U.S. COMMISSION ON OCEAN POLICY

MINUTES

Eleventh Meeting of the U.S. Commission on Ocean Policy
John G. Shedd Aquarium
Phelps Auditorium
1200 South Lake Shore Drive
Chicago, Illinois 60605
September 24-25, 2002

Commissioners in Attendance

Honorable James D. Watkins, (Admiral, USN (Ret.)) - Chair
Dr. Robert D. Ballard
Mr. Ted A. Beattie
Mrs. Lillian Borrone
Dr. James M. Coleman
Ms. Ann D'Amato
Mr. Lawrence Dickerson
Vice Admiral Paul G. Gaffney II, USN
Professor Marc J. Hershman
Mr. Paul L. Kelly
Mr. Christopher Koch
Dr. Frank Muller-Karger
Mr. Edward B. Rasmuson
Dr. Andrew A. Rosenberg
Honorable William D. Ruckelshaus
Dr. Paul A. Sandifer

Meeting Attendees

A list of meeting attendees, including affiliation where provided, is included in Appendix 1.

TUESDAY, SEPTEMBER 24, 2002

Welcome

The Chair called the meeting to order at 9:00 a.m. and announced the release of the midterm report of the U.S. Commission on Ocean Policy. The Chair introduced Ms. Marcia Jimenez, Commissioner of the Department of the Environment, representing The Honorable Richard M. Daley, Mayor of Chicago and Mr. Donald Vonnahme, Director of the Office of Water Resources/Department of Natural Resources of Illinois. Ms. Jimenez and Mr. Vonnahme provided welcoming remarks.

Ms. Jimenez discussed the benefits of the Great Lakes to the region and the importance of a long-term plan for protecting this resource. She stated that Mayor Daley has worked on these issues with the understanding that the ecology and economics cannot be separated. Ms. Jimenez stressed the need to test for water quality to protect public health and safety. She stated that the federal government must work with the state to collect public health data and that it is a federal responsibility to ensure that local governments have the resources necessary. Ms. Jimenez stressed that federal policy must seek to protect the Great Lakes and that ultimately, protecting the Great Lakes means evaluating human decisions. She commented that invasive species are a critical issue and have devastating effects on commerce, recreation and the economy and therefore urged the Commission to consider polices to protect waters from invasive species. Ms. Jimenez noted that requirements must apply to all ships, both domestic and international. She also commented that conservation is an ethic that must be addressed and that there is a need for mayors to be involved in these issues and to have an input on national policies. Ms. Jimenez discussed a meeting that Mayor Daley convened in May of mayors representing cities on the southern end of Lake Michigan, from Milwaukee WI to Gary IN. She noted that this fall they will reconvene a meeting of some of those same mayors as well as mayors from some other larger cities throughout the Great Lakes. She concluded that federal policy must support and work in concert with the goals of protecting and conserving the Great Lakes.

Following Ms. Jimenez's presentation, she commented on a number of issues raised by the Commission. The Commission expressed interest in the way that the mayors in the Great Lakes have come together to address common issues. It was noted that the Commission is looking at how to be responsive to regional needs and asked Ms. Jimenez to further discuss the Great Lakes Protection and Restoration Strategy that the mayors are developing. Ms. Jimenez responded that the Strategy would identify the projects, programs and policies they believe are necessary to protect, conserve and manage the resources of the Great Lakes. This plan would identify the capacities and resources that local and state governments bring to the table and then will identify how they can coordinate with the federal government to realize these goals. She added that this plan will be completed in the early part of November and then the mayors will meet in January.

Commissioners asked Ms. Jimenez to expand on what has taken place at the earlier meetings between the mayors, the level of cooperation from the mayors and what the Commission can do to support that effort. In response, Ms. Jimenez commented that Mayor Daley realized early on how important it is to work with other mayors in the Great Lakes region. She noted that they are looking at key issues in the Great Lakes such as preventing beach closures. She added that water quality and beaches are economic drivers in the region. She also expressed concern with the discharge of sewage into the Great Lakes. Ms. Jimenez stated that they are looking at the

infrastructure to ensure that it is sufficient for stormwater drainage. She noted that Chicago is involved with continual upgrades and repair of the infrastructure to ensure they do not have raw sewage leaking into lakes and rivers. She stressed the need for additional federal support. She also noted that what happens in Milwaukee, WI will affect Chicago and what happens in Chicago will affect Gary, IN. She concluded that they formed this coalition of mayors in the Great Lakes to find better ways to protect the Great Lakes.

Ms. Jimenez expressed concern with invasive species and that the federal government has a role in preventing the introduction of invasive species through the ballast water of ships entering U.S. ports, particularly freshwater ports such as the Great Lakes. She was asked whether the Great Lakes mayors have made any recommendations on this. Ms. Jimenez responded that developing a recommendation to study the discharge of invasive species into the Great Lakes will be a priority at the meeting the mayors are having. She added that this needs to be addressed both at a national and international level and they need a body with enforcement and inspectors.

Commissioners commented that Ms. Jimenez indicated a desire for more federal support for sewage systems and asked her what funding would be required. She commented that stormwater management would be a high priority but they would need a study of what systems exist around the Great Lakes Basin before they came up with a dollar value. She said that there should be more federal support to replace the infrastructure that affects the Great Lakes.

In response to a question about the need for a regional coordinating body, Ms. Jimenez commented that the Great Lakes Charter allows for governors to have a voice on Great Lakes issues but that there is no avenue for municipalities that have to deal with day-to-day problems to have an input. She commended the governors for their work thus far on Annex 2001 to the Great Lakes Charter. She expressed that the original charter needs to be modified to allow for local involvement at every level of decision making that concerns the Great Lakes and noted that mayors and municipalities should have an equal vote. Ms. Jimenez added that the Great Lakes Governors Council has done a good job but she would like municipalities to be added to the table.

Mr. Donald Vonnahme commented that only through cooperation can the Great Lakes ecosystem be preserved and protected. He noted that they support the Commission's elements document, which lists ten elements to lead toward a robust national ocean policy. Mr. Vonnahme commented that the governors are doing a similar exercise to set priorities for the Great Lakes. He added that they have committed to a Comprehensive Great Lakes Restoration Plan to ensure that restoration activities are undertaken and that will also allow for economic growth of the region. Their plan has both short-term and long-term objectives and they plan to present their short-term goals to the public this fall. Mr. Vonnahme discussed the ten guiding principles that they believe are important. These included: 1) maximize reinvestment in existing core urban areas, namely transportation and infrastructure networks; 2) minimize the conversion of green space and the loss of critical habitat areas and open spaces; 3) limit any net increase in the loading of pollutants or the transfer of pollution loading from one medium to another; 4) protect and restore the natural hydrology of the watershed; 5) restore the physical habitat and chemical water quality to protect and restore diverse and thriving plant and animal communities; 6) encourage the inclusion of all economic and environmental factors into cost-benefit analysis; 7)

avoid development decisions that shift benefits and burdens; 8) encourage all new development and redevelopment initiatives to protect and preserve access to historical, cultural and scenic resources; 9) promote public access to natural resources; and 10) encourage the development and sharing of useful research information. Mr. Vonnahme recommended that the Commission give priority to the issue of invasive species because this is a serious problem in the Great Lakes today. He also commented that there is a growing concern over beach closures and that this problem has become more acute over the past three years. He noted that this problem may be reflective of changes of the Great Lakes ecosystem that they do not understand, and that requires expertise from the federal government.

Following his presentation, Mr. Vonnahme addressed follow-up questions asked by the Commission. Admiral Watkins noted that the National Governors Association is meeting in February and asked Mr. Vonnahme if he thought it would be useful to them to have the Commission speak before them at their meeting. Mr. Vonnahme replied that it would be a good vehicle and would be useful.

Commissioners asked Mr. Vonnahme how much the Comprehensive Great Lakes Restoration Plan will cost. He responded that they think it will probably exceed the cost of the Florida Everglades project but they have not estimated a dollar value yet. Commissioners noted that Mr. Vonnahme discussed tasking federal agencies for a research agenda and asked him to expand on this. He stated that a committee task force of the Great Lakes region has been meeting to see where the voids are and where the money is and that they will provide that to the Commission. It was noted that the Commission has been given dollar values from various panelists around the country and that priorities have to be made. Mr. Vonnahme was asked to give guidance for trying to set those priorities. He responded that this effort is being undertaken by the governors in the Great Lakes region. He added that of the eight states in this region, some governors put the economic concerns ahead of the environmental concerns and others put the environment ahead of the economy. Mr. Vonnahme stated that they do not yet have a set of priorities. He noted that in his testimony he discussed the ten short-term goals but they are still looking at priorities and that they realize it is capital intensive. The Commission asked Mr. Vonnahme to provide the Commission with information on their outreach and educational programs pertaining to water quality.

The question was asked about the need for a regional coordinating body, how it would have authority and if that authority would be listened to. Mr. Vonnahme commented that the Council of Governors is looking at the proper level of government and that this issue is being debated. He noted that even among the eight states in the Great Lakes region, there is disagreement about the level of government for a regional body and whether municipalities should have a vote. He commented that he thinks the preference of the other states and provinces would be to not let the voting level go below the state or provincial level.

Commissioners asked, in terms of water quality or quantity, if they can attribute effects to global change. Mr. Vonnahme responded that the current chief of the water survey has done some work on this and they have looked at long-term trends. He stated that they are getting predictions that it is going to get dryer and that it is going to get wetter. They have not been able to draw any conclusions.

Mr. Vonnahme was asked to explain the relationship between the various groups he discussed such as the Mayors Task Force and Council of Governors. He was also asked why he did not address the Great Lakes Commission or the International Joint Commission and why with these groups there is still a need for a separate governors or mayors group. He commented that he did not mention these other organizations because he was trying to keep his testimony within the time limit. He noted that they have tremendous connections with the Great Lakes Commission and International Joint Commission. He added that as far as having the primary responsibility, the governors feel they have this and they see themselves as being on the cutting edge. He noted that they utilize the Great Lakes Commission because they have a knowledgeable staff and have much expertise. The Great Lakes Commission provides research, ideas and studies but implementation is done through the governors. Mr. Vonnahme noted that the International Joint Commission brings Canada and the U.S. together and when they develop recommendations, sometimes they are embraced by the states and provinces and sometimes they are not. He concluded that the governors see themselves in the forefront and that it is their primary responsibility.

Commissioners expressed interest in the priority that Mr. Vonnahme gave to limiting net increase in the loading of pollutants or the transfer of pollution loading from one medium to another. It was noted that only a small part of Illinois contributes pollutants to the Great Lakes Basin and the majority of the state contributes pollutants to the Mississippi River Basin. Mr. Vonnahme was asked if the infrastructure exists to determine if there is a net increase or decrease in loading of pollutants. Mr. Vonnahme deferred to Mr. Toby Frevert, with the Illinois Environmental Protection Agency to address the question. Mr. Frevert stated that the majority of state does drain into the Mississippi River Basin. He noted that they could always use more help in monitoring pollutant loading. He commented that the pollutant loads going into the Great Lakes Basin were not as bad because they have successfully restricted the flow from developed areas. He added that in some neighboring states they could use a significant amount of assistance in monitoring.

Commissioners commented that they have heard much testimony regarding air pollution and the impact of air pollutants from the Midwest on the East Coast. Mr. Vonnahme was asked if he had any comments on views the governors have on this issue. In response, he commented that about two years ago there was interest from the natural gas industry who wanted to create gas-fired electrical generated plants. He said there was a large interest in this but that interest faded with the slow-down in the economy. He also added that they have a lot of coal in southern part of the state. He stated that they have three federal reservoirs they work with and now there has been enough interest in using coal instead of natural gas to power these facilities. However, he noted that they have high sulfur coal so it will be more difficult to clean up.

The Honorable James Connaughton – Chairman, White House Council on Environmental Quality

Following his presentations, Mr. James Connaughton commented on a number of issues raised by the Commission. Admiral Watkins discussed that at the Rio Convention, oceans did not get noticed and he is pleased that oceans were brought up on the agenda at the World Summit on

Sustainable Development in Johannesburg. He expressed that it was helpful for the Commission to get an update on what happened in Johannesburg from Mr. Connaughton. Admiral Watkins asked how receptive the Administration will be to the Commission's report. Mr. Connaughton responded that at the federal level, they are very interested to hear the Commission's thinking on horizontal integration, which could include outright changes or coordination. Mr. Connaughton offered the salmon recovery issue as an example of coordination. Salmon recovery has involved an effective regional body that has a corresponding group at the national level that provides direction. He added that there is a conservatism in government and once things are in place people often do not want to change the structure, so the Commission must take that into account in making realistic recommendations. He expressed that he is more and more in favor of the idea of regional entities. Mr. Connaughton also noted that if people are given specific, feasible performance outcomes, they tend to meet those goals. Mr. Connaughton stated that more ways should be found to offer incentives and increase motivation. He provided the example of Coastal America, which has restored massive amounts of wetlands by getting federal and state agencies together with the private sector by picking projects and working together. He discussed a dam removal project in Maine in which no one had the resources to take the dam down. To solve this problem, Coastal America found a reserve unit in Texas that needed to perform a training exercise and brought them to Maine, blew up the dam, and restored the wetland. This fulfilled a defense readiness need and restored the environment. Mr. Connaughton concluded that the Commission should focus on making recommendations that are challenging but realistic.

In response to a question about whether the U.S. would ratify the Law of the Sea, Mr. Connaughton stated that the Administration has made ratification a priority, that the ratification documents were provided to the Senate, and he was hopeful that with the new Senate, the Law of the Sea will get ratified. He added that the U.S. is largely implementing the Law of the Sea even though it has not yet been ratified by the Senate.

Commissioners noted that Mr. Connaughton discussed the Farm Bill and conservation. He was asked if there is flexibility in the Farm Bill to allow farmers to switch to different crops instead of using more fertilizer than might be needed. Mr. Connaughton responded that there is a new commitment to conservation and that they expect that to reinvigorate the watershed management discussions because the watershed management planners will have new priorities for setting goals to link together plans and resources among groups. He expressed that getting farmers and ranchers to talk together has an economic value.

It was stated that Mr. Connaughton expressed that at the World Summit in Johannesburg he had hoped that there would have been other things accomplished, and he was asked to discuss what those things were. He responded that he had hoped that there would have been more partnerships developed. He added that the U.S., during the planning process, introduced and promoted the idea of high-level partnerships among countries. He commented that he was disappointed that they did not have ten times as many of those partnerships in Johannesburg. He discussed that the U.S. worked with eight countries in central Africa to create things such as forest preservation and national parks. He commented that this was the first partnership of that scale of magnitude and it had real money that would help those economies grow in a more sustainable way. Mr. Connaughton commented that from a forward-looking perspective, they are done with the text and have the plan for implementation. They were able to demonstrate that

these high-level partnerships can be created. He concluded that now the only conversation left is about action.

Commissioners asked Mr. Connaughton for his thoughts on trying to coordinate various agencies and U.S. representation for the World Summit in Johannesburg. He was asked if there are changes that he would like to see occur. He commented that the United States' natural resource agencies such as the Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA) and the Fish and Wildlife Service (F&WS) are not responsible for the environmental outcome. He added that as the U.S. moves forward at the international level, there is a need to improve the accountability of the entities that own the projects that produce the environmental benefits. Mr. Connaughton stated that it is the finance, trade and development, and economic ministers who are going to be spending the money. He added that the environmental ministers should be providing the expertise but the economic ministers should be responsible. Mr. Connaughton gave an example of the need to get the commercial fishing industry together again. He commented that perhaps there needs to be regional economic councils rather than regional fisheries councils since they are accountable for the performance.

It was noted that Mr. Connaughton mentioned, in his testimony, that there is a call for strengthening science and capacity in marine science and he was asked to offer a deeper understanding of the administration's position. He responded that this is something that Admiral Lautenbacher focused on at the World Summit in Johannesburg. He stated that access and coordination of information systems is a high priority and that Admiral Lautenbacher is focusing on this. Mr. Connaughton commented that they are focusing on global ocean observing systems and how to construct that infrastructure, encourage other countries to recognize the need for this, and get them involved. He added that the excitement level has been reinvigorated. Commissioners asked Mr. Connaughton to provide more specific information in writing.

Commissioners commented that they are struggling with the best way to come up with a governance structure – whether it would be best to consolidate or coordinate. Mr. Connaughton was asked if there are any principles that should go into the development of models for coordination. He responded that top management commitment is needed and then key deliverables. He added that commitment to follow-up by the players involved is required. Mr. Connaughton commented that the Commission has the choice of creating a stand-alone body to implement. He offered some examples where the issue was too complex to create a stand-alone body. Both energy and climate are too complex to create a single body so they had to identify players that own the outcome. He added that this needs to be made a high-level priority and then the federal government should break the outcome into tasks and assign those tasks to state and local governments. Mr. Connaughton also suggested that each group only be assigned about two tasks so that people knew what they were doing and it was achievable. He added that everyone's role has to be defined and then there will be peer pressure for everyone to do their part. He stressed the need for shared responsibility over an outcome and to make the plans operational.

Commissioners thanked Mr. Connaughton for bringing an international perspective to the meeting. It was noted that a high percent of the population lives in coastal areas and yet with climate change, high percentages of those coastal ecosystems will be lost. It was asked if there

was discussion and plans looking 20, 50 or more years ahead to look at climate. Mr. Connaughton responded that these areas today are at risk and have been because man has settled and been productive a little too close to the shore. He stated that regardless of climate change, the action that is going to make a difference is combined land and water management. He added that the U.S. has learned a lot about flood plain management and yet there are still people living in flood plains. Very few places on the edge last longer than 50 years. Mr. Connaughton suggested that the U.S. needs to be smarter about the broader societal objectives and let more dynamic elements play out in the way intended by nature. He added that this is a philosophy around which everyone can act.

It was noted that Mr. Connaughton made reference to the U.S. leadership position internationally. He was asked what key issues the Commission should make sure are part of the report to assure that position. Mr. Connaughton responded that the key issues are capacity and education. He added that especially with the international focus, we have the luxury in America to do better and we have an ethic of doing better. In much of the rest of the world, they will not implement things the U.S. has because it is expensive, complicated and requires a free and open political environment. He commented that the tools we set for ourselves to achieve the outcomes are important and we should take education and capacity to achieve our objectives. Mr. Connaughton added that the U.S. should take successes from around the country and export the solutions. He commented that the evolution of farmers' productivity is stunning to look at and the remarkable capacity of farmers and the agriculture industry to adapt as they are taught to do better things. He added that the U.S. has to understand and develop approaches that are responsive to some of the cultural differences and barriers.

Natural Resources

Mr. William F. Hartwig – Regional Director, U.S. Fish and Wildlife Service, U.S. Department of the Interior
Mr. Cameron Davis – Executive Director, Lake Michigan Federation
Mr. Marc Gaden – Communications Officer, Great Lakes Fishery Commission
Dr. Thomas C. Johnson – Director, Large Lakes Observatory, University of Minnesota– Duluth

Once the panelists had provided their formal statements, they addressed specific issues raised by the Commission. Commissioners asked the panelists to address the issue of salmon being introduced to the Great Lakes and if these fish are reproducing naturally. Mr. Hartwig responded that lake trout is the species of interest. Lake trout should be the top predator and has been replaced in some parts of the lake with salmon, which is a great sport fishery but is not native to the region. Mr. Hartwig added that often the impact is unknown when the environment is altered and it is never certain what the outcome will be. He stated that sportfishers would like to see salmon stay there, but others want to restore the lakes to their natural conditions. Mr. Hartwig added that there is also an enormous potential problem if Asian carp invade the Great Lakes. Four fish species, known as Asian carp, pose an immediate threat to invade and expand within the Great Lakes through the Chicago Ship and Sanitary Canal, which connects the Great Lakes and Mississippi River watersheds. Commissioners asked Mr. Hartwig if salmon are reproducing naturally in the Great Lakes. He responded that Pacific salmon are reproducing in many areas of the Great Lakes. Mr. Gaden commented that they are trying to restore native species like lake

trout and are also trying to stock fish in the lake. The introduced species are not native so they have to rehabilitate the fish that are native.

It was noted that Mr. Hartwig recommended a mandatory ballast water management program for all ships entering the U.S. ports and the Great Lakes, so that risk of species invasion via ballast water is greatly reduced. Commissioners asked him to give more detail regarding this recommendation. Mr. Hartwig commented that he is supporting what has been recommended by other boards and commissions. He added that the Great Lakes already contain too many invasive species. Mr. Hartwig suggested what is required is to stop both purposeful and accidental introduction of non-native species, but more species will invade the Great Lakes via ballast water unless mandatory management programs are implemented. Once species have invaded, they must be controlled, and control costs are much greater than the costs of prevention. He noted that he hopes that can be done to prevent Asian carp and other species from invading the Great Lakes via all vectors. Mr. Hartwig suggested that more education and outreach is needed to either slow or stop the human-assisted spread of invasive species. Public outreach and education have slowed the accidental spread of zebra mussels from the Great Lakes and Mississippi River to nearby waters, and have helped prevent the spread of zebra mussels west of the 100th Meridian (which is an interagency goal). He stressed that education of sportsman, boaters, and others are vitally important to preventing the spread of most invasive species.

Commissioners expressed interest in Mr. Hartwig's recommendation that barriers to passage of native fish and other aquatic organisms should be either eliminated or modified to allow passage of those organisms to their historic habitats. He was asked if he has a specific programmatic initiative or if he was simply saying that ways to remove dams that block fish passage need to be found. Mr. Hartwig responded that he did not have a specific process recommendation but that he would offer some comments. He commented that most of the cases he has been involved with have been driven from the ground up. The Service works with local and state governments on fish passage projects. He added that there have been some projects that have been done at the local and state level and then they have had problems when they reached the federal level. Mr. Hartwig commented that the Federal Energy Regulatory Commission (FERC) has often slowed things down. He suggested that there be more local control and influence rather than having to go through something at the federal level that often takes five or ten years.

The question was raised about whether there is a governing structure present to address the Chicago Ship and Sanitary Canal issue and find an alternative to the existing electric barrier before the existing barrier fails. Mr. Hartwig responded that this is currently a local issue, but if it is not solved locally, it will be a regional, national, and international issue as well. He added in jest that Mayor Daley is part of the problem because he has done such a great job cleaning up the Chicago Canal so that fish now can survive and reproduce in portions of the canal that formerly could not support reproducing populations. Because it is presently a local issue, Mayor Daley has the opportunity to find a solution. The Service is willing to help the City of Chicago. The Canal was originally constructed to solve water quality issues. Mr. Hartwig commented that there is not a mechanism today to solve this particular issue and they do not have a board of governors with expertise to solve this problem. Mr. Hartwig expressed that the barrier technology presently employed is unlikely to be totally effective at preventing the exchange of invasive species between the Great Lakes and Mississippi River Basins. He stressed that we

need to design a state-of-the-science barrier, install that barrier quickly, evaluate the barrier, and adapt it as needed to prevent the interbasin exchange of invasive species.

Commissioners noted that they have heard from over 350 testifiers and at least 250 have used the words habitat, ecosystem and biodiversity imprecisely. Mr. Davis was asked if he could give an example of a biodiversity goal and how it is measured. He responded that a starting point would be the ability to provide a setting for indigenous species to reproduce in a viable way over time. He commented that sustaining biodiversity health is often a question of scale because restoring one acre of a wetland may not be enough for biodiversity sustainability but restoring a larger part of a wetland may. Mr. Davis commented that rehabilitating urban aquatic habitat is important because some of our best opportunities for bolstering viable populations of native species may be in reclaiming urban habitats. The Lake Michigan Federation has launched an Urban Aquatic Habitat Initiative as an experiment, with successes to be measured.

It was noted that the Lake Michigan Federation is involved with education and communication, which are issues that are important to the Commission. Mr. Davis was asked for recommendations, and responded that there are some lessons in what has been done and what needs to be done. He commented that ecological problems are becoming more complex. Mr. Davis expressed that it is important to communicate issues in ways that connect or appeal to the individual. He noted that most people in the region know what zebra mussels are but do not know how this invasive species will affect them. However, if the individual understood that their water bills would go up as zebra mussels clog pipes, it would have more meaning to them. Mr. Davis added that fewer people are reading the newspapers and instead relate to other media like magazines. He suggested that the Commission should recognize that and use these new types of media.

Commissioners commented on Mr. Davis' recommendation for bringing fish and wildlife habitat back into cities. He was asked if they are looking to the federal government for the majority of the funding for this. In response, Mr. Davis commented that federal funding sources exist but that they also will rely on funding from foundations. There are ten new foundations, though small, emerging in Michigan every month, many of which are dedicated to restoration of the natural world. He commented that building the costs of maintaining healthy ecosystems needs to be built into our economic systems so that actions that degrade coasts are not in effect subsidized is important from a governance standpoint. Commissioners commented that many foundations are experiencing declines in their ability to support efforts because of declining investment portfolios. Mr. Davis added that while bigger grants are becoming more difficult to obtain, the Federation is successfully stitching together smaller funding sources to achieve the same result. For example, instead of getting one $60,000 grant, the Federation is combining two $15,000 grants and one $30,000 grant for planning to bring habitat back to the Chicago lakefront.

It was noted that the Great Lakes Fishery Commission has a strong consensus process. Mr. Gaden was asked how things are moved forward if consensus cannot be reached and the process is dragging out. He answered that there is a provision for dispute resolution to bring an issue to a third party. He provided an example where there were disputes about a management issue in Lake Erie and Ontario. When they asked to solve this issue through dispute resolution, the federal government told them to try to reach a compromise. Mr. Gaden commented that they did

reach a consensus due to the fear of the federal government stepping in. He commented that perhaps the fear of the federal government drives it or perhaps chaos does. He added that peer pressure also helps create consensus because biologists have to explain why their agency does not agree with other agencies.

Commissioners asked Mr. Gaden about why they rely on the U.S. Geological Survey (USGS) to provide data they use in making their management decisions regarding fisheries considering this is a geological rather than a biological agency. Mr. Gaden explained that they rely on information provided by USGS because the research that was done was traditionally done by F&WS until it became the biological division of USGS. He added that they just changed logos but it is the same group of people. Mr. Gaden stated that it is critical data that fishery managers need in making decisions, but over time there has been erosion in the efforts of USGS to deliver the science. Commissioners asked Mr. Gaden to provide specific recommendations regarding this in writing.

Commissioners expressed interest in Dr. Johnson's comments regarding the lack of funding and infrastructure and observing system capabilities in the Great Lakes. In his testimony, Dr. Johnson stated that the participants from the NSF-funded workshop on the Science of Freshwater Inland Seas advocate the establishment of a separate budget of $10M per year in the Geosciences Directorate at NSF for large lakes research. In response to a question about whether this number included the cost for a new research vessel, Dr. Johnson explained that the figure does not include the cost for added infrastructure such as a new research vessel.

Admiral Watkins commented that the Commission has heard a lot about the need for good science. He asked Dr. Johnson to provide the Commission in writing with a breakdown of what would be addressed with the $10M per year budget and why they picked these as priority issues. Dr. Johnson commented that the Science of Freshwater Inland Seas workshop, which was held in July 2002, will be coming out with a final report that will be completed by the end of the year. The report will not be available until late January 2003. Dr. Johnson submitted a breakdown of the $10M budget by e-mail attachment to the Commission, dated 2 November 2002. This report will outline how they feel on the order of $10M per year. He commented that this is complimentary to the research and management activities in federal laboratories in the Gt. Lakes region and that there is a role for the academic research community to play in the mix of this. Their report is strictly about NSF funding. Most of their funding is from NSF but they also get some funding from Sea Grant, USGS and EPA. Funding from NSF is for basic research whereas funding from Sea Grant, USGS and EPA is for priority research based on specific research questions.

Non-point Source Pollution

Mr. Robert H. Wayland III – Director, Office of Wetlands, Oceans and Watersheds, U.S. Environmental Protection Agency
Ms. Sarah Chasis – Water and Coasts Program Director, Natural Resources Defense Council
Mr. Roy P. Bardole – Farmer, Rippey, Iowa
Dr. Dan Walker – Senior Program Officer, Ocean Studies Board, National Academies
Dr. Dennis R. Keeney – Senior Fellow, Institute of Agriculture and Trade Policy

Following their formal presentations, panelists addressed questions raised by the Commission. Panelists were asked to list what they thought were the three major pollutants for the Commission to address in dealing with nonpoint source pollution issues. Mr. Robert H. Wayland III listed pathogens, sediment, nutrients and invasive species; Ms. Sarah Chasis listed nutrients, toxics and pathogens; Mr. Roy Bardole listed soil, nitrate and phosphorus; Dr. Dan Walker listed nitrate, phosphorus and mercury; and Dr. Dennis R. Keeney listed nitrate, phosphorus and mercury.

It was discussed that the Commission conducted a site visit in the Chesapeake Bay region and met with the Chesapeake Bay Foundation. It was noted that the Chesapeake Bay Foundation stated that from a scale of 1 to 100, they are at a 27 in terms of getting better. They are having problems with nutrients coming from the west, sewers dumping waste into the Chesapeake Bay and nonpoint source pollution coming from farms. Commissioners noted that this appears to be a daunting problem because cities do not have money to clean up their sewer systems and 97% of the land in the Chesapeake is owned by individuals. Commissioners commented that it seems that the easiest of the three is to improve the sewer systems in the U.S. Commissioners asked the panelists for recommendations.

Mr. Wayland commented that it has taken a long time to get where they are and will take a sustained effort and getting the general public to understand the three key problems the Chesapeake Bay faces. However, there already are a variety of groups in the Chesapeake Bay that are trying to get the public to understand these things, such as the Chesapeake Bay Program. He commented that he thinks some of the environmental education efforts are beginning to pay dividends and those efforts need to be continued. Mr. Wayland noted that most of the areas of the Chesapeake Bay are served by upgraded sewage plants and that aspect is being addressed. He added that improvements need to be made with respect to nonpoint source pollution and there needs to be a better mechanism to target agriculture for conservation. Ms. Chasis commented that public understanding of these issues is fairly recent and the Commission's report will contribute to increasing public understanding. She commented that these issues could be addressed without creating whole new programs. Ms. Chasis added that it is going to take time. Dr. Walker commented that humans have been loading the landscapes for decades and these nutrients are incorporated into the landscapes. Many of the aquifers in the Midwest have elevated nitrate levels and they will continue to leak nitrate for some time. Dr. Walker stated that one of the frustrations is that they reduce fertilizer levels but the concentration in the rivers does not go down. He commented that they may not be targeting the right sources or waiting long enough to see change. He added that he cannot overemphasize the importance that what works in one watershed is not going to necessarily work somewhere else. Dr. Walker echoed Ms. Chasis' comment that it is going to take some time.

Commissioners commented that Mr. Wayland concluded that technology exists but motivation is lacking, but stated that they did not get a sense from his testimony where the Commission should go to fix this. Mr. Wayland commented that he is operating under some constraints but that he agrees with many of the recommendations that Ms. Chasis made. He noted that it was interesting to hear Mr. Connaughton talk about the coordinated effort of Coastal America. He commented that he found it valuable to collaborate and develop joint programs because people want to get the job done and realize that their own authorities and capabilities are insufficient.

He added that additional resources would, for the most part, overcome the other problems. Mr. Wayland expressed that it is not necessarily a structural problem as much as an issue of fostering partnerships and rewarding them. He commented that he wished that in addition to a stick they gave more carrots; there are not many incentives, and this might be a valuable addition. Ms. Chasis added that currently, the penalty is to withhold funds so their recommendations are to look at some other things. Mr. Bardole commented that Natural Resources Conservation Service (NRCS) should be funded adequately. Part of what is being discussed by their new chief is trying to decide how to implement the conservation title of a new Farm Bill. Mr. Bardole commented that part of that would include paying farmers and he thinks funding is in the wrong place. Dr. Keeney echoed that funding is a little misdirected in the Farm Bill and that needs to be looked at. Admiral Watkins asked Dr. Keeney to provide more information on this to the Commission.

Commissioners commented that Mr. Wayland used the number 40,000 for TMDLs and asked him what this number represented. He explained that there are 40,000 TMDLs that need to be done. Mr. Wayland was also asked what is being measured in a TMDL, how it is being measured and who pays for that measurement. He responded that state water quality agencies are responsible for much of this work because they list water bodies and determine pollutants. He commented that TMDLs do not have to be developed for water bodies that are impaired from things other than pollutants. They require states to provide a methodology prior to when they submit a listing of their waters to know how they interpreted their standards. Mr. Wayland noted that state agencies and the federal government, through grants provided by EPA, are the ones who pay. He added that it is a significant challenge to make this affordable and that they have increased grants over the years. They also do extensive cost-analysis in the TMDL process.

It was noted that TMDLs have been described as the best game in town since it is the only game in town and that TMDLs are about as effective as the single species management plans for fisheries. Commissioners asked about what EPA is doing within its research division and how much of a priority is being placed on finding a better method. Mr. Wayland responded that it is an area that is getting increased attention. He expressed that the consulting community is putting a great deal of energy into creating new models. Mr. Wayland also stated that they want states to implement their programs such that they look at all of the stressors within a watershed. Mr. Wayland was asked to provide the Commission with a priority for where this falls within EPA's research agenda.

Commissioners commented that a number of the panelists pointed out that they need more money or that the money is in the wrong place. The question was raised that it may be a structural problem rather than a lack of money. Commissioners noted that Ms. Chasis did a good job of laying out some specific proposals but all of those proposals were for the improvement of current agencies. She was asked to indicate whether some structural changes are needed since she described mostly programmatic and statutory changes. Ms. Chasis responded that there is a need for a stronger ocean agency in the federal government, which would help in addressing some of these issues and increase public visibility. She expressed that there needs to be not only more coordination but also a stronger agency that can be an advocate for the oceans in the U.S. She commented that politically it is a tall order and she is not sure if she would rather see that

structural change than some of the other changes she recommended. Mr. Bardole added that government agencies have to talk to each other as well as among themselves.

It was noted that Dr. Keeney made a comment that to successfully develop working landscapes requires a strong partnership which would include landowners. Commissioners also noted that they have heard from EPA that for the Clean Water Act nonpoint source program, community level involvement can be an important tool for engaging support. The question was asked about what the Commission can recommend to involve the landowner. Mr. Bardole responded that the Commission must deal with the problem and its source. He commented that problems must be dealt with on a small watershed basis and the leaders in that watershed must be involved. He added that those leaders and the watershed group can apply pressure to get landowners to come on board as part of the solution. Mr. Bardole stated that the solution has to come at the small watershed level with a carrot; government programs must cease to punish the good guy and instead should reward the good guy and punish the bad guy. Mr. Bardole stressed that currently, farm programs pay the person who has been doing the wrong thing.

Commissioners expressed interest in the recommendations Ms. Chasis made for Best Management Practices (BMPs). Mr. Bardole was asked about whether he thought these recommendations are realistic. He responded that he strongly supports planting winter cover crops, which greatly reduces the leaching of nitrate. Mr. Bardole commented that wetland restoration is very important and he would support returning marginal farmland to wetlands. He noted that wetlands are a sore subject because if it were not for field tile, there would be wetlands all over, and wetlands are the best processor of nitrate. Mr. Bardole stated that wetlands need to be placed where they will do the most good. He also agreed with the recommendation for increased vegetative buffers to intercept tile drainage from farm fields. He commented that he agrees with reducing the nitrate input from farms, but they do not yet have an understanding of the agronomic rates, so that is the only recommendation he has an issue with.

Dr. Keeney and Mr. Bardole were asked if there is a trade-off in terms of output of nitrate for incentivizing the growing of corn for energy. Dr. Keeney responded that there is a trade-off and that thinking should go beyond using corn for ethanol. He added that there are markets for green energy, and there could be markets for green ethanol as well. He suggested that ways to grown corn without the release of more nitrate should be looked into. Mr. Bardole commented that he is a firm believer in economics and he does not believe corn is the most efficient way to make ethanol. He added that what is driving corn to more acres is not ethanol, it is the farm program and since they grow more corn, they have to do something with it.

Admiral Watkins commented that the Ocean Studies Board of the National Academy has produced a number of reports, some of which are very broad. He noted that there is no receptor for those reports and that the Commission is currently undergoing a study to review a number of National Academy reports to look at what has been done regarding their recommendations. Admiral Watkins asked Dr. Walker what he suggests the Commission do to implement the policies that the National Academy has recommended. Dr. Walker responded that by their nature they are independent of the process but they have done a lot with educating Congress on these issues. He added that many of their studies are now jointly funded. Dr. Walker commented that they are seeing the same problems over and over again and they are addressing

them because it is difficult for agencies to coordinate and implement actions even when they agree on what should be done.

Dr. Walker was asked to provide the Commission with more information in writing regarding long-term monitoring and how it might be linked with other observing systems to get one data system.

Commissioners commented that the biggest surprise with the National Academy report, "Oil and the Sea" was the large percent of oil that comes from nonpoint sources such as recreational boating, marinas, 2-stroke engines and aviation fuel dumps. Dr. Walker commented that the two earlier "Oil and the Sea" studies identified nonpoint source pollution as a source and in terms of other sources, they tried to be more comprehensive in the third study. He added that new designs are already on the market for engines and industry is responding to the recognition that they need to reduce those effluents. Dr. Walker commented that they have to recognize the huge uncertainty, which goes back to the need for monitoring. He noted that they have to understand where to target their efforts. He added that sharing of data that is collected is important. Dr. Keeney commented that there are global problems, which require local solutions. He added that EPA does a good job in their field offices but they do not have the agriculture mandate. He recommended getting people out of their offices and out on the land. Mr. Wayland commented that he is very proud of EPA's role and participation in wetland restoration in Louisiana. He added that the ACOE, NOAA, EPA and the state of Louisiana are all participating in this process. Mr. Wayland stated that he believes that coordination mechanisms at the watershed scale are producing remarkable results and there should be more examples of them.

In response to a question about how much priority and effort, in terms of money, the Department of Agriculture and the research community is investing in BMPs, Mr. Keeney stated that not enough is being done and that priorities are toward improving production.

Governance

Dr. Frank L. Kudrna – Member, Board of Directors, Great Lakes Commission
Mr. James Chandler – International Joint Commission
Dr. William Eichbaum – Vice President, Endangered Species, World Wildlife Fund
Mr. Jeff Gray – Manager, Thunder Bay National Marine Sanctuary and Underwater Preserve

Following their presentations, the panelists answered questions on a number of issues raised by the Commission. Commissioners expressed interest in Dr. Kudrna's recommendation that consideration be given to the structure provided in the Water Resources Planning Act of 1965 as it related to the formation of a national system of (multi-state) river basin commissions and a federal U.S. Water Resources Council. Dr. Kudrna was asked if the Commission should look at this as a potential model and if he could elaborate on the lessons the Commission could take from that model in approaching watershed or ecosystem-based management. He responded that the concept is good in that it has a clear charge for states and the federal government. However, he expressed that there are problems with this model because it was dominated by federal partners.

Mr. Chandler was asked if, under the Boundary Waters Treaty, there is enough monitoring and data acquisition to pinpoint sites of major pollution. He was also asked, if there has been, what are the regulatory authorities or enforcement powers of the International Joint Commission. Mr. Chandler responded that they do not have any regulatory authority or enforcement power because the International Joint Commission is advisory. He commented that some points of pollution are well known but there are so many of those sites that it is beyond the stage of pointing fingers. The problem is it is extremely expensive and except in a few areas in the U.S. where certain Members of Congress have had a lot of influence, it is hard to make progress. Commissioners asked Mr. Chandler whether Canada would want to be part of a monitoring system that the U.S. created. He responded that he thought they would want their own separate monitoring system rather than just being part of ours.

Commissioners asked Dr. Eichbaum about the report "Striking the Balance," particularly with respect to regional councils. It was noted that the report makes a suggestion for ad hoc regional councils but that in his testimony, Dr. Eichbaum did not recommend ad hoc councils. He was asked to comment on this, the size of regional councils and who the representatives on the council would be. Dr. Eichbaum responded that the view of the committee was that initially councils should be ad hoc and temporary in the sense that they would operate as long as it takes to address a problem or set of problems and they need not address the marine environment of the entire U.S. He added that it could be from a downwards process triggered upon determination that a national interest was not being met. He stated that they looked at several case studies. In one case study, they looked at fisheries in New England. He commented that if someone had been able to intervene in a reasonable way, they might have ended up with different results with respect to fisheries in New England. Dr. Eichbaum addressed the question of who should be on the council by saying that it should be a political process and that members of council probably need to have political leadership. He gave the example of the management structure in the Chesapeake Bay where there are political leaders but immediately under them are a science board and a public board that are involved. He commented that this is how unwieldiness at the council level would be avoided.

Commissioners asked Dr. Eichbaum about his comment that when local government cannot come together, the federal government has to address the issue. He responded that a national council should set priorities in a limited number of areas. They should define critical national interests in the marine environment. He commented that there is a need to have a regional and local response. Only in the case of failure would the federal government monitor progress of the regional and local levels in order to ensure that the regional council carries out their objectives.

Commissioners expressed that the regional fish councils in Alaska work well and asked Dr. Eichbaum to be more specific about the question regarding the recommendation of "Striking the Balance" to set up ad hoc councils. Dr. Eichbaum responded that the current role of the fishery management councils could be modified where fishery management has been ineffective. He gave an example of wind generation of energy where that requires removing areas that are available for fishing. He commented that solving these conflicts could be a role for this type of council. The council could address improving habitat and dealing with habitat issues that would produce more resources.

Dr. Eichbaum was asked to elaborate on his use of the term refugia. He responded that that term means a no-take-zone or "parks of the sea." He commented that this term differs from an MPA because there are MPAs that do not exclude all uses. There are many uses that go on in some sanctuaries. He commented on the Dry Tortugas, which is a 180 square mile area that was supported by commercial and sport fishermen because of the benefits to fishing outside of the refugia. Dr. Eichbaum stated that the Dry Tortugas would not have worked if it were not for an overall plan for the sanctuary and working with all the stakeholders. He added that now at World Wildlife Fund, they are taking fishermen from that process to see if it would make sense to create refugia in other areas.

The question was raised about when it is better to create a council than to clarify within the government which agencies are responsible for particular jobs. Dr. Eichbaum was asked what guidance World Wildlife Fund had on this issue and what criteria they used to determine whether a regional council should be used. He was also asked what powers a regional council should have. He used the wind-energy issue as an example. He commented that it is conceivable that a national marine council could decide that the issue of generating energy from wind is an important national objective but the issues that are inherent in location (biological, economic, aesthetic, and conflicts with other uses) are more appropriate to deal with at the regional level. There should be a regional council dealing with these regional issues. He added that if the federal government decided it does not care about these conflicts, it would be a local issue and decisions should be made at the local level.

Commissioners asked Dr. Eichbaum if there are any coherent principles that would be applied to this structure regardless of the situation. He replied that the structure should be used when: 1) there is a critical national interest that is not being addressed due to inadequacy or indecision at the regional/local level or 2) a local interest could be elevated to a national level issue. Dr. Eichbaum discussed estuary programs such as the Chesapeake Bay estuary program which began as a local issue and then was elevated to a national level issue through the National Estuary Program.

Admiral Watkins commented that the Commission is looking at issues such as nonpoint source pollution, fisheries, coastal zone management and water quality. He stated that the Commission is being encouraged to take on the issue of ecosystem-based management. Admiral Watkins commented that when a marine council is set up on a national level, there needs to be regional ecosystem management as well. He asked Dr. Eichbaum if that exists today where all those groups get together to deal with these issues. Dr. Eichbaum responded that this is fairly effective in the National Estuary Program. He commented that he believes there is an important and growing role to organize government around eco-regional concepts. He added that he is equally persuaded that a system of governing a marine environment should not try to reach into the structures of government that manage terrestrial ecosystems. He commented that this would be too cumbersome and would attempt to integrate separate things. Dr. Eichbaum stated that there is a line that should be drawn at the shoreline. Commissioners raised questions regarding this since the Commission is looking at coastal zone management and the need for a watershed plan that looks at land impacts on water. Dr. Eichbaum was asked to comment on those linkages. He responded that the committee was primarily focused on improved government and less concerned with maximizing effectiveness of the land side to protect the marine environment.

They did not view that as within their charge but he commented that it is probably within the Commission's charge. He commented that if he was recommending a governance plan, he would look at the marine environment and then look at how to build linkages between the terrestrial system and the marine environment.

Commissioners commented that Dr. Eichbaum mentioned stopping at the coast but that maybe this Commission should not. It was noted that one issue that the Commission will need to look at is anadromous fish, which would require managing habitat in coastal and inshore areas. He was asked what kind of structure would be ideal for dealing with these issues. Dr. Eichbaum answered that when there is a discrete issue and certain players need to be brought together, management could go across sea and land but for a general system the committee thought that would be too broad. Commissioners commented that millions of dollars have been spent on salmon recovery and there is very little coordination for habitat restoration because there is no one to pull them together and doing that spontaneously is asking a lot.

Interest was expressed in Mr. Gray's presentation because this was the first formal presentation on underwater archeology that the Commission has had. Mr. Gray was asked to provide, in writing, specific recommendations that the Commission should consider for underwater cultural resources.

Commission Business

Approval of Minutes of June 13-14, 2002 Meeting

Commissioners approved the minutes of the June 13-14, 2002 Meeting without changes. The minutes will then be subject to review by the panelists at those meetings who will be given an opportunity to recommend edits. Once finalized, the minutes will be posted on the Commission web site.

Report of Working Group Chairs

Research Education and Marine Operations:
Dr. James Coleman reported that by the October meeting the Research Education and Marine Operations Working Group will have draft recommendations completed. He discussed what they accomplished at their working group meeting in Chicago. They reviewed the CORE education survey, which gave them a good view of where they stand with regard to educational facilities. They also reviewed a white paper on education by Sharon Walker. They made a few recommendations to her on the white paper which she will incorporate. Dr. Coleman also commented that they discussed the need to translate research into educational programs. They also discussed the facilities assessment, marine commerce and transportation. Dr. Coleman also stated that they sent a letter under Admiral Watkin's signature to the state governors requesting information about facilities at the state level. At the federal level, they made requests to federal agencies regarding facilities. In the area of research, they discussed several models and research needs. He commented that they need to look at stewardship areas and see what the Stewardship Working Group defines. They also discussed the role of federal research and will ask for a white paper on this topic from staff. They are also pursuing a white paper on ocean health. Dr.

Coleman commented that they discussed ocean observing systems and that they have conflicting views on the proper role and where it should be housed. He added that they defined the purpose of the system and that it has to be based on the needs of the region and they will look at the National Weather Service model. Last, the Research Education and Marine Operations Working Group looked at exploration and agreed that it is an integral component of science, has large appeal to the public and is valuable for education.

Stewardship:
Dr. Paul Sandifer announced that the Stewardship Working Group meeting in Chicago focused on water quality, pollution and monitoring issues with two scientific experts. He added that today they have heard a lot of testimony on nonpoint source pollution. They focused on nonpoint source pollution issues at the working group meeting and tried to determine what direction their recommendations will be going. Dr. Sandifer added that they discussed a draft for a mechanism to deal with living marine resources issues. They also discussed work that needs to be done and timelines. In addition, the Stewardship Working Group addressed definitions of terms such as ecosystem management, the precautionary approach and biodiversity. They also discussed the need for additional information on informal education. Mr. Ted Beattie and Dr. Robert Ballard will be working with Dr. Michael Orbach from the Commission's Science Advisory Panel on the topic of informal education. Admiral Watkins noted that the living marine resources section of the midterm report takes up a significant number of pages and asked Dr. Sandifer how they are dealing with all this. Dr. Sandifer commented that the volume reflects the importance of living marine resources to the public. He added that they are trying to deal with the largest issues and are stressing the utilization of science and management and regional programs that are consistent but allow as much local decision-making as possible.

Governance:
Mr. William Ruckelshaus reported that the Governance Working Group has developed responses to coastal zone management issues that they have been charged with looking at along with nonliving marine resources. He commented that they are looking at the potential recommendation for a coordinating body. They looked at how a coordinating body might assist them with solving these issues and principles to guide the governance recommendations they might make. He added that they have not come to any conclusions about what those principles might be. The Governance Working Group also looked at substantive issues including sediment, nonpoint source pollution, land use planning, hazards and habitat restoration. They looked at how these issues would fit with a coordinating body.

The meeting adjourned for the day at 6:00 p.m.

THURSDAY, SEPTEMBER 26, 2002

Welcome

The Chair called the meeting to order at 8:30 a.m. and introduced the members of the first panel.

Invasive Species

Ms. Lori Williams – Executive Director, National Invasive Species Council
Dr. James T. Carlton – Director, Williams College-Mystic Seaport – Marine bioinvasions: Vectors, invasion pulse, and strategies
Mr. Richard Harkins – Vice President of Operations, Lake Carriers' Association
Dr. Jeffrey M. Reutter – Director, Ohio Sea Grant College Program and Stone Laboratory– Invasive species: Their impact and our response

Following formal statements, Admiral Watkins remarked on the need to examine investment strategies for managing invasive species. He asked the panelists if invasive species management plans have been costed out. He assumed that these plans have research components and requested the panelists submit estimates of the costs of high priority research components. He also requested that the panelists submit to the Commission their views on current invasive species legislation.

The Commission noted that there are differences in how the introduction of invasive species is addressed that are similar to the different ways point and nonpoint source pollution are addressed. It was indicated that the control of ballast water exchange from ships seems to be occurring more successfully than the introduction of invasive species by other means, such as by sushi restaurants and aquarium dumping. In the second case, a massive public education campaign may be needed; however there is currently no federal support for this kind of initiative. The Commission also recognized the need for monitoring and rapid response strategies. The panelists were asked if any strategies were being looked at to address these issues.

Dr. Carlton noted a grassroots effort as an example of a strategy to address invasive species that would not have been thought up by state government. His example involved a Pew Oceans Commission report on introduced species that described several ways in which nonnative species are introduced in coastal waters. One of the methods of introduction described in the report involved the introduction of invertebrates that live in the seaweed used to pack and send crabs from the East Coast for use as bait on the West Coast. After reading the report, he stated, a dealer inserted a label into every package of seaweed that warned the recipient against discarding the seaweed into San Francisco Bay. Dr. Carlton remarked that invasive species introduced by different vectors require different strategies. He noted that there has been much discussion on developing ways to rank or weigh the significance of the different kinds of vectors. The key question, he stated, is how to measure the strength and the pulse of the vectors and also which species are likely to travel in each of these vectors.

The Commission asked the panelists at what point an invasive species become native. Dr. Carlton responded that humans have dissolved all barriers of time and space in the introduction of nonnative species. Many of these species, he stated, would never have arrived at these

locations naturally. He remarked that humans have radically altered the process of natural migration. The transition from nonnative to native transcends human generation time. He remarked that 100 to 200 years does not an indigenous species make. He commented on the sliding baseline syndrome and noted that humans tend to reset their perception of what is natural from one generation to the next at zero.

The Commission stated that education is a very important issue and complimented the panelists for making it a priority in their testimony. In follow-up testimony, it was asked that the panelists be as specific as possible on the role of education in addressing invasive species. The panelists were asked whether there are examples of current, effective education initiatives. Dr. Carlton responded that the New England Aquarium in Boston displays information on invasive species, as does the Bishop Museum in Honolulu. Also, there have been exhibits and programs scattered throughout the country on this issue. He stated that a national coordinated effort and a uniform outreach approach would be welcome. The Commission added the Lake Erie project described by Dr. Reutter as another example of a successful initiative and asked if there were models to look at from that effort.

The Commission asked about the science used for invasive species risk assessment. Dr. Carlton responded that there are people employed as risk assessment professionals. He noted, however, that risk assessment works best when vectors are known. The challenge is with species that have no prior history of being invasive, because in their native location, they are not noxious. Therefore, when an apparently benign species is on a vector, the challenge is knowing how the species will respond to its new environment. The problem is compounded by the fact that more than one species may travel on the same vector at the same time.

Dr. Reutter remarked that there is not enough risk assessment work being done. He noted the case of the introduction of the zebra mussel as an example. It has become clear through DNA sequencing that the mussels were introduced multiple times from multiple locations. As a result of DNA technology, there is now a better sense of where the species are coming from, i.e. we know the locations of many of the high-risk ports or where introductions often originate. He commented that there is also a need to look at the ballast compartments of ships. Because these compartments cannot be cleaned completely, they continue to have the potential to introduce invasive species. He noted that it was initially thought that the environment within the ballast compartments would be a lot less hospitable to nonnative species than what they are currently finding, An important questions now is to determine what other species are poised to invade and from where, and use that information to prioritize prevention efforts.

Dr. Reutter remarked that the National Sea Grant College Program focuses tremendous efforts on outreach initiatives. He noted, however, that the total budget for these types of educational efforts is not enough. Dr. Carlton echoed Dr. Reutter's comments and noted that Sea Grant is given only about $2 million to fund entire national efforts. This, he stated, presents a huge challenge. Admiral Watkins stated that the Commission needs to be aware of situations like the one faced by Sea Grant. He noted the insufficiency of Sea Grant's current funding to provide nationwide education on important issues. He requested additional data and trends to support these findings. He remarked that it needed to be pointed out why the influx of invasive species in areas like the San Francisco Bay is so bad. The Commission, he stated, would be better able

to help this situation if a strong case was made. The Commission echoed Admiral Watkins statements and strongly encouraged the panelists to provide more details on the problem of invasive species. It was requested that the panelists describe more thoroughly why research and education are important.

The Commission reiterated the need to examine investment requirements of a strong invasive species education and prevention program. It was noted that the Commission supports the efforts of the National Sea Grant College Program, but that they are concerned that the program is not experiencing a lot of growth. What would be helpful for the Commission is a statement by the panelists of what a strengthened program would do for the nation. Dr. Reutter remarked that he would respond to part of this request now and part in a follow-up statement. He referred to the current $62 million in federal funding for the national program as "decimal dust." He remarked that the program is a wonderful model that works through partnerships to address almost every coastal issue and that the program focuses on human health, the economy, and the environment through research, education and outreach.

In response to a Commission request for a model of a successful education initiative, Dr. Reutter referred to a recently submitted proposal that addresses education on aquatic nuisance species for a mass audience. An example of a strategy included in the report involves setting up informative signs in areas where visitors to zoos and aquariums stand in line. He referred to the term "edutainment" which means educating people in an entertaining fashion. The Commission requested a copy of his proposal.

Ms. Williams remarked that the problem with nonnative species is not just that they are from somewhere else. She recommended that focus be put on the harm caused by introduced species on human health, the economy, and the environment. She went on to note two objectives of the National Invasive Species Council, of which she is executive director. One objective is for a public education campaign. The other is for the coordination of current efforts to control invasive species. She remarked that the federal government has not been successful on these two points.

The Commission asked Ms. Williams whether any broad sensitivity analysis has been done in regards to where restricted resources should be allocated to address invasive species. It was asked whether there has been any analysis done on the biggest fouling risks. Ms. Williams noted that it was difficult to rank pathways and that there is a lot of uncertainty. Ballast water, she stated, has come up first on the list and it has therefore been given a lot of attention. She remarked that an attempt has been made to form a federal cross-budget initiative that includes an attempt to coordinate and identify high priority federal programs and expenditures. She also stated that the Aquatic Nuisance Species Task Force has identified priority research areas. She noted, however, that they are still talking about a very small investment in this problem.

The Commission commented that there have been several proposals for a coordinating council for ocean governance. It was also noted that, in the area of invasive species, such a council exists—the National Invasive Species Council. The Council is co-chaired by three federal agencies, was established by an Executive Order, and has a non-federal advisory council. It was asked whether the Council is a good model and whether there are structural problems in dealing

with the issue of invasive species that have had to be overcome by the Council. Ms. Williams stated that the Council has been in existence for two years and that they are still learning. She acknowledged that a mechanism for federal coordination is essential, but it is not the only thing. She stated that the Council is mandated to coordinate with the Aquatic Nuisance Species Task Force and not to replicate their work. She stated that through the work of the Council and the Task Force, the necessity of regional panels has become apparent. She noted that there needs to be some kind of regional look at the system. One of the features of the Council is that it involves the participation of the heads of several key departments and agencies. She recommended the NSTA as another good model.

In regards to ballast water control, the Commission asked Mr. Harkins about the establishment of standards recommended in his testimony. It was asked whether he believed mandatory standards would have more of an effect than voluntary measures. Mr. Harkins noted that the proposed changes to the National Invasive Species Act prescribe mandatory ballast water exchange standards. He noted that this provision represents the only mechanism available today to adequately control this form of nonnative species introduction.

The Commission remarked on the challenging problem of a lack of standards for ballast water exchange technology. It was noted that the International Maritime Organization struggles with this issue as do other groups. Mr. Harkins was asked whether these types of organizations may play a potential role in working on the technology problem. Mr. Harkins responded that there is not a lot of research being done on ballast water exchange technology and that the research that is taking place is not coordinated. He noted that Lloyd's Register is involved, but that the American Bureau of Shipping (ABS) is not. The role of ABS, he stated, is vessel safety, which is challenging to join with ballast water exchange planning. However, ABS and other class societies will have a big interest in the results of the research. He also expressed the need for insurers to become involved.

The Commission remarked that mid-ocean ballast water exchange will most likely become mandatory. It was noted that if the IMO does not endorse such standards, they will be developed and implemented by the U.S. Coast Guard. Mr. Harkins stated that two sets of standards were created two years ago which have to do with the size and type of species transported in ballast water. Since that time, no additional standards have been developed. He commented that the IMO would not act as quickly as the U.S. in setting these types of standards.

The Commission asked whether or not there were examples of how other countries have effectively managed invasive species to look to as models. Mr. Harkins responded that different countries have different regulations for ballast water exchange. The NISA bill, he stated, contains specific required management practices. He remarked that he does not know of any other country that has anything better at this point and that he anticipates that the amended NISA will address this quite well.

The Commission requested additional statistics from the panelists beyond what was provided in the written testimony and that specific mention is given to the rapidity at which the introduction of nonnative species is taking place. It was also asked that the panelists address the introduction

of Atlantic salmon in the Pacific Northwest and whether this event was intentional or inadvertent.

Admiral Watkins concluded the session by asking that the panelists provide the Commission with more details on current management plans, the new NISA bill, current and planned education initiatives, and investment needs.

Education

Dr. Eric Lindstrom – Director, Ocean.US—NASA's success in engaging the public on Earth and space science education
Dr. Wendell Mohling – Associate Executive Director for Professional Programs, National Science Teachers Association—Where are we going in science education?
Dr. Bruce Carr – Director of Education, American Zoo and Aquarium Association – America's aquariums: roles, capacities, and partnerships for ocean education
Dr. Paul Boyle – Acting Director, New York Aquarium and Director, Osborne Laboratories of Marine Science

Following their formal statements, the Commission remarked that it has been a challenge to determine how to inspire responsible behavior among members of the public. Dr. Lindstrom's point was noted by the Commission—that NASA's efforts at outreach and education were fueled by Neil Armstrong's walk on the moon and the nation's overall zeal for adventure at that time. Dr. Lindstrom was asked whether he thought that NASA had acted to propagate the nation's excitement for space science with investment in education and outreach activities. More specifically, Dr. Lindstrom was asked to provide an estimate of the percentage of NASA's budget dedicated to education and outreach so that a comparison could be made with similar efforts on the part of the ocean science community.

Dr. Lindstrom indicated that a large number of NASA projects have budgets that specifically identify money to be used for education purposes. He noted as an example the TOPEX/Poseidon program, which has the largest education and outreach budget for a satellite program in NASA history. The program, he stated, has created a large response from a cross-section of society interested in the program's data products. The Commission remarked that, in the case of most other agencies, programs specific to education and outreach in the agency's budget would be the first programs cut. It was stressed by the Commission that the ocean community have the capability to make improvements in investment for education across agencies. Dr. Lindstrom noted the importance of education and outreach in moving from research to application. He stated it should be stressed that education not be thought of in isolation from other program components.

Dr. Lindstrom was asked if the public excitement generated by NASA for science and engineering was planned or just something that happened. Dr. Lindstrom responded that he did not believe it was planned. Rather, the public found role models within the space program and became interested in the scientists' background and expertise.

Dr. Lindstrom remarked that the National Oceanographic Partnership Program (NOPP) is headed in the right direction in terms of its sponsorship and coordination of education and outreach efforts. He remarked that NOPP has reached out to many organizations in support of these kinds of programs. In his experience with NOPP, Dr. Lindstrom told the Commission that the need for national standards to be established for outreach initiatives became apparent. He noted the need for a public visions to be expressed in the process of program development with the help of the National Science Teachers Association (NSTA).

Dr. Mohling responded that the NTSA agrees with this idea and that standards are meant to give visions and guidance—not a rigid curriculum. Dr. Mohling was asked if the NSTA was involved in national-level collaborative work with other agencies besides NASA. He responded that the NSTA is involved with several, but not all agencies. He noted that several groups associated with NSTA have also been very involved with many agencies.

Dr. Mohling remarked that the NSTA sees value in dedicating part of an agency's budget for education purposes. He indicated that NASA has aligned many of its programs with national teaching standards, and in so doing, assisted NSTA efforts in providing enhanced strategies for teaching math, science, and other subjects. He stated that he would like to see similar budget allocations for education programs be made in other agencies.

Dr. Boyle noted that it would be valuable if a mechanism were put in place that allowed education components to be included early on in program development. Having people experienced in outreach and education involved from the onset, he noted, would allow lessons and strategies learned from previous efforts to be applied to future efforts. Admiral Watkins agreed that education should be a key part of program development. There are tremendous educational opportunities associated with ocean programs, he said, but the ocean community is fractionated unlike NASA. He stated that educators need to be brought into the process at the beginning and that the NSTA could help with this goal.

Dr. Boyle remarked on the success of the informal education movement that took place in the 1980s. Before that, he stated, education in aquariums was relegated to words on walls. Now, it is apparent that people have the ability to learn more effectively in settings like aquariums and museums than they do in classrooms. He commented that he has witnessed first hand the ability of people to "connect the dots" between what they learn in an aquarium and how it relates to what is going on in the outside world.

Dr. Boyle commented that there should be more research on how and what aquarium visitors are learning. The Commission noted a NSF-funded study to measure the educational impact of AZA institutions in Dr. Carr's written testimony. The Commission remarked that it is important to know what it is aquarium visitors are learning and for how long they remember the lessons learned.

The point was made by the Commission that there is a disconnect between the aquarium world and the oceanographic world. It was noted that most of the science information presented at aquariums is biological in nature. The chemistry, geology, and physics of the ocean are not equally represented; whereas, these disciplines are included in museum exhibits and programs.

The Commission asked if there was any effort being made by the American Zoo and Aquarium Association to incorporate these disciplines in aquariums, or if there was any effort being made to encourage visitors to pursue advanced knowledge of the ocean sciences. Dr. Carr responded that the Commission's assessment of the difference between museums and aquariums is an accurate one. Aquariums focus on living organisms and come from a tradition that is more entertainment-oriented than education-oriented. Happily, educational professionalism and commitment at aquariums have superceded entertainment as the primary role and service. The primary strength of zoos and aquariums begins with the appeal of innately fascinating living marine organisms. Aquariums can certainly be effective by building upon that innate fascination to attract the visitor's interest in other sciences. The Commission expressed interest in continuing to link all ocean science disciplines—including open ocean and deep sea research and exploration—to museum and aquarium programs.

Dr. Carr was asked to comment on the training and education of people who work in zoos and aquariums. He responded that, several years ago, there were two types of people who worked at aquariums: trained teachers who came to participate in programs and keepers who spent a lot of time talking with the visitors about the animals. Now, he stated, there is not a uniform picture. The employees typically have bachelor and graduate degrees in a wide range of disciplines. Efforts are also being made to develop a graduate program to train future aquarium professionals. Dr. Mohling added that currently there are good collaborations between aquariums and school districts. He commented that continued partnerships with teachers would result in more efficient and focused delivery of science education funding.

The panelists were asked to respond to the following three questions in follow-up testimony. First, they were asked to provide their thoughts on who should be involved in coordinating a message on the importance and significance of the ocean. Second, the panelists were asked for their views on how to reach aquarium visitors with a message of personal responsibility. For example, could issues like non-point source pollution be addressed in exhibits and programs? Third, they asked how aquariums could get across a more multi-disciplinary message to its visitors.

Climate Prediction

Dr. Raymond P. Motha – Chief Meteorologist, World Agriculture Outlook Board, U.S. Department of Agriculture—Application of weather and climate for agriculture
Dr. Ronald McPherson – Executive Director, American Meteorological Society—Prediction as a mechanism for coping with climate variability and change
Dr. Lisa M. Goddard – Associate Research Scientist, International Research Institute for Climate Research, Lamont-Doherty Earth Observatory Council/Columbia University—Climate prediction capabilities
Dr. Terrence M. Joyce – Senior Scientist Woods Hole Oceanographic Institution – Abrupt climate change and the oceans

Following their formal statements, Admiral Watkins remarked that the Commission is very interested in the topic of climate change—as evidenced in the mid-term report. He noted that at the public meeting of the Commission in Alaska, the Commissioners heard testimony from

panelists on Arctic research. Furthermore, Admiral Watkins expressed that, although it seems as if the Arctic is especially important to climate change research, little is heard about the region. In response, Dr. Joyce noted that as the Russian threat in the Arctic subsided, so did a lot of the science that was going on there. He also noted that the changes in the Arctic have the potential to shut down global ocean circulation.

Admiral Watkins then expressed puzzlement as to why the Department of Agriculture is not more involved in ocean observation and research. For example, he remarked that the Secretary of Agriculture is not a member of the National Ocean Research Leadership Council. He asked Dr. Motha to comment on how more enthusiasm could be generated at the Department, considering the potential benefit of their participation to ocean prediction modeling. Dr. Motha responded by acknowledging that the Department of Agriculture has acted conservatively in this regard. Specifically, the Department does not use climate forecasts when making commodity predictions. He did indicate, though, that there has become more acknowledgement of the ocean, land, atmosphere continuum. Agriculture, he stated, needs to step forward and assist in the better understanding of these interactions. He remarked that many outside of the United States look to this country as a sleeping giant—we have a tremendous amount of information and tools, but need to use them correctly and pool our resources. He noted that the Department of Agriculture does have a good relationship with the National Weather Service and stated that the Department could benefit from more use of climate prediction data and modeling. Admiral Watkins then reiterated his statement that Agriculture needs to be a key player in any future ocean activity coordinating body.

Based on his experience as the head of an integrated and sustained atmospheric coordination system, Dr. McPherson was asked how a similar initiative could be developed for the ocean. In response, Dr. McPherson remarked on the need to develop this type of system for the ocean. He also noted the need for some kind of coordinating mechanism to ensure that all interested players are represented. He stated that a lead agency should be identified, given the difficulty of running this type of program on a sustained basis. This type of program, he commented, takes an array of disciplines and a lot of dedication on the part of all of the participants.

The Commission remarked that when NOAA was formed, a regulatory component was added to the ocean science and services part of the organization, but not to the atmospheric science and services part. McPherson commented that it is better to separate science from regulation, but that regulation has to be based on sound science. He remarked that one has to be sure that the regulatory tail of governance does not wag the science dog.

Dr. McPherson was asked what it would take to correct the existing *ad hoc* observing network that has fallen into disarray. It was noted by the Commission that in his testimony, Dr. McPherson made the case for an integrated global observing system for monitoring the state of the coupled ocean-atmosphere-land system on a continuing basis. He was asked what kinds of institutional arrangements it would take to develop this kind of system. Dr. McPherson responded that, after serving on the National Advisory Committee on Oceans and Atmosphere (NACOA), he has a good idea of what NACOA could do to pool the resources of all the related agencies. He stated that he would like to see the applicable components of different agencies like NOAA and USGS brought together to form an independent agency focused on climate. This

agency, he stated, would have three main components: observation, services, and research. There would be no regulatory component.

The Commission asked Dr. McPherson to provide additional testimony on his call for a coupled ocean-atmosphere-land system of monitoring. He was asked to provide specific details on why this type of system is important and why this initiative warrants the development of an independent agency. He responded that he would be delighted to provide this information.

Dr. McPherson was then asked to provide further comment on his desire to see the research kept separate from regulation. Commissioner Ruckelshaus noted that, as head of the EPA, there were occasions that good science needed to be accessed on a short time scale—particularly in emergency situations. He remarked on the importance of having the ability to coordinate science with decision making. In response, Dr. McPherson commented that he did not mean to suggest that regulators not have access to science. His point was that he did not want to see regulatory activity unduly influence scientific observations. Commissioner Ruckelshaus then reiterated the idea that decision makers often need quick access to sound science, and that this may be a legitimate reason for having science and regulatory components coexist in the same agency. Dr. McPherson responded that statutory requirements that mandate science as a basis for decision making suggest that scientific research would continue to be used to satisfy regulatory imperatives. As an example, he cited the use of NOAA's Air Research Laboratories by EPA to satisfy these types of regulatory objectives.

Dr. McPherson was asked where regulatory functions should go if they are not to be included with research within NOAA. He responded that he did not have strong feelings on the matter—possibly the Department of Interior. The Commission asked, if these two components are to be separated, how you would ensure that policy is based on the best science. Dr. McPherson posited that unhelpful separations, such as oceans from atmosphere and weather from climate should be avoided. However, he noted that fisheries management within NOAA has never fit well with the physical sciences. He suggested that research and monitoring could be separated from the regulation of fisheries. Commissioner Rosenberg asked Dr. McPherson to clarify his position based on the fact that fisheries management is often expected to be based on the best science. Dr. McPherson noted the different types of measurements needed for the physical and chemical sciences and fisheries science. What is needed for the physical and chemical sciences, he stated, are measurements of temperature, pressure, wind, currents, etc. Given that these measurement types support needs beyond fisheries science, he suggested that it may not be efficient or appropriate to have the same organization (fisheries management) be responsible for both functions. The Commission remarked that the thought behind the decision to separate science from policy making remains an issue.

Dr. Joyce remarked that we probably do not want to restore existing observation systems because we have learned how to do things better. For example, where weather ships were once needed to gather data, moorings and satellite-derived data now offer a more efficient alternative. Also, recent NASA participation now enables remotely-sensed global salinity measurements to be made. Although new and better ways of doing things are being discovered, he stated that the problem remains of trying to get the will and organizational structure to make this happen. What is being done now, he noted, is being done in an *ad hoc* fashion.

It was noted by the Commission that the findings described in the testimony of Dr. Joyce were startling. The Commission made specific reference to Dr. Joyce's concluding statement: "For those of us living around the edge of the North Atlantic Ocean, and that includes Chicago where we are meeting today, we may be planning for climate scenarios of global warming that are opposite to what might actually occur." The point was made that there is a great debate on global warming and that people thus far have been led to believe that the consequences of climate change will mean a rise in sea level and the loss of land. It was noted that, in his testimony, Dr. Joyce suggested that increased freshwater runoff from polar regions could lead to a change in the large scale oceanic circulation, reducing the magnitude and trajectory of the Gulf Stream, thereby leading to global cooling in parts of Europe and North America, which may lead to opposite results predicted thus far. The cooling of these regions may in turn lessen the fresh water runoff, so this may be a self-regulating mechanism. The Commission expressed concern that the public not be given too complex a message about global warming and asked what kind of reception Dr. Joyce has had on his recent findings.

Dr. Joyce responded that the message he is trying to convey is that you can have areas of regional cooling as a result of global warming. He stated that there has been evidence of a temperature increase of 1 degree Celsius over the last thirty years in most of the Northern Hemisphere. If the ocean conveyor belt collapses, warming in the North Atlantic would likely reverse, but cooling would be limited to this area. He specified that what he was inferring was not a new ice age, which are global and occur every 100,000 years. Rather, the scale and magnitude of this cooling would be significantly smaller. He also stated that there would also be a storm track change, with Canadian Arctic air coming down and sweeping across North America. He noted that some climate change models do not account for abrupt climate change and that there should be more "truth in advertising" in what is presented to the public. Admiral Watkins added that he did not see any difference in Dr. Joyce's testimony and what was presented in the NRC report, *Abrupt Climate Change*.

Commissioner Rasmuson remarked that, as a resident of Alaska, he has witnessed over the last forty years ice breaking away from the northern part of the Arctic Ocean. He stated that there is evidence of global warming, but he remains unclear as to how this trend will affect global populations. Dr. Joyce noted that there is research being done in the Arctic onboard the USCGS Polar Star and USCGS Healy. He remarked on the current elevated interest in Arctic research based on the observance of ice that is either vanishing or compacting. Admiral Watkins remarked on the need to enhance ocean observation efforts in the Arctic, which was expressed in the Commission's mid term report.

Admiral Watkins concluded the discussion by mentioning an upcoming report on the need for a global observation system to be presented by Ocean.US. He noted the potential significance of the findings of this report in corroborating the direction advocated by the Commission.

Public Comment

Once the Executive Director explained the rules of the public comment process, the Chair opened the floor for public comment.

Mr. Ned Dikmen of Great Lakes Boating Magazine discussed recreational boating in the Great Lakes. He remarked on the size and growth of the retail boating industry and noted that one-third of the nation's boating takes place in the Great Lakes. The large number of boats, he stated, signaled a need for marina expansion. Large-scale marinas were built; however these "jumbo marinas" have fallen short of expectations—that is, many of these marinas are currently less than half-filled. He expressed a need for applied market research and stated that it is imperative that marinas be scaled properly and only expanded as needed. He also commented that recreational boating should not be second to commercial shipping in the amount of money spent for dredging. He noted that more money should be allocated for harbor dredging to allow more access for recreational boating.

Mr. John Rogner of the Chicago Wilderness coalition described a model of collaborative conservation. He remarked on how the Chicago Regional Biodiversity Council chose to horizontally integrate units of government in order to address biodiversity issues in urban areas. He remarked that, for years, conservation organizations worked independently. Chicago Wilderness was formed when thirty-four public and private institutions acted to form a coalition in order to work more effectively at preventing biodiversity loss. He noted the coalition's award-winning biodiversity plan, which was developed with the goal of protecting land, influencing policy, developing better science, and creating citizenry. Using this case as an example, he recommended that the federal government align its resources behind regionally-driven initiatives. He noted that federal support brings local groups together to see the big picture—all the while acting to accomplish their own agency missions with the help of local and state expertise. He remarked on the significance of this initiative as a model for urban resource management.

Mr. Rahm Emanuel, a Democratic nominee for U.S. Congress, stated his support for the establishment of a Great Lakes trust fund. A Great Lakes trust fund, he stated, would be modeled after funds in the Florida Everglades and Chesapeake Bay. He noted that the Great Lakes is one of the nation's great natural resources and that demands on the lakes are increasing, making preservation a challenge. Last year, the Great Lakes experienced the largest number of beach closings ever. Although the use of the Great Lakes is growing, there is no federal commitment of resources for a Great Lakes trust fund. He noted that the highlights of a Great Lakes trust fund are included in a written statement submitted to the Commission.

Mr. Jeff Boem of the Shedd Aquarium remarked on the strong need for ocean conservation coordination and offered Shedd Aquarium as an example of a model for conservation education. Shedd Aquarium reaches two million visitors a year— engaging them in the importance of ecosystems, the complexity of ocean problems, and the important role they can play. He noted two programs at the aquarium: the ecologically-minded "Right Bite" program in partnership with

The Audubon Society; and Project Seahorse, which focuses on the relationship between communities and the ocean on a global-scale.

Ms. Lee Botts of the Lake Michigan Federation voiced concern over a current navigation project of the U.S. Army Corps of Engineers (USACOE). She stated that USACOE efforts aim to revive the previously-failed concept of year-round navigation in the Great Lakes and represent an unsustainable expansion of navigation. This activity, she stated, is not supported by any evidence of economic benefit; would create contaminated dredge spoils; would damage the coastline; and would introduce nonnative species through ballast water. She advocated reforming the mission of the USACOE and how it functions. She also noted the need for an independent analysis of USACOE activities. She recommended that the Commissioners read a book entitled *Corps by the Shore* by Orrin Pilkey.

Mr. Mark Rogers of Cape Wind Associates commented on efforts to develop the first offshore wind farm in the U.S. He noted that the proposed wind farm would generate half of the electricity needs for Cape Cod and the islands. He noted that wind farms have the potential to provide a safe and secure energy future from the development of clean resources. He remarked that his company's goal is aligned with the mission of the Ocean Act that encourages innovative projects and technologies. He stated that offshore winds are inexhaustible, offer less of a threat to marine life than global climate change, and would curb the nation's crippling dependence on oil and other nonrenewable resources. The Cape Cod wind project would also be a major attraction for sustainable tourism. He noted that the project is receiving favorable reviews in newspapers and magazines and that there is considerable support for the project from environmental groups. He asked that the Commission make recommendations to enable renewable technologies and demonstrate a commitment to ocean resources.

Mr. Fred Kenney of the U.S. Department of State updated the Commission on the development of an international ballast water program being coordinated by the IMO. Mr. Kenney announced plans for an upcoming diplomatic conference to negotiate key issues in the process of finalizing an international convention. Under negotiation are the mechanisms to control ballast water exchange. The main question, he stated, is that of establishing mandatory requirements. The U.S. has submitted a position paper that addresses this issue, as well as a number of smaller issues requiring resolution. He concluded by noting that, at the conclusion of the upcoming conference, the State Department will provide the Commission an updated report on the process.

Ms. Megan Amundson of the Massachusetts Chapter of the Sierra Club expressed concern that the Commission is overlooking issues involving military encroachment. She noted the recent occurrence of a massive beaching of right whales on Cape Cod and indicated that a possible cause of the deaths may be the use of low frequency sonar by the military off the New England coast. She remarked that the work being done by the military is largely kept secret from the public. She acknowledged that an attack on military behavior is unpopular now, but urged the Commission to work with the administration to put ecosystem protection at the forefront of national concern. She remarked that, if the Commission is concerned about ocean health, it must consider military encroachment as a major issue.

The Commission meeting adjourned at 4:30 p.m.

Appendix I

September 24-25, 2002 Ocean Commission Meeting Attendees

Name	Affiliation
Linda V. Bauch	American Petroleum Institute
Doris J. Bautch	Maritime Administration
Fred P. Binkowski	University of Wisconsin, Milwaukee
Glenn Boledovich	NOAA
Allen R. Brown	Consulate General of Canada
Sydney J. Butler	American Zoo and Aquarium Assoc.
Larry Clark	National Science Foundation
Ashley Collins	Citizen Action Illinois
David C. Cowgill	U.S. EPA
Cynthia Decker	U.S. Navy
Leslie E. Dorworth	Illinois-Indiana Sea Grant Program
Andrew Fedyn sky	North Shore Consultants, Inc.
Michael S. Gardiner	USCG
Robin Goettel	Illinois-Indiana Sea Grant Program
Gary Gulezian	U.S. EPA
Herb Hallberg	Shedd Aquarium
William Harder	Army Corps of Engineers
Rodney Hoinkes	Immersion Studios
Daniel Injerd	Illinois Dept of Natural Resources
Judy Johnston	League of Women Voters
Scott Kenney	U.S. Department of Defense
Michael Keriohe	No Affiliation Given
J. Val Klump	University of Wisconsin, Milwaukee
Kathy Luther	Indiana Dept of Env. Mgmt
Dennis McKenna	Illinois Department of Agriculture
Donna N. Myers	U. S. Geological Survey
Bruce Nilles	Sierra Club
Jack Orchard	University of Wisconsin, Milwaukee
Mark Rodgers	Cape Wind
John D. Rogner	U.S. Fish & Wildlife Service
CAPT Bob Ross	USCG
Betsie Rypma	Shedd Aquarium
Daniel Schwartz	University of Washington
Stephanie Smith	Lake Michigan Federation
Mark Stoermer	University of Washington
Kristin Tepas	Illinois Natural History Survey
Vicki Thomas	U.S. EPA
Thomas Trudeau	Illinois DNR
Richard Warner	Illinois-Indiana Sea Grant
Michelle Wildes	Northeastern University