

CHAPTER 31: SUMMARY OF RECOMMENDATIONS

The Oceans Act of 2000 charged the U.S. Commission on Ocean Policy with carrying out the first comprehensive review of ocean-related issues and laws in more than thirty years. The Commission took up that charge, presenting almost 200 recommendations throughout this preliminary report that will move the nation toward a more coordinated and comprehensive ocean policy. This chapter provides summaries of those recommendations, categorized by the organization or individual charged with carrying out the proposed action. To see the actual text of each recommendation, along with more detailed elaborations and context, readers should consult the appropriate report chapter.

GUIDING PRINCIPLES

As described in Chapter 3, the Commission's work was guided by a set of fundamental principles. These principles underlie all the recommendations and should form the basis of a comprehensive national ocean policy:

- *Sustainability*: Ocean policy should be designed to meet the needs of the present generation without compromising the ability of future generations to meet their needs.
- *Stewardship*: The principle of stewardship applies both to the government and to every citizen. The U.S. government holds ocean and coastal resources in the public trust—a special responsibility that necessitates balancing different uses of those resources for the continued benefit of all Americans. Just as important, every member of the public should recognize the value of the oceans and coasts, supporting appropriate policies and acting responsibly while minimizing negative environmental impacts.
- *Ocean–Land–Atmosphere Connections*: Ocean policies should be based on the recognition that the oceans, land, and atmosphere are inextricably intertwined and that actions that affect one Earth system component are likely to affect another.
- *Ecosystem-based Management*: U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.
- *Multiple Use Management*: The many potentially beneficial uses of ocean and coastal resources should be acknowledged and managed in a way that balances competing uses, while preserving and protecting the overall integrity of the ocean and coastal environment.

- *Preservation of Marine Biodiversity:* Downward trends in marine biodiversity should be reversed where they exist, with a desired end of maintaining or recovering natural levels of biological diversity and ecosystem services.
- *Best Available Science and Information:* Ocean policy decisions should be based on the best available understanding of the natural, social, and economic processes that affect ocean and coastal environments. Decision makers should be able to obtain and understand quality science and information in a way that facilitates successful management of the ocean and coastal resources.
- *Adaptive Management:* Ocean management programs should be designed to meet clear goals and provide new information to continually improve the scientific basis for future management. Periodic reevaluation of the goals and effectiveness of management measures, and incorporation of new information in implementing future management, are essential.
- *Understandable Laws and Clear Decisions:* Laws governing uses of ocean and coastal resources should be clear, coordinated, and accessible to the nation's citizens to facilitate compliance. Policy decisions and the reasoning behind them should also be clear and available to all interested parties.
- *Participatory Governance:* Governance of ocean uses should ensure widespread participation by all citizens on issues that affect them.
- *Timeliness:* Ocean governance systems should operate with as much efficiency and predictability as possible.
- *Accountability:* Decision makers and members of the public should be accountable for the actions they take that affect ocean and coastal resources.
- *International Responsibility:* The United States should act cooperatively with other nations in developing and implementing international ocean policy, reflecting the deep connections between U.S. interests and the global ocean.

The Commission's recommendations embody these principles, and their full implementation will lead the nation toward a future where the benefits of the oceans and coasts are fully realized and the problems plaguing these areas are minimized.

CREATING A STRONG ROLE FOR STATES

Based on the charge of the Oceans Act of 2000, the Commission has recommended actions for a coordinated and comprehensive national ocean policy on all government levels—including state and local—and has called for enhanced partnerships among federal agencies and state and local stakeholders. The Commission sees a central role for states in ocean and coastal management and identifies many opportunities for them to contribute to an integrated national ocean policy. The Presidential Council of Advisors on Ocean Policy, a high-level advisory body to be appointed by the President, should serve as an important formal structure for input from nonfederal individuals and organizations, including governors of coastal states, additional state, territorial, tribal, and local government representatives, and others.

Important areas for state involvement include:

- formal and informal ocean education at all levels, including outreach to underrepresented and underserved communities.
- creation of regional ocean councils to help coordinate federal, state, tribal, and local planning and action, and of regional ocean information programs to supply the information needed to support an ecosystem-based approach.
- improved management of coastal areas, including incorporation of coastal watersheds, to achieve better control of nonpoint sources of pollution, growth management, natural hazards mitigation, marine

transportation planning, regional sediment management, and identification of priority habitats for conservation and restoration.

- development of a prioritized, comprehensive plan for upgrading the nation's aging and inadequate wastewater and drinking water infrastructure, including improved stormwater management.
- coordination of a national water quality monitoring network and creation of useful products based on the monitoring data.
- planning for early detection, prompt notification, and rapid response to marine invasive species.
- prevention of marine debris, in part through public outreach and education.
- management of commercial and recreational fish stocks and sustainable aquaculture operations.
- protection of corals and coral reefs.
- development of a coordinated offshore management regime, including the design and implementation of marine protected areas.
- development of renewable and nonrenewable ocean energy sources, including attention to their environmental and socioeconomic impacts.

Another area where state input will be essential is the development of ocean observations and science to support policy decisions. States will need to communicate their information needs and priorities as part of the creation of a national strategy for basic and applied ocean science and technology, including the social science and economic research needed to understand the human dimensions and economic value of the oceans and coasts. States should also participate as full partners in the design and implementation of regional observing systems and their integration into the national Integrated Ocean Observing System.

Many of the recommendations listed below explicitly call for federal entities to work with the states and the nonfederal Presidential Council of Advisors on Ocean Policy. But even where it is left unsaid, the importance of state input and action in moving the nation toward an ecosystem-based management approach for the ocean is assumed.

RECOMMENDATION SUMMARIES

The following sections summarize all of the Commission recommendations, sorted according to the various organizations and individuals who should take action. Although recommendations are categorized by the primary actor, often another organization or individual is directed to help accomplish the objective. Although these summaries capture the major message of each recommendation, the reader must examine the appropriate report chapter to find the context, background discussion, precise recommendation language, and further details about implementation.

The summary recommendations in this chapter are organized as follows:

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 - 3. U.S. Fish and Wildlife Service
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- IV. Recommendations to Regional Bodies
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 - B. Regional Ocean Information Programs
 - C. Regional Fishery Management Councils
 - D. Regional Dredging Teams
- V. Recommendations related to International Affairs

I. Recommendations to Congress

Recommendation 4–1. Congress should establish a National Ocean Council, and a nonfederal Presidential Council of Advisors on Ocean Policy, within the Executive Office of the President to provide enhanced federal leadership and coordination for the ocean and coasts. While Congress works to establish these components in law, the President should begin immediately to implement an integrated national ocean policy by creating them through an Executive Order, and by appointing an Assistant to the President to chair the Council.

Recommendation 4–6. Congress should establish an Office of Ocean Policy to support the Assistant to the President, the National Ocean Council (NOC), and the Presidential Council of Advisors on Ocean Policy. To provide immediate staff support, the President should include an Office of Ocean Policy in the Executive Order that creates the Council.

Recommendation 4–7. Congress, working with the National Ocean Council (NOC), should amend the National Oceanographic Partnership Act (NOPA) to integrate ocean observing, operations, facilities, and education into its marine research mission. A strengthened and enhanced National Ocean Research Leadership Council should be redesignated as the Committee on Ocean Science, Education, Technology, and Operations (COSETO). NOPA amendments should specify that COSETO reports to the NOC and is chaired by the director of the Office of Science and Technology Policy.

Recommendation 5–2. Congress should establish regional ocean information programs throughout the nation to improve coordination and set regional priorities for research, data collection, science-based information products, and outreach activities in support of improved ocean and coastal management. The regional ocean information programs should be established immediately, independent of the voluntary, and potentially more complicated, process of establishing regional ocean councils.

Recommendation 5–5. Congress should establish regional boards to administer the regional ocean information programs. Each regional board should include a broad range of stakeholders, develop a regional plan to be submitted to the National Ocean Council, and oversee the regional ocean observing systems. Program priorities should be carried out primarily through a grants process.

Recommendation 6–1. Congress, working with the National Ocean Council (NOC), should ensure that each current and foreseeable use of federal waters is administered by a lead federal agency. The lead agency should coordinate with other federal agencies with applicable authorities and ensure full consideration of the public interest. Pending congressional action, the NOC should designate interim lead agencies to oversee new offshore activities.

Recommendation 6–2. Congress, working with the National Ocean Council and regional ocean councils, should establish an ecosystem-based offshore management regime that sets forth guiding principles for the balanced coordination of all offshore uses. It should recognize the need, where appropriate, for comprehensive single-purpose ocean governance structures that are fully integrated with, and based on the principles of the new offshore management regime. The regime should include a process for incorporating new and emerging activities and a policy that a reasonable portion of the resource rent derived from such activities is returned to the public.

Recommendation 7–1. Congress should pass an organic act that codifies the establishment and missions of the National Oceanic and Atmospheric Administration (NOAA). The act should ensure that NOAA's structure is consistent with the principles of ecosystem-based management and with its three primary functions: assessment, prediction, and operations; resource management; and research and education.

Recommendation 7–4. Congress should authorize the President to propose structural reorganization of federal departments and agencies, subject to expedited Congressional approval. The legislation should preclude Congress from amending the President’s proposal and require a vote on the proposal within a fixed time period after submission of the plan by the President.

Recommendation 8–2. Congress should provide funding for the operation of a new National Ocean Council (NOC) Office on Ocean Education (Ocean.ED), and for implementation of related programs, as a line item in the National Oceanic and Atmospheric Administration (NOAA) budget, to be spent at the direction of the NOC. NOAA should develop a streamlined process for distributing Ocean.ED funds to other federal and nonfederal entities as approved by the NOC.

Recommendation 9–1. Congress should reauthorize the Coastal Zone Management Act to strengthen the planning and coordination capabilities of coastal states and enable them to incorporate a coastal watershed focus and more effectively manage growth. Amendments should include requirements for resource assessments, the development of measurable goals and performance measures, improved program evaluations, incentives for good performance and disincentives for inaction, and expanded boundaries that include coastal watersheds.

Recommendation 9–2. Congress should consolidate area-based coastal management programs in a strengthened National Oceanic and Atmospheric Administration (NOAA), capitalizing on the strengths of each program. At a minimum, this consolidation should include the Coastal Zone Management, National Estuarine Research Reserve System, and National Marine Sanctuary programs currently administered by NOAA and additional programs administered by other agencies, including the Coastal Barrier Resources System, the National Estuary Program, and the U.S. Fish and Wildlife Service Coastal Program.

Recommendation 9–4. Congress should amend the Coastal Zone Management Act, the Clean Water Act, and other federal laws where appropriate, to provide better financial, technical, and institutional support for watershed initiatives. Amendments should include appropriate incentives and flexibility for local variability. The National Ocean Council should develop guidance concerning the purposes, structures, stakeholder composition, and performance of watershed initiatives.

Recommendation 10–4. Congress should increase financial and technical assistance to state and local entities for developing hazards mitigation plans consistent with requirements of the Federal Emergency Management Agency (FEMA). The National Ocean Council should identify opportunities for linking federal hazards-related financial and infrastructure support with completion of FEMA-approved state and local hazards mitigation plans.

Recommendation 11–1. Congress should amend the Coastal Zone Management Act to authorize a dedicated coastal and estuarine land conservation program. To achieve this, each state coastal zone management program should identify priority coastal habitats and develop a plan for establishing partnerships among willing landowners for conservation purposes.

Recommendation 11–3. Congress should amend relevant legislation to allow federal agencies greater discretion in using a portion of habitat conservation and restoration funds for related assessments, monitoring, research, and education.

Recommendation 12–4. The U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, and U.S. Geological Survey should develop a strategy for improved assessment, monitoring, research, and technology development to enhance sediment management. Congress should modify its current authorization and funding processes to encourage USACE to monitor outcomes from past projects and study the cumulative, regional impacts of its activities within coastal watersheds and ecosystems.

Recommendation 13–1. Congress should designate the U.S. Department of Transportation (DOT) as the lead federal agency for planning and oversight of the marine transportation system and DOT should submit regular reports on the condition and future needs of the system. The National Ocean Council should identify overlapping functions in other federal agencies and make recommendations concerning the advisability of transferring those functions to DOT.

Recommendation 13–2. Congress should codify the Interagency Committee for the Marine Transportation System and place it under the oversight of the National Ocean Council. The Committee should improve coordination among participants in the U.S. marine transportation system and promote integration with other modes of transportation and with other ocean and coastal uses and activities.

Recommendation 14–9. To improve and strengthen federal efforts to address nonpoint source pollution, Congress should amend the Clean Water Act to move the National Oceanic and Atmospheric Administration’s enforceable nonpoint source pollution program, created under Section 6217 of the Coastal Zone Act Reauthorization Amendments, to become a part of the U.S. Environmental Protection Agency’s incentive-based program, created under Section 319 of the Clean Water Act.

Recommendation 14–10. Congress should provide authority under the Clean Water Act and other applicable laws for federal agencies to impose financial disincentives and establish enforceable management measures to ensure action if a state does not make meaningful progress toward meeting water quality standards on its own.

Recommendation 16–2. Congress should provide the U.S. Coast Guard with the resources necessary to sustain and strengthen the performance-based inspection program for marine safety and environmental protection. Coast Guard resource commitments in these areas should be coordinated with new demands for vessel security inspections and other security requirements.

Recommendation 16–5. Congress should amend the Clean Water Act to establish a new national regime for managing wastewater discharges from large passenger vessels, including several elements: uniform discharge standards and waste management procedures; thorough recordkeeping requirements to track the waste management process; required sampling, testing, and monitoring by vessel operators using uniform protocols; and flexibility and incentives to encourage industry investment in innovative treatment technologies.

Recommendation 16–8. Congress should provide incentives for boat owners to install improved treatment devices and should increase support for building pumpout facilities under the Clean Vessel Act. Congress, with input from the National Ocean Council, should also consider transferring the Clean Vessel Act grant program to the U.S. Environmental Protection Agency to consolidate the administration of programs related to marine sanitation devices.

Recommendation 16–11. Congress should create an incentive program for boat owners to install or use less polluting engines in recreational boats.

Recommendation 19–1. Congress should amend the Magnuson–Stevens Fishery Conservation and Management Act and related statutes to require Regional Fishery Management Councils (RFMCs) and interstate fisheries commissions to rely on their Scientific and Statistical Committees (SSCs), incorporating SSC findings and advice into the decision-making process. In keeping with this stronger role, SSC members should meet more stringent scientific and conflict of interest requirements, and receive compensation.

Recommendation 19–9. Congress should increase support for an expanded, regionally-based cooperative research program in the National Oceanic and Atmospheric Administration (NOAA) that coordinates and funds collaborative projects among scientists and commercial and recreational fishermen. NOAA should develop a process for external evaluation and ranking of all cooperative research proposals to ensure the most

worthwhile projects are funded, the most capable performers are undertaking the research, and the information produced is both scientifically credible and useful to managers.

Recommendation 19–10. Congress should develop new statutory authority, similar to the Atlantic Coastal Fisheries Cooperative Management Act, to support and empower the Gulf States and Pacific States Fisheries Management Commissions. All interstate management plans should adhere to the national standards in the Magnuson–Stevens Fishery Conservation and Management Act and the federal guidelines implementing these standards. States should participate in development of the guidelines to ensure they are relevant to interstate plans.

Recommendation 19–11. Where a fish stock crosses administrative boundaries, Congress should assign clear fishery management jurisdiction and authority. For each fishery management plan, a state, Regional Fishery Management Council, interstate fisheries commission, or the National Oceanic and Atmospheric Administration should be established as the lead authority. That designation should be based primarily on the proportion of catch associated with each management authority. However, once designated, management authority should not shift based on annual changes in landings.

Recommendation 19–12. Congress should amend the Magnuson–Stevens Fishery Conservation and Management Act to require governors to submit a broad slate of candidates for each vacancy of an appointed Regional Fishery Management Council seat. The slate should include at least two representatives each from the commercial fishing industry, the recreational fishing sector, and the general public.

Recommendation 19–13. Congress should give the Administrator of the National Oceanic and Atmospheric Administration responsibility for appointing Regional Fishery Management Council members with the goal of creating councils that are knowledgeable, fair, and reflect a broad range of interests.

Recommendation 19–15. Congress should amend the Magnuson–Stevens Fishery Conservation and Management Act to affirm that fishery managers are authorized to institute dedicated access privileges. Congress should direct the National Marine Fisheries Service to issue national guidelines for dedicated access privileges that allow for regional flexibility in implementation. Every federal, interstate, and state fishery management entity should consider the potential benefits of adopting such programs.

Recommendation 19–16. Congress should repeal the Fisheries Finance Program (formerly the Fishing Vessel Obligation Guarantee Program), the Capital Construction Fund, and other programs that encourage overcapitalization in fisheries. The National Oceanic and Atmospheric Administration should implement programs to permanently reduce fishing capacity to sustainable levels.

Recommendation 19–17. Congress should increase support for Joint Enforcement Agreements to implement cooperative fisheries enforcement programs between the National Marine Fisheries Service and state marine enforcement agencies. The U.S. Coast Guard should be included as an important participant in such agreements.

Recommendation 20–1. Congress should amend the Marine Mammal Protection Act to require the Marine Mammal Commission, while remaining independent, to coordinate with all relevant federal agencies through the National Ocean Council (NOC). The NOC should consider whether there is a need for similar oversight bodies for other marine animals whose populations are at risk.

Recommendation 20–2. Congress should amend the Marine Mammal Protection Act to place the protection of all marine mammals within the jurisdiction of the National Oceanic and Atmospheric Administration.

Recommendation 20–4. Congress should amend the Marine Mammal Protection Act to require the National Oceanic and Atmospheric Administration to more clearly specify categories of activities that are allowed without a permit, those that require a permit, and those that are prohibited.

Recommendation 20–5. Congress should amend the Marine Mammal Protection Act to revise the definition of harassment to cover only activities that meaningfully disrupt behaviors that are significant to the survival and reproduction of marine mammals.

Recommendation 20–8. Congress should increase support for research into ocean acoustics and the potential impacts of noise on marine mammals. This funding should be distributed across several agencies, including the National Science Foundation, U.S. Geological Survey, and Minerals Management Service, to decrease the reliance on U.S. Navy research in this area. The research programs should be well coordinated across the government and examine a range of issues relating to noise generated by scientific, commercial, and operational activities.

Recommendation 21–1. Congress should pass a Coral Protection and Management Act that covers research, protection, and restoration of coral ecosystems. This legislation should provide support for mapping, monitoring, and research primarily through the National Oceanic and Atmospheric Administration and the U.S. Coral Reef Task Force.

Recommendation 21–2. Congress should codify and strengthen the U.S. Coral Reef Task Force, placing it under the National Ocean Council. The task force should be strengthened by expanding its responsibilities to include both warm and cold water coral communities and by adding the U.S. Department of Energy and the U.S. Army Corps of Engineers as members. The task force should coordinate the development of regional ecosystem-based plans to address the impacts of nonpoint source pollution, fishing, and other activities on coral resources.

Recommendation 22–1. Congress should amend the National Aquaculture Act to create an Office of Sustainable Marine Aquaculture in the National Oceanic and Atmospheric Administration (NOAA) and designate NOAA as the lead federal agency for implementing a national policy for environmentally and economically sustainable marine aquaculture.

Recommendation 22–3. Congress should increase support for expanded marine aquaculture research, development, training, extension, and technology transfer programs in the National Oceanic and Atmospheric Administration (NOAA). NOAA’s new Office of Sustainable Marine Aquaculture should set priorities for the research and technology programs, in close collaboration with academic, business, and other stakeholders.

Recommendation 23–4. Congress should establish a national, multi-agency Oceans and Human Health Initiative to coordinate, direct, and fund research and monitoring programs in this area.

Recommendation 24–1. Congress, with input from the National Ocean Council, should ensure that a portion of the revenues that the federal government receives from the leasing and extraction of outer Continental Shelf (OCS) oil and gas is invested in the sustainable development and conservation of renewable ocean and coastal resources through grants to all coastal states. States off whose coasts OCS oil and gas is produced should receive a larger share of such portion to compensate them for the costs of addressing the environmental and socioeconomic impacts of energy activity in adjacent federal waters.

Recommendation 24–5. Congress, with input from the National Ocean Council, should enact legislation providing for the comprehensive management of offshore renewable energy development as part of a coordinated offshore management regime.

Recommendation 25–1. Congress should double the federal ocean and coastal research budget over the next five years, from the 2004 level of approximately \$650 million to \$1.3 billion per year. A portion of these new funds should be used to support research directed by the regional information collection programs, enlarge the National Sea Grant College Program, and support other high priority research areas described throughout this report.

Recommendation 25–4. Congress should support a greatly expanded national ocean exploration program. The National Oceanic and Atmospheric Administration and the National Science Foundation should be designated as the lead agencies, with additional involvement from the U.S. Geological Survey and the U.S. Navy’s Office of Naval Research. Public outreach and education should be integral components of the program.

Recommendation 26–3. Congress should amend the National Oceanographic Partnership Act to formally establish Ocean.US, with a budget appropriate to carry out its mission. Ocean.US should report to the National Ocean Council’s (NOC’s) Committee on Ocean Science, Education, Technology, and Operations. Congress should make Ocean.US funding a line item within the National Oceanic and Atmospheric Administration’s budget, to be spent subject to NOC approval.

Recommendation 26–8. Congress should transfer the National Aeronautics and Space Administration’s (NASA’s) Earth environmental observing satellites, along with associated resources, to the National Oceanic and Atmospheric Administration (NOAA) to achieve continued operations. NOAA and NASA should work together to ensure the smooth transition of each Earth environmental observing satellite after its launch.

Recommendation 26–9. Congress should fund the Integrated Ocean Observing System (IOOS) as a line item in the National Oceanic and Atmospheric Administration (NOAA) budget, to be spent subject to National Ocean Council direction and approval. IOOS funds should be appropriated without fiscal year limitation. NOAA should develop a streamlined process for distributing IOOS funds to other federal and nonfederal partners.

Recommendation 27–4. Congress should establish a modernization fund for critical ocean infrastructure and technology needs. Spending priorities should be based on the National Ocean Council’s ocean and coastal infrastructure and technology strategy.

Recommendation 28–1. Congress should amend the National Oceanographic Partnership Act to establish a federal interagency planning organization for ocean and coastal data and information management to be called Ocean.IT. Ocean.IT should consist of representatives from all federal agencies involved in ocean data and information management, be supported by a small office, and report to the National Ocean Council’s Committee on Ocean Science, Education, Technology, and Operations.

Recommendation 30-1. Congress, with input from the National Ocean Council, should establish an Ocean Policy Trust Fund in the U.S. Treasury. The Fund should be composed of unallocated federal revenues from outer Continental Shelf oil and gas leasing and development, and resource rents assessed on new activities in federal waters. Trust Fund monies should be dispersed to coastal states and federal agencies to support improved ocean and coastal management. This new source of funds should be used to supplement—not replace—existing appropriations for ocean and coastal programs and to fund new or expanded duties.

II. Recommendations to the Executive Branch Leadership

A. The President

Recommendation 4–1. Congress should establish a National Ocean Council, and a nonfederal Presidential Council of Advisors on Ocean Policy, within the Executive Office of the President to provide enhanced federal leadership and coordination for the ocean and coasts. While Congress works to establish these components in law, the President should begin immediately to implement an integrated national ocean policy by creating them through an Executive Order, and by appointing an Assistant to the President to chair the Council.

Recommendation 4–5. The Presidential Council of Advisors on Ocean Policy, a formal structure for input from individuals and organizations outside the federal government, should advise the President on ocean and

coastal policy matters. The President should appoint to the Council a representative selection of nonfederal individuals who are knowledgeable about, and experienced in, ocean and coastal issues.

Recommendation 4–6. Congress should establish an Office of Ocean Policy to support the Assistant to the President, the National Ocean Council (NOC), and the Presidential Council of Advisors on Ocean Policy. To provide immediate staff support, the President should include an Office of Ocean Policy in the Executive Order that creates the Council.

Recommendation 4–11. The President, through an Executive Order, should direct federal agencies with ocean- and coastal-related functions to immediately improve their regional coordination, as a precursor to federal reorganization around common regional boundaries and the eventual establishment of regional ocean councils. As part of this process, federal agencies should collaborate with regional, state, territorial, tribal, and local governments and nongovernmental parties to identify major issues of concern in each region.

Recommendation 5–4. The Council on Environmental Quality should revise its National Environmental Policy Act guidelines to require that environmental impact statements for proposed ocean- and coastal-related activities take into account any available regional ecosystem assessments developed under the oversight of the regional ocean information programs.

Recommendation 7–2. The President should instruct the Office of Management and Budget (OMB) to review the National Oceanic and Atmospheric Administration budget within OMB's Natural Resources Programs, along with the budgets of the U.S. Departments of Agriculture, Energy, and the Interior, the U.S. Environmental Protection Agency, the National Science Foundation, the National Aeronautics and Space Administration, and the U.S. Army Corps of Engineers' Directorate of Civil Works.

Recommendation 7–5. Following the establishment of the National Ocean Council and the Presidential Council of Advisors on Ocean Policy, strengthening of the National Oceanic and Atmospheric Administration, and consolidation of similar federal ocean and coastal programs, the President should propose to Congress a reorganization of the federal government that recognizes the links among all the resources of the sea, land, and air and establishes a structure for more unified, ecosystem-based management of natural resources.

Recommendation 28–6. The President should convene an interagency task force to plan for modernizing the national environmental data archiving, assimilation, modeling, and distribution system with the goal of designing an integrated Earth environmental data and information system.

B. National Ocean Council

Recommendation 4–2. The National Ocean Council (NOC) should provide high-level attention to ocean and coastal issues, develop and guide the implementation of appropriate national goals and policies, and coordinate the many federal departments and agencies with ocean and coastal responsibilities. The NOC should be chaired by an Assistant to the President and composed of cabinet secretaries of departments and directors of independent agencies with relevant ocean- and coastal-related responsibilities.

Recommendation 4–3. The National Ocean Council (NOC) should adopt the principle of ecosystem-based management and assist federal agencies in moving toward an ecosystem-based management approach.

Recommendation 4–8. The National Ocean Council (NOC) should establish a Committee on Ocean Resource Management to better integrate the resource management activities of ocean-related agencies. This committee should oversee and coordinate the work of existing ocean and coastal interagency efforts, recommend the creation of new topical task forces as needed, and coordinate with government-wide environmental and natural resource efforts that have important ocean components. The Committee on Ocean Resource Management should be chaired by the chair of the Council on Environmental Quality and

should include undersecretaries and assistant secretaries of departments and agencies that are members of the NOC.

Recommendation 4–9. The National Ocean Council should review all existing ocean-related councils and commissions and make recommendations about their ongoing utility and reporting structure.

Recommendation 4–10. The National Ocean Council should develop a flexible and voluntary process for the creation of regional ocean councils working closely with Congress, the Presidential Council of Advisors on Ocean Policy, state, territorial, tribal, and local leaders, and representatives from the private sector, nongovernmental organizations, and academia.

Recommendation 5–6. The National Ocean Council should ensure that adequate support is provided for both the research and observing components of the regional ocean information programs.

Recommendation 6–1. Congress, working with the National Ocean Council (NOC), should ensure that each current and foreseeable use of federal waters is administered by a lead federal agency. The lead agency should coordinate with other federal agencies with applicable authorities and ensure full consideration of the public interest. Pending congressional action, the NOC should designate interim lead agencies to oversee new offshore activities.

Recommendation 6–3. The National Ocean Council should develop national goals and guidelines leading to a uniform process for the effective design and implementation of marine protected areas. Marine protected area designations should be based on the best available scientific information and these areas should be periodically assessed, monitored, and modified to ensure continuing ecological and socioeconomic effectiveness.

Recommendation 8–1. The National Ocean Council should establish a national ocean education office, to be called Ocean.ED, under its Committee on Ocean Science, Education, Technology, and Operations to coordinate federal efforts, enhance educational achievement in natural and social sciences, and strengthen ocean awareness.

Recommendation 8–5. The National Ocean Council (NOC), working with the National Science Foundation, should relocate and expand the Centers for Ocean Science Education Excellence within the NOC structure as a program to be organized, overseen, and funded through Ocean.ED.

Recommendation 9–3. The National Ocean Council should recommend changes to federal funding and infrastructure programs to discourage inappropriate growth in fragile or hazard-prone coastal areas and ensure consistency with national, regional, and state goals aimed at achieving economically and environmentally sustainable development.

Recommendation 9–4. Congress should amend the Coastal Zone Management Act, the Clean Water Act, and other federal laws where appropriate, to provide better financial, technical, and institutional support for watershed initiatives. Amendments should include appropriate incentives and flexibility for local variability. The National Ocean Council should develop guidance concerning the purposes, structures, stakeholder composition, and performance of watershed initiatives.

Recommendation 10–1. The National Ocean Council should review and recommend changes to the U.S. Army Corps of Engineers' Civil Works Program to ensure valid, peer-reviewed cost-benefit analyses of coastal projects, provide greater transparency to the public, enforce requirements for mitigating the impacts of coastal projects, and coordinate such projects with broader coastal planning efforts.

Recommendation 10–2. The National Ocean Council should establish a task force of representatives from state and local governments and appropriate federal agencies, with the Federal Emergency Management Agency in the lead, to improve the collection and usability of hazards-related data.

Recommendation 10–3. The National Ocean Council should recommend changes in the National Flood Insurance Program to establish clear disincentives against building in coastal high-hazard zones, enforce measures that reduce vulnerability to natural hazards, and create enforceable mechanisms to direct development away from undeveloped floodplains and erosion zones.

Recommendation 10–4. Congress should increase financial and technical assistance to state and local entities for developing hazards mitigation plans consistent with requirements of the Federal Emergency Management Agency (FEMA). The National Ocean Council should identify opportunities for linking federal hazards-related financial and infrastructure support with completion of FEMA-approved state and local hazards mitigation plans.

Recommendation 11–2. The National Ocean Council should develop national goals for ocean and coastal habitat conservation and restoration efforts and should ensure coordination among all related federal activities. The regional ocean councils and regional ocean information programs should determine habitat conservation and restoration needs and set regional goals and priorities that are consistent with the national goals.

Recommendation 11–4. The National Ocean Council should coordinate development of a comprehensive wetlands protection program that is linked to coastal habitat and watershed management efforts, and should make specific recommendations for the integration of the Clean Water Act Section 404 wetlands permitting process into that broader management approach.

Recommendation 12–1. The National Ocean Council should develop a national strategy for managing sediment on a regional basis, taking into account both economic and ecosystem needs. The strategy should accomplish several objectives: consider adverse impacts on marine environments due to agriculture, dredging, pollutant discharges, and other activities that affect sediment flows or quality; ensure involvement of port managers, coastal planners, and other stakeholders in watershed planning; and require that ecosystem-based management principles serve as the foundation for permitting activities that affect sediment.

Recommendation 13–1. Congress should designate the U.S. Department of Transportation (DOT) as the lead federal agency for planning and oversight of the marine transportation system and DOT should submit regular reports on the condition and future needs of the system. The National Ocean Council should identify overlapping functions in other federal agencies and make recommendations concerning the advisability of transferring those functions to DOT.

Recommendation 14–8. The National Ocean Council (NOC) should establish significant reduction of nonpoint source pollution in all impaired coastal watersheds as a national goal, and set specific, measurable objectives focused on meeting human health- and ecosystem-based water quality standards. The NOC should ensure that all federal nonpoint source pollution programs are coordinated to meet those objectives.

Recommendation 14–13. The National Ocean Council and regional ocean councils should strengthen the ability of collaborative watershed groups to address problems associated with nonpoint source pollution by providing them with adequate technical, institutional, and financial support.

Recommendation 16–15. The National Ocean Council should coordinate closely with the U.S. Coast Guard to ensure that initiatives to enhance maritime domain awareness are developed and implemented to provide effective support for all coastal and ocean management needs.

Recommendation 17–2. The National Ocean Council should commission an independent, scientific review of existing U.S. ballast water management research and demonstration programs and make recommendations for improvements.

Recommendation 17–3. The National Ocean Council, working with the Aquatic Nuisance Species Task Force and the National Invasive Species Council, should coordinate public education and outreach efforts on aquatic invasive species, with the aim of increasing public awareness about the importance of prevention.

Recommendation 17–5. The National Ocean Council should review, coordinate, and streamline the current proliferation of federal, regional, and state programs for managing marine invasive species. Coordinated plans should be implemented to develop risk assessment and management approaches for intentional and unintentional species introductions that minimize the potential of invasions at the lowest cost.

Recommendation 17–7. The National Ocean Council should coordinate the development and implementation of an interagency plan for research and monitoring to understand and prevent aquatic species invasions. Research and monitoring should focus on gathering baseline taxonomic information, identifying invasive pathogens and vectors of introduction, understanding the human dimensions behind species introductions, and developing new options for minimizing invasions.

Recommendation 18–2. The National Ocean Council should re-establish an interagency marine debris committee, co-chaired by the U.S. Environmental Protection Agency and National Oceanic and Atmospheric Administration. The committee should work to expand and better coordinate national and international marine debris efforts, including public outreach and education, monitoring and identification, research, and partnerships with local government, community groups, and industry.

Recommendation 19–26. The National Ocean Council’s (NOC’s) international committee, which is charged with supporting the development and implementation of ocean-related international policy, should initiate a process to determine the most effective methods of encouraging other nations to implement the United Nations Food and Agriculture Organization’s Code of Conduct for Responsible Fisheries and other Plans of Action, and provide its findings to the U.S. Department of State and the NOC.

Recommendation 20–1. Congress should amend the Marine Mammal Protection Act to require the Marine Mammal Commission, while remaining independent, to coordinate with all relevant federal agencies through the National Ocean Council (NOC). The NOC should consider whether there is a need for similar oversight bodies for other marine animals whose populations are at risk.

Recommendation 20–3. The National Ocean Council should improve coordination between the National Marine Fisheries Service and U.S. Fish and Wildlife Service with respect to the implementation of the Endangered Species Act, particularly for anadromous species or when land-based activities have significant impacts on marine species.

Recommendation 20–6. The National Marine Fisheries Service and the U.S. Fish and Wildlife Service should implement programmatic permitting for activities that affect marine mammals, wherever possible. More resource intensive case-by-case permitting should be reserved for unique activities or where circumstances indicate a greater likelihood of harm to marine mammals. The National Ocean Council should create an interagency team to recommend activities appropriate for programmatic permitting, those that are inappropriate, and those that are potentially appropriate pending additional scientific information. Enforcement efforts should also be strengthened and the adequacy of penalties reviewed.

Recommendation 24–4. The National Ocean Council (NOC), working with the U.S. Department of Energy and other appropriate entities, should review the status of methane hydrates research and development and seek to determine whether methane hydrates can contribute significantly to meeting the nation’s long-term energy needs. If such contribution looks promising, the NOC should determine how much the current investment in methane hydrates research and development efforts should be increased, and whether a comprehensive management regime for private industry access to methane hydrates deposits is needed.

Recommendation 25–2. The National Ocean Council should develop a national ocean research strategy that reflects a long-term vision, promotes advances in basic and applied ocean science and technology, and guides relevant agencies in developing ten-year science plans and budgets.

Recommendation 25–3. The National Ocean Council should create a national program for social science and economic research to examine the human dimensions and economic value of the nation’s oceans and coasts and encourage ocean research agencies to include socioeconomic research as part of their efforts. An operational socioeconomic research and assessment function should be designated within the National Oceanic and Atmospheric Administration.

Recommendation 25–5. The National Ocean Council should coordinate federal resource assessment, mapping, and charting activities with the goal of creating standardized, easily accessible national maps that incorporate living and nonliving marine resource data along with bathymetry, topography, and other natural features.

Recommendation 26–1. The National Ocean Council should make development and implementation of a sustained, national Integrated Ocean Observing System a central focus of its leadership and coordination role.

Recommendation 26–10. The National Ocean Council should oversee coordination of the Integrated Ocean Observing System with other existing and planned terrestrial, watershed, atmospheric, and biological observation and information collection systems, with the ultimate goal of developing a national Earth Observing System.

Recommendation 26–11. The National Ocean Council (NOC) should promote international coordination and capacity building in the field of global ocean observations. The NOC should lead the U.S. implementation of the 2003 Declaration on Earth Observing, advocate full, open, and meaningful data access policies, and contribute technological expertise to ensure access by all nations.

Recommendation 27–1. The National Ocean Council should develop a national ocean and coastal infrastructure and technology strategy, including funding and implementation requirements.

Recommendation 27–3. The National Ocean Council should update the assessment of U.S. ocean and coastal infrastructure and technology, including federal, state, academic, and private assets and associated human resource needs, every five years.

Recommendation 28–4. The National Ocean Council should establish and enforce common requirements and deadlines for investigators to submit data acquired during federally funded ocean research projects.

Recommendation 29–2. The National Ocean Council should coordinate an expedited review and analysis of the ocean-related components of the United Nations Convention on Biological Diversity and recommend to the U.S. Department of State whether, from an ocean perspective, ratification of this treaty would be beneficial to U.S. interests.

Recommendation 29–3. The National Ocean Council (NOC) should establish and oversee an interagency committee to support the development and implementation of ocean-related international policy. This committee should be chaired by the U.S. Department of State, make recommendations to the Assistant to the President and the Secretary of State on international ocean policy, and provide technical assistance to the NOC on international ocean issues.

Recommendation 29–4. The National Ocean Council’s international committee should assess emerging international ocean-related management challenges and make recommendations for either incorporating these activities under existing management regimes or developing appropriate new ones. The U.S. Department of State should work with the international community to implement these recommendations.

1. NOC Committee on Ocean Science, Education, Technology, and Operations

i) Office on Ocean Education (Ocean.ED)

Recommendation 8–4. Ocean.ED should lead the development of a framework for evaluating and assessing the effectiveness of ocean-related education programs, ocean-based K–12 professional development programs, best practices for incorporating ocean-based examples into K–12 education, and public education programs.

Recommendation 8–6. Ocean.ED, working with state and local education authorities and the research community, should coordinate the development and adoption of ocean-related materials and examples that meet existing education standards.

Recommendation 8–7. Ocean.ED, working with academic institutions and local school districts, should help establish stronger and more effective relationships between the research and education communities to expand professional development opportunities for teachers and teacher educators. The National Oceanic and Atmospheric Administration, National Science Foundation, the U.S. Navy, and National Aeronautics and Space Administration should support these efforts by providing secure and stable funding.

Recommendation 8–8. Ocean.ED should promote partnerships among school districts, institutions of higher learning, aquariums, science centers, museums, and private laboratories to develop more opportunities for students to explore the marine environment, both through virtual means and hands-on field, laboratory, and at-sea experiences. Ocean.ED should ensure that ocean-based educational programs and materials acknowledge cultural differences and other aspects of human diversity, resulting in programs that expose students and teachers from all cultures and backgrounds to ocean issues.

Recommendation 8–10. Ocean.ED should guide and promote the development of the nation’s ocean-related workforce.

Recommendation 8–11. The National Oceanic and Atmospheric Administration and the U.S. Department of Labor should establish a national ocean workforce database and compile an annual report for the National Ocean Council on trends in ocean-related human resource development and needs. This effort should include an information clearinghouse to facilitate career decisions, provide access to career guidance, and enable employers, guidance counselors, and others to develop effective strategies to attract students to ocean-related careers. Ocean.ED should organize an ocean workforce summit every five years to address the alignment of ocean education with workforce needs.

Recommendation 8–15. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should encourage and increase the participation of traditionally underrepresented and underserved groups in the ocean-related workforce. Ocean.ED should facilitate collaboration between these agencies and institutions of higher learning to ensure that the appropriate mix of programs and opportunities exists to provide underrepresented and underserved groups ample access to and support for pursuing ocean-related graduate education.

Recommendation 8–16. Ocean.ED, working with other appropriate entities, should enhance existing and establish new mechanisms for developing and delivering relevant, accessible information and outreach programs to enhance community education.

ii) Office on Ocean Observing (Ocean.US)

Recommendation 26–2. Ocean.US, with National Ocean Council (NOC) oversight, should be responsible for planning the national Integrated Ocean Observing System (IOOS). The National Oceanic and Atmospheric

Administration should be the lead federal agency for implementing and operating the IOOS, with extensive interagency coordination and subject to NOC approval.

Recommendation 26–4. Ocean.US should proactively seek input from coastal and ocean communities to build cross-sector support for the national Integrated Ocean Observing System and develop consensus about operational requirements.

Recommendation 26–5. Ocean.US, with National Ocean Council oversight, should develop a set of core variables to be collected by all components of the national Integrated Ocean Observing System. The core variables should include appropriate biological, chemical, geological, and physical variables, and should be agreed on by the regional ocean information programs.

Recommendation 26–6. Ocean.US should recommend priorities and long-term plans for space-based missions as an essential component of the national Integrated Ocean Observing System.

iii) Office on Ocean Information (Ocean.IT)

Recommendation 28–3. The interagency group for ocean information management, Ocean.IT, should work with developers of the National Virtual Ocean Data System and other innovative data management systems to implement a federally-supported system for accessing ocean and coastal data both within and outside the national data centers.

C. Assistant to the President

Recommendation 4–4. A designated Assistant to the President should provide leadership and support for national ocean and coastal policy. The Assistant to the President should chair the National Ocean Council (NOC), co-chair the Presidential Council of Advisors on Ocean Policy, and lead NOC efforts to coordinate federal agency actions and involve regional, state, and local stakeholders.

Recommendation 7–3. The Assistant to the President, with advice from the National Ocean Council and the Presidential Council of Advisors on Ocean Policy, should review federal ocean, coastal, and atmospheric programs, and recommend opportunities for consolidation of similar functions.

D. Presidential Council of Advisors on Ocean Policy

Recommendation 4–5. The Presidential Council of Advisors on Ocean Policy, a formal structure for input from individuals and organizations outside the federal government, should advise the President on ocean and coastal policy matters. This Council should be composed of a representative selection of nonfederal individuals appointed by the President who are knowledgeable about, and experienced in, ocean and coastal issues.

III. Recommendations to Federal Government Agencies

A. U.S. Department of Commerce, National Oceanic and Atmospheric Administration

Recommendation 8–2. Congress should provide funding for the operation of a new National Ocean Council (NOC) Office on Ocean Education (Ocean.ED), and for implementation of related programs, as a line item in the National Oceanic and Atmospheric Administration (NOAA) budget, to be spent at the direction of the NOC. NOAA should develop a streamlined process for distributing Ocean.ED funds to other federal and nonfederal entities as approved by the NOC.

Recommendation 8–3. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should strengthen their support of both formal and informal ocean-related education, including appropriate assessments and evaluation of these efforts.

Recommendation 8–7. Ocean.ED, working with academic institutions and local school districts, should help establish stronger and more effective relationships between the research and education communities to expand professional development opportunities for teachers and teacher educators. The National Oceanic and Atmospheric Administration, National Science Foundation, the U.S. Navy, and National Aeronautics and Space Administration should support these efforts by providing secure and stable funding.

Recommendation 8–9. The National Oceanic and Atmospheric Administration, National Science Foundation, and Office of Naval Research should support colleges and universities in promoting introductory marine science courses to expose students, including non-science majors, to these subjects.

Recommendation 8–11. The National Oceanic and Atmospheric Administration and the U.S. Department of Labor should establish a national ocean workforce database and compile an annual report for the National Ocean Council on trends in ocean-related human resource development and needs. This effort should include an information clearinghouse to facilitate career decisions, provide access to career guidance, and enable employers, guidance counselors, and others to develop effective strategies to attract students to ocean-related careers. Ocean.ED should organize an ocean workforce summit every five years to address the alignment of ocean education with workforce needs.

Recommendation 8–12. The National Oceanic and Atmospheric Administration should establish a national ocean education and training program, patterned after the National Institutes of Health model, within its Office of Education and Sustainable Development to provide diverse, innovative ocean-related education opportunities at the undergraduate, graduate, and postdoctoral levels.

Recommendation 8–15. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should encourage and increase the participation of traditionally underrepresented and underserved groups in the ocean-related workforce. Ocean.ED should facilitate collaboration between these agencies and institutions of higher learning to ensure that the appropriate mix of programs and opportunities exists to provide underrepresented and underserved groups ample access to and support for pursuing ocean-related graduate education.

Recommendation 12–4. The U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, and U.S. Geological Survey should develop a strategy for improved assessment, monitoring, research, and technology development to enhance sediment management. Congress should modify its current authorization and funding processes to encourage USACE to monitor outcomes from past projects and study the cumulative, regional impacts of its activities within coastal watersheds and ecosystems.

Recommendation 15–1. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should develop a national water quality monitoring network that coordinates existing and planned monitoring efforts, including monitoring of atmospheric deposition. The network should include a federally funded backbone of critical stations and measurements needed to assess long-term water quality trends and conditions.

Recommendation 15–2. The National Oceanic and Atmospheric Administration should ensure that the national water quality monitoring network includes adequate coverage in both coastal areas and the upland areas that affect them, and that the network is linked to the Integrated Ocean Observing System, to be incorporated eventually into a comprehensive Earth observing system.

Recommendation 15–3. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should ensure that the national water quality monitoring network includes the following elements: clearly defined goals that fulfill user needs and measure management success; a core set of variables to be measured, with regional flexibility to measure additional variables where needed; an overall system design that determines where, how, and when to monitor and includes a mix of time and space scales, probabilistic and fixed stations, and stressor- and effects-oriented measurements; technical coordination that establishes standard procedures and techniques; and periodic review of the monitoring network, with modifications as necessary.

Recommendation 15–4. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should ensure that water quality monitoring data are translated into timely and useful information products that are easily accessible to the public and linked to output from the Integrated Ocean Observing System.

Recommendation 16–14. The U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S. Coast Guard, and other appropriate public and private entities should support a vigorous research program on the impacts of all types of vessel pollution. Research results should be used to guide management priorities, develop new control technologies, determine best management practices, and create more effective regulatory regimes.

Recommendation 18–1. The National Oceanic and Atmospheric Administration should establish and support a marine debris management program.

Recommendation 18–3. The U.S. Department of State and the National Oceanic and Atmospheric Administration, working with the United Nations Food and Agriculture Organization and other appropriate entities, should develop a detailed plan of action to address derelict fishing gear, to be implemented on a regional, multi-national basis.

Recommendation 18–4. The National Oceanic and Atmospheric Administration should promote a public-private partnership program and implement strong incentives for removal and disposal of derelict fishing gear.

Recommendation 19–9. Congress should increase support for an expanded, regionally-based cooperative research program in the National Oceanic and Atmospheric Administration (NOAA) that coordinates and funds collaborative projects among scientists and commercial and recreational fishermen. NOAA should develop a process for external evaluation and ranking of all cooperative research proposals to ensure the most worthwhile projects are funded, the most capable performers are undertaking the research, and the information produced is both scientifically credible and useful to managers.

Recommendation 19–16. Congress should repeal the Fisheries Finance Program (formerly the Fishing Vessel Obligation Guarantee Program), the Capital Construction Fund, and other programs that encourage overcapitalization in fisheries. The National Oceanic and Atmospheric Administration should implement programs to permanently reduce fishing capacity to sustainable levels.

Recommendation 19–25. The National Oceanic and Atmospheric Administration, working with the U.S. Fish and Wildlife Service and the U.S. Department of State, should design a National Plan of Action for the United States that implements, and is consistent with, the International Plans of Action adopted by the United Nations Food and Agriculture Organization and its 1995 Code of Conduct for Responsible Fisheries. This National Plan should stress the importance of reducing bycatch of endangered species and marine mammals.

Recommendation 20–7. The National Oceanic and Atmospheric Administration and the U.S. Department of the Interior should promote an expanded research, technology, and engineering program, coordinated

through the National Ocean Council, to examine and mitigate the effects of human activities on marine mammals and endangered species.

Recommendation 21–3. The National Oceanic and Atmospheric Administration should develop national standards—and promote international standards—to ensure that coral reef resources that are collected, imported, or marketed are harvested in a sustainable manner. The U.S. Department of State should implement incentive programs to encourage international compliance with these standards.

Recommendation 22–2. The National Oceanic and Atmospheric Administration’s new Office of Sustainable Marine Aquaculture should be responsible for developing a comprehensive, environmentally-sound permitting, leasing, and regulatory program for marine aquaculture.

Recommendation 22–3. Congress should increase funding for expanded marine aquaculture research, development, training, extension, and technology transfer programs in the National Oceanic and Atmospheric Administration (NOAA). NOAA’s new Office of Sustainable Marine Aquaculture should set priorities for the research and technology programs, in close collaboration with academic, business, and other stakeholders.

Recommendation 23–1. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support expanded research and development efforts to encourage multidisciplinary studies of the evolution, ecology, chemistry, and molecular biology of marine species, discover potential marine bioproducts, and develop practical compounds, through both competitively awarded grants and support of federally designated centers.

Recommendation 23–2. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support expanded research efforts in marine microbiology and virology.

Recommendation 23–3. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support the development and implementation of improved methods for monitoring and identifying pathogens and chemical toxins in ocean waters and organisms.

Recommendation 24–3. The National Oceanic and Atmospheric Administration, working with the Minerals Management Service and the offshore oil and gas industry, should establish a partnership that will allow the use of industry resources, including pipelines, platforms, vessels, and research and monitoring programs, as part of the Integrated Ocean Observing System.

Recommendation 26–2. Ocean.US, with National Ocean Council (NOC) oversight, should be responsible for planning the national Integrated Ocean Observing System (IOOS). The National Oceanic and Atmospheric Administration should be the lead federal agency for implementing and operating the IOOS, with extensive interagency coordination and subject to NOC approval.

Recommendation 26–7. The National Oceanic and Atmospheric Administration, National Science Foundation (NSF), the U.S. Navy, and National Aeronautics and Space Administration should require investigators who receive federal funding related to ocean research observatories, including the NSF Ocean Observatories Initiative, to develop plans for transferring new technologies to an operational mode in the Integrated Ocean Observing System.

Recommendation 26–8. Congress should transfer the National Aeronautics and Space Administration’s (NASA’s) Earth environmental observing satellites, along with associated resources, to the National Oceanic and Atmospheric Administration (NOAA) to achieve continued operations. NOAA and NASA should work together to ensure the smooth transition of each Earth environmental observing satellite after its launch.

Recommendation 26–9. Congress should fund the Integrated Ocean Observing System (IOOS) as a line item in the National Oceanic and Atmospheric Administration (NOAA) budget, to be spent subject to National Ocean Council direction and approval. IOOS funds should be appropriated without fiscal year limitation. NOAA should develop a streamlined process for distributing IOOS funds to other federal and nonfederal partners.

Recommendation 27–2. The National Oceanic and Atmospheric Administration should create an Office of Technology to expedite the transition of experimental technologies into operational applications. This office should work closely with academic institutions, the regional ocean information programs, the National Science Foundation, the U.S. Navy, the National Aeronautics and Space Administration, and other relevant agencies to achieve its mission.

Recommendation 27–5. The National Oceanic and Atmospheric Administration should establish national virtual marine technology centers to provide coordinated access, through electronic means, to cutting-edge, large-scale research technologies.

Recommendation 28–2. The National Oceanic and Atmospheric Administration and the U.S. Navy should establish a joint ocean and coastal information management and communications program to generate information products relevant to national, regional, state, and local needs on an operational basis.

1. National Marine Fisheries Service

Recommendation 19–4. The National Marine Fisheries Service, working with the Regional Fishery Management Councils and the interstate fisheries commissions, should develop a process for independent review of the scientific information generated by the Scientific and Statistical Committees in all regions. This process should include three procedures: a standard review, an enhanced review, and an expedited review.

Recommendation 19–5. Each Regional Fishery Management Council should set a deadline for its Scientific and Statistical Committee (SSC) to determine allowable biological catch. If the SSC does not meet that deadline, the National Marine Fisheries Service Regional Science Director should set the allowable biological catch for that fishery.

Recommendation 19–7. The Regional Fishery Management Councils and their Scientific and Statistical Committees should develop an annual, prioritized list of management information needs and provide it to the National Marine Fisheries Service (NMFS). NMFS should incorporate these needs to the maximum extent possible in designing its research, analysis, and data collection programs.

Recommendation 19–8. The National Marine Fisheries Service, working with states and interstate fisheries commissions, should require all saltwater anglers to purchase licenses to improve in-season data collection on recreational fishing. Priority should be given to fisheries in which recreational fishing is responsible for a large part of the catch, or in which recreational fishermen regularly exceed their allocated quota.

Recommendation 19–14. The National Marine Fisheries Service (NMFS) should require all newly appointed Regional Fishery Management Council (RFMC) members to complete a training course within six months of their appointment. NMFS should contract with an external organization to develop and implement this training course. Members who have not completed the training may participate in RFMC meetings, but may not vote.

Recommendation 19–18. The National Marine Fisheries Service and the U.S. Coast Guard should strengthen cooperative enforcement efforts at the national level by developing a unified strategic plan for fisheries enforcement that includes significantly increased joint training, and at the regional and local levels, by developing a stronger and more consistent process for sharing information and coordinating enforcement.

Recommendation 19–19. The National Marine Fisheries Service, working with the Regional Fishery Management Councils, the U.S. Coast Guard, and other appropriate entities, should maximize the use of the Vessel Monitoring System (VMS) for fishery-related activities by: requiring that VMS with two-way communication capability be phased in for all commercial fishing vessels receiving permits under federal fishery plans, including party and charter boats that carry recreational fishermen, incorporating VMS features that assist personnel in monitoring and responding to potential violations, and identifying state fisheries that could significantly benefit from VMS implementation.

Recommendation 19–21. The National Marine Fisheries Service (NMFS) should change the designation of essential fish habitat from a species-by-species to a multispecies approach and, ultimately, to an ecosystem-based approach. The approach should draw upon existing efforts to identify important habitats and locate optimum-sized areas to protect vulnerable life-history stages of commercially important species. NMFS should work with other management entities to protect essential fish habitat when such areas fall outside their jurisdiction.

Recommendation 19–22. The National Marine Fisheries Service (NMFS) and Regional Fishery Management Councils should develop regional bycatch reduction plans that address broad ecosystem impacts of bycatch. Implementation of these plans will require NMFS to expand current efforts to collect data on bycatch, not only of commercially important species, but on all species captured by commercial and recreational fishermen. The selective use of observers should remain an important component of these efforts.

Recommendation 20–6. The National Marine Fisheries Service and the U.S. Fish and Wildlife Service should implement programmatic permitting for activities that affect marine mammals, wherever possible. More resource intensive case-by-case permitting should be reserved for unique activities or where circumstances indicate a greater likelihood of harm to marine mammals. The National Ocean Council should create an interagency team to recommend activities appropriate for programmatic permitting, those that are inappropriate, and those that are potentially appropriate pending additional scientific information. Enforcement efforts should also be strengthened and the adequacy of penalties reviewed.

B. U.S. Environmental Protection Agency

Recommendation 12–4. The U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, and U.S. Geological Survey should develop a strategy for improved assessment, monitoring, research, and technology development to enhance sediment management. Congress should modify its current authorization and funding processes to encourage USACE to monitor outcomes from past projects and study the cumulative, regional impacts of its activities within coastal watersheds and ecosystems.

Recommendation 12–5. The U.S. Environmental Protection Agency, working with other appropriate entities, should develop a coordinated strategy for assessment, monitoring, and research to better understand how contaminated sediment is created and transported, and to develop technologies for better prevention, safer dredging of such sediment, and more effective treatment after it is recovered.

Recommendation 14–1. The U.S. Environmental Protection Agency (EPA) and states should require advanced nutrient removal for wastewater treatment plant discharges into nutrient-impaired waters. Additionally, EPA should support a vigorous effort to characterize the extent of the impact of household and industrial chemicals in wastewater.

Recommendation 14–2. The U.S. Environmental Protection Agency (EPA) and states should increase technical and financial assistance to help communities improve the permitting, design, installation, operation, and maintenance of septic systems and other on-site treatment facilities. State and local governments, with assistance from EPA, should adopt more effective building codes and zoning ordinances for septic systems and should improve public education about the benefits of regular maintenance.

Recommendation 14–3. The U.S. Environmental Protection Agency and the U.S. Department of Agriculture should fund research on removal of nutrients from animal wastes and should develop improved best management practices that retain animal waste-derived nutrients and pathogens on agricultural lands. Where necessary to meet water quality standards, states should issue regulatory controls on concentrated animal feeding operations in addition to those required by the federal government.

Recommendation 14–4. The U.S. Environmental Protection Agency, working with state and local governments, should develop a prioritized, comprehensive plan for long-term funding of the nation’s current aging and inadequate wastewater and drinking water infrastructure, anticipating demands for increased capacity and more stringent treatment in the coming decades.

Recommendation 14–5. The U.S. Environmental Protection Agency and states should experiment with tradable credits for nutrients and sediments as a water pollution management tool and evaluate the ongoing effectiveness of such programs in reducing water pollution.

Recommendation 14–6. The U.S. Environmental Protection Agency and states should modernize the National Pollutant Discharge Elimination System’s information management system and strengthen the program’s enforcement to achieve greater compliance with permits and develop an effective ongoing monitoring program.

Recommendation 14–11. The U.S. Environmental Protection Agency and other appropriate entities should increase outreach programs that provide local land use decision makers with the knowledge and tools needed to make sound land use decisions that protect coastal water quality. State and local governments should revise their codes and ordinances to require land use planning and decision-making to carefully consider the individual and cumulative impacts of development on water quality, including effects on stormwater runoff.

Recommendation 14–12. The U.S. Environmental Protection Agency, working with state and local governments, should ensure that stormwater management programs are based on a comprehensive approach that includes: codes or ordinances requiring best management practices; increased enforcement of legal requirements; monitoring to determine whether goals and state water quality standards are being met and to identify ongoing problems; an adaptive management approach to ensure that efforts are effective and that best management practices are modified as needed; improved public education; and funding and personnel sufficient to implement and enforce stormwater management programs.

Recommendation 14–14. The U.S. Environmental Protection Agency, states, and watershed groups should explore regional approaches for managing atmospheric deposition, particularly when it affects water bodies in states far from the source.

Recommendation 15–1. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should develop a national water quality monitoring network that coordinates existing and planned monitoring efforts, including monitoring of atmospheric deposition. The network should include a federally funded backbone of critical stations and measurements needed to assess long-term water quality trends and conditions.

Recommendation 15–3. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should ensure that the national water quality monitoring network includes the following elements: clearly defined goals that fulfill user needs and measure management success; a core set of variables to be measured, with regional flexibility to measure additional variables where needed; an overall system design that determines where, how, and when to monitor and includes a mix of time and space scales, probabilistic and fixed stations, and stressor- and effects-oriented measurements; technical coordination that establishes standard procedures and techniques; and periodic review of the monitoring network, with modifications as necessary.

Recommendation 15–4. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should ensure that water quality monitoring data are translated into timely and useful information products that are easily accessible to the public and linked to output from the Integrated Ocean Observing System.

Recommendation 16–6. The U.S. Environmental Protection Agency should revise the Clean Water Act marine sanitation device (MSD) regulations to require that new MSDs meet significantly more stringent pathogen-reduction standards. The U.S. Coast Guard should require manufacturers to provide warranties that MSDs will meet these new standards for a specified time period.

Recommendation 16–7. The U.S. Environmental Protection Agency (EPA) should conduct a thorough assessment, including field inspections, to verify the availability and accessibility of functioning pumpout facilities in existing no-discharge zones and prior to the approval of any new no-discharge zones. EPA, working with other appropriate entities, should increase voluntary installation of pumpout facilities.

Recommendation 16–9. The U.S. Environmental Protection Agency, working with other appropriate entities, should investigate and develop incentive-based measures that result in measurable voluntary reductions in vessel air emissions.

Recommendation 16–10. The United States should ratify Annex VI of the International Convention on the Prevention of Pollution from Ships and work for adoption by the International Maritime Organization of even stricter air emission standards that reflect advances in marine engine technology, availability of cleaner fuels, and improved operational practices. The U.S. Environmental Protection Agency should consider designating certain U.S. ocean and coastal areas with impaired air quality as Annex VI Sulfur Oxide Emission Control Areas.

Recommendation 16–12. The U.S. Department of Transportation, U.S. Coast Guard, U.S. Environmental Protection Agency, and Minerals Management Service should conduct a risk-based analysis of all oil transportation systems, identify and prioritize areas of greatest risk, and develop a comprehensive plan for long-term action to reduce the threat of significant spills.

Recommendation 16–14. The U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S. Coast Guard, and other appropriate public and private entities should support a vigorous research program on the impacts of all types of vessel pollution. Research results should be used to guide management priorities, develop new control technologies, determine best management practices, and create more effective regulatory regimes.

C. U.S. Department of Defense

1. U.S. Navy

Recommendation 8–7. Ocean.ED (the National Ocean Council’s office of education) working with academic institutions and local school districts, should help establish stronger and more effective relationships between the research and education communities to expand professional development opportunities for teachers and teacher educators. The National Oceanic and Atmospheric Administration, National Science Foundation, the U.S. Navy, and National Aeronautics and Space Administration should support these efforts by providing secure and stable funding.

Recommendation 26–7. The National Oceanic and Atmospheric Administration, National Science Foundation (NSF), the U.S. Navy, and National Aeronautics and Space Administration should require investigators who receive federal funding related to ocean research observatories, including the NSF Ocean Observatories Initiative, to develop plans for transferring new technologies to an operational mode in the Integrated Ocean Observing System.

Recommendation 28–2. The National Oceanic and Atmospheric Administration and the U.S. Navy should establish a joint ocean and coastal information management and communications program to generate information products relevant to national, regional, state, and local needs on an operational basis.

Recommendation 28–5. The U.S. Navy should periodically review and declassify appropriate naval oceanographic data for access by the civilian science community.

i) Office of Naval Research

Recommendation 8–3. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should strengthen their support of both formal and informal ocean-related education, including appropriate assessments and evaluation of these efforts.

Recommendation 8–9. The National Oceanic and Atmospheric Administration, National Science Foundation, and Office of Naval Research should support colleges and universities in promoting introductory marine science courses to expose students, including non-science majors, to these subjects.

Recommendation 8–14. The Office of Naval Research (ONR) should reinvigorate its support of graduate education in ocean sciences and engineering. This could be partly accomplished by increasing the number of ocean-related awards made under ONR’s National Defense Science and Engineering Graduate Fellowship Program.

Recommendation 8–15. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should encourage and increase the participation of traditionally underrepresented and underserved groups in the ocean-related workforce. Ocean.ED, the National Ocean Council’s office of education, should facilitate collaboration between these agencies and institutions of higher learning to ensure that the appropriate mix of programs and opportunities exists to provide underrepresented and underserved groups ample access to and support for pursuing ocean-related graduate education.

2. U.S. Army Corps of Engineers

Recommendation 12–2. The U.S. Army Corps of Engineers should ensure that its selection of the least-cost disposal option for dredging projects reflects a more accurate accounting of the full range of economic and environmental costs and benefits for options that reuse dredged materials, as well as for other disposal methods.

Recommendation 12–4. The U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, and U.S. Geological Survey should develop a strategy for improved assessment, monitoring, research, and technology development to enhance sediment management. Congress should modify its current authorization and funding processes to encourage USACE to monitor outcomes from past projects and study the cumulative, regional impacts of its activities within coastal watersheds and ecosystems.

D. U.S. Department of Homeland Security, U.S. Coast Guard

Recommendation 16–1. The U.S. Coast Guard should encourage industry partners engaged in vessel management to develop stronger voluntary measures, particularly those that reward crew member contributions, as part of a continuing long-term effort to build a culture of safety, security, and environmental compliance in routine vessel operations.

Recommendation 16–2. Congress should provide the U.S. Coast Guard with the resources necessary to sustain and strengthen the performance-based inspection program for marine safety and environmental protection. Coast Guard resource commitments in these areas should be coordinated with new demands for vessel security inspections and other security requirements.

Recommendation 16–4. The U.S. Coast Guard, working with other nations, should establish a permanent mechanism to strengthen and harmonize port state control programs under the auspices of the International Maritime Organization. The Coast Guard should provide sustained funding to support an international vessel information database that can be used to enhance the effectiveness of port state control efforts.

Recommendation 16–6. The U.S. Environmental Protection Agency should revise the Clean Water Act marine sanitation device (MSD) regulations to require that new MSDs meet significantly more stringent pathogen-reduction standards. The U.S. Coast Guard should require manufacturers to provide warranties that MSDs will meet these new standards for a specified time period.

Recommendation 16–12. The U.S. Department of Transportation, U.S. Coast Guard, U.S. Environmental Protection Agency, and Minerals Management Service should conduct a risk-based analysis of all oil transportation systems, identify and prioritize areas of greatest risk, and develop a comprehensive plan for long-term action to reduce the threat of significant spills.

Recommendation 16–13. The U.S. Coast Guard, working with the spill response community, should develop comprehensive policy guidance and contingency plans for places of refuge in the United States. The plans should clearly delineate decision-making authorities and responsibilities and provide for a coordinated and timely assessment and response to vessels seeking a place of refuge.

Recommendation 16–14. The U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S. Coast Guard, and other appropriate public and private entities should support a vigorous research program on the impacts of all types of vessel pollution. Research results should be used to guide management priorities, develop new control technologies, determine best management practices, and create more effective regulatory regimes.

Recommendation 17–1. The U.S. Coast Guard’s national ballast water management program should: apply uniform, mandatory national standards; incorporate sound science in the development of a biologically meaningful and enforceable ballast water treatment standard; include a process for revising the standard to incorporate new technologies; ensure full consultation with the U.S. Environmental Protection Agency, both during and after the program’s development; and include an interagency review, through the National Ocean Council, of the policy for ships that declare they have no ballast on board.

Recommendation 19–18. The National Marine Fisheries Service and the U.S. Coast Guard should strengthen cooperative enforcement efforts at the national level by developing a unified strategic plan for fisheries enforcement that includes significantly increased joint training, and at the regional and local levels, by developing a stronger and more consistent process for sharing information and coordinating enforcement.

Recommendation 19–20. The U.S. Coast Guard should be the lead organization in managing the integration of a fishery Vessel Monitoring System (VMS) database into the larger maritime operations database and should work with the National Marine Fisheries Service to ensure effective use of VMS data for monitoring and enforcement.

E. National Science Foundation

Recommendation 8–3. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should

strengthen their support of both formal and informal ocean-related education, including appropriate assessments and evaluation of these efforts.

Recommendation 8–7. Ocean.ED, working with academic institutions and local school districts, should help establish stronger and more effective relationships between the research and education communities to expand professional development opportunities for teachers and teacher educators. The National Oceanic and Atmospheric Administration, National Science Foundation, the U.S. Navy, and National Aeronautics and Space Administration should support these efforts by providing secure and stable funding.

Recommendation 8–9. The National Oceanic and Atmospheric Administration, National Science Foundation, and Office of Naval Research should support colleges and universities in promoting introductory marine science courses to expose students, including non-science majors, to these subjects.

Recommendation 8–13. The National Science Foundation’s Directorates of Geosciences, Biological Sciences, and Education and Human Resources should develop cooperative programs to provide diverse educational opportunities at the undergraduate, graduate, and postdoctoral levels in a range of ocean-related fields.

Recommendation 8–15. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should encourage and increase the participation of traditionally underrepresented and underserved groups in the ocean-related workforce. Ocean.ED should facilitate collaboration between these agencies and institutions of higher learning to ensure that the appropriate mix of programs and opportunities exists to provide underrepresented and underserved groups ample access to and support for pursuing ocean-related graduate education.

Recommendation 23–1. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support expanded research and development efforts to encourage multidisciplinary studies of the evolution, ecology, chemistry, and molecular biology of marine species, discover potential marine bioproducts, and develop practical compounds, through both competitively awarded grants and support of federally designated centers.

Recommendation 23–2. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support expanded research efforts in marine microbiology and virology.

Recommendation 23–3. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support the development and implementation of improved methods for monitoring and identifying pathogens and chemical toxins in ocean waters and organisms.

Recommendation 26–7. The National Oceanic and Atmospheric Administration, National Science Foundation (NSF), the U.S. Navy, and National Aeronautics and Space Administration should require investigators who receive federal funding related to ocean research observatories, including the NSF Ocean Observatories Initiative, to develop plans for transferring new technologies to an operational mode in the Integrated Ocean Observing System.

F. U.S. Department of the Interior

Recommendation 20–7. The National Oceanic and Atmospheric Administration and the U.S. Department of the Interior should promote an expanded research, technology, and engineering program, coordinated through the National Ocean Council, to examine and mitigate the effects of human activities on marine mammals and endangered species.

Recommendation 24–2. The U.S. Department of the Interior should reverse recent budgetary trends and increase funding for the Minerals Management Service’s Environmental Studies Program.

1. U.S. Geological Survey

Recommendation 12–4. The U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, and U.S. Geological Survey should develop a strategy for improved assessment, monitoring, research, and technology development to enhance sediment management. Congress should modify its current authorization and funding processes to encourage USACE to monitor outcomes from past projects and study the cumulative, regional impacts of its activities within coastal watersheds and ecosystems.

Recommendation 15–1. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should develop a national water quality monitoring network that coordinates existing and planned monitoring efforts, including monitoring of atmospheric deposition. The network should include a federally funded backbone of critical stations and measurements needed to assess long-term water quality trends and conditions.

Recommendation 15–3. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should ensure that the national water quality monitoring network includes the following elements: clearly defined goals that fulfill user needs and measure management success; a core set of variables to be measured, with regional flexibility to measure additional variables where needed; an overall system design that determines where, how, and when to monitor and includes a mix of time and space scales, probabilistic and fixed stations, and stressor- and effects-oriented measurements; technical coordination that establishes standard procedures and techniques; and periodic review of the monitoring network, with modifications as necessary.

Recommendation 15–4. The National Oceanic and Atmospheric Administration, U.S. Geological Survey, and U.S. Environmental Protection Agency, working with other appropriate entities, should ensure that water quality monitoring data are translated into timely and useful information products that are easily accessible to the public and linked to output from the Integrated Ocean Observing System.

2. Minerals Management Service

Recommendation 16–12. The U.S. Department of Transportation, U.S. Coast Guard, U.S. Environmental Protection Agency, and Minerals Management Service should conduct a risk-based analysis of all oil transportation systems, identify and prioritize areas of greatest risk, and develop a comprehensive plan for long-term action to reduce the threat of significant spills.

Recommendation 24–6. The Minerals Management Service should systematically identify the nation’s offshore non-energy mineral resources and conduct the necessary cost-benefit, long-term security, and environmental studies to create a national program that ensures the best uses of those resources.

3. U.S. Fish and Wildlife Service

Recommendation 20–6. The National Marine Fisheries Service and the U.S. Fish and Wildlife Service should implement programmatic permitting for activities that affect marine mammals, wherever possible. More resource intensive case-by-case permitting should be reserved for unique activities or where circumstances indicate a greater likelihood of harm to marine mammals. The National Ocean Council should create an interagency team to recommend activities appropriate for programmatic permitting, those that are inappropriate, and those that are potentially appropriate pending additional scientific information. Enforcement efforts should also be strengthened and the adequacy of penalties reviewed.

G. U.S. Department of State

Recommendation 18–3. The U.S. Department of State and the National Oceanic and Atmospheric Administration, working with the United Nations Food and Agriculture Organization and other appropriate entities, should develop a detailed plan of action to address derelict fishing gear, to be implemented on a regional, multi-national basis.

Recommendation 18–5. The U.S. Department of State should increase efforts to ensure that all port reception facilities meet the criteria necessary to allow implementation of Special Areas protections under Annex V of the International Convention for the Prevention of Pollution from Ships.

Recommendation 19–23. The U.S. Department of State, working with other appropriate entities, should encourage all countries to ratify the Fish Stocks Agreement and the United Nations Food and Agriculture Organization’s Compliance Agreement. In particular, the United States should condition other nations’ access to fishing resources within the U.S. exclusive economic zone on their ratification of these agreements. Other incentives should be developed by the United States and other signatory nations to encourage all nations to ratify and enforce these agreements.

Recommendation 19–24. The U.S. Department of State, working with the National Oceanic and Atmospheric Administration, should review and update regional and bilateral fishery agreements to which the United States is a party, to ensure full incorporation of the latest science and harmonize those agreements with the Fish Stocks Agreement.

Recommendation 21–3. The National Oceanic and Atmospheric Administration should develop national standards—and promote international standards—to ensure that coral reef resources that are collected, imported, or marketed are harvested in a sustainable manner. The U.S. Department of State should implement incentive programs to encourage international compliance with these standards.

Recommendation 29–4. The National Ocean Council’s (NOC’s) international committee (which is charged with supporting the development and implementation of ocean-related international policy) should assess emerging international ocean-related management challenges and make recommendations for either incorporating these activities under existing management regimes or developing appropriate new ones. The U.S. Department of State should work with the international community to implement these recommendations.

Recommendation 29–5. The U.S. Department of State should improve its integration of ocean-related scientific expertise in policy and program development and implementation.

Recommendation 29–7. The U.S. Department of State should offer strong support for U.S. scientists conducting research programs around the world. Existing international partnerships should be strengthened and new partnerships promoted to facilitate the conduct of international research.

H. National Aeronautics and Space Administration

Recommendation 8–3. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should strengthen their support of both formal and informal ocean-related education, including appropriate assessments and evaluation of these efforts.

Recommendation 8–7. Ocean.ED (the National Ocean Council’s office of education), working with academic institutions and local school districts, should help establish stronger and more effective relationships between the research and education communities to expand professional development opportunities for teachers and

teacher educators. The National Oceanic and Atmospheric Administration, National Science Foundation, the U.S. Navy, and National Aeronautics and Space Administration should support these efforts by providing secure and stable funding.

Recommendation 8–15. The National Oceanic and Atmospheric Administration, National Science Foundation, Office of Naval Research, and National Aeronautics and Space Administration should encourage and increase the participation of traditionally underrepresented and underserved groups in the ocean-related workforce. Ocean.ED should facilitate collaboration between these agencies and institutions of higher learning to ensure that the appropriate mix of programs and opportunities exists to provide underrepresented and underserved groups ample access to and support for pursuing ocean-related graduate education.

Recommendation 26–7. The National Oceanic and Atmospheric Administration, National Science Foundation (NSF), the U.S. Navy, and National Aeronautics and Space Administration should require investigators who receive federal funding related to ocean research observatories, including the NSF Ocean Observatories Initiative, to develop plans for transferring new technologies to an operational mode in the Integrated Ocean Observing System.

Recommendation 26–8. Congress should transfer the National Aeronautics and Space Administration’s (NASA’s) Earth environmental observing satellites, along with associated resources, to the National Oceanic and Atmospheric Administration (NOAA) to achieve continued operations. NOAA and NASA should work together to ensure the smooth transition of each Earth environmental observing satellite after its launch.

I. U.S. Department of Transportation

Recommendation 13–1. Congress should designate the U.S. Department of Transportation (DOT) as the lead federal agency for planning and oversight of the marine transportation system and DOT should submit regular reports on the condition and future needs of the system. The National Ocean Council should identify overlapping functions in other federal agencies and make recommendations concerning the advisability of transferring those functions to DOT.

Recommendation 13–3. The U.S. Department of Transportation should draft a new national freight transportation strategy to support continued growth of the nation’s economy and international and domestic trade. This strategy should improve the links between the marine transportation system and other components of the transportation infrastructure, including highways, railways, and airports. Based on the new strategy, investments should be directed toward planning and implementation of intermodal projects of national significance.

Recommendation 13–4. The U.S. Department of Transportation should conduct a thorough analysis and assessment of the potential societal and economic benefits of increased short sea shipping.

Recommendation 13–5. The U.S. Department of Transportation (DOT), working with other appropriate entities, should establish a national data collection, research, and analysis program to provide a comprehensive picture of freight flows in the United States and to enhance the performance of the nation’s intermodal transportation system. DOT should periodically assess and prioritize the nation’s future needs for ports and intermodal transportation capacity to fulfill the needs of the nation’s expected future growth in marine commerce.

Recommendation 13–6. In developing a national freight transportation strategy, the U.S. Department of Transportation should work closely with the U.S. Department of Homeland Security and the Federal Emergency Management Agency to incorporate port security and other emergency preparedness requirements. The strategy should focus on preventing threats to national security and port operations and on response and recovery practices that limit the impacts of such events, including an assessment of the availability of alternative port capacity.

Recommendation 16–12. The U.S. Department of Transportation, U.S. Coast Guard, U.S. Environmental Protection Agency, and Minerals Management Service should conduct a risk-based analysis of all oil transportation systems, identify and prioritize areas of greatest risk, and develop a comprehensive plan for long-term action to reduce the threat of significant spills.

J. U.S. Department of Health and Human Services, National Institutes of Health, National Institute of Environmental Health Sciences

Recommendation 23–1. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support expanded research and development efforts to encourage multidisciplinary studies of the evolution, ecology, chemistry, and molecular biology of marine species, discover potential marine bioproducts, and develop practical compounds, through both competitively awarded grants and support of federally designated centers.

Recommendation 23–2. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support expanded research efforts in marine microbiology and virology.

Recommendation 23–3. The National Oceanic and Atmospheric Administration, National Science Foundation, National Institute of Environmental Health Sciences, and other appropriate entities should support the development and implementation of improved methods for monitoring and identifying pathogens and chemical toxins in ocean waters and organisms.

K. U.S. Department of Agriculture

Recommendation 14–3. The U.S. Environmental Protection Agency and the U.S. Department of Agriculture should fund research on removal of nutrients from animal wastes and should develop improved best management practices that retain animal waste-derived nutrients and pathogens on agricultural lands. Where necessary to meet water quality standards, states should issue regulatory controls on concentrated animal feeding operations in addition to those required by the federal government.

Recommendation 14–7. The U.S. Department of Agriculture (USDA) should align its conservation programs and funding with other programs aimed at reducing nonpoint source pollution, such as those of the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration. USDA's Natural Resources Conservation Service should require that its state conservationists coordinate with representatives of federal and state water quality agencies and state coastal management agencies.

L. U.S. Department of Labor

Recommendation 8–11. The National Oceanic and Atmospheric Administration and the U.S. Department of Labor should establish a national ocean workforce database and compile an annual report for the National Ocean Council on trends in ocean-related human resource development and needs. This effort should include an information clearinghouse to facilitate career decisions, provide access to career guidance, and enable employers, guidance counselors, and others to develop effective strategies to attract students to ocean-related careers. Ocean.ED, the National Ocean Council's office of education, should organize an ocean workforce summit every five years to address the alignment of ocean education with workforce needs.

M. Interagency groups

1. Aquatic Nuisance Species Task Force and the National Invasive Species Council

Recommendation 17–4. The Aquatic Nuisance Species Task Force and the National Invasive Species Council, working with other appropriate entities, should establish a national plan for early detection of invasive species and a system for prompt notification and rapid response.

2. National Dredging Team

Recommendation 12–3. The National Dredging Team and regional dredging teams should begin to implement more ecosystem-based approaches. The National Dredging Team should implement the recommendations of the 1994 report to the Secretary of Transportation, *The Dredging Process in the United States: An Action Plan for Improvement*, with a priority of developing and implementing a streamlined permitting process. Regional dredging teams, working with regional ocean councils, should establish sediment management programs that include watersheds, coastal areas, and the nation’s shoreline.

3. U.S. Coral Reef Task Force

Recommendation 21–4. The U.S. Coral Reef Task Force should identify critical research and data needs related to coral reef ecosystems. These needs should guide agency research funding and be incorporated into the design and implementation of the Integrated Ocean Observing System.

IV. Recommendations to Regional Bodies

A. Regional Ocean Councils

Recommendation 5–1. State, territorial, tribal, and local governments and nongovernmental participants should use the broad, flexible process developed through the National Ocean Council to begin the establishment of regional ocean councils.

Recommendation 6–4. Regional ocean councils, or other appropriate regional entities, should actively solicit stakeholder participation and lead the design and implementation of marine protected areas. The design and implementation should be conducted pursuant to the goals, guidelines, and uniform process developed by the National Ocean Council.

Recommendation 11–2. The National Ocean Council should develop national goals for ocean and coastal habitat conservation and restoration efforts and should ensure coordination among all related federal activities. The regional ocean councils and regional ocean information programs should determine habitat conservation and restoration needs and set regional goals and priorities that are consistent with the national goals.

Recommendation 14–13. The National Ocean Council and regional ocean councils should strengthen the ability of collaborative watershed groups to address problems associated with nonpoint source pollution by providing them with adequate technical, institutional, and financial support.

B. Regional Ocean Information Programs

Recommendation 5–3. Each regional ocean information program, with guidance from the National Ocean Council, should coordinate the development of a regional ecosystem assessment, to be updated periodically.

Recommendation 11–2. The National Ocean Council should develop national goals for ocean and coastal habitat conservation and restoration efforts and should ensure coordination among all related federal activities. The regional ocean councils and regional ocean information programs should determine habitat

conservation and restoration needs and set regional goals and priorities that are consistent with the national goals.

C. Regional Fishery Management Councils

Recommendation 19–2. Scientific and Statistical Committees (SSCs) should be required to supply Regional Fishery Management Councils with the scientific information necessary to make fishery management decisions. Such information could include reports on stock status and health, socioeconomic impacts of management measures, sustainability of fishing practices, and habitat status. In particular, the SSCs should determine allowable biological catch based on the best scientific information available to them.

Recommendation 19–3. Each Regional Fishery Management Council should be required to set harvest limits at or below the allowable biological catch determined by its Scientific and Statistical Committee. The councils should begin immediately to follow this practice, which need to be codified at the next opportunity in amendments to the Magnuson–Stevens Fishery Conservation and Management Act.

Recommendation 19–5. Each Regional Fishery Management Council should set a deadline for its Scientific and Statistical Committee (SSC) to determine allowable biological catch. If the SSC does not meet that deadline, the National Marine Fisheries Service Regional Science Director should set the allowable biological catch for that fishery.

Recommendation 19–6. Once allowable biological catch is determined, whether by the Scientific and Statistical Committee or the National Marine Fisheries Service (NMFS) Regional Science Director, the Regional Fishery Management Council should propose a fishery management plan in time for adequate review and approval by NMFS. If the plan is not presented in a timely fashion, all fishing on that stock should be suspended until NMFS can review the adequacy of the management plan.

Recommendation 19–7. The Regional Fishery Management Councils and their Scientific and Statistical Committees should develop an annual, prioritized list of management information needs and provide it to the National Marine Fisheries Service (NMFS). NMFS should incorporate these needs to the maximum extent possible in designing its research, analysis, and data collection programs.

Recommendation 19–22. The National Marine Fisheries Service (NMFS) and Regional Fishery Management Councils should develop regional bycatch reduction plans that address broad ecosystem impacts of bycatch. Implementation of these plans will require NMFS to expand current efforts to collect data on bycatch, not only of commercially important species, but on all species captured by commercial and recreational fishermen. The selective use of observers should remain an important component of these efforts.

D. Regional Dredging Teams

Recommendation 12–3. The National Dredging Team and regional dredging teams should begin to implement more ecosystem-based approaches. The National Dredging Team should implement the recommendations of the 1994 report to the Secretary of Transportation, *The Dredging Process in the United States: An Action Plan for Improvement*, with a priority of developing and implementing a streamlined permitting process. Regional dredging teams, working with regional ocean councils, should establish sediment management programs that include watersheds, coastal areas, and the nation’s shoreline.

IV. Recommendations related to International Affairs

Recommendation 16–3. The United States should work with other nations to accelerate efforts at the International Maritime Organization to enhance flag state oversight and enforcement by creating a code that outlines flag state responsibilities and obligations and instituting a voluntary audit regime.

Recommendation 16–10. The United States should ratify Annex VI of the International Convention on the Prevention of Pollution from Ships and work for adoption by the International Maritime Organization of stricter air emission standards that reflect advances in marine engine technology, availability of cleaner fuels, and improved operational practices. The U.S. Environmental Protection Agency should consider the potential designation of certain U.S. ocean and coastal areas with impaired air quality as Annex VI Sulfur Oxide Emission Control Areas.

Recommendation 17–6. The United States should take a leading role in the global effort to control the spread of non-native aquatic species by working internationally to develop treaties, agreements, and policies to minimize the introduction and establishment of such species.

Recommendation 18–3. The U.S. Department of State and the National Oceanic and Atmospheric Administration, working with the United Nations Food and Agriculture Organization and other appropriate entities, should develop a detailed plan of action to address derelict fishing gear, to be implemented on a regional, multi-national basis.

Recommendation 18–5. The U.S. Department of State should increase efforts to ensure that all port reception facilities meet the criteria necessary to allow implementation of Special Areas protections under Annex V of the International Convention for the Prevention of Pollution from Ships.

Recommendation 19–23. The U.S. Department of State, working with other appropriate entities, should encourage all countries to ratify the Fish Stocks Agreement and the United Nations Food and Agriculture Organization’s Compliance Agreement. In particular, the United States should condition other nations’ access to fishing resources within the U.S. exclusive economic zone on their ratification of these agreements. Other incentives should be developed by the United States and other signatory nations to encourage all nations to ratify and enforce these agreements.

Recommendation 19–24. The U.S. Department of State, working with the National Oceanic and Atmospheric Administration, should review and update regional and bilateral fishery agreements to which the United States is a party, to ensure full incorporation of the latest science and harmonize those agreements with the Fish Stocks Agreement.

Recommendation 19–26. The National Ocean Council’s (NOC’s) international committee, which is charged with supporting the development and implementation of ocean-related international policy, should initiate a process to determine the most effective methods of encouraging other nations to implement the United Nations Food and Agriculture Organization’s Code of Conduct for Responsible Fisheries and other Plans of Action, and provide its findings to the U.S. Department of State and the NOC.

Recommendation 21–3. The National Oceanic and Atmospheric Administration should develop national standards—and promote international standards—to ensure that coral reef resources that are collected, imported, or marketed are harvested in a sustainable manner. The U.S. Department of State should implement incentive programs to encourage international compliance with these standards.

Recommendation 22–4. The United States should work with the United Nations Food and Agriculture Organization to encourage and facilitate worldwide adherence to the aquaculture provisions of the Code of Conduct for Responsible Fisheries.

Recommendation 26–11. The National Ocean Council (NOC) should promote international coordination and capacity building in the field of global ocean observations. The NOC should lead the U.S. implementation of the 2003 Declaration on Earth Observing, advocate full, open, and meaningful data access policies, and contribute technological expertise to ensure access by all nations.

Recommendation 29–1. The United States should accede to the United Nations Convention on the Law of the Sea.

Recommendation 29–2. The National Ocean Council should coordinate an expedited review and analysis of the ocean-related components of the United Nations Convention on Biological Diversity and recommend to the U.S. Department of State whether, from an ocean perspective, ratification of this treaty would be beneficial to U.S. interests.

Recommendation 29–3. The National Ocean Council (NOC) should establish and oversee an interagency committee to support the development and implementation of ocean-related international policy. This committee should be chaired by the U.S. Department of State, make recommendations to the Assistant to the President and the Secretary of State on international ocean policy, and provide technical assistance to the NOC on international ocean issues.

Recommendation 29–4. The National Ocean Council’s international committee should assess emerging international ocean-related management challenges and make recommendations for either incorporating these activities under existing management regimes or developing appropriate new ones. The U.S. Department of State should work with the international community to implement these recommendations.

Recommendation 29–5. The U.S. Department of State should improve its integration of ocean-related scientific expertise in policy and program development and implementation.

Recommendation 29–6. The United States should continue to support and actively participate in major international ocean science organizations and programs.

Recommendation 29–7. The U.S. Department of State should offer strong support for U.S. scientists conducting research programs around the world. Existing international partnerships should be strengthened and new partnerships promoted to facilitate the conduct of international research.

