integrating among users, sensors and models. In exchange for the wealth of information IOOS could provide, he said academia must also be willing to assist in turning research products and information into operational end products in a more timely fashion.



The U.S. Integrated Ocean Observing System.

PAUL KIRCHNER: Mr. Kirchner spoke to the group from the perspective of the American Pilots' Association whose members work in each port within the United States to bring in large commercial ocean-going vessels. He stressed the importance of accurate and timely information, especially given the dramatic size increase of many vessels. These vessels strain our channels and waterways, cause navigational problems under bridges and power lines, and generally reduce existing margins of error. He described the Physical Oceanographic Real Time System (PORTS), a partnership between NOAA and local maritime communities, and how it provides real time quality controlled data to improve navigation and safety efficiency. Thirteen sites in the U.S. have an operational PORTS system, providing predicted and observed water levels, and meteorological information updated at 6-minute intervals. He stated that PORTS leads to improved safety of navigation, improved efficiency of marine transportation, a more efficient emergency response, increased safety for recreational boaters, and benefits for the fishing industry. There are also economic benefits. He stressed that based on all of these benefits the PORTS system must be expanded beyond its current structure to reach all significant ports and waterways in the country. A proposed National PORTS Plan would reach the 150 major ports in the US, representing 98% of oceanborne tonnage.

HAUKE KITE-POWELL: Mr. Kite-Powell described two economic benefits of high quality data derived from ocean observation and highlighted three examples of studies that have been done to quantify these benefits. The real benefit comes, he explained, not from the data and sensors, but from the information products developed to inform economic decisions. He argued that better decisions are made with good information and explained this is where value of these systems is generated, either for operational short-term decisions or long-term investment and planning activities. From various studies, it was discovered that a large portion of the potential benefits of an integrated ocean observing system come from recreational activities, which Mr. Kite-Powell stated, are not always what is expected. Other significant economic benefits were discovered in areas like electricity generation load management and commercial fishing. Mr. Kite-Powell said these studies also help point system developers toward the most promising user sectors and geographic regions of an integrated observing system, allowing prioritization of investment in these areas. To estimate the benefits for a global observing system, researchers looked at ship routing on transoceanic voyages. It was found that with expanded coverage and improved forecast products, the current generation of approximately \$80 million in benefits from this information could be easily doubled.

SCOTT J. McFARLAND: Mr. McFarland addressed the business case for ocean observing. He explained that NOAA and NASA have satellites, sensor systems and in situ sensors to capture earth observing data. The data is then be used in models to analyze and create predictions. It is important to note, said Mr. McFarland, that information isn't the end of the business case. Information must be moved to the private sector, which in turn creates return on investment for private investors. Mr. McFarland highlighted the need to understand what value can come from ocean observing system and stressed the importance of moving forward with integration. He encouraged the government, academia and industry to work together, using good economic information, to demonstrate the economic value ocean observing could contribute to this country. He finished by stating the best way to expedite the process of transforming scientific research to operational products useable by resource managers and decision-makers is to engage the private sector.

CHALLENGES

- Transforming scientific research into useable decision-making tools can be difficult.
- The goals of the Integrated Ocean Observing System are not necessarily the same as goals of the contributing agencies.
- Data management may prove to be time-consuming and complicated when coordinating and Integrated Ocean Observing System.
- A way forward and a vision for an Integrated Ocean Observing System should be developed, unconstrained by today's budgets or technology.
- Better, rigorous valuations of the outcomes and wealth created by ocean observing systems are needed to entice the private sector.
- Business models of government and industry are significantly different, and bringing those together will take an experienced team.

RECOMMENDATIONS

- Investment should be made in expeditionary oceanographic tools, such as ships, airplanes, aircraft, and satellites.
- Once running, new research, techniques and business practices must be incorporated into the Integrated Ocean Observing System to ensure the system evolves over time.
- The information in the Integrated Ocean Observing System must be tailored and configured for users.
- The Physical Oceanographic Real Time System (PORTS) should be expanded to deliver real-time oceanographic and meteorological information in all major ports and waterways in the United States.
- In order to maximize the value generated by ocean observing systems, emphasis should be placed on end user requirements and business case planning up front when designing and implementing these systems.
- Effective Public Private Partnerships are key to creating and sustaining a robust ocean observing system.

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Innovations from the Gulf of Maine: Bringing New Ideas to an Old Ecosystem

Moderator: Mr. Bud Ris, President and CEO, *New England Aquarium*

Panelists: The Honorable Tom Allen, U.S. House of Representatives, *Maine*
Dr. James Wilson, Professor of Marine Sciences and Economics,
University of Maine

Ms. Susan Snow-Cotter, Director, *Massachusetts Office of Coastal
Zone Management*

Dr. John D. Crawford, Senior Scientist, *Conservation Law Foundation*

Panel Overview

Panelists discussed Maine's unique and productive ecosystems focusing on various ways people in Maine are dealing with the new challenges faced by local fishing and coastal communities. Panelists addressed a range of innovative methods for dealing with ecosystem challenges including local community-based ecosystem management approaches, comprehensive coastal marine management, and scientific approaches providing regional and national models for ocean stewardship.

BUD RIS: Mr. Ris discussed the important role aquariums play in reaching out to a broad audience on ocean and coastal issues. Specifically, he discussed the New England Aquarium, which has approximately 1.5 million visitors every year, and its roles to educate school children on various marine and marine conservation issues, as well as undertake research projects all around the world. Mr. Ris stated that the New England Aquarium, along with Monterey and other aquariums, is beginning to play a much bigger role in helping the U.S. population understand the major threats facing the oceans and, most importantly, what they can do to make a difference. Mr. Ris acknowledged the vast marine resources of the New England region, at one point as the epicenter of the whaling industry worldwide, at another point the epicenter of the cod fishery worldwide and still as the epicenter of the lobster fishing industry worldwide. He closed by encouraging panelists to discuss the many innovative approaches underway to protect the resources of New England and the specific efforts to bring back the ground fishery in the region.

TOM ALLEN: Congressman Allen discussed the increasing stress facing our oceans each year. He said that ocean acidification is one aspect of climate change ocean stakeholders must deal with and mentioned the challenges facing communities and families who depend on the oceans for their livelihoods. He said diverse stakeholders must share information and be determined to use that information wisely when developing ocean policy. He discussed his work in protecting the ocean and livelihoods surrounding ocean resources by helping to found the House Oceans Caucus, introducing the Fishing Quota Standards Act, H.R. 3278, and working to ensure national fishing quota standards protect small boat fisheries. In addition, Congressman Allen discussed his role as a co-sponsor of the Coastal and Ocean Observation System Act, H.R. 1584 to tie in with the Gulf of Maine Ocean Observing System, and H.R. 2939 the Ocean Conservation Education and National Strategy for the 21st Century Act (OCEANS-21), laid down for a marker describing the kind of comprehensive approach the United States should take to managing the oceans. He stressed the importance of protected ecosystems and of developing a better understanding of their complexity and variety.

JIM WILSON: Dr. Wilson began by discussing the Downeast Initiative, a group of fishermen, scientists, members of the local community, and state and federal government addressing the groundfish crisis in New England. The group, he explained, is trying to implement an area management approach to fisheries in the Gulf of Maine and looks at the ecological zone created by the Eastern Maine Coastal current. He said the motivating factor behind

the development of this initiative is the scarcity of groundfish in New England. He spoke of the depletion of the ground fisheries, the urchin fisheries, the cod fishery, scallops, halibut and clams in Maine. He highlighted two lessons from the U.S. Commission on Ocean Policy's An Ocean Blueprint for the 21st Century and Pew Oceans Commission's America's Living Oceans reports strongly supported by the Downeast Initiative: ecosystems should be managed from multiple scales and incentive systems are necessary to align self-interests with the long-term sustainability of resources. To effectively govern, Dr. Wilson stated the need for a local area governance approach nested within the state and regional councils in which fishermen play a strong participatory role and are held accountable for their actions. He concluded by stating the Downeast Initiative is working toward a system of ecosystem-based management within the Gulf of Maine. It is intended to manage the continental shelf and the deeper parts of the Gulf separately.

SUSAN SNOW-COTTER: Ms. Snow-Cotter discussed efforts underway in Massachusetts to respond to a series of ocean use pressures facing the state. She explained that as a lot of the national planning for ocean policy was happening, Massachusetts started to see proposals for ocean use projects. These proposals highlighted gaps in jurisdiction, authority, and laws. She said the wind farm proposal in Nantucket Sound, in federal waters surrounded by state waters, raised policy and jurisdiction questions that are still unanswered in the state, with new ocean use projects proposed. She said a lot of the decision-making is being completed on a project-by-project basis. Based on the need to focus on these projects and the momentum from the U.S. Commission on Ocean Policy's An Ocean Blueprint for the 21st Century and Pew Oceans Commission's America's Living Oceans reports, the state of Massachusetts established an ocean management Task Force. Ms. Snow-Cotter said Massachusetts has conducted sea floor mapping, fisheries use characterization and public awareness and engagement, however there is still very little support for ocean planning. To improve decision-making, the Task Force has created the Ocean Partnership Fund and is developing collaboration among those interested in providing leadership and support for important ocean initiatives. Ms. Snow-Cotter concluded by stating the Fund is a public/private partnership, augmenting state and federal funds, to support ocean policy, science, education and outreach to attain healthy marine and coastal ecosystems, vibrant ocean industries, economically healthy communities and ocean literacy among the citizens of Massachusetts.

JUD CRAWFORD: Dr. Crawford discussed two projects dealing with important issues related to the management of ecosystems and the care of ocean resources. He highlighted the tremendous biodiversity found in the Gulf of Maine and its complex ecological system consisting of a highly interconnected and valuable food web. He discussed emerging use issues in this region and recommended careful analysis of potential impacts from ocean use proposals. He stressed the need to protect the ocean and its biodiversity, specifically through protected areas in the ocean. Dr. Crawford identified the difficulties in finding areas of the ocean to protect and challenges associated with defining a way forward for ecosystem management. He also stressed the importance of collaborating internationally since ecosystems often span political boundaries. He is working with a group that has gathered biological and physical information for the development of habitat maps to try and identify systems or priorities for conservation. Dr. Crawford hopes social and economic data will also be incorporated to try and minimize conflicts between protected areas and ongoing human activities.

CHALLENGES

- Single species fisheries management does not capture entire ecosystems and, therefore, can be less effective than an ecosystem-based approach.
- Species tend not to separate, making it difficult to determine exact species being fished, and therefore how much should be left behind to sustain a fishery.
- A great deal of data is required to develop an effective ecosystem-based management plan.

RECOMMENDATIONS

- Individual self-interests should be aligned with the sustainability of resources.
- Clean water, ecologically sustainable harvesting methods, and protection of habitat are needed to revive the Gulf of Maine.
- Networks of protected areas are needed in the ocean for sustaining biodiversity of ecosystems.
- A five-year strategic plan, science and technical plan should be developed for the Ocean Partnership Fund in Massachusetts.

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/chow2006/index.html>.