Draft National Ocean Policy Implementation Plan

National Ocean Council

An America whose stewardship ensures that the ocean, our coasts, and the Great Lakes are healthy and resilient, safe and productive, and understood and treasured so as to promote the well-being, prosperity, and security of present and future generations.

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Introduction

The ocean, our coasts, and the Great Lakes are integral to who we are as a Nation, and are among our greatest assets. They feed us, support millions of jobs, and provide recreation. They are part of our communities and cultures, and enhance our national security by their mere presence. With 53 percent of our population living in coastal counties according to the most recent census, and that percentage expected to grow to 63 percent by 2020, the United States is a coastal nation. Our valuable ocean and coastal resources are vulnerable to misuse, and need to be thoughtfully managed to ensure they will be healthy and productive for current and future generations.

> Vision of the National Ocean Policy:
>
> "To achieve an America whose stewardship ensures that the ocean, our coasts, and the Great Lakes are healthy and resilient, safe and productive, and understood and treasured so as to promote the well-being, prosperity, and security of present and future generations."
>
> - Executive Order 13547

The Federal Government has a critical role to play as a steward, leading the way in sound management of these ecosystems working with States, Tribes, and other partners to find common solutions to key challenges, and ensuring the Nation's valuable ocean, coastal, and Great Lakes resources continue to provide us with the wealth of benefits that ensure our well-being and prosperity. Recognizing this, the National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes (hereinafter "National Ocean Policy") was established by Executive Order 13547 on July 19, 2010. The National Ocean Policy provides that Federal agencies will "ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources, enhance the sustainability of ocean and coastal economies, preserve our maritime heritage, support sustainable uses and access, provide for adaptive management to enhance our understanding of and capacity to respond to climate change and ocean acidification, and coordinate with our national security and foreign policy interests."

For the first time in our Nation's history, the National Ocean Policy provides the framework for all Federal agencies to work together to pursue these goals with cohesive actions across the Federal Government, and for engaging State, Tribal, and local authorities, regional governance structures, non-governmental organizations, the public, and the private sector. Fishing, energy, transportation, recreation, security, and other uses will be considered collectively and managed comprehensively and collaboratively.

IMPLEMENTATION PLAN

This draft Implementation Plan lays out the initial steps required to achieve the vision and charge of the National Ocean Policy, and to address the most pressing challenges facing the ocean, our coasts, and the Great Lakes. This document describes specific actions the Federal Government will take to deliver tangible results to the American people.

This draft Implementation Plan does not encompass all Federal actions relating to ocean, coastal, and Great Lakes matters; rather, it focuses on the nine priority objectives highlighted under the National Ocean Policy. For each priority objective, a suite of actions and their intended outcomes are described. For each action, key milestones are outlined, lead agencies or other responsible entities are identified, and timeframes are listed. This structure is designed to provide a clear layout of what will be accomplished when and who will be engaged.

THEMES

This draft Implementation Plan is guided by four themes: (1) adopt ecosystem-based management; (2) obtain, use, and share the best science and data; (3) promote efficiency and collaboration; and (4) strengthen regional efforts.

Adopt Ecosystem-Based Management

Ecosystem-based management (EBM) is an integrated approach to resource management that considers the entire ecosystem, including humans. It requires managing ecosystems as a whole instead of separately managing their individual components or uses, considers all the elements that are integral to ecosystem functions, and accounts for economic and social benefits as well as environmental stewardship concerns. The concept of EBM is underpinned by sound science and a commitment to adaptive management as information or changing conditions present new challenges and opportunities. It also recognizes that ecosystems are not defined or constrained by political boundaries; thus, it requires collaboration among Federal agencies and with other entities at local, State, Tribal, and regional scales.

The EBM implementation actions outlined in this document are designed to ensure that the necessary collaborative and scientific frameworks are in place, and that training is provided to support an ecosystem-scale approach to management at national, regional, and local levels. Further, it lays out how pilot projects will be used to develop best practices for implementing EBM at scales relevant to addressing specific resource management objectives. While the EBM concept is not new, the Federal Government–wide implementation of EBM is a major shift in how the Nation considers human uses of ecosystems, moving away from a sector-by-sector approach to management toward a more integrated way of doing business. Through the *Ecosystem-Based Management* priority objective, this draft Implementation Plan provides a foundation for integrating EBM into the other National Ocean Policy priority objectives.

Obtain, Advance, Use, and Share the Best Science and Data

In many regards, our understanding of marine ecosystems has not kept pace with the cumulative impacts of human uses and the environmental changes that are occurring. "Best science" is a guiding concept that requires using the best available science when making a current policy decision and improving upon that knowledge as the basis for future decisions. To implement EBM successfully, decisions must be informed by the best available ecological, social, and economic science and data. At the same time, we must improve greatly upon our understanding of ecosystem structure and function. This is especially true in a world increasingly reshaped by extreme events, climate change, coastal development, and other drivers. Ongoing research, monitoring, and modeling efforts will enable management to adapt to changing conditions.

This draft Implementation Plan aims to ensure that high-quality science is carried out, made available, and used in decision-making so that our knowledge of ecosystem science is advanced, thereby enabling more informed decisions in the future. It also aims to ensure that the quality, quantity, availability, integration, and transparency of management-relevant data are continually improved. It prioritizes ocean research, education, observation, and exploration through actions that provide a strong scientific foundation for management and stewardship and that enable translation of scientific and technological advances into support for decision-making. Two priority objectives focus specifically on advancing knowledge and providing data and science: *Inform Decisions and Improve Understanding*, and *Observations, Mapping, and Infrastructure*.

Access to Federal data and information has been widely identified as a critical need by ocean users, managers, and stakeholders. As a significant example, the ocean.data.gov web portal, described under the *Coastal and Marine Spatial Planning* priority objective, addresses the National Ocean Policy's call for a "robust national information management system dedicated to coastal and marine scientific data and information products." The intent of this portal is to manage and disseminate information relevant to conducting collaborative and comprehensive planning and provide access to important information at national and regional scales by making existing and new databases available and interoperable.

Promote Efficiency and Collaboration

The National Ocean Policy depends on coordination across the Federal Government, as well as coordination and collaboration with our partners. Management of ocean and coastal resources will greatly benefit from strengthening and fostering collaboration among Federal agencies and partnerships with State, Tribal, and local authorities, regional governance structures, non-governmental organizations, the private sector, the public, and the international community. While the actions in this draft Implementation Plan provide guidance to Federal entities regarding the use of tools and resources, the effectiveness of these efforts will also depend on management decisions made by communities. There is potential to improve efficiency by

leveraging expertise and resources, identifying and augmenting synergies, reducing redundancies, and streamlining management.

The actions in this draft Implementation Plan will improve cooperation among multiple jurisdictions, and enhance and initiate partnerships within the Federal Government and with external entities. This draft Implementation Plan creates no new regulations. However, within existing authorities, legal and regulatory barriers to full implementation of the National Ocean Policy will be identified and permitting processes will be streamlined. One priority objective, *Coordinate and Support*, is focused exclusively on partnerships and collaboration, but these themes are woven through all nine priority objectives.

Strengthen Regional Efforts

Ocean, coastal, and Great Lakes ecosystem protection and restoration are currently being carried out at State and regional scales. Regionally based efforts to address ocean and coastal issues are already in place. For example, Governors in six regions have established State-led regional ocean governance bodies to advance coastal and ocean use, management, protection, and restoration priorities. Federal agencies are also engaged in various regions through interagency collaborations focused on regional ecosystem restoration and management. This draft Implementation Plan seeks to support these existing efforts, foster new efforts, and provide data and decision-support tools, including coastal and marine spatial planning (CMSP), that would greatly contribute to the success of this important regional work.

The actions in this draft Implementation Plan support regional alliances and move toward a set of shared priorities across the Federal Government and with States and Tribes. Issues range from conservation of coral reef ecosystems, to assessing the impacts of ocean acidification, to minimizing the impacts of harmful algal blooms, to observing and forecasting Arctic sea ice. Five of the priority objectives include a regional focus: *Regional Ecosystem Protection and Restoration, Resiliency and Adaptation to Climate Change and Ocean Acidification, Water Quality and Sustainable Practices on Land, Changing Conditions in the Arctic*, and *Coastal and Marine Spatial Planning.*

COASTAL AND MARINE SPATIAL PLANNING

CMSP is an important tool for implementing EBM. It involves increased coordination and collaboration across all levels of government, leading to a more efficient, streamlined, and certain decision-making process for managing activities in the ocean, coasts, and Great Lakes. CMSP provides a framework for engaging stakeholders and a process for comprehensively planning how to balance the myriad demands on ocean and coastal resources. It encourages States, Tribes, localities, and regions to collaborate in an inclusive manner to meet regional needs. CMSP offers an opportunity to better facilitate sustainable economic growth, without

compromising national security or ecosystem protection, by providing the data and information, transparency, and predictability the private sector needs to make informed business decisions.

CMSP is science-based. A core component is integrating ocean and coastal data and developing innovative visualization and other decision support tools. Robust science, data, and mapping tools will help managers understand and reduce conflicts among present and potential uses. The results of accomplishing actions and milestones throughout this draft Implementation Plan regarding research, data, and best practices will help the CMSP process realize its full potential.

This draft Implementation Plan includes preliminary national objectives and actions for CMSP. Additional information, guidelines, and implementation options will be included in a separate handbook, addressed by one of the actions, which will provide suggestions for how CMSP may be adapted to suit each region's specific challenges and to best achieve the opportunities it presents.

FISCAL RESPONSIBILITY

In today's fiscal climate, it is important to leverage existing resources and prioritize use of funds among projects and programs. As the actions in this draft Implementation Plan were developed, Federal agencies were asked to consider three questions: What activities can be accomplished with existing Federal and partner resources? How can existing resources be repurposed for greater efficiency and effectiveness? Where do we need to include activities that with minimal additional resources may allow for additional truly transformative and far-reaching impacts? This draft Implementation Plan prioritizes efforts and thereby enables us to better apply limited Federal resources to address some of the key challenges facing the ocean, coasts, and Great Lakes.

Efforts have been made to ensure the actions within this draft Implementation Plan can be achieved based on expected Federal budgets for the coming years. However, given the constrained fiscal climate and the uncertainty in the budget and appropriations processes, completion of every action and milestone in this draft Implementation Plan within the timeframes expected are contingent on the availability of funds. Federal agencies involved in each action will periodically evaluate resource allocations within the parameters of agency-specific statutory or regulatory mandates. Plans for long-term activities requiring additional resources will be further developed in future years. An annual memorandum from the National Ocean Council (NOC) to its member agencies will provide further guidance and prioritization toward allocating Federal resources to achieve implementation goals.

Stakeholder Involvement in Development of the Draft Implementation Plan

Experts from Federal agencies and offices developed the actions in this draft Implementation Plan with significant input from national, regional, and local stakeholders and the general public. The development process included public comment periods from January through April 2011 and June through July 2011, and 12 regional listening sessions around the country. In addition, the NOC's Governance Coordinating Committee—composed of State, Tribal, and local government officials—and the Ocean Research Advisory Panel—composed of expert representatives from a range of ocean sectors—provided input on preliminary documents used in developing this draft Implementation Plan. Many of the actions in this draft Implementation Plan reflect the comments received. A description of how substantive comments were addressed is provided as an Appendix. We will continue to seek public and stakeholder input as the Implementation Plan is finalized. Comments will be used to develop the final approach to improving how the Federal agencies implement the National Ocean Policy.

Next Steps

This draft Implementation Plan is available for public comment through February 27, 2012. In particular, the public is asked to provide comments regarding (1) priorities for the ocean, our coasts, and the Great Lakes and whether this draft Implementation Plan reflects those priorities, and (2) the most effective way to measure outcomes and to detect whether a particular action in the Implementation Plan has achieved its intended outcome.

The NOC expects to complete and approve the final Implementation Plan in the spring of 2012. Federal agencies will then implement its initial set of actions. The Implementation Plan is designed to be adaptive and allow for modification of existing actions and addition of new actions based on new information or changing conditions.

This draft Implementation Plan is not meant to be exhaustive or final. Rather, it represents an alignment of priorities and agreement across the Federal Government on the initial actions required to achieve the goals of the National Ocean Policy. It will be updated periodically as we make progress toward completing these actions, plan new initiatives, and continually strive to improve our stewardship.

While the actions for addressing the National Ocean Policy's priority objectives are presented here in separate chapters, they are not intended to be pursued independently, but as interrelated and often simultaneously executed activities that together form a comprehensive approach to meet the needs of our coastal Nation. The National Ocean Policy and this draft Implementation Plan do not change existing Federal authorities and responsibilities. However, the outlined actions are designed to work synergistically to spur an ecosystem-based management approach, expand our scientific knowledge, forge increased efficiency and collaboration, and strive to meet

regional needs by pursuing stewardship through comprehensive management. Overall, implementing this set of actions will be far more than the sum of its parts, and will represent a pivotal step toward improving the management of the ocean and coastal resources upon which our Nation depends.

MAKING INFORMATION EASILY AVAILABLE: OCEAN.DATA.GOV AND BEYOND

The National Ocean Policy calls for strengthening and integrating Federal and non-Federal ocean observing systems, sensors, data collection platforms, technology, data management, and mapping capabilities into a national system, and integrating that system into international observation efforts. Observations, monitoring, and data are essential to ensuring timely, certain, and objective information for managing ocean, coastal, and Great Lakes resources. Access to Federal data and information has been widely identified as a critical need by ocean users, managers, and stakeholders. A number of actions in this Plan identify efforts to provide easier and more transparent open access to Federal scientific data, tools, and information.

The most prominent tool is the **ocean.data.gov** web portal, which addresses the National Ocean Policy's call for a "robust national information management system dedicated to coastal and marine scientific data and information products." This portal is an effective and central system for users and stakeholders, as well as NOC partners, to manage and disseminate relevant information at scales needed for regional planning.

This draft Implementation Plan also includes development or use of information systems for specific actions. A key action for the *Observations, Mapping, and Infrastructure* priority objective is to develop an integrated observations and data collection, processing, and management system for coastal and ocean data and information. Federal agencies will also conduct an evaluation of a prototype portal to make available the Federal Oceanographic Fleet schedule. An action addressing the Inform Decisions and Improve Understanding priority objective calls for the delivery of a portal to access decision-support tools and to make results and "lessons learned" of pilot ecosystem-based management studies available to decision-makers and interested non-Federal partners and stakeholders.

Under the *Regional Ecosystem Restoration and Protection* priority objective, to improve the effectiveness of coastal and estuarine habitat restoration projects, information will be made available to the public via an Estuary Habitat Restoration Council website. In addition, the Chesapeake land conservation priority system will be accessible to stakeholders through a regional data portal.

Other actions in this draft Implementation Plan will build on the success of existing Federal data portals. A national hypoxia data portal for seamless data sharing and information dissemination for regional ecosystem protection and restoration will use the EPA/USGS data portal. Another action includes steps that will be taken to further implement the U.S. Integrated Ocean Observing System observational and data management components to provide local and regional observations.

Collectively, these Federal data services will be a coordinated part of an overarching and interoperable national system. The implementation of this Plan will include ways to make existing and new databases and services available and connected through **ocean.data.gov** and other interconnected systems.

NATIONAL PRIORITY OBJECTIVES

Ecosystem-Based Management: Adopt ecosystem-based management as a foundational principle for the comprehensive management of the ocean, our coasts, and the Great Lakes.

Inform Decisions and Improve Understanding: Increase knowledge to continually inform and improve management and policy decisions and the capacity to respond to change and challenges. Better educate the public through formal and informal programs about the ocean, our coasts, and the Great Lakes.

Observations, Mapping, and Infrastructure: Strengthen and integrate Federal and non-Federal ocean observing systems, sensors, data collection platforms, data management, and mapping capabilities into a national system, and integrate that system into international observation efforts.

Coordinate and Support: Better coordinate and support Federal, State, Tribal, local, and regional management of the ocean, our coasts, and the Great Lakes. Improve coordination and integration across the Federal Government and, as appropriate, engage with the international community.

Regional Ecosystem Protection and Restoration: Establish and implement an integrated ecosystem protection and restoration strategy that is science-based and aligns conservation and restoration goals at the Federal, State, Tribal, local, and regional levels.

Resiliency and Adaptation to Climate Change and Ocean Acidification: Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.

Water Quality and Sustainable Practices on Land: Enhance water quality in the ocean, along our coasts, and in the Great Lakes by promoting and implementing sustainable practices on land.

Changing Conditions in the Arctic: Address environmental stewardship needs in the Arctic Ocean and adjacent coastal areas in the face of climate-induced and other environmental changes.

Coastal and Marine Spatial Planning: Implement comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management in the United States.

Ecosystem-Based Management

Adopt ecosystem-based management as a foundational principle for the comprehensive management of the ocean, our coasts, and the Great Lakes.

Traditional approaches to management of natural resources focus on single species or uses, and may not adequately consider the entire ecosystem. This single-issue approach is inconsistent with the reality that ecosystems are complex, dynamic assemblages of diverse, interacting organisms, habitats, and environmental factors shaped by natural and human influences. More importantly, this approach has not been effective in preventing degradation of ocean and coastal resources and habitats. Over the past century of management, the health of most ocean and coastal resources has severely declined. The deep interdependence and dynamic relationships between all ecosystem components make it imperative to take an ecosystem-wide approach to protect, maintain, and restore the health, function, and biological diversity of ocean, coastal, and Great Lakes ecosystems and resources. A narrow single-species or single-use approach to resource management is inherently inadequate, and often results in resource depletion, economic hardships, and environmental risks. A holistic approach that examines and accounts for the complex relationships among species and their habitats is required.

For example:

- Fisheries can be better managed by considering not only fishing and targeted fish population dynamics, but also competitors, predators, and prey; the quantity and quality of the habitat that supports each life-stage; cultural, societal, and economic importance; the effects of climate change and invasive species; and the dynamic interactions among these components. Considering interactions with other human uses such as energy, mineral extraction, coastal development, tourism, shipping, and national security will improve future management decisions.

- Wetlands should not be managed by focusing only on the importance of habitat for wildlife species, but should also ensure the ecosystem's ability to sequester atmospheric carbon, mitigate natural hazards, filter pollution and excess nutrients out of water flowing into the ocean and Great Lakes, and provide nursery grounds for fish species while coastal development and climate change occur.
- The coastal tourism industry should not only endeavor to maintain sandy beaches, but also the value of healthy ecosystems broadly, including water quality and clarity, biodiversity, and healthy habitats that make recreational opportunities such as surfing, SCUBA diving, snorkeling, whale watching, and fishing enjoyable.

This comprehensive, big-picture approach to management is called ecosystem-based management, and is a foundational principle for stewardship and sustainable use of natural resources. In a consensus statement signed by over 200 highly regarded academic scientists, McLeod et al. (2005) defined EBM as "an integrated approach to resource management that considers the entire ecosystem, including humans," and noted that the goal of EBM is "to maintain an ecosystem in a healthy, productive, and resilient condition so that it can provide the services humans want and need." The NOC has built upon this definition, and its accompanying list of elements and characteristics, with modifications that reflect the views of multiple Federal agencies as they address implementation of EBM.

Accordingly, the term EBM describes an integrated approach to management, including resource management, that considers the entire ecosystem, including humans, and elements that are integral to ecosystem functioning. Informed by both natural and social science, EBM is intended to conserve and restore our natural and cultural heritage by sustaining diverse, productive, resilient ecosystems and the services they provide, thereby promoting the long-term health, security, and well-being of our Nation. Specifically, EBM:

- Recognizes that humans are a part of ecosystems and that healthy ecosystems are essential to human welfare;

Benefits provided by healthy ecosystems:

Sustainable fisheries provide food, create jobs, and support local economies.

Mangroves and salt marshes are natural filters, trapping harmful sediments and excessive nutrients.

Offshore reefs create sand and protect the shoreline from flooding and severe storm erosion.

Healthy, oxygen-rich seabeds with large invertebrates provide prey and important habitat for sustainable fisheries.

Offshore energy provides power to support the economy.

Healthy coral reefs are hotspots of marine biodiversity, are of major importance for tourism, and can be a source for new medicines and health care products.

Marine ecosystems such as seagrasses, mangroves, and salt marshes are carbon sinks, reducing greenhouse gases.

Clean, navigable oceans enable marine transportation and commerce, and are vital to national and homeland security.

Examples of Implementing EBM around the United States

The Puget Sound Partnership (PSP) is a community effort of citizens, governments, Tribes, scientists, and businesses working together to restore and protect the Puget Sound. The PSP uses ecosystem health metrics and modeling to provide stakeholders and managers with a framework for making decisions.

Landscape Conservation Cooperatives (LCCs) are a network of public–private partnerships seeking to identify best practices, connect efforts, identify gaps, and avoid duplication through improved conservation planning and design.

The National Estuary Program (NEP) is a place-based partnership effort that uses a voluntary, collaborative approach to address protection and restoration priorities in 28 diverse estuarine watersheds. NEPs identify local estuarine watershed priorities, develop long-term management plans, and implement short-term actions to improve water quality and living resources in their watersheds.

Eco-Logical is a framework for integrating plans across agencies, and endorses ecosystem-based mitigation for unavoidable infrastructure impacts.

Integrated Ecosystem Assessments (IEAs) are syntheses and quantitative analyses of information on relevant physical, chemical, ecological, and human processes in relation to specified management objectives. IEAs integrate ecological and economic models that reveal the full suite of trade-offs among different ocean-use sectors inherent in different management actions.

- Focuses on ensuring the abundance and long-term sustainability of natural resources and the benefits they provide (see sidebar) by emphasizing protection and restoration of ecosystem structure, functioning, and key processes;
- Is place-based, with a focus on a specific ecosystem, is implemented on a range of scales, and addresses a range of activities and cumulative impacts affecting the ecosystem;
- Recognizes ecological complexity and accounts for the interconnectedness within individual systems, including interactions among target and non-target species and key services;
- Acknowledges the interconnectedness among different systems, such as between air, land, and sea, while remaining open and flexible to change and adaptation;
- Is based on sound natural and social science, is information-driven, and is adaptable to changing environmental, social, and economic conditions;
- Considers diverse ecological, social, economic, cultural, and institutional perspectives, recognizing their strong interdependencies, and assesses trade-offs among diverse management objectives; and
- Aims to conserve and protect our natural and cultural heritage.

EBM is information-driven, multidisciplinary by nature, comprehensive in scope, and adaptive in practice. Adopting EBM as the foundation for resource stewardship requires a fundamental shift in the way Federal agencies manage the ocean, our coasts, and the Great Lakes. Although there are some examples of EBM efforts with multiple Federal agencies, State and local governments, and other stakeholders working together with a focus on particular ecosystems (for example, under the National Estuary Program), generally management has focused largely on single species, uses, and ecosystem benefits. No single agency can accomplish EBM alone because it requires simultaneous consideration of the gamut of natural resources and human uses–from sharks to shipping, oysters to oil drilling, pharmaceuticals to fish farming, and wetlands to wind energy. To implement EBM, Federal agencies must work together, share their expertise, integrate their data, educate their workforces and constituencies, and provide science-based information to decision-makers. Existing regulatory requirements and programs that were developed based on a fundamentally different model may need to be modified (to the extent consistent with existing statutory frameworks). In addition, Federal agencies must work with Tribal, State, and local governments to best manage the system holistically. This comprehensive approach will not result in increased bureaucracy but will increase efficiency by eroding divisions between Federal agencies, provide a unified framework within

which collaboration among Federal agencies and with States and Tribes can flourish, and unify implementation of all nine National Ocean Policy priority objectives.

Achieving EBM will require application of the information and knowledge gained through the actions identified in the other eight priority objectives. The ocean.data.gov portal, decision support tools, and best practices revealed through pilot studies will be particularly valuable for implementing EBM. Everything from how to adapt to climate change, strengthen ocean observing systems, manage water quality, restore ecosystems, and improve data integration and modeling will inform EBM. This is not to discount important past EBM efforts, but to build on them, institutionalize them within and among Federal agencies, and increase the number of EBM efforts nationally. Furthermore, an EBM approach supports adaptive, iterative management that is responsive to new information and to changing conditions that present new challenges and opportunities. Integrated Ecosystem Assessments (IEAs) and CMSP are important tools for implementing EBM at local to regional scales appropriate for addressing diverse management objectives.

EBM is not viewed as a replacement of our Nation's current management strategies, but rather as a means to capitalize on their strengths, increase efficiency and streamline processes, and expand the scope of information and knowledge to account for the complexity of our oceans, coasts, and Great Lakes. Implementing EBM is an incremental process that builds on existing knowledge and management structures. Since EBM is more about a change in approach, initial implementation will not require major new resources, but possibly some realignment and leveraging of existing resources. As pursued through the actions and milestones identified below, strategic implementation of EBM will establish a framework for collaboration and a shared set of goals (Action 1), establish a scientific framework to provide information to decision-makers (Action 2), train practitioners and decision-makers (Action 3), and develop a set of best practices via pilot projects (Action 4). In the implementation of pilot projects, Federal, State, and Tribal entities will also learn about the impediments to EBM that can be associated with existing statutory and regulatory mandates and requirements that were established based on very different frameworks. Depending on the nature of the pilot project, various responses or actions may become necessary given the limits of existing regulatory or statutory authority. Implementing EBM necessitates a long-term commitment. Progress toward EBM will be more an evolution than a

revolution. The actions below will facilitate efficient collaborative efforts across agencies and levels of governments, and enable well-informed, holistic decisions for managing ocean, coastal, and Great Lakes resources in a manner that promotes the long-term economic and environmental health, security, and well-being of our Nation and to the benefit of all.

Action 1: Establish a framework for collaboration and a shared set of goals for Federal implementation of ecosystem-based management.

Establishing a framework to guide Federal agencies will provide the necessary structure for a Government-wide transition toward collaborative EBM, and facilitate the development of measurable standards for effective and streamlined resource management based on existing statutory and regulatory regimes. Developing a shared set of goals will further synchronize and enhance the productivity of interagency EBM implementation. These set the stage for comprehensive EBM.

Outcomes

Shared goals and a collaborative approach to EBM will improve management and yield healthy and productive ecosystems for the long term.

Agencies: OSTP, CEQ, USDA, DOC, DOD, EPA, DOE, HHS, DHS, DOI, DOJ, JCS, DOL, NASA, NSF, DOS, DOT, OVP, DNI, OMB, NSS, DPC, NEC, USACE

Milestones

- Develop EBM principles, goals, and performance measures; produce a policy statement; and coordinate adoption by NOC member agencies. (CEQ, ORM-IPC[1], OST-IPC; 2012)
- Complete formal interagency partnership agreements (e.g., Memoranda of Agreement) between NOC agencies regarding coordination and leveraging efforts to achieve EBM. (NOC; 2013)
- Complete a review of EBM-relevant statutes and regulations to identify agency authorities (particularly those currently underutilized); opportunities to incorporate EBM principles into Federal laws, regulations, and policies; and potential legislative changes that would fill gaps and support full implementation of EBM. (NOC Legal Working Group, 2013)
- Conduct an inventory of and develop plans to strengthen existing agency and interagency EBM efforts, focusing on increasing collaboration, efficiency, consistency, and transparency of management efforts across agencies, and on involving additional

[1] The Ocean Resource Management Interagency Policy Committee (ORM-IPC) and the Ocean Science and Technology Interagency Policy Committee (OST-IPC) themselves do not have the capacity to carry out the milestones in this Implementation Plan to which these two groups are assigned. It is envisioned that, by the time this document is completed, subcommittees within each of the IPCs will be created to coordinate implementation of such milestones by a range of Federal agencies.

agencies in efforts that are currently occurring within a single agency. (ORM-IPC member agencies; 2013)

- Develop guidance for all Federal agencies about how to implement EBM under existing regulatory and legislative authorities, such as the National Environmental Policy Act (NEPA), into agency-specific programs and associated actions (e.g., risk analyses and permit reviews). (ORM-IPC, OST-IPC, NOC Legal Working Group; 2013)
- Incorporate EBM into Federal agency environmental planning and review processes. (CEQ, NOC member agencies; 2016)

Action 2: Establish a science framework to support science-based EBM implementation.

Sustainably managing human uses of an ecosystem requires a robust understanding of the nature of the dynamically interacting biological, physical, chemical, and geological components and processes; the effects of human and natural forces; and the results of management efforts. A science framework for EBM will provide a mechanism to identify and fill data gaps; target research, monitoring, modeling, assessments, and forecasting to management objectives and priority information needs; and ensure best practices to guide future EBM efforts. This action draws upon data, information, and tools prepared in Action 3 of the *Inform Decisions and Improve Understanding* (i.e., data and tools to support EBM) and Action 5 of the *Coastal and Marine Spatial Planning* priority objective (i.e., development of ocean.data.gov) to identify information requirements to implement EBM and provide guidance on how these data could be used in making decisions.

Outcomes

An EBM science framework will enable reliable natural and social science data and tools to inform management decisions, evaluate trade-offs between alternative management scenarios, and enhance our ability to balance competing demands on ecosystems and adapt to changing resource scenarios.

Agencies: OSTP, CEQ, USDA, DOC, DOD, EPA, DOE, HHS, DHS, DOI, DOJ, JCS, DOL, NASA, NSF, DOS, DOT, OVP, DNI, OMB, NSS, DPC, NEC, USACE

Milestones

- Inventory programs and projects that use EBM, analyze their successes and shortcomings, and identify and fully describe the key characteristics of effective EBM efforts. (ORM-IPC; 2012)

- Phase EBM principles and goals (developed under Action 1) into the Federal process for awarding future grants related to the restoration of ocean, coastal, and Great Lakes ecosystems, to the extent practicable. Require future funded projects to collect data in accordance with the data practices developed in Action 3 of the *Coastal and Marine Spatial Planning* priority objective, to the extent feasible. (NOAA; 2013)
- Using ocean.data.gov and other data sources, identify regional information gaps to fully enable science-based EBM, and develop a plan to fill them. In addition to necessary basic data, this should focus on gaps in synergistic and cumulative ecosystem effects of various human and natural forces. (OST-IPC; 2013)
- Develop national guidelines and best practices for EBM implementation based on engagement of non-Federal partners and stakeholders. This should be based on the inventory above and honed considering the results of pilot projects. (CEQ, OSTP, ORM-IPC, OST-IPC; 2013)
- Establish a process for adaptive resource management, engaging partners and stakeholders. (CEQ, OSTP, ORM-IPC, OST-IPC; 2013)
- Monitor performance and complete biannual progress reports on meeting EBM and adaptive management goals and objectives. (CEQ, OSTP, ORM-IPC, OST-IPC; 2014, 2016)
- Identify and validate ecosystem indices and routinely incorporate them into EBM tools (e.g., integrated ecosystem assessments). (NOAA; 2017)

Action 3: Build capacity to implement EBM through training on principles, best practices, and decision-support tools.

The data, tools, and guidance developed to support EBM will only be valuable if they are applied to management. It is important to train Federal and other managers to use these decision-support tools to inform their approach to and implementation of EBM. Training will enable decision-makers to better assess trade-offs associated with alternative policy options, and promote collaboration and innovation among agencies responsible for managing our oceans, coasts, and Great Lakes. Training is important to ensure the successful shift in management that an EBM approach represents, and to inform non-

Federal partners and stakeholders to ensure they understand the processes and benefits of implementing EBM. Training will be made available to State, Tribal, and local government partners.

Outcomes

Building proficiency in EBM principles, best practices, and use of decision-support tools will further enable decision-makers and managers to fully adopt an EBM approach and balance competing demands on ecosystems by evaluating trade-offs within alternative management scenarios.

Agencies: OSTP, CEQ, USDA, DOC, DOD, EPA, DOE, FERC, HHS, DHS, DOI, DOJ, JCS, DOL, NASA, NSF, DOS, DOT, OVP, DNI, OMB, NSS, DPC, NEC

Milestones

- Develop and initiate an outreach and education program to inform stakeholders and the public of the benefits and principles of EBM. (NOAA, DOI; 2012)
- Develop introductory and advanced training materials for Federal managers and scientists to obtain a common understanding of EBM principles, best practices, and latest decision-support tools. (ORM-IPC; OST-IPC; 2013)
- Provide formal training on EBM principles, best practices, and latest decision-support tools to Federal managers and scientists. (NOAA, EPA, DOI, USDA, DOT; 2013)

Action 4: Identify and implement place-based pilot projects that foster an EBM approach to managing ocean and coastal resources.

Conducting pilot projects will hone EBM best practices, test on-the-ground effectiveness of decision-support tools, and demonstrate the practical utility of the EBM approach. Pilot projects will determine what additional data, tools, and training are required; identify how the collaborative and scientific frameworks may need to be altered to achieve EBM objectives; enable decision-makers and managers to understand how EBM can be most effectively implemented; and help identify what, if any, changes may be needed in existing statutory and regulatory mandates and requirements.

Outcomes

Pilot projects in locations primed for near-term implementation of EBM will facilitate the development and improvement of tools, methods, and capabilities for broader use. EBM is implemented at regional scales relevant to address specific resource management objectives.

Agencies: OSTP, CEQ, USDA, DOC, DOD, EPA, DOE, FERC, HHS, DHS, DOI, DOJ, JCS, DOL, NASA, NSF, DOS, DOT, OVP, DNI, OMB, NSS, DPC, NEC, USACE

Milestones

- Develop criteria for identifying priority geographic areas for pilot implementation of EBM, and use those criteria to identify three locations for pilot projects. (ORM-IPC; 2012)
- Determine what additional data and tools are needed for implementing EBM in the selected pilot project locations, develop plans to fill those gaps, and initiate the requisite research, monitoring, and modeling needed to support EBM in pilot project locations. (OST-IPC; 2013)
- Conduct EBM pilot projects in the identified areas, ensuring that EBM data and tools (e.g. Integrated Ecosystem Assessments) are available for use, data/tool gaps are filled, and data are collected in accordance with ocean.data.gov requirements. (ORM-IPC; 2016)
- Compile and disseminate initial EBM best practices and case studies to Federal agencies, non-Federal partners, and stakeholders via the EBM portal developed in Action 3 of "Inform Decisions and Improve Understanding," and refine best practices based on results of pilot projects (ORM-IPC member agencies; 2017)

Gaps and Needs in Science and Technology

Implementation of EBM requires research to improve our understanding of ecosystem structure, functions, and processes. This includes understanding how ecosystems respond to various drivers and stressors over various spatial and temporal scales. Key indicators of ecosystem health and spatial areas of high or unique value must be identified. To effectively apply EBM principles and guidance to decision-making, protocols or standards must be developed and adopted to account for ecosystem services and the value of EBM-relevant nonmarket goods and services that are not represented in current decision-making. Adequate capability and capacity for state-of-art decision support, ecosystem modeling, and forecasting are needed. Models that effectively integrate disparate ecological, social, and economic data are an important component of this capacity. EBM relies on a data and information management system. This begins with enhanced ocean observing systems (e.g., the Integrated Ocean Observing System, the Ocean Observatories Initiative) to collect physical, chemical, biological, and ocean use data in (near) real-time. Technology must be available to easily input, archive, access, share, integrate, analyze, visualize, and explain disparate data and information, using mapping and geospatial analysis tools. Data access must be facilitated by developing formal metadata standards and specific guidance for data input, integration, and preservation. Requirements for "open access" and "open science" for data and research methods must be followed.

Inform Decisions and Improve Understanding

Increase knowledge to continually inform and improve management and policy decisions and the capacity to respond to change and challenges. Better educate the public through formal and informal programs about the ocean, our coasts, and the Great Lakes.

Strong science, technology, and engineering capabilities are the foundation for making informed decisions and improving our understanding of how best to manage the Nation's ocean, coastal, and Great Lakes resources. These capabilities also provide the innovative spark that drives our economy and improves our quality of life. Advances in science allow us to adapt to a changing environment and foster economic growth across multiple existing and emerging sectors, which benefit our overall economic and environmental health and security.

The health and productivity of regional economies requires a balanced and judicious approach to managing human activities in our ocean and coastal areas. Sound management of our valuable natural resources requires accurate scientific information. Improved science is particularly needed in regard to emerging sectors such as renewable energy, aquaculture, and biotechnology. More remains to be learned about traditional economic sectors as well, such as water resource development; fisheries; marine transportation; oil, gas, and mineral extraction; and tourism. Augmenting the breadth and depth of the knowledge upon which we base our decisions will allow us to respond more appropriately to new challenges and resource uses, and to adapt to changing conditions. Science supports increased understanding of the interactions between natural and human social systems. Improved information will enable management to become more proactive and visionary, identify opportunities for growth, and create effective, long-term, ecosystem-based strategies for sustainable resource use.

Advances in science and technology will provide significant opportunities for international commerce. For example, improving communication, observational, and predictive capabilities can increase the security of shipping, which is critical because 90 percent of international goods are shipped over the oceans. Enhancing aquaculture technologies will create jobs, provide affordable and accessible food, and lower our trade deficit (currently 86-percent of seafood consumed in the United States is

imported). Improving biotechnology will lead to medical discoveries that increase the quality and duration of our lives. Advancing renewable energy technologies will reduce our dependency on foreign sources, reduce greenhouse gas emissions, and stimulate local economies.

The actions in this section are designed to provide significant, long-term commitments of intellectual, financial, and educational support to build increasingly nuanced and management-applicable knowledge. Discoveries and technological advances will provide data to improve decision-making and enhance the effectiveness of management actions. A focus on fundamental and exploratory activities must be maintained to ensure continued advances in basic scientific understanding. An informed society and workforce will enable innovative and effective entrepreneurship and stewardship. Collectively, these actions will lead to enhanced economies, improved human well-being, and increased national security.

Action 1: Advance fundamental scientific knowledge through exploration and research.

This action focuses on the importance of conducting fundamental and mission-driven research and sustaining Federal research and exploration activities. It promotes scientific exploration, particularly of the 95-percent of the ocean that remains poorly known, through international and Federal–non-governmental partnerships. New ocean discoveries will expand our knowledge and understanding of Great Lakes and oceanic biodiversity, biogeochemical processes, ecosystem services, and climate interactions at local to global scales. Increased scientific knowledge will improve our awareness of changing environmental conditions and trends, and help us understand the causes of such changes. Scientific information will help us better understand the range of human activities in ocean, coastal, and Great Lakes waters, and of the potential to make more responsible and effective use of available renewable and non-renewable resources. Scientific insights and innovative technologies will enhance the Nation's competitiveness by increasing scientific and technological capability and discovering new opportunities for biomedical and business development. Scientific activities will be informed by recommendations from *Science for an Ocean Nation: An Update of the Ocean Research Priorities Plan,* a comprehensive and interagency Federal ocean research plan.

Outcomes

Insight gained from scientific research and innovative technologies will strengthen the Nation's competitiveness and enhance sustainable uses of ocean, coastal, and Great Lakes resources.

Agencies: OST-IPC, IPC member agencies, NOAA, NASA

Milestones

- Release *Science for an Ocean Nation: An Update of the Ocean Research Priorities Plan.* (OST-IPC; 2012)

- Prioritize Federal research activities informed by recommendations from *Science for an Ocean Nation: An Update of the Ocean Research Priorities Plan* as appropriate. (IPC member agencies; 2013)
- Establish a new cost-sharing partnership with domestic and international governmental and nongovernmental entities that supports global-scale systematic exploration. (NOAA, NASA; 2014)
- Execute expeditions in poorly known or unknown Great Lakes and national and international ocean regions. (NOAA, NASA; 2014)

Action 2: Provide scientific information to support emerging sustainable uses of resources including renewable energy, aquaculture, and biotechnology.

Quality scientific information will strengthen our confidence that emerging and future uses of ocean, coastal, and Great Lakes resources are economically and ecologically sustainable. Fundamental and applied scientific information and technology are used to characterize features of ocean resources, their uses, and potential environmental impacts. Scientific information will increase opportunities for economic growth, create new jobs, and optimize traditional ocean uses such as working waterfronts, sustainable fisheries, tourism, and domestically produced energy. Collaboration among Federal government agencies, private industry, and other partners will facilitate the transition from basic research to applying the findings in commercial markets.

Outcomes

Greater access to data and information will enable better informed decisions about the feasibility and optimization of operations for sustainable uses of ocean, coastal, and Great Lakes resources and services.

Agencies: NOAA, DOC, USDA, DOE, DOI, FERC, DOL, NSF

Milestones

- Establish a National Shellfish Initiative, in partnership with commercial and restoration aquaculture communities, that includes pilot projects to identify ways to simultaneously maximize the ecosystem benefits (i.e., nutrient filtration, habitat provision, restoration) and commercial value of shellfish aquaculture, and develop a plan to increase shellfish production in U.S. waters. (NOAA, USDA-ARS, USDA-NIFA; 2013)
- Establish an interagency aquaculture initiative that supports jobs and innovation, through the National Science and Technology Council's Interagency Working Group on Aquaculture and other partnerships. (DOC, USDA-NIFA, USDA-ARS; 2015)
- Estimate the contribution and impacts (including job creation) of emerging uses–including renewable energy, aquaculture, and biotechnology–on the economies of the communities and regions dependent on marine and coastal resources. (NOAA, DOE, DOI, FERC, DOL, DOC; 2015)

- Compile and make available relevant climate, water, wind, and weather data; environmental models of seasonal and extreme conditions; and other information to support development of the Nation's coastal and offshore renewable energy, including wind, ocean thermal, and hydrokinetic (e.g., waves, tidal energy) resources. (DOE, NOAA, DOI, DOC, NSF; 2017)
- To the extent they may be discovered, characterize new natural products and biotechnological processes from ocean, coastal, and Great Lakes environments and evaluate their potential for commercial development. (NOAA, DOI, DOE, DOC, NIH, NSF; 2017).

Action 3: Provide the data and tools necessary to support science-based decision-making and ecosystem-based management.

To enable science-based decisions, Federal agencies and partners will provide data and information; develop and refine decision-support tools; and expand outreach, training, technical assistance, and expertise. Robust decision-support tools and processes will provide ecological, social, and economic data and information to support timely and effective policy development and EBM. Timely, objective, and high-quality scientific information can be evaluated for management purposes through the use of decision-support tools. These tools enable informed, iterative decision-making that can adapt to changing resource scenarios, better understanding of ecosystem functioning, and improved scientific assessments of the efficacy and consequences of management approaches.

Outcomes

Improved decision-support tools and information services will further enable evaluation of trade-offs between alternative management scenarios, and enhance our ability to balance competing demands on ecosystems.

Agencies: ORM-IPC, OST-IPC, NOAA, DOI, EPA, DOE

Milestones

- Develop and complete an assessment of existing and needed decision-support tools, including tools for EBM, and training

to support ocean and coastal decision-makers. (OST-IPC, ORM-IPC; 2013)

- Develop and provide decision-support tools and information services to meet the needs of Federal, State, Tribal, regional, and local ocean, coastal, and Great Lakes resource managers, policymakers, and stakeholders. (NOAA, DOI, EPA, DOE, DOD; 2016)
- Provide training curricula to meet the needs of Federal, State, Tribal, regional, and local ocean, coastal, and Great Lakes resource managers, policymakers, and stakeholders. (USDA, NOAA, USACE, DOD, DOI; 2016)
- Deliver an EBM portal for agencies and stakeholders to access decision-support tools and share the results of and lessons learned from pilot studies. (DOI, NOAA; 2016)

Action 4: Integrate social and natural scientific information into decision-making.

Many controversial or urgent ocean policy issues need to place biophysical scientific research into political and socioeconomic contexts. Integration of natural and social science data, information, and knowledge is necessary to support the development and maintenance of sustainable ocean, coastal, and Great Lakes resources and economies, and to understand the social context for planning and implementing ocean policy. We need to understand how ocean science, environmental resources, and human socioeconomic systems affect each other and communicate these interactions to stakeholders and the public.

Knowledge of human behavior, attitudes, and preferences; societal values; economics; and human use of and dependence on ecosystem services will be routinely acquired and incorporated into research, ecosystem assessments, decision-making, and management of ocean, coastal, and Great Lakes resources. Natural and social scientific data will be incorporated into models and analyses that inform planning, policy, and management decisions. Public attitudes and preferences will be routinely incorporated into ecosystem assessments, policy, and management decisions.

Outcomes

Incorporating natural, social, and behavioral information in decision support tools will enable Federal, State, and Tribal authorities to manage ocean, coastal, and Great Lakes resources more efficiently and effectively.

Agencies: NOAA, DOC, DOI, DOL, DOT, IWG-OSS, EPA

Milestones

- Develop a set of indicators to characterize human interactions with the ocean, our coasts, and Great Lakes and identify cutting-edge issues, with intent to maintain relevant data collections and analyses for long-term trends. (NOAA; 2012)
- Complete an initial analysis of ocean and coastal economic statistics and jobs. (DOC, DOI, DOL, DOT, USACE; 2012)

- Plan and conduct one or more showcase projects employing public input that use socioeconomics and natural sciences to identify, develop, and apply valuation frameworks for ecosystem services. (IWG-OSS; 2014)
- Initiate a pilot project to include one or more public health or economic indicators, such as port commerce and storm damage prevented, in the Coastal Condition Report. (EPA, DOT; 2015)

Action 5: Develop human capacity and the skilled workforce necessary to conduct ocean research and manage ocean, coastal, and Great Lakes resources.

A diverse workforce with interdisciplinary skills and training is needed to keep the United States a world leader in ocean science research, and to provide the most knowledgeable management of our ocean, coastal, and Great Lakes resources possible. Current graduation rates in the ocean sciences are low. Support for students, particularly those from underrepresented groups, is needed to expand these ocean and coastal topics to a wider demographic that better represents the U.S. population.

This action will build the technical, scientific, and managerial workforce capacity to ensure that management of and research on the ocean and U.S. coastal and Great Lakes regions are of the highest quality possible; that educational programs include a diverse group of students; and that a highly competent workforce, including experts capable of communicating with and understanding many different cultures, is available for U.S. employers.

Outcomes

More students, particularly from underrepresented groups at the undergraduate and graduate level, graduating in academic fields related to ocean, coastal, and Great Lakes science and management will support U.S. leadership in ocean research and development and application of the best management approaches possible.

Lead Agencies: NOAA, DOT, DOC, DOL, NSF, DOE, DOI, DOD, USCG, EPA

Milestones

- Complete studies of future ocean workforce requirements, including in the areas of science and technology, ocean industry and infrastructure, and water transportation. (NOAA, DOT, DOC, DOL; 2014).
- Provide scholarship, fellowship, and internship opportunities in ocean, coastal, and Great Lakes programs to underrepresented groups, working with professional societies, nonprofits, and minority-serving institutions. (NOAA, EPA, DOT; 2016)
- Support periodic competitions and other activities for middle and high school students that demonstrate a positive impact on students' choices of future academic and career paths. (NOAA, NSF, NASA, DOI, SI, EPA, USACE; 2017)

- Provide scholarship, fellowship, and internship opportunities to high school, undergraduate, and graduate/postgraduate students that leverage Federal investment in ocean research, laboratories, and natural areas to support education. (NOAA, NSF, DOE, DOT, DOI, DOD, USCG; 2016)

Action 6: Increase ocean and coastal literacy by expanding the accessibility and use of ocean content in formal and informal educational programming for students, educators, and the public.

Every student in the Nation should encounter ocean sciences concepts in their K-12 educational experience. Federal agencies seek to improve ocean literacy through a variety of programs for students, educators, and the public. These programs provide professional development opportunities for teachers to engage students in science and work with partners at aquariums, museums, and science centers to engage the public. These activities are responsive to studies by the National Research Council and others that show how formal and informal science education programs are effective at raising levels of knowledge and awareness and at improving understanding about trade-offs. This action addresses increased opportunities for systematic inclusion of ocean topics and concepts into mainstream K-12 and informal education systems.

Outcomes

Increased public understanding of ocean and coastal science and the importance of the ocean in Earth systems will produce a more informed citizenry; create better stewards of ocean, coastal, and Great Lakes resources; and increase awareness of business opportunities related to these resources. It will also increase interest in activities to address the issues facing the ocean, our coasts, and the Great Lakes.

Lead Agencies: IWG-OE, CEQ, NOAA, DOI, NSF

Milestones

- Include ocean content in Next Generation Science Standards. (IWG-OE; 2012)
- Incorporate, in collaboration with the Department of Education, ocean and coastal criteria into the Green Ribbon Schools initiative. (CEQ; 2012)
- Execute formal and informal education strategies for the Chesapeake Bay region that build on Federal and non-Federal education resources. (NOAA, DOI; 2017)

- Complete a study of environmental knowledge of middle school students and use study results to refine educational programming. (NOAA; 2017)
- Execute infrastructure and demonstration projects that deliver ocean observing data for formal and informal education. (NOAA, NSF; 2017)
- Enhance incorporation of native and traditional observations and knowledge, along with information on native peoples and their cultural traditions, into ocean education materials. (NSF, DOI; 2017)
- Make available education and training tools that can be used to improve national and international educational opportunities on ocean issues (EPA; 2014)
- Develop stories and data sets to deliver the latest ocean science content for coordinated networks of innovative exhibits in aquariums, museums, science centers, and National Parks (NOAA; 2014)

Observations, Mapping, and Infrastructure

Strengthen and integrate Federal and non-Federal ocean observing systems, sensors, data collection platforms, data management, and mapping capabilities into a national system and integrate that system into international observation efforts.

Vital to ocean and coastal research and management in the United States is the availability of modern ships, undersea vehicles, moorings, satellites, laboratories, instruments, and observing systems. Ocean data provide the information needed to support decisions every day, from routine operations to emergency responses. A glider in the Gulf of Mexico maps contaminants below the ocean's surface. A wave buoy supplies real-time information for safe marine operations. A network of floats provides the first-ever global real-time observations of the deep sea. Coastal and ocean observations and mapping provide critical information for protecting human lives and property from marine hazards, enhancing national and homeland security, predicting global climate change, improving ocean health, and providing for the protection, sustainable use, and enjoyment of ocean resources.

Many years of integrated infrastructure and technology planning and coordination have allowed us to provide this critical information to enable decision-making, further cross-disciplinary research efforts, improve predictive models, and deliver essential baseline mapping data. However, continued interagency coordination is needed to plan for the most cost-effective acquisition, maintenance, and operation of these expensive, large-scale assets.

In addition, collecting and delivering data to better support future decisions in a complex environment requires an understanding of the requirements of the other eight National Ocean Policy priority objectives and matching them with a well-coordinated effort that integrates Federal and non-Federal expertise, resources, and assets. The actions below will allow us to continue to increase efficiency, enable integration, and provide sustainability of observations, data, and information while laying the foundation for continuing long-term efforts.

Action 1: Assess the status of the Federal Oceanographic Fleet.

The Federal Oceanographic Fleet (Fleet) is a critical national infrastructure that supports Federal agency and academic oceanographic operations, surveys, and research across a broad spectrum of needs. Ships provide access to the sea and Great Lakes and enable data collection and research that informs and/or addresses needs in national security, weather and climate, ocean mapping, biomedical research, seismic and tsunami activity, living and non-living marine resources, disaster warnings and response, and ocean and seafloor physical, chemical, geological, and biological processes. The Fleet is composed of Federally-owned research and survey ships greater than 40 meters in length owned and operated by Federal agencies, Federally owned ships operated by academic organizations, and the human capital required to operate the Fleet to modern standards.

This action will provide a status report of the Fleet to inform future planning, and address the Fleet's capacity to support the National Ocean Policy. A more efficient interagency approach to managing the Fleet could lessen the impact of steadily increasing operational costs by ensuring efficient and effective operations are conducted at the lowest possible life-cycle costs.

Outcomes

Assessing the Federal Oceanographic Fleet will provide a foundation to ensure an efficient and effective infrastructure to address the Nation's seagoing data collection and research needs.

Agencies: IWG-FI

Milestones

- Identify at-sea survey (oceanographic and living marine resource) and research mission requirements to support the National Ocean Policy. (IWG-FI; 2013)
- Update the *Federal Oceanographic Fleet Status Report*. (IWG-FI; 2013)
- Complete analysis and selection of Fleet utilization performance measurements. (IWG-FI; 2013)
- Complete evaluation of a prototype Fleet schedule portal. (IWG-FI; 2013)
- Assess the capabilities for oceanographic ships to support multi-mission agency activities in the Arctic. (IWG-FI; 2013)

Action 2: Improve unmanned and satellite remote sensing systems.

Observing the environment with unmanned systems reduces uncertainties in our science, thereby improving predictive capability and, ultimately, decision-making. Improving unmanned and satellite remote sensing systems, Federal and non-Federal unmanned undersea vehicles (both tethered and autonomous), unmanned airborne systems, and unmanned surface vehicles will improve our research and management capabilities. Developing a fully coordinated pool of

unmanned assets designed for multiple users within 10 years will increase our Nation's capabilities for thorough environmental sampling by coupling the spatial and temporal coverage of multiple unmanned and satellite remote sensing system types.

This action will determine the priorities for unmanned observing systems and conduct an inventory of Federal and non-Federal systems. It will produce a status report on the use and application of unmanned and satellite remote sensing systems, an examination of the inherent efficiencies attributable to their use, and ongoing identification of ways to improve use of these systems to achieve the priorities of the National Ocean Policy. This is a first step toward improvements in the Nation's unmanned and satellite remote-sensing fleets.

Outcomes

Better coordinated and efficient use of existing unmanned observing systems will improve cost-effective data collection to meet National Ocean Policy operational and research mission priorities. Examining unmanned systems will identify gaps in and potential for expanding capacity and infrastructure for such systems based on clearly defined requirements for the future.

Agencies: IWG-FI

Milestones

- Identify observation priorities for all National Ocean Policy priority objectives that are suitable for accomplishment with unmanned and/or satellite remote-sensing systems, including an assessment for developing unmanned undersea vehicles with under-ice data collection capability. (IWG-FI; 2012)
- Complete an inventory of available Federal and non-Federal unmanned undersea vehicles (both tethered and autonomous) and satellite remote-sensing systems. (IWG-FI; 2013)
- Complete an analysis and selection of performance measurements for unmanned and satellite remote-sensing system utilization. (DOD, NASA, NOAA, NSF; 2014)
- Complete an evaluation of a prototype unmanned system inventory and allocation planning tool. (IWG-FI; 2014)
- Identify and report on regulatory restrictions to the use of Federal and non-Federal unmanned systems and identify ways

Observing Systems

Global Earth Observation System of Systems is a distributed system of systems, built on current international cooperation efforts among existing Earth observing and processing systems, that enables the collection and distribution of accurate, reliable Earth observation data, information, products, and services to both suppliers and consumers worldwide.

Integrated Ocean Observing System (IOOS®) is a partnership of Federal and State agencies, regional partners, private enterprise, academia, and nongovernmental organizations that gathers physical, geological, chemical, and biological information on our oceans and coasts— and conditions that affect, and are affected by, humans and their activities. This coordinated network of people and technology generates and disseminates continuous data, information, models, products, and services on our coastal waters, Greats Lakes, and oceans.

Ocean Observatories Initiative (OOI) is a long-term, NSF-funded program to provide 25 to 30 years of sustained ocean measurements to study climate variability, ocean circulation and ecosystem dynamics, air-sea exchange, seafloor processes, and plate-scale geodynamics.

to enable better use of these systems to achieve National Ocean Policy priorities. (IWG-FI; 2014)

- Demonstrate capability for coordinated unmanned and satellite remote sensor sampling in a limited region of environmental interest as a step toward a fully operational capability. (DOD, NASA, NOAA, NSF; 2017).

Action 3: Advance observation and sampling technologies for exploring and understanding the complexities of land, ocean, atmosphere, ice, biological, and social interactions on a global scale.

Short-term experimental and pilot observation projects support new discoveries and improvements to our understanding of the ocean. These observations provide the basis for informing decision-making and EBM. Our Nation needs a broad array of observations from an infrastructure that incorporates in situ observation systems, satellites, data use and integration, and the development and testing of the next generation of observation technologies and capabilities. These new technologies are critical to improve understanding of the underlying physical and ecological processes driving the ocean, coasts, and Great Lakes and to identify less costly means of monitoring these ecosystems. This new understanding will inform planning, decision-making, management, and stewardship of these ecosystems.

Outcomes

Advanced technologies will improve scientific understanding of the underlying physical and ecological processes driving the ocean, coasts, and Great Lakes to inform and support EBM, CMSP, and other decision-making.

Agencies: NASA, NOAA, NSF, USGS

Milestones

- Identify the limitations of existing methodologies for integrating observational data, including coastal and global ocean remote and in situ data, physical and biological data, and ocean observations and socioeconomic data. (NASA, NOAA, NSF, USGS; 2013)
- Identify the potential for developing deep Argo profiling floats and integrating additional sensors on them. (NOAA, NSF; 2013)
- Construct and deploy the Ocean Observatories Initiative as a long-term platform for testing and developing innovative ocean sensors and communication standards. (NSF; 2015)
- Identify the limitations of existing methodologies for integrating short-term and sustained long-term ocean observational data, and develop initial activities to improve integration. (NASA, NOAA, NSF; 2016)
- Implement data and modeling techniques to support a global mapping capability for seasonal, inter-annual, and decadal changes. (NASA, USGS; 2017)

Offshore remote-sensing observations allow:

Utility companies to monitor cooling water intake at their nuclear power plants for safety.

Oil companies to assess impact of local oceanographic conditions on offshore rigs to assist with oil platform management.

State and local governments to make decisions whether to close a beach to protect public safety, while allowing them to limit the amount of time it is closed to minimize economic impacts on local business.

Maritime situational awareness to support our homeland and national security and maritime law enforcement needs.

Regional Fishery Management Councils to inform their decisions to set annual quotas and prevent overfishing.

Action 4: Provide local and regional observation systems to support a variety of ocean, coastal, and Great Lakes users.

Sustained observation systems provide the observational backbone underlying decisions made at regional and local scales to address maritime commerce, safety at sea, weather and climate forecasts and effects, national and homeland security, maritime law enforcement, sustainable living marine resources, and ecosystem health. Easier and better access to observations and information is improving our ability to understand and predict ecosystem events—such as harmful algal blooms and changes in habitat—as well as long-term planning and decision-making. This action will coordinate with specific observing activities outlined for the *Resiliency and Adaptation to Climate Change and Ocean Acidification* and *Changing Conditions in the Arctic* priority objectives.

This action includes the steps that will be taken to further implement the U.S. Integrated Ocean Observing System (IOOS®) observational and data management components and the Physical Oceanographic Real-Time System (PORTS), bringing them to a baseline operational level. These components will provide users with standardized data discovery and access to a minimum set of ocean observing data from Federal and non-Federal sources.

Outcomes

Sustained observing systems in the ocean, coasts, and Great Lakes will provide the information for sound planning and decision-making at regional and local scales.

Agencies: NOAA, USACE, IOOC, USGS, EPA, NASA, NOAA

Milestones

- Complete a detailed inventory of non-fleet operational ocean observation assets for the 11 IOOS® Regions and develop/release build-out plans within available resources. (NOAA; 2013)
- Develop and release an inventory of both Federal and non-Federal IOOS® capabilities by comparing observing requirements with standardized requirement specifications. (NOAA; 2013)
- Within existing statutory authorities, develop, evaluate, and expand an integrated geospatial database of Federal and non-Federal, certified and non-certified ocean observation data to provide access to public

information and provide extracts or contact information for privately held information. (IOOC member agencies, NOAA, DOD; 2013)

- Establish a mechanism for obtaining external expert advice (e.g., a Federal Advisory Committee) to advise the IOOC. (NOAA; 2013).
- Announce the standards for certifying non-Federal data providers to IOOS® and certify at least one provider. (NOAA; 2014)
- Update the National Surface Current Mapping Plan to include a gap-filling component and up-to-date coverage, including prioritization of new radar sites. (NOAA; 2014)
- Update the National Operational Wave Observation Plan. (USACE, NOAA; 2015)
- Complete plans for the PORTS. (NOAA, 2015)
- Provide remotely sensed imagery and data, including those from shore-based and sea-mounted sensors, to the National Water Quality Monitoring Network design. (USGS, EPA, NASA, USCG, NOAA; 2017)

Action 5: Coordinate and leverage ocean and coastal mapping efforts to improve access to existing data and efficiently collect future data.

Improvements in providing fundamental baseline data for defining and mapping ocean, coastal, and Great Lakes areas—notably critical habitat—will support spatial planners and decision-makers in improving resource management. Interagency coordination will provide more effective planning, acquisition, processing, and access to ocean and coastal mapping data by increasing data sharing, developing appropriate data acquisition and metadata standards, and facilitating the interoperability of in situ data collection systems, data processing, archiving, and distribution of data products.

This action will strengthen and integrate Federal and non-Federal ocean and coastal mapping resources. It will improve the efficiency of mapping assets (including program, platforms, technologies, and resultant data), facilitate the use and re-use of our mapping data, and enable the integration of these data and products. This will in turn allow us to better define critical habitat areas, assess vulnerability to coastal change, manage marine resources, and identify and mitigate threats to marine transportation. Specifically, this action will develop a comprehensive, integrated inventory of ocean and coastal mapping data, to improve planning for the efficient response of Federally-funded mapping programs to the diverse needs in the National Ocean Policy.

Outcomes

Sustained and coordinated ocean and coastal mapping will support planning and decision-making about ocean and coastal uses.

Agencies: NOAA, USGS, USACE, IC-OCM

Milestones

- Integrate existing and emerging coastal and seafloor mapping guidelines, best practices, and standards to ensure interoperability of data. (IC-OCM, NOAA; 2013)
- Develop, evaluate, and expand a prototype interagency Ocean and Coastal Mapping (OCM) Inventory that includes information (metadata) on existing and planned acquisition of framework data meeting agreed standards, including elevation, imagery, and geophysical data. (NOAA, USGS, USACE, IC-OCM; 2014)
- Obtain modern high-resolution seafloor mapping data in key coastal and shelf waters, including the National Shoreline, in accordance with the priorities and standards of the National Ocean and Coastal Mapping Plan. (IC-OCM; 2014)
- Develop an annually updated National Ocean and Coastal Mapping Plan, using the OCM Inventory, that defines priority mapping needs and gaps, and implement the plan through interagency collaboration in planning, budgeting, and execution. (IC-OCM; 2017)

Action 6: Improve mapping capabilities and mapping products.

The majority of the ocean and our coasts is not mapped to modern standards. Improved mapping capabilities and products—inventoried in a national system—will serve user communities with varied interests, needs, and responsibilities, as well as support tsunami modeling and storm surge planning, enhance safety of navigation, improve EBM and decision-making for conservation and management of marine resources and habitats, and advance ocean and coastal science.

This action will improve technologies and methodologies that are needed to acquire data in a manner that enables re-use. It will develop methods and strategies for more consistent and integrated data products. Integration of mapping data will allow timely access to high-quality ocean and coastal mapping data and derived products.

Outcomes

Improved mapping capabilities and products will better support a range of activities, including navigation, emergency planning, search and rescue, and conservation practices.

Agencies: IC-OCM, USGS, USACE, NOAA

Milestones

- Improve and implement coastal change analysis products and a sustained and seamless description of coastal and marine elevation extending from on-shore coastal areas (Coastal National Elevation Dataset) through the U.S. Exclusive Economic Zone and extended continental shelf, including elevation models and derived map products, which meet the needs of decision-makers. (IC-OCM, USGS, USACE, NOAA; 2013)

- Improve and implement technology and techniques for acoustic characterization of seafloor properties to enable multiple uses of data for nautical charting and marine habitat mapping. (IC-OCM, NOAA; 2014)
- Improve and implement airborne and other techniques for coastal elevation, bathymetric mapping, and nautical charting, including low-lying coastal areas with turbid waters. (USACE, USGS, NOAA, IC-OCM; 2017)

Action 7: Develop an integrated ocean and coastal data collection, processing, and management system to support real-time observations.

Development of a national, enterprise-wide, integrated management system for physical, biological, chemical, and social data is an essential component of the larger, overarching ocean and coastal infrastructure that supports all nine National Ocean Policy priority objectives. A system for data and information management, archiving, access, and stewardship—with supporting policies—is needed to ensure the full value of the Nation's investment in ocean, coastal, and Great Lakes data and information. This effort will be part of the national information management infrastructure to provide easy access to relevant data and information for research, planning, and decision support, and will be closely linked with ocean.data.gov and other ocean and coastal data portals and services.

This action provides the initial steps that will identify and integrate the data and information required by the eight other priority objectives. It will also provide the end-to-end data services required (e.g., data collection, management, stewardship, integration, and product dissemination to all end users) to make this a truly national capability for current and future applications. Data collected from existing systems will be submitted regularly to relevant national archive centers for long-term stewardship. The action includes a long-term commitment to integrating biological data with other natural and social data.

Outcomes

A national data and information management system and supporting policies will ensure the full value of the Nation's investment in ocean, coastal, and Great Lakes data and information.

Agencies: IOOC member agencies, IC-OCM, NOAA, DOI, NSF, USDA, EPA, NASA, DOC, United States Global Change Research Program (USGCRP), USACE

Milestones

- Define Federal and non-Federal partners' data and information management, archive, access, and long-term stewardship systems modeled on the U.S. IOOS®: A Blueprint for Full Capability. (NOAA; 2012)
- Within existing statutory authorities, create a program for the notification, collection, and organization of Federal and non-Federal ocean observing systems that will reduce redundancies in collection, provide a central database for public information and connect to privately held information, and assist in prioritizing areas in need of additional collection. (IOOC member agencies, NOAA, DOD; 2012)
- Identify the existing data services and systems, as well as the requirements to support integrated discovery and access through an information management system and integrative functions required for the management system. (IOOC member agencies; 2013)
- Adopt recommended best practices and standards (such as the Coastal and Marine Ecological Classification Standard) to ensure consistent terminology for coastal and marine ecological features when describing and delivering ocean and coastal mapping data and derived products. (IC-OCM; 2013)
- Implement a fully coordinated, nationally integrated system that includes international partners under the Global Earth Observation System of Systems framework and supports the Global Climate Observing System Implementation Plan. (IOOC member agencies, USGCRP; 2016)
- Begin implementing well-accepted international standards for data transmission formats, metadata, and version control via the Global Telecommunications System (GTS), as well as best practices for observing and data quality. (NOAA, USACE; 2016)
- Extend the current data standards within the biological domain to allow for increased interoperability between marine biological data and physical and social data within an ocean observation context. (NOAA, DOI, NSF, USDA, EPA, NASA, DOC; 2020)

Coordinate and Support

Better coordinate and support Federal, State, Tribal, local, and regional management of the ocean, our coasts, and the Great Lakes. Improve coordination and integration across the Federal Government and, as appropriate, engage with the international community.

One of the significant obstacles to effective management of the ocean, our coasts, and the Great Lakes is the complex set of Federal, State, Tribal, and local laws, authorities, mandates, and governance structures for resource management and conservation. Managing resources and uses consistently is difficult to achieve given statutorily mandated divisions of authority among overlapping jurisdictions of the various Federal agencies. In addition, many of the Nation's most pressing ocean and coastal issues are local or regional in nature and their resolution requires strong support for regional governance structures.

The effects of climate change, overfishing, and the depletion of many of the world's fish stocks, the global reach of regional disasters, ocean habitat degradation, and an increased need to take advantage of observation platforms have drawn attention to the international nature of ocean and coastal challenges and opportunities that our Nation faces. These far-reaching issues require both bilateral and multilateral collaboration and cooperation with our international partners.

To move toward EBM, the Nation needs to improve its ability to respond to ocean and coastal issues in a coordinated fashion across jurisdictional boundaries and at all levels of governance. The actions below will increase communication, streamline processes, leverage resources, resolve disparities, and enhance synergies within and between Federal, State, Tribal, regional, and local ocean, coastal and Great Lakes programs, and, as appropriate, with the international community. The actions work to strengthen and leverage existing partnerships and build new partnerships, such as assisting the States in advancing the network of regional alliances to protect ocean, coastal, and Great Lakes health. Partnerships with local governments and private interests are also needed to leverage limited resources. Cooperation among Federal agencies in regionally focused efforts, as described in the *Regional Ecosystem Protection and Restoration* priority objective, is critical. Development of cross-cutting budget

analyses for ocean activities will further identify areas of redundancy and opportunities for partnering.

Action 1: Support regional priorities and enhance regional partnerships.

Existing regional ocean and Great Lakes partnerships (ROPs) are voluntary, usually multi-state, Governor-established forums that develop shared priorities and take critical action on a broad diversity of ocean, coastal, and Great Lakes needs as relevant to their region. They have different structures and employ varied methods and approaches to enhance the ecological and economic health of the region. Their efforts involve nongovernmental stakeholders and multiple State and Federal agencies involved in coastal and ocean management.

The ROPs have many priorities in common—such as habitat restoration, outreach and education, and increasing science and data—and in many cases are well aligned with the National Ocean Policy. Enhancing communication and coordination among these groups and with the NOC will further the priorities addressed in the Policy. For example, with the anticipated creation of regional planning bodies to implement the National Ocean Policy's framework for effective coastal and marine spatial planning (hereinafter "CMSP Framework"), several ROPs are considering possible ways to align their existing regional collaborations with those envisioned specifically for CMSP.

In implementing this action, Federal agencies will enhance progress in the regions by supporting ROP priorities and by improving coordination among Federal offices based in the regions. Increased involvement by Federal agencies in ROPs will facilitate greater exchange of information and access to technical, scientific, and training support. (See also the "Restoration in Action" text box in the *Regional Ecosystem Protection and Restoration* priority objective.) In addition, this action will assist ROPs with sharing lessons learned about methods or techniques they have found most effective in achieving regional objectives using limited resources.

Outcomes

Improved inter-jurisdictional cooperation and collaboration will facilitate the development of regional goals and priorities and improve responses to regional challenges.

Regional Ocean and Great Lakes Partnerships

Great Lakes Regional Collaboration
(www.glrc.us)
- Illinois
- Indiana
- Michigan
- Minnesota
- New York
- Ohio
- Pennsylvania
- Wisconsin

Governors' South Atlantic Alliance
(www.southatlanticalliance.org)
- Florida
- Georgia
- North Carolina
- South Carolina

Gulf of Mexico Alliance
(http://gulfofmexicoalliance.org)
- Alabama
- Florida
- Louisiana
- Mississippi
- Texas

Mid-Atlantic Regional Council on the Ocean
(www.midatlanticocean.org)
- Delaware
- Maryland
- New Jersey
- New York
- Virginia

Northeast Regional Ocean Council
(http://community.csc.noaa.gov/nroc)
- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island
- Vermont

West Coast Governors' Alliance on Ocean Health
(**http://westcoastoceans.gov)**
- California
- Oregon
- Washington

Leveraging Partnerships

National Oceanographic Partnership Program (NOPP) works to coordinate and strengthen oceanographic efforts to support national security, economic development, and ocean science and education. The NOPP identifies and carries out partnerships among Federal agencies, academia, industry, and other members of the oceanographic scientific community in the areas of data, resources, education, and communication.

Corporate Wetlands Restoration Partnership (CWRP) is an innovative private–public initiative aimed at preserving, restoring, enhancing, and protecting aquatic habitats throughout the United States. Bringing together over 300 corporations, Federal and State agencies, non-profit organizations, and academia, the CWRP allows members to contribute in a fundamental way to crucial projects involving America's coastal and inland aquatic resources and to support related education programs.

National Fish Habitat Partnerships are regional partnerships among State and Tribal governments, the Federal Government, businesses, and NGOs working to reverse declines in fish habitat across the Federal Government.

Agencies: NOAA, EPA, DOI, all agencies who are members of Federal regional task forces.

Milestones

- Identify grant and non-monetary opportunities to support the continued development and organization of regional alliances and existing ROPs (e.g., support for regional action plans). (NOAA, EPA, DOI; 2012)
- Compile a list of tools, resources, and in-kind services that are available to ROPs to enhance accomplishment of mutual regional goals (e.g., facilitators, use of Federal facilities, grant opportunities, decision-support tools, scientific information, and technical experts). (NOAA, EPA, DOI, USACE; 2012)
- Identify and distribute, in coordination with ROPs, Best Management Practices (BMPs) that are broadly applicable for all ROPs (e.g., how to effectively engage stakeholders, develop partnerships, identify priorities, develop regional action plans, measure success). (NOAA, EPA, DOI, USACE; 2012)

Action 2: Strengthen existing partnerships and establish new partnerships, as appropriate, to enhance the actions within this Implementation Plan.

Improving collaboration through partnerships allows the Federal Government to leverage the unique and diverse strengths of Tribal and State partners, the private sector, and other stakeholders. These partnerships allow Federal agencies to better address national problems that are beyond the mandate or capability of any single Federal agency or the Federal Government acting alone. Engaging the private sector and communities in ocean, coastal, and Great Lakes stewardship promotes environmental conservation, economic growth, and other societal benefits.

In addition to facilitating new partnerships, this action will improve leveraging of existing partnerships (e.g., National Oceanographic Partnership Program, Corporate Wetlands Restoration Partnership, and National Fish Habitat Partnerships). This action aligns with other national and regional initiatives, including "America's Great Outdoors" and the Administration's "Commitment to Clean Water." NOC member

agencies would also work through their ongoing stakeholder partnerships as appropriate to address actions in this draft Implementation Plan.

Outcomes

Strengthening existing and establishing new partnerships will result in greater efficiency, extended capacity, improved effectiveness, and greater joint public–private partnerships to support mutual objectives.

Agencies: ORM-IPC, OST-IPC, NOAA, USDA, NFHP Federal Caucus

Milestones

- Identify and prioritize specific opportunities to partner with non-Federal entities and organizations on National Ocean Policy priorities. (ORM-IPC, OST-IPC; 2012)
- Establish and work with a national coastal conservation corps network to identify potential sites and projects for phased regional implementation. (NOAA,; 2012)
- Identify and prioritize ocean, coastal, and Great Lakes protection and restoration projects that would benefit from involvement of public–private partnerships, such as Corporate Wetlands Restoration Partnerships. (ORM-IPC; 2012)
- Identify, in coordination with the National Oceanographic Partnership Program, funding opportunities to support National Ocean Policy priorities. (OST-IPC; 2013)
- Officially recognize one new coastal, estuarine, or marine focused Fish Habitat Partnership. (NFHP Federal Caucus; 2013)
- Assess Federal grant solicitations to determine whether additional criteria can be identified and added to better coordinate with priorities of the coastal and marine Fish Habitat Partnerships. (NFHP Federal Caucus; 2014)

Action 3: Reduce barriers to implementation of the National Ocean Policy.

When authorities and responsibilities remain dispersed, poorly defined, or nonexistent, the decision-making process is unclear. The resulting confusion can create roadblocks to public participation, discourage private investment, cause harmful delays, and generate unnecessary costs. This action will help Federal agencies identify and make recommendations to resolve gaps, inconsistencies, and duplications in statutory authorities, policies, and regulations. This will be particularly beneficial in instances when decision-making responsibilities are poorly defined or non-existent due to lack of coherency among differing agency mandates, policies, regulations, practices, or funding. As part of this analysis, opportunities to incorporate EBM principles into statutory authorities, policies, and regulations will be identified.

Outcomes

Identification and resolution of legal barriers will improve the Federal Government's ability to improve management of activities taking place or being proposed in our ocean, coasts, and Great Lakes.

Agency: NOC Legal Working Group

Milestones

- Identify Federal legal or regulatory gaps, overlaps, redundancies, and inconsistencies to effective collaboration and governance that require further analysis. (NOC Legal Working Group; 2012)
- Review the interpretation and, as necessary, propose to strengthen content and/or application of Federal legislation, including the Coastal Zone Management Act, Coastal Barriers Resources Act, the Stafford Act, and others to incorporate and better support climate change adaptation efforts. (NOAA, DOI; 2013)
- Deliver a report on priority recommendations to accelerate Federal decision-making with actions that would address the regulatory and legislative issues identified in the milestone above. (NOC Legal Working Group; 2014)

Action 4: Develop cross-cutting budget analyses that address priority areas in the National Ocean Policy.

Ocean and coastal cross-cutting Federal budget analyses will help to address the complexity of organizing, managing, and implementing the National Ocean Policy, including EBM, and will facilitate the formation of a comprehensive Federal management scheme. These analyses can also assist in making budget information more understandable across the 26 agencies, offices, and departments represented on the NOC. It may also be used to track accomplishments, measure progress toward achieving policy goals, and compare activities conducted by various agencies aimed at the same goal.

Outcomes

Federal cross-cutting budget analyses will result in more efficient and economical uses of limited Federal resources.

Agencies: NOC Co-Chairs, OMB, NOC Member Agencies

Milestones

- In consultation with the NOC and OMB, develop a timely annual interagency budget guidance memo on ocean priorities consistent with the goals and objectives of the National Ocean Policy. (NOC Co-Chairs; 2012)

- In consultation with the NOC and OMB, identify Federal programs that contribute significantly to the National Ocean Policy. (NOC Co-Chairs; 2013)
- In consultation with the NOC and OMB, develop crosscuts to inform the annual priorities on ocean, coastal, and Great Lakes stewardship. (NOC Co-Chairs; 2014)

Action 5: Improve efficiency of permitting of ocean, coastal, and Great Lakes uses.

There are a number of overlapping, redundant, and sometimes conflicting permit review processes that result in unnecessary delays, increased costs, and lack of predictability for commercial investments. Relevant agencies, offices, and departments represented on the NOC will work together to review permitting processes to determine how these processes may be better coordinated. The initial focus, or pilot, will be on aquaculture permitting. Currently, at least five Federal agencies must be consulted or grant permits before an aquaculture facility can proceed. This includes NOAA, USFWS, the USACE for shellfish operations or for operations attached to the sea floor, the U.S. Coast Guard if there is a potential obstruction to safe navigation, and EPA for any facility that discharges a pollutant into U.S. navigable waters or the exclusive economic zone. Additionally, Federal agencies need to coordinate with the States on the respective State aquaculture permit requirements. To facilitate and ensure interagency coordination, the Interagency Working Group on Aquaculture under the National Science and Technology Council will collaborate with the NOC to create a senior-level interagency coordinating task force to improve permitting efficiencies for aquaculture and address key milestones.

Outcomes

Efficient, coordinated permitting processes will allow ocean industries to save time and money and encourage economic development and growth without compromising Federal agency responsibilities to protect health, safety, and the environment. Improved coordination and decreased redundancies will also reduce administrative waste and burden on Federal agencies.

Agencies: NOAA, USDA, EPA, USACE, USCG, DOI

Milestones

- Develop and make available communication tools that educate the U.S. aquaculture community and public on Federal laws and regulations that apply to aquaculture operations. (NOAA, USDA; 2012)
- Identify opportunities and pursue agreements to integrate aquaculture operations permit review processes (e.g., NEPA). (NOAA, USDA, EPA, USACE, USFWS; 2012)
- Identify and pursue aquaculture permitting regulatory efficiencies. (NOAA, USDA, EPA, USACE, USCG, USFWS; 2013)
- Identify and make available BMPs to inform and improve other Federal permitting processes. (NOAA, USDA, EPA, USACE, USCG, USFWS; 2015).

Action 6: Address high-priority ocean policy issues through international engagement by promoting the exchange of information and expertise.

Greater collaboration by U.S agencies with international partners to share scientific knowledge and to develop and expand scientific expertise is important for addressing ocean and coastal issues on a global scale. These efforts will increase awareness of the National Ocean Policy by other countries and international organizations. This may lead to strengthened coordination with countries sharing a maritime boundary with the United States, improve the exchange of information, and address key transboundary and relevant ocean issues, as well as generally enhance communication and collaboration with the international community on ocean issues.

Outcomes

International engagement and cooperation on information and science will enhance support for and collaboration on addressing ocean issues. At this point in the implementation of the National Ocean Policy, we envision that such engagement will yield three main outcomes internationally: (1) awareness of the National Ocean Policy by other interested countries and appropriate international organizations and fora; (2) enhanced U.S. efforts at information exchange on matters related to the National Ocean Policy; and (3) engagement with countries sharing a maritime boundary with the United States, in particular on matters relating to CMSP.

Agencies: DOS, CEQ, OSTP, DOJ, DOD, NOAA, USCG, NSS, EPA, NSF, NASA, DOI, DOT

Milestones

- At international fora, the United States will present relevant information on the National Ocean Policy in an effort to raise awareness of the Policy. Specific aspects of the Policy to be highlighted (e.g., CMSP, EBM) and specific fora in 2012 and 2013 (e.g., the UN Conference on Sustainable Development ["Rio +20"]) will be determined through interagency preparations. (DOS, DOJ; 2012)

- Identify and pursue specific opportunities to exchange information, expertise, and science on matters related to the National Ocean Policy with international organizations that address ocean and maritime issues contained in the Policy and with countries that may have an interest on such matters. (DOS, USCG, NOAA, EPA, NSF, NASA, USCG, DOI, USACE, DOT, DOJ; 2013)
- Engage with relevant countries sharing a maritime boundary with the United States to make them aware of the National Ocean Policy, in particular the CMSP efforts. (DOS, DOJ; 2012)

Regional Ecosystem Protection and Restoration

Establish and implement an integrated ecosystem protection and restoration strategy that is science-based and aligns conservation and restoration goals at the Federal, State, Tribal, local, and regional levels.

Regional ocean, coastal, and Great Lakes ecosystems are diverse and complex, ranging from tropical coral reefs and mangroves to temperate salt marshes and sea grass beds. They comprise 25 percent of the Nation's wetlands, and include our bays, estuaries, and gulfs. They provide spawning grounds, nurseries, shelter, and food for finfish, shellfish, migratory birds and waterfowl, and other wildlife. They provide a multitude of services; for example, more than half of the recreational and commercial fish caught in U.S. waters depend on estuaries and coastal wetlands at some point in their life cycles. Ocean, coastal, and Great Lakes ecosystems provide components for pharmaceuticals, act as a barrier against hurricanes, and offer areas of natural beauty for recreation and relaxation. Coastal wetlands also sequester vast amounts of carbon in organic material and sediments. The combined value of these ecosystems is estimated to be in the hundreds of billions of dollars.

However, the health of ocean, coastal, and Great Lakes ecosystems and their ability to provide such a wealth of products and services is being degraded by urban, rural, and agricultural development; unsustainable land-use practices; and other human activities. An estimated 27 percent of coral reefs have already been lost, and an estimated 60 percent are threatened by ocean warming and reef bleaching, as well as human impacts. Between 1998 and 2004, an estimated 59,000 acres of coastal freshwater and saltwater wetlands were lost each year. These threats are exacerbated by the environmental impacts of climate change, invasive species, and shifts in wildlife populations and abundance. Marine and aquatic invasive species alter habitats and push out native species. They cost hundreds of millions of dollars each year because invasions limit the ability of natural ecosystems to support fisheries, raw water uses, wildlife watching, and other uses. In addition, they damage vessels, piers, bridges, water systems, and other coastal infrastructure. As

development and human activity in coastal areas increase and resources decline, addressing these threats is becoming more complex.

Ocean, coastal, and Great Lakes ecosystem protection and restoration is being carried out at local, Tribal, State, and regional scales through implementation of Federal and State resource management and land-use planning initiatives. Programs aimed at reducing impacts in coastal landscapes, bays, wetlands, and estuaries include innovative growth-management initiatives that incorporate low-impact design elements, plans for improving management and control of storm water and wastewater discharges into coastal and ocean waters, and removal of incentives for new infrastructure and increased density in vulnerable or high-quality habitat areas.

Federal agencies implement a variety of habitat conservation programs at national, regional, and local scales to sustain valuable ecosystem services for the benefit of future generations of Americans. These programs help keep working forests and farmland in production, protect high-quality fish and wildlife habitats, direct development away from flood hazard areas, conserve cultural sites, and provide opportunities for outdoor recreation. (See text box on "Restoration in Action" for specific regional interagency efforts.)

While many restoration efforts have identified priority areas, there is no mechanism to assemble this information and align priorities across the landscape. The following actions address areas where increased coordination and prioritization among Federal agencies and with their non-Federal partners, enhancement of program effectiveness, or development and improvement of methodologies and protocols will help increase conservation success. The actions will build on and be informed by the processes, priorities, and existing ecosystem restoration and protection programs at the State, regional, and local levels. They will also complement other place-based EBM and CMSP efforts. Future updates will provide an opportunity to include next steps to advance solutions to the issues and identify other issues and priorities.

RESTORATION IN ACTION

The National Ocean Council is charged with implementing the National Ocean Policy and addressing broad, national enhanced stewardship of our ocean, coasts, and Great Lakes, including economic, environmental, social, and national security issues. One priority area is regional ecosystem restoration, including issues such as water quality impacts and other large-scale threats, ecosystem-based management, and coordination and support among Federal and State agencies at the regional scale.

Federal agencies are engaged in various regions through interagency collaborations focused on regional ecosystem restoration and management. The National Ocean Policy and the National Ocean Council provide an overarching framework for ongoing ecosystem-specific efforts.

Two ongoing restoration initiatives that exemplify the principles of the National Ocean Policy are the Great Lakes Restoration Initiative (GLRI) and the Gulf Coast Ecosystem Restoration Task Force. Both initiatives demonstrate how regional, State, and local entities can work together to address common goals for protecting and restoring natural resources in concert with building strong coastal economies and resilient communities.

The GLRI integrates and aligns restoration plans for the Great Lakes region. This initiative is an excellent example of how regional efforts can address common goals and build broad consensus throughout a larger ecosystem and community. It is the largest investment in the Great Lakes in two decades. It addresses urgent issues such as toxics, invasive species, near-shore health, and wetland restoration. Through reduced duplication of effort, the GLRI plans are addressing high-priority issues. The initial GLRI effort continues to be strengthened by the additional focus on implementing the National Ocean Policy.

The Gulf Coast Ecosystem Restoration Task Force supports implementing an important piece of the National Ocean Policy—ecosystem restoration. As the varied communities come together, their collective restoration activities promote and sustain a culture of shared stewardship, both across Federal agencies and between Federal, Tribal, State, and local jurisdictions. Through the Task Force, these multi-level entities work together to better coordinate planning, decision-making, and regulatory enforcement. Together, these activities ensure that best practices, information, discoveries, and advancements in science and management of coastal ecosystems are integrated and aligned with common goals that benefit multiple stakeholders and sectors.

Additionally, through groups such as the U.S. Coral Reef Task Force (USCRTF) and the Aquatic Nuisance Species Task Force, interagency efforts are coordinated across several regions to preserve and protect coral reef ecosystems and to prevent and control aquatic nuisance species.

Action 1: Develop and transfer decision support tools to identify land protection and restoration priorities.

Coastal landscapes, bays, wetlands, and estuaries provide numerous ecosystem services: habitat for fish and wildlife, a resource base for communities that depend on fishing and other water-dependent or water-based industries, rich farmland, productive forests, scenic and recreational opportunities that enhance quality of life, and natural buffers from floods and storms.

This action will promote better coordination between Federal agencies and local, Tribal, State, and regional entities in identifying protection and restoration priorities across the coastal landscape. As an initial step, agencies would build on the work under Executive Order 13508 to create a mapping tool for the Chesapeake Bay that provides such a mechanism for coordination. This tool will enable the sharing of information, data, and ideas between geographically based initiatives and provide opportunities for addressing gaps or areas of common concern and mutual benefit. It will focus initially on the Chesapeake Bay watershed, with a focus on transferability to other regions where Federal agencies are working collaboratively with States, local governments, other stakeholders, and Tribes to support regional ecosystem priorities. The Chesapeake Land Conservation Priority System (Chesapeake System) will be made available to stakeholders through a regional data portal linked to ocean.data.gov.

Outcomes

Watershed-wide decision support tools will promote strategic coastal land conservation, restoration planning, and decision-making.

Agencies: USGS, NPS, DOD

Milestones

- Institute collaborative partnership(s) (e.g., State, local, private, academic) within the Chesapeake Bay to augment an initial system prototype. (USGS, NPS, DOD; 2013)
- Complete the initial build-out of the Chesapeake System and initiate its use for collaborative conservation efforts, including development of data standards. (USGS, NPS, DOD; 2013)
- Assess the Chesapeake System's functionality and accessibility via focus groups. (USGS, NPS, DOD; 2013)
- Deliver a documented plan for storage, access, updating, and maintenance of source data used in prioritization tool. (USGS, NPS; 2013)
- Convene a small working group of representatives from other interested regions to advise on system infrastructure development and to facilitate transferability. (USGS, NPS, DOD; 2014)
- Make the Chesapeake System infrastructure available for other regional initiatives. (USGS, NPS, DOD; 2014)

Action 2: Reduce coastal wetland loss and improve understanding of coastal wetland status and trends.

To reduce, and work toward the goal of reversing, coastal wetland loss, Federal agencies (principally EPA, NOAA, USACE, and USFWS) will work together and in cooperation with States and Tribes to identify the underlying causes of loss and opportunities to more effectively protect and restore the important functions and values provided by wetlands in coastal watersheds. Due to a number of factors, which include natural processes and increasing human impacts in densely populated coastal areas, wetlands in coastal counties are being lost at a rate four to five times higher than inland wetlands. Some of the most well-known coastal wetland losses are estuarine saltmarsh wetlands, particularly along the coast of Louisiana and throughout the Gulf of Mexico. The overarching strategy to address wetland loss will be based on the results of pilot studies conducted to identify the most common underlying factors responsible for coastal wetland loss and the most successful tools for addressing this loss. There are numerous ongoing efforts to protect and restore coastal wetland ecosystems (e.g., the Gulf Coast Ecosystem Restoration Task Force, the South Florida Ecosystem Restoration Task Force). The actions discussed here are intended to complement these ecosystem restoration plans.

Outcomes

Conservation of coastal wetlands (including freshwater and saltwater wetlands in coastal watersheds) will improve through recommended strategies and collaborative actions that can be taken by Federal, State, Tribal, regional, and/or local entities to reduce and ultimately reverse the loss of coastal wetlands.

Agencies: NOAA, USFWS, EPA, USACE

Milestones

- Complete an assessment of the status and trends of coastal wetlands using the most recent data from 2004 to 2009, including status and trends across the U.S. coastal regions. (NOAA, USFWS; 2012)
- Develop an analytical framework and pilot assessment selection strategy. (EPA, NOAA, USACE, USFWS; 2012)
- Identify coastal watersheds for pilot assessments using the pilot assessment selection strategy and updated wetland inventories and geospatial data. (EPA, NOAA, USACE, USFWS; 2012)
- For each pilot watershed, complete analyses of data and information from the 2011 *Status and Trends of Wetlands in the Conterminous United States*, NOAA's Coastal Change Analysis Program, Clean Water Act Section 404 program, State regulatory programs, USACE Civil Works programs, and geospatial sources. (EPA, NOAA, USACE, USFWS; 2013)

- Complete a report recommending actions Federal agencies can take, in coordination with State, Tribal, regional, and local agencies, to improve the management of coastal wetlands and reduce losses nationwide. (EPA, NOAA, USACE, USFWS; 2014)

Action 3: Incorporate carbon sequestration into coastal habitat conservation.

The capability of coastal habitats to sequester carbon is an important but undervalued ecosystem service. It could provide incentives for increased protection of these habitats. This capability requires increased protection and restoration of salt marsh, mangrove, and sea grass habitats and better implementation of mitigation requirements for impacts to these systems. A greater understanding of the opportunities and barriers to including carbon sequestration in ecosystem service assessments is also needed.

Federal agencies will incorporate the carbon sequestration and storage function of coastal wetlands into public policy regarding management, protection, and restoration of coastal wetlands, and develop a better understanding of this ecosystem service. Agencies will also develop tools, models, and methods for quantifying greenhouse gas impacts of coastal habitat alteration to improve the ability of Federal and State agencies to implement effective protection and restoration programs. The ability to quantify carbon sequestration as an offset in a voluntary carbon market could also lead to significant private investment in coastal habitat conservation.

Outcomes

Accounting for coastal wetlands' carbon sequestration and storage functions will increase their protection and restoration, contribute to reducing the release of greenhouse gases (GHGs) to the atmosphere, and facilitate a greater understanding of the opportunities and barriers to including carbon sequestration in ecosystem service assessments.

Agencies: DOI, NOAA, USDA, EPA, USFWS, USGS, NSF

Milestones

- Assess the role of coastal habitat carbon storage and sequestration to increase the ability to incorporate these ecological services into habitat protection, restoration, management, and adaptation efforts. (DOI, NOAA; 2013)
- Complete an assessment of Federal policy opportunities and barriers for including carbon sequestration in ecosystem service assessments for coastal wetlands. (NOAA, USDA, EPA, USFWS; 2012)
- Develop methods and models to improve the assessment of carbon sequestration capacities for different coastal wetland types (e.g. mangroves and sea grasses). (USGS; 2013)

- Identify coastal wetland demonstration sites appropriate for carbon sequestration and emission research, with emphasis on sites already identified for the purposes of long-term ecological research. (USGS, USDA, EPA, NSF, NOAA, USACE; 2013)
- Develop a protocol for carbon sequestration as an ecosystem service that can be incorporated into existing Federal policies and laws that require the use of ecosystem-based management approaches for environmental management. (USGS, NOAA, USDA; 2015)
- Provide quantitative data on coastal habitat carbon sequestration and facilitate the use of results from pilot projects in supporting private-sector development of greenhouse gas offset protocols for use in voluntary carbon markets. (USGS; 2015)

Action 4: Strengthen interagency collaboration to protect and conserve coral reef ecosystems.

Coral reefs are among the most diverse and biologically complex ecosystems on Earth, and they support more species per unit area than any other marine environment. They provide important fish, areas of natural beauty, recreational opportunities, and effective shoreline protection. Under threat from multiple environmental stressors, coral reefs are deteriorating worldwide at an alarming rate.

Agencies will coordinate to address two key threats to coral reef ecosystems: impacts from land-based sources of pollution, and impacts from planned (e.g., permitted/authorized) and unplanned (e.g., vessel groundings, spills) activities. Principal agencies engaged in coral reef activities (e.g., regulation, management, water quality, and damage response) and agencies conducting and/or funding activities that take place in coral reef ecosystems working in partnership with the U.S. Coral Reef Task Force (USCRTF), will work within existing authorities, mandates, and programs to effectively enhance protection and conservation of coral reef ecosystems.

Outcomes

Improving coral reef conservation by strengthening interagency coordination will promote a ridge-to-reef or watershed approach to

address land-based sources of pollution and facilitate a more consistent approach to evaluating, assessing, and mitigating impacts to coral reef ecosystems.

Agencies: USCRTF, USACE, EPA, NOAA, DOI, USDA

Milestones

- Compile and make publically available an online reference library to include general background materials, case studies, and protocols for addressing planned and unplanned activities impacting coral reef ecosystems. (USCRTF; 2012).
- Complete and disseminate a reference handbook to include a review of existing policies, agency and State/territory roles and responsibilities, a compendium of best practices, science-based methodologies for quantifying ecosystem services, and protocols for use when responding, assessing, mitigating, and restoring coral reef ecosystems. (USCRTF; 2014).
- Implement coordinated projects in targeted locations to reduce land-based pollutants. Provide information and tools necessary for managers and decision-makers to identify and implement the most effective and efficient management practices in upstream environments. (USCRTF; 2014)

Action 5: Locate, control, and, where possible, eradicate invasive species populations.

Invasive species introduced into our coastal and Great Lakes waters can rapidly spread and degrade marine, estuarine, and freshwater ecosystems habitats, and push out native species. Slowing the spread of invasive species and reducing the likelihood of future invasions will improve protection of commercial and recreational fish stocks, shellfish, native plants, and threatened and endangered species and their habitats. It will also improve water quality, sustain jobs, and save millions of dollars in lost revenue and infrastructure damage.

The National Invasive Species Council (NISC), supported by the Aquatic Nuisance Species Task Force (ANSTF), will partner with the National Fish and Wildlife Foundation (NFWF) to establish a mechanism to support Federal, State, regional, and local actions to prevent the establishment and spread of invasive species, particularly those species that impact aquatic environments. This partnership will protect native marine and freshwater species and their habitats by encouraging and supporting coordinated efforts to locate, monitor, control, and, where possible, eradicate invasive species populations.

Outcomes

Controlling invasive species will improve water quality and ecosystem services; protect commercially, recreationally, culturally, and ecologically important marine species and their habitats; and help sustain the jobs and industries that depend upon healthy aquatic ecosystems.

Agencies: NISC, ANSTF

Milestones

- Analyze potential models and identify strategic gaps and opportunities, with the ANSTF, to improve our ability to conduct Early Detection Rapid Response operations. (NISC; 2013)
- Develop the processes for requesting Early Detection Rapid Response proposals and evaluation criteria in concert with the Invasive Species Advisory Committee, Aquatic Nuisance Species regional panels, and Federal invasive species program experts. (NISC, ANSTF; 2013)
- Develop mechanisms to facilitate public–private partnerships such as Memoranda of Understanding and related joint planning documents, and submit them for review and approval by participating entities. (NISC; 2013)
- Identify potential Federal and non-Federal funding sources that can contribute to the funding of a pilot-scale request for proposals. (NISC; 2013)
- Review the initial round of pilot-scale proposals, and report on the pilot program's effectiveness and make recommendations for its continued improvement. (NISC, ANSTF; 2014)

Action 6: Identify nationally significant marine and Great Lakes natural and cultural areas in need of protection.

Identifying ecologically important and culturally significant areas in need of protection is the first step in planning for future marine protected or managed areas, and for other ocean uses. Several Federal agencies have processes by which to identify important marine areas for management or protection under various authorities, such as designation of national marine sanctuaries, national estuary programs, and national marine monuments. This action will address the protection of essential fish habitat (EFH) and support reactivation of the National Marine Sanctuary Site Evaluation List (SEL)—a tool for evaluating marine areas that may be considered for national marine sanctuaries—and conducting a gap analysis to identify areas that may be considered for other levels of protection.

Prioritizing actions to identify and conserve habitat for priority fish species will enhance existing EFH efforts and provide both ecosystem and economic benefits. An updated SEL will include marine areas that have been identified as nationally significant due to their conservation, recreational, ecological, historical, scientific, cultural, archaeological,

educational, or aesthetic qualities, and inform the designation of future national marine sanctuaries. The SEL process is designed specifically to help designate national marine sanctuaries. However, the information gained through communities' identification of significant marine areas could also be used to inform other processes. Showcasing a comprehensive marine gap analysis in one region will develop the methodology for conducting a broader scientific analysis, and will integrate information on ecological resources, human uses, threats, and current levels of protection to identify ecologically important and culturally significant marine areas that should be considered for additional protection through existing marine protected area (MPA) programs and authorities. This information could be used in other site selection processes as well.

Outcomes

Nationally significant marine areas will be identified for science-based protection that balances conservation and human uses.

Agencies: NOAA, NFHP Federal Caucus, DOI

Milestones

- Identify actions encouraging the conservation and enhancement of habitat for priority species through EFH Provisions, including Habitat Areas of Particular Concern (HAPCs), to avoid, minimize, or compensate for adverse effects from impacts. (NOAA; 2012)
- Identify priority species and their high-value habitats that would benefit most from habitat assessments and conservation actions. (NOAA; 2013)
- As part of the national fish habitat assessment, complete a marine fish habitat assessment that includes an analysis of the links between estuarine and upland habitats to inform future habitat conservation work under the National Fish Habitat Partnership. (NFHP Federal Caucus; 2015)
- Reactivate and repopulate the SEL with marine areas that have been identified as nationally significant due to their conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, or aesthetic qualities. (NOAA; 2012)
- Develop and pilot a methodology for conducting a marine gap analysis and inventorying information sources to support the analysis. (NOAA; 2012)
- Showcase the gap analysis in one U.S. region. (NOAA; 2013)
- Evaluate cultural resources for additional protection based on the National Historic Preservation Act. (DOI, NOAA; 2014)

Action 7: Improve the effectiveness of coastal and estuarine habitat restoration projects.

Several Federal agencies fund and implement coastal and estuarine habitat restoration projects. These efforts must be coordinated, evaluated, and tracked to ensure that restoration is effective

and efficient. Project monitoring provides an opportunity to improve the science of restoration and document the benefits to the ecosystem and society, such as increases in fishing opportunities, fish populations, and biological diversity.

Outcomes

Increased monitoring and data collection to document the ecological and socioeconomic benefits of habitat restoration projects will improve the effectiveness of habitat restoration.

Agencies: NOAA, USACE, DOI, EPA, USDA

Milestones

- Complete an interagency review of existing monitoring data standards; revise and approve minimum ecological monitoring data standards for coastal and estuarine habitat restoration projects. (NOAA, USACE, DOI, EPA, USDA; 2014
- Make project information available for projects using the approved minimum monitoring standards available to the public via an Estuary Restoration Act website. (NOAA, USACE, DOI, EPA; 2014)
- Implement the revised ecological monitoring standards for restoration projects where project monitoring is required. (NOAA, USACE, DOI, EPA, USDA; 2015)

Gaps and Needs in Science and Technology

Methods for evaluating ecosystem response to conservation measures are evolving, as is the approach to conserving historically altered landscapes. Data and information have not been sufficiently integrated to describe the environmental, economic, and social impacts to working coastal communities and culturally significant landscapes. For example, coral reef ecosystems are extremely complex and can vary considerably from one area to the next. A case-by-case approach must be used to assess the complexity and services provided by ecosystems, as well as mitigation costs.

Resiliency and Adaptation to Climate Change and Ocean Acidification

Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.

We have an opportunity and a responsibility to reduce the vulnerability and increase the resilience of human and natural systems to climate change impacts. The scale, scope, and pace of climate change is having and will continue to have complex impacts on food, flood protection, tourism and recreation, economic activity, jobs, and cultural heritage. Sea-level rise, increased severe storm events, rapid erosion, changing ocean temperature, and saltwater intrusion present serious and growing threats to low-lying coastal communities through the destruction of infrastructure, flood inundation, loss of arable land, and the potential displacement of millions of people. At the same time, climate change is predicted to lower the water levels of the Great Lakes, thereby altering water cycles and supply, habitats, and economic uses of the Lakes. In addition, changing ocean temperature and ocean acidification are expected to have significant impacts on many marine species, food webs, and ocean ecosystem structure and function, and the many benefits they provide.

The best scientific information must be accessible and relevant to inform decisions that enhance the resiliency of the Nation in the face of climate change and ocean acidification. Decision-makers rely on science to understand and envision potential impacts, assess vulnerability and risk to a plausible range of climate change scenarios, and inform adaptive actions. Sustained, mutual information exchange among scientists, decision-makers, and practitioners increases the Nation's ability to provide early warnings and to track, model, and project climate-related impacts over time and geography, fostering more timely and effective responses in support of managing and adapting to changing conditions. Fostering coordination and advancements in understanding, observing, and projecting the impacts of climate change will result in the core information base needed for vulnerability assessments and adaptation efforts.

Decision-makers at all levels are beginning to implement actions to enhance the resilience of ecosystems and coastal communities. We can make significant progress in this area by building on current efforts at Federal, State, Tribal, regional, and local levels and coordinating across political jurisdictions. Strengthening and integrating observations from the Nation's protected areas, research activities, and observing systems into a coordinated network is an efficient and effective way to provide decision-makers with the information they need to reduce risks and increase resilience of ocean and coastal environments and communities in a changing climate. In addition, coordinated vulnerability assessments of ecosystems, communities, and economies will inform adaptation actions. Investing now by developing and deploying adaptive approaches to climate change will better enable the Nation to manage the risks and reduce negative impacts to society now and into the future.

The following set of coordinated, interdependent actions will yield better understanding of, preparation for, and response to the impacts of climate change and ocean acidification on ecosystems and communities.

Action 1: Strengthen and integrate observations from the Nation's protected areas, research sites, and observing systems into a coordinated network of sentinel sites to track changes in the condition of ocean, coastal, and Great Lakes environments and communities.

Robust information on the magnitude, scope, and timing of climate-related changes is critical for providing decision-makers with the current trends, early warnings, and future scenarios they need in order to take action to reduce vulnerabilities and impacts on environments and communities. While the *Observations, Mapping, and Infrastructure* priority objective focuses on ocean, coastal, and Great Lakes observations, integrating observations is essential to advancing our understanding of how communities and ecosystems respond and adapt to climate change. Strengthening and integrating observations from the Nation's protected areas, research activities, and observing systems into a coordinated and integrated network of climate "sentinel sites" is an efficient and effective way to provide decision-makers with the information they need to reduce risks and increase

Among other concerns, climate change poses challenges to our national, homeland, and economic security, including rising seas that threaten low-lying bases, increasing ocean temperatures and acidification that threaten food sources, an increasingly accessible Arctic frontier, and increasing demand for humanitarian aid.

resilience of ocean and coastal environments and communities in a changing climate.

A network of sentinel sites, including a number of existing monitoring systems, will strengthen the Nation's ability to provide early warnings, risk assessments, and forecasts for climate and ocean acidification impacts. This network will allow the Federal Government and partners to track changes in the conditions of ocean and coastal ecosystems and communities. Common protocols and mechanisms will ensure collecting, synthesizing, and communicating this information is consistent and on decision-relevant scales.

Outcomes

Decision-makers have increased information about past and current climate-related changes that improves assessment of risks and impacts, and significantly increases the efficiency and effectiveness of adaptation efforts.

Agencies: USGCRP, NOAA, USGS, DOD, USACE, DOC, DOL, EPA, DOI, IWG-OA

Milestones

- Develop a framework for indicators of community and ecosystem impacts (physical, biological, chemical, cultural, social, and economic) to track changes in vulnerability and resiliency through time as part of the sustained National Climate Assessment process. (USGCRP, NOAA; 2013)
- Develop an interagency plan for topographic (primarily LiDAR or equivalent accuracy) and shallow bathymetric mapping in order to ensure comprehensive and accurate seamless elevation information for coastlines. (USGS, NOAA, USACE; 2013)
- Integrate relevant socioeconomic monitoring information (e.g., U.S. Census and Bureau of Labor Statistics data) with ecosystem monitoring information to understand changes in coupled human–natural systems in selected areas. (NOAA, DOC, DOL; 2013)
- Produce an inventory and assessment of observations and monitoring capabilities in networks and systems of ocean, coastal, and Great Lakes protected areas, research sites, and observing systems. (NOAA, DOI, EPA, DOD; 2014)
- Disseminate and implement best practices (including guidance for relevant parameters that should be measured at each observing system), standardized monitoring protocols, and quality assurance and quality control procedures and provide appropriate training opportunities. (NOAA, EPA; 2014)
- Develop and begin to implement a plan for incorporating species phenology information (i.e., the annual timing of major life cycle events such as migration, reproduction, and flowering) from coastal and ocean ecosystems into the National Phenology Network. (DOI, NOAA; 2014)
- Build and expand on partnerships with both Federal and non-Federal entities (e.g., State agencies, Tribal agencies, and academic institutions) to increase integration of their existing observing activities into sentinel site networks. (NOAA; 2014)

- Integrate and strengthen sentinel site networks to track the impacts of climate change and ocean acidification on living marine resources (e.g., fisheries and marine protected species), protected areas, and coastal and Great Lakes communities in selected areas. (NOAA, DOI; 2015)
- Create and implement an interagency plan for coordinated monitoring of the impacts of climate change and ocean acidification through existing networks using standardized and/or interoperable techniques, databases, and indicators when and wherever possible, to maximize integration of information across networks and agencies, leveraging existing protocols where practical and relevant. (IWG-OA, USGCRP Ecosystems Working Group, IOCM, IOOS; 2020)

Action 2: Determine the impacts of climate change, ocean acidification, and interacting stressors on ecological, economic, and social systems.

Preparing for and responding to the impacts of climate change and ocean acidification requires improved understanding of the scale, scope, and intensity of these impacts on the Nation's valuable ocean and coastal ecosystems, and on the human communities that depend on them. An integrated research agenda, including physical, chemical, biological, and social sciences, will help address gaps in our current understanding and build a foundation for the development of models, tools, and services to better inform future planning and decisions.

This integrated, interdisciplinary agenda will foster understanding of climate change and ocean acidification impacts in the context of other environmental stressors to more accurately predict and enhance resilience to future conditions. It will provide information for improved forecasts of changes in ecological, economic, and social systems due to climate change and ocean acidification. It will fill critical gaps in understanding and build a foundation for the development of observations, models, tools, and services that support the information needs of decision-makers at all levels. This improved knowledge will underlie the development of effective EBM and adaptation strategies to increase resilience of ecologically and economically important populations and ecosystems, and the coastal communities that rely on them.

Outcomes

Increased understanding of climate change and ocean acidification impacts improves vulnerability assessments and effectiveness of adaptation actions reducing risks and impacts.

Agencies: NOAA, NSF, DOT, DOI, USACE

Milestones

- Conduct targeted research and disseminate findings to address valuable information needs related to the direct and indirect impacts of climate change, ocean acidification, and interacting stressors (e.g., land-use changes) on coastal communities, infrastructure, and economies. (NOAA, NSF, DOT; 2013)

- Conduct targeted research and disseminate findings to address valuable information needs related to the direct and indirect impacts of climate change, ocean acidification, and interacting stressors (e.g. land-use changes) on key species, habitats, and ecosystems. (NSF, NOAA, DOI, USACE; 2014)

Action 3: Provide critical projections of climate change impacts on coasts and oceans at decision-relevant scales.

Planning and management communities have identified the need for accurate, timely, and relevant multi-decadal projections of future impacts of climate change and ocean acidification to inform planning and prepare for future conditions. As current and new information on climate change and ocean acidification is collected and assimilated, we can provide increasingly robust projections of impacts at scales useful to decision-makers.

This action will allow Federal agencies and the external research community to improve regional-scale projections and provide decision-makers with information and tools to conduct vulnerability assessments and adaptation efforts.

Outcomes

Access to a range of regional projections of future climate conditions on physical, ecological, and social systems will help decision-makers reduce risks and increase the effectiveness of adaptation efforts.

Agencies: USGCRP, NOAA, USGS, DOI, USACE

Milestones

- Develop and disseminate a suite of regional climate projections for all coastal and marine regions of the United States. (USGCRP, NOAA; 2014)
- Develop and disseminate a set of estimates for global mean sea-level rise that incorporates thermal expansion and ice-sheet melting, as well as a summary of what is known regarding regional variations from the global trend. (USGCRP, NOAA; 2014)
- Develop regional-scale, decision-relevant models and projections for selected areas that link changes in climate to changes in the physical, chemical, and biological conditions of coastal and marine ecosystems (e.g., ocean currents, primary and secondary productivity, trophic relationships, species interactions, and higher trophic levels such as fish and marine mammals). (NOAA, USGS; 2014)
- Make available coastal inundation and sea-level change visualization and decision support tools at decision-relevant scales. (NOAA, DOI, USACE; 2015)
- Provide and integrate county-level coastal and ocean job trends data via NOAA's Digital Coast to enable decision-makers and planners to better assess the economic impacts of climate change. (NOAA,DOI, USACE, FEMA; 2015)

Action 4: Assess the vulnerability of coastal and ocean environments and communities to climate change and ocean acidification.

Assessing vulnerability is a crucial step in preparing for and responding to the impacts of climate change and ocean acidification on coastal and ocean environments and coastal communities and economies. A vulnerability assessment is the identification of current and foreseeable risks that provides decision-makers with information they need to develop appropriate responses to reduce vulnerability and impacts, and strengthen resiliency in a changing climate. Understanding the current and future threats to and vulnerabilities of environments and communities enables decision-makers and stakeholders to plan and implement more effective actions to reduce risks and impacts in a changing climate.

Methods, best practices, and guidance will be developed for assessing the vulnerability and resiliency of resources, infrastructure, and communities to a changing climate. These tools will help avoid actions that increase vulnerability (i.e., maladaptation) and identify how coastal and ocean managers can reduce risks and increase adaptation of human communities and economies.

Outcomes

Improved information on vulnerability of coastal and ocean environments and communities will enable decision-makers at Federal, State, Tribal, regional, and local levels to design and implement actions that more effectively reduce risks and impacts.

Agencies: CEQ, EPA, NOAA, DOI, FEMA, USACE, USGCRP, DOT

Milestones

- Provide guidance for performing comprehensive, risk-based vulnerability assessments of climate change impacts for voluntary adoption by coastal programs. (EPA, NOAA, DOI; 2013)
- Develop and disseminate methods, best practices, and standards for assessing the resiliency of natural resources, cultural resources, populations, and infrastructure in a changing climate. (DOI, NOAA, EPA, FEMA; DOT; 2013)
- Update USACE guidance on incorporating sea-level rise into project planning. (USACE, NOAA; 2013)

- Develop tools for and conduct training courses on design and implementation of vulnerability assessments for coastal and ocean infrastructure, communities, and natural and cultural resources. (NOAA, EPA, FEMA, USACE, DOT; 2013)
- Develop a national synthesis and assessment of coastal and ocean vulnerability to climate change, ocean acidification, and sea-level change, in cooperation with stakeholder groups. (USGCRP; 2014)
- Develop best practices for climate change vulnerability assessments for Federally managed cultural and natural resources, tailored to different ecosystems and landscapes as needed. (NOAA, DOI, DOT, EPA; 2014)
- Develop best practices for climate change vulnerability assessments for Federally funded and/or managed coastal and ocean facilities and infrastructure in high-hazard areas. (NOAA, DOI, EPA, DOD, DOT; 2014)
- Collaborate with State, Tribal, and local efforts on climate change vulnerability assessments for communities. (NOAA, DOI/USGS, EPA; 2014

Action 5: Strengthen interagency coordination on the development and provision of information, training, guidance, tools, and support for adaptation practitioners.

Accessible and relevant scientific information will enhance the resilience of our Nation in the face of a changing climate. Decision-makers rely on science that understands and envisions potential impacts, assesses vulnerability and risk to a plausible range of climate change scenarios, and informs adaptive actions. However, they often have difficulty navigating the complex landscape of Federally produced science to locate, access, and use information that meets their needs.

Through sustained, mutual information exchange among scientists, decision-makers, and managers, the Federal Government can help ensure that decision-makers have the information they need to make adaptation decisions. Online infrastructure will support these efforts by improving the accessibility of relevant science and sharing lessons learned among practitioners. Guidance and training will help Federal, State, regional, and local managers understand and use climate information, tools, and projections in vulnerability assessments and adaptation planning.

Outcomes

Improved access and utility of information, tools, and guidance will support actions by individuals, communities, and governments that increase the resilience of ecosystems, societies, and economies to climate change and ocean acidification.

Agencies: USGCRP, NOAA, EPA, DOI

Milestones

- Develop a strategic plan for continuously identifying information needs of decision-makers and addressing them through an integrated research agenda. (USGCRP; 2014)
- Integrate ocean, coastal, and Great Lakes climate change risks, impacts, and vulnerabilities into national and international climate assessments. (USGCRP; 2014)
- Integrate climate information, tools, and services on coasts and oceans into the online interagency global change information system. (USGCRP, NOAA, EPA, DOI; 2014)
- Provide accessible, standardized guidance and training for incorporating climate change and ocean acidification information into ecosystem management, restoration, and CMSP activities. (NOAA, DOI, EPA; 2014)
- Provide guidance on the effective use of regional climate projections and local sea-level rise scenarios, including associated uncertainties. (USGCRP, ; 2013)
- Train science "translators," such as Sea Grant Extension agents, to communicate and connect adaptation-relevant information to practitioners. (NOAA, DOI; 2014)

Action 6: Design, implement, and evaluate adaptation strategies to reduce vulnerabilities and promote informed decisions.

Climate change adaptation is a critical component of the broader effort to build a more sustainable future through enhancing social, economic, and ecosystem resilience. Developing and deploying adaptive approaches now will better enable the Nation to manage the risks posed by climate change, thus reducing negative impacts to society now and in the future. Adaptation actions can lead to more robust and forward-looking management strategies, as well as co-benefits.

This action will develop and promote strategies to allow coastal communities and the public to prepare to address the risks posed by climate change and ocean acidification. The result will be reduced vulnerability and improved resilience of communities, ecosystems, and infrastructure through actions that lead to smart siting and design, restoration and protection of ecosystem services, improved public health and safety, reductions in the loss of life and property, decreased costs of disaster response, and avoidance of maladaptive actions. Improved communication of adaptation actions across levels of government will enable a more coordinated approach to enhance resiliency to climate change and ocean acidification.

Outcomes

Implementation of adaptation actions will reduce vulnerability and improve resilience of communities, ecosystems, and infrastructure.

Agencies: DOI, NOAA, USDA, FEMA, USCG, DOT, CEQ, EPA, USACE

Milestones

- Foster and apply ecosystem-based approaches to adaptation, using the adaptive services of natural systems to help reduce vulnerabilities and risks to people and the built environment. (DOI, NOAA; 2013)
- Develop adaptation strategies, in consultation with Tribes and State Historic Preservation Offices, to address the impacts of climate change on coastal and ocean cultural resources. (DOI, NOAA, USDA; 2013)
- Develop an interagency coordinating framework to strengthen the institutions, mechanisms, and capacities for systematically enhancing resilience to hazards. (FEMA, USCG, DOT, working with National Science and Technology Council Subcommittee on Disaster Reduction; 2013)
- Complete the National Fish, Wildlife, and Plants Climate Adaptation Strategy to help guide development and application of vulnerability assessments for coastal and ocean living resources and environments. (DOI, NOAA, CEQ, USACE; 2013)
- Provide guidance to waterfront property owners on adaptive management options for shoreline erosion. (USACE, DOI, EPA, FEMA, NOAA; 2015)
- Develop and incorporate adaptation strategies for coastal and ocean species and habitats into future planning and management processes (e.g., fisheries, protected species, and shellfish aquaculture). (NOAA, DOI; 2016)

Gaps and Needs in Science and Technology

To advance our understanding of climate change and its impacts on marine ecosystems and human communities, our monitoring capacity must be strengthened. Improved design of chemical and biological sensors and development of an integrated, geographically distributed database would help meet this need. In addition, existing social, behavioral, and economic monitoring efforts should be coordinated with ecosystem monitoring efforts. Comprehensive vulnerability assessments will be important elements in the development of adaptation strategies in response to climate change. Effective vulnerability assessments require mechanisms to incorporate improved knowledge about sensitivity, exposure, and adaptive capacity, as well as future environmental changes and impacts. A mechanism also is needed to deploy and maintain an interagency adaptation information clearinghouse, and additional research is needed to improve risk communication.

Water Quality and Sustainable Practices on Land

Enhance water quality in the ocean, along our coasts, and in the Great Lakes by promoting and implementing sustainable practices on land.

There is nothing more vital to life on our planet than clean water. Healthy watersheds and coasts contribute to our health and our Nation's well-being by providing sources of clean water, as well as food and shelter for both human and natural communities. Healthy coastal watersheds also support commercial enterprises, recreational activities, and tourism. When the health of our watersheds and coasts is in danger, so is the health of our Nation's people and economy. Maintaining high-quality waters and healthy watersheds is key to ensuring resilient and adaptable aquatic ecosystems so they may withstand human and natural stresses and continue to provide services to humans and all other species that depend on them.

What we do on our land impacts our waters. Runoff from suburban streets and lawns, agricultural and industrial uses, transportation activities, and urban development—even hundreds of miles away—affects water quality. The resulting effects on the ocean, our coasts, and the Great Lakes manifest as beach and fisheries closures, fish kills, harmful algal blooms, areas of toxic sediments, "dead zones," increased incidents of human illness, and massive amounts of plastic debris that kill seabirds and other marine life.

Because this pollution comes from an array of sources throughout the country, addressing it requires a commitment to cooperation among Federal, State, and Tribal governments, regional governance structures, local authorities, multiple stakeholders, and the public. Water quality can be improved by coordinating protection and restoration efforts that occur on land with those that occur across our coastlines and into the ocean. Successful implementation will require concerted activities, including the

use of regulatory and non-regulatory measures to enhance water quality.

Marine debris warrants particular attention. The debris and trash entering our waterways from both land and ocean sources and the damage it causes is preventable. But it can only be dealt with effectively using a comprehensive approach that is local in scale and global in scope involving engagement and action by stakeholders and the public. This approach will ensure changes in attitudes and practices to prevent marine debris, especially plastic waste, at the source and reduce its long-term impact.

A number of programs at various levels exist to address point and non-point source pollution. They offer opportunities to significantly reduce the input of pollutants to water through concrete mechanisms that integrate and coordinate with land-based pollution reduction programs. The actions in this Plan are designed to address the major impacts of urban and suburban development and agriculture—including forestry and animal feedlots—on ocean, coastal, and Great Lakes waters. Voluntary participation by agricultural producers, supported by a strong public–private partnership to provide technical and financial assistance, is needed. Strong partnerships can be achieved through improved coordination of existing programs. The overarching goal of the actions below is to identify and

Preventing and Responding to Oil Spills

The Federal Government has a long history of ongoing programs and regulations to prevent, prepare for, and mitigate oil spills. There have been many significant changes and advances on these topics during this Administration. In particular, a number of interagency efforts are underway. The Department of the Interior's Bureau of Safety and Environmental Enforcement (BSEE), through coordinated interagency review, approves oil spill prevention and response plans submitted by private-sector entities engaged or proposing to engage in oil exploration and production in the offshore environment. BSEE has established the Offshore Energy Safety Advisory Committee—made up of 15 members from Federal agencies, the offshore oil and gas industry, academia, and research organizations—to provide critical policy advice to the Secretary of the Interior through the BSEE Director on improving all aspects of ocean energy safety. USCG and the EPA lead regional and local area oil spill preparedness and response contingency planning efforts in cooperation with Tribal, State, and local officials and the private sector. These efforts focus on optimizing community awareness of threats, consensus understanding of priorities for protection and mitigation, the tools and strategies available to protect and mitigate, and the challenges in employing those tools effectively in the environment. USCG and NOAA lead coordination efforts on research and development needs and activities through the Interagency Coordination Committee on Oil Pollution Research and the National Response Team Science and Technology Committee. In addition, Federal agencies coordinate with industry and international efforts on research and development of enhanced oil spill prevention and response tools and methods. The National Ocean Policy will help to accelerate these efforts nationally, fostering even greater coordination and helping to identify priorities.

address the most significant land-based sources of pollutants and contaminants to coastal waters.

Action 1: Reduce rural sources of excessive nutrients, sediments, toxics, and pathogens.

Pollution to our streams, rivers, estuaries, and coasts from diffuse sources (non-point source pollution) is the leading cause of water quality problems in the United States and a major cause of rapidly declining ocean and coastal ecosystem health. Pollutants from rural sources include nutrients, sediment, toxins, pesticides, and pathogens. Reducing the rural input of these materials means considering all components of the landscape, including soil, water, air, and plant and animal communities.

Well-managed watersheds are fundamental to clean and abundant water resources. This action will enhance water quality in the ocean, along our coasts, and in the Great Lakes by promoting conservation and best management practices in rural and forested watersheds to reduce non-point sources of pollution. Because this pollution comes from many diffuse sources throughout rural watersheds, addressing it requires a strong commitment to setting priorities and collaboration between multiple sectors and among Federal, State, and Tribal governments; regional governance structures; and local authorities.

Outcomes

Reducing pollutants from rural sources will improve local water quality and enhance ecosystem services and benefits within rural watersheds and in downstream waters.

Agencies: USDA, EPA, USGS, NOAA, USACE, DOI

Milestones

- Establish Priority Watersheds within current Regional Landscape Initiatives (e.g., Mississippi River Basin Healthy Watershed Initiative) and other water quality restoration efforts on public and private lands. (USDA, EPA, USGS; 2012)
- Evaluate the effectiveness of restoration efforts and BMPs for mitigating hypoxia through watershed nutrient loading reductions, using quantitative performance measures and an adaptive management approach. (NOAA, NRCS; 2013)
- Establish integrated interagency monitoring, modeling, and assessment partnerships in priority watersheds to better evaluate the effectiveness of land treatment practices (e.g., the Mississippi River Basin Healthy Watersheds Initiative, Chesapeake Bay Initiative, and Great Lakes Restoration Initiative). (USDA, EPA, USACE, DOI, NOAA; 2013)
- Make financial cost-sharing assistance available to assist private landowners in priority watersheds (e.g., Mississippi River Basin Healthy Watersheds Initiative) on a voluntary basis with the application of conservation practices to reduce excessive nutrient and sediment loadings from entering the Nation's waters. (USDA; 2012)

- Complete implementation of the EPA 2008 Concentrated Animal Feeding Operations regulation. (EPA; 2012)
- Implement environmental market pilot projects (e.g., USDA Chesapeake Bay Watershed Initiative) between Federal and regional partners for nutrient and sediment reduction. (USDA, DOI, EPA; 2013)
- Identify and develop specific Federal, State, regional, and local partnership opportunities through the USCRTF to reduce watershed pollution in coral reef areas. (USDA, NOAA; 2013)
- Support the development and implementation of State-wide nitrogen and phosphorus reduction strategies in the Mississippi River Basin and Gulf region, working collaboratively with interested states, and verify and communicate these results to the public. (EPA; 2014)
- Target State CWA section 319 programs to current regional landscape initiatives and other priority areas identified by States as they develop comprehensive strategies for reducing nitrogen and phosphorus pollution, and encourage the use of Clean Water State Revolving Fund funding to high-priority projects in each state, including those that address nutrient pollution. (EPA; 2015)
- Support development of State regulatory certainty programs for reducing nutrient and sediment loads that will accelerate the adoption of voluntary conservation efforts. (USDA, EPA; 2013)

Action 2: Reduce urban sources of excessive nutrients, sediments, toxins, and pathogens.

More than half of the U.S. population lives in coastal counties, which has a significant impact on the quality of the waters that reach the ocean, coasts, and Great Lakes. Cities, suburbs, and towns have large areas of impervious surfaces (e.g., paved streets, roads, parking lots, and rooftops) that do not allow rain to drain into the ground, resulting in polluted storm-water runoff. Runoff from roads and highways can have adverse effects if measures are not taken to remove sediments before the runoff reaches the receiving water. Municipal wastewater treatment plants contribute significant amounts of nitrogen and phosphorus to waterways, and septic systems, lawns, and golf courses contribute materials that harm water quality.

This action will enhance water quality in the ocean, along our coasts, and in the Great Lakes by reducing urban, suburban, and ex-urban sources of water pollution. A collaborative approach at the national level, along with targeted State and regional efforts, will be the most successful approach to reduce pollutant loadings in the near term. Federal agencies in partnership with States and Tribes, and in collaboration with stakeholders, will make greater progress in reducing pollutant loadings in the Great Lakes, coastal zone, and in downstream communities from both land-based and air-based pollution sources. This action also will lead to innovation in improving water quality by linking upstream actions to downstream impacts. It will complement the efforts of the Urban Waters Partnership.

Outcomes

Reducing urban, suburban, and ex-urban pollutant loads in coastal and Great Lakes communities will improve water quality and lead to healthier waterways and communities, both at the source and downstream.

Agencies: DOT, EPA, Urban Waters Federal Partnership

Milestones

- Reduce air deposition of sulfur, nitrogen, and other pollutants to ocean, coastal, and Great Lakes waters. (EPA; 2012)
- Determine number of significant municipal wastewater treatment plants in coastal and Great Lakes States that have National Pollutant Discharge Elimination System (NPDES) permit limits for nitrogen and phosphorus based on numeric water quality criteria and those based on narrative water quality criteria. Implement strategies to promote information sharing about reduction levels among States, Tribes, regional partners, landowners, and local stakeholders. (EPA; 2013)
- Develop pilot projects to increase access to the Urban Waters Federal Partnership for nearby residents, implement environmental improvements in or near these areas, and increase economic activity in or near urban water bodies. (Urban Waters Federal Partnership; 2015)
- Implement an effective storm-water control program that promotes green infrastructure and low-impact development approaches in urban and suburban areas to reduce impacts of discharges from newly developed and existing sites. (EPA; 2015)
- Inventory and evaluate best management practices to address storm-water runoff from the Federal-aid highway system, the efficiency of measures implemented to reduce pollutants, and the costs associated with construction, operation, and maintenance to establish performance measures that can be applied consistently across the Nation. (DOT; 2015)
- Reduce air deposition of mercury and other toxic pollution to help achieve water quality standards. (EPA;2015)

Action 3: Minimize impacts of hypoxia.

Hypoxia occurs when the amount of oxygen in water becomes too low to support most life (usually around 2 mg/L or less). This condition can kill aquatic organisms, resulting in depleted fisheries and disrupted ecosystems. Hypoxia is predominantly regional in nature and is often associated with excess nutrients entering water from the watershed, but it can form farther offshore, away from direct coastal influences.

More than 80 bodies of water on the U.S. East Coast alone have been identified as having symptoms of hypoxia and its associated ecological, public health, and economic consequences. Both Congress and the Administration have recognized hypoxia's increasing frequency and severity. The Harmful Algal Bloom and Hypoxia Research and Control Act provides a national framework for research, education, and support for coastal resource management strategies for preventing, forecasting, reducing, and controlling hypoxia and harmful algal blooms, addressed in Action 4 for this priority objective. The Administration has developed a restoration strategy for the Gulf of Mexico hypoxia zone, the Nation's largest.

This action will address and reverse widespread environmental degradation and ensure a healthier environment and improved regional economies. Monitoring, science, data access, modeling, and forecasting of hypoxia will be strengthened.

Outcomes

Increased scientific knowledge and more effective environmental monitoring and forecasting will provide decision-makers with the necessary information to minimize and mitigate impacts of hypoxia on regional ecosystems, fisheries resources, wildlife, and human populations.

Agencies: NOAA, USDA, USGS, Gulf of Mexico Hypoxia Task Force, , EPA, DOC

Milestones

- Identify collaborative measures with regional partnerships to improve water quality in the Gulf of Mexico. (NOAA, USDA, USGS, Gulf of Mexico Hypoxia Task Force; 2012)
- Advance the development and application of scenario-based ecosystem models to quantitatively evaluate hypoxia causes and impacts, using an integrative modeling approach, and develop outreach tools to communicate advanced understanding to coastal managers and other stakeholders. (NOAA, USGS; 2013)
- Produce and implement at least 12 State-wide nutrient reduction strategies. (EPA; 2013)
- Provide results of integrated modeling and resulting tool kits for communicating hypoxia-related information to coastal managers and other stakeholders. (NOAA, USGS, USDA; 2013)

- Produce an interagency report on socioeconomic benefits to coastal communities of restoring hypoxic zones. (NOAA, EPA, DOC; 2015)
- Develop a national hypoxia data portal for seamless data sharing and information dissemination, building on the success of the EPA/USGS data portal, and link to ocean.data.gov. (NOAA, USGS, EPA; 2015)

Action 4: Minimize impacts of harmful algal blooms.

Harmful algal blooms (HABs) are occurrences of certain algal species and other micro-organisms, often in large concentrations, that produce potent toxins or cause other harm to humans, domestic animals, regional fisheries, and wildlife. The nature, frequency, and severity of HABs in the United States have changed markedly over the past two decades. Coastal and inland states are now increasingly threatened by their occurrence, which often results in exposure of humans, wildlife, and seafood to toxins; habitat degradation and loss of species; restricted commercial and sport fishing areas; and reduced recreational use of the coast and shorelines. We can improve our understanding of the factors responsible for HABs—and our ability to forecast, monitor, and reduce their impacts—through enhanced observation and experiments to fill in missing data and understand their sources.

This action will improve infrastructure and monitoring for detecting HABs regionally, understanding the science behind their occurrence, and providing State and local officials with products and guidance for more rapid and certain decision-making.

Outcomes

Increased scientific knowledge, monitoring, and forecasting will minimize and mitigate the impacts of harmful algal blooms on regional ecosystems and human populations.

Agencies: NOAA, USGS, CDC

Milestones

- Develop and deploy rapid, field-based detection systems for various HAB-causing species and their toxins. (NOAA, USGS; 2015)
- Develop consistent and comparable reporting procedures for HABs and associated environmental parameters. (NOAA, CDC; 2013)
- Improve infrastructure—including availability of standards and probes, shared-use facilities, monitoring platforms, and training—to develop the expertise necessary for state-of-the-art national capabilities for HAB monitoring and detection and improving accuracy of HAB forecasting. (NOAA, NIST, USGS; 2015)
- Provide more reliable models for HAB forecasts and coordinated training for State and local officials to improve regional capabilities for HAB monitoring, assessment, forecasting, and response. (NOAA, CDC; 2015)

- Produce analysis of human dimensions of impacts and economic benefits of HAB forecasting at various spatial and temporal scales, and identify human sub-populations and wildlife that may be at increased health risk. (NOAA; 2015)

Action 5: Address threats posed by toxic chemicals and land-use practices to human, environmental, and wildlife health.

Contaminated seafood, disease outbreaks, and other threats to human and animal health not only take a toll on our Nation's people and environments, but impose economic costs. Identifying and understanding essential links between human, environmental, and wildlife health and the threats posed by toxic chemicals and land-use alterations on valued coastal and marine resources is an important national priority. Federal agencies have long been engaged in research and related activities that deal with fish, shellfish, marine mammal, and coral health and with environmental aspects of human and wildlife health, notably in the context of contaminants, pathogens, and toxins.

This action will provide a measureable reduction in targeted land-derived contaminants by focusing on water quality improvements through coordinated, cohesive approaches. It will improve analytical and monitoring methods, indicators, and models, and result in operational forecasts of pathogens on beaches, shorelines, and shellfish harvesting areas that allow more time to respond and minimize economic impacts. The result will be more reliable seafood consumption advisories, fewer unwarranted beach and shellfish fisheries closures, and a proactive outreach program aimed at seafood processors, consumers, regulators, and medical providers.

Outcomes

Improved analyses, monitoring, and notifications will protect human and wildlife health, and safeguard valuable coastal and marine resources and habitats.

Agencies: NOAA, EPA, CDC, FDA, USGS, USACE

Milestones

- Establish a Health Early Warning (HEW) System (i.e., a disease/toxin/pathogen surveillance system) to provide effective procedures for information dissemination and to alert public health officials and managers to protect against emerging threats to human, wildlife, and ecosystem health posed by degraded water quality. (NOAA, EPA, CDC; 2014)
- Institute an outreach program aimed at seafood processors, consumers, regulators, and medical providers. (NOAA, EPA, CDC, FDA; 2014)
- Establish baseline levels of selected contaminants in bays, estuaries, and Great Lakes waters, sentinel species, and people living in coastal communities and, where sufficient data exist, describe temporal trends and an assessment of the impact of Federal programs designed to abate degradation of water quality. (NOAA, EPA, USGS, USACE; 2014)
- Enhance contaminant monitoring and disease surveillance programs in a showcase region, ensuring broader agency participation by providing a continuum of observations from the watershed to the coastal ocean, and producing a government-wide monitoring portfolio that links across States, Tribes, regions, academia, and other stakeholders and volunteer organizations. (NOAA, EPA, USGS; 2014)
- Develop new, rapid assessment methods to detect microbial contamination and spoilage in seafood, and broadly disseminate information or transfer the technology to the seafood industry. (NOAA; 2015).
- Deliver an assessment of the impacts of toxic chemicals on valued resources and an evaluation of current measures to curtail or eliminate environmental contamination for a State or region where such strategies exist (such as the Great Lakes). (NOAA, EPA, USGS; 2015)
- Incorporate into forecast models more realistic hydrological characterization of the coastal watershed and of human-use activities, and deliver the model output (or forecasts) to coastal resource managers in a timely manner. (NOAA, EPA; 2015)
- Develop or enhance conceptual or analytical models that simulate contaminant transport, fate, and effects; take a holistic "atmosphere-watershed-coastal ocean" approach; and offer a capability of resolving outcomes of cost-effective options to achieve further reduction in the use and disposition of the target chemical or chemicals. (NOAA, EPA, USGS; 2016)

Action 6: Reduce the impacts of trash and marine debris on ocean, coastal, and Great Lakes waters and associated watersheds, through cooperative efforts aimed at pollution prevention, reduction, and removal.

Marine debris and trash, especially non-biodegradable plastics, are pervasive problems in and along our watersheds, Great Lakes, coasts, and the ocean. They enter our waterways through land- and ocean-based sources, and injure and kill marine wildlife; degrade ocean habitats; interfere with navigation safety; cause economic losses to shipping, fishing, tourism, and coastal

communities; and pose a threat to human health. This issue can be effectively resolved only through a comprehensive approach involving all levels, from local to global. Marine debris prevention efforts must focus on source reduction and prevention, and on community education and empowerment to action.

This action will increase research and monitoring efforts regarding marine debris baselines and volumes along the coast and in the oceans, and the environmental and human health impacts of key marine debris items. It will strengthen partnerships with affected communities, Tribes, stakeholders, industry, and government for a more comprehensive approach to addressing marine debris and trash in the environment. Promoting and identifying the availability of both non-regulatory and regulatory tools will prevent the build-up of trash and marine debris in our coastal waters.

Outcomes

Pollution prevention, mitigation, research, and removal activities will reduce impacts from marine debris and trash on ocean, coastal, and Great Lakes waters and associated watersheds.

Agencies: NOAA, USCG, EPA, DOI; Interagency Marine Debris Coordinating Committee

Milestones

- Publish a report on derelict traps/pots and fishing gear as a source of marine debris, and include information regarding the extent of the problem, mechanisms of the debris transport and accumulation in the sea, its impacts on wildlife and on ocean users, and the success of voluntary efforts and best management practices for reuse, accountability, or recycling of fishing gear and equipment. (NOAA; Interagency Marine Debris Coordinating Committee; 2012)
- Create a Federal Marine Debris Information Clearinghouse for scientific literature and information products that is accessible to researchers and other interested persons to improve marine debris source identification, research collaboration, and open sharing of data. (NOAA; Interagency Marine Debris Coordinating Committee; 2012)
- Identify and promote non-regulatory measures to reduce marine debris, such as market-based incentives, use of litter receptacles along shorelines, and use of litter traps in rivers and estuaries. (EPA, NOAA; 2013)
- Establish a marine debris monitoring protocol—including consistent nomenclature, sampling methods, source attrition, and data reporting requirements—and encourage its use by Federal agencies and non-Federal entities, including nongovernmental organizations and volunteer groups. (NOAA; 2013)
- Facilitate removal of trash and marine debris through community-based grants and other means. (NOAA, USCG, EPA, DOI; 2014)

- Increase research efforts regarding the relationship between marine debris (specifically microplastics) and toxic chemicals and the resulting impacts to marine organisms and human health via the food chain. (EPA, NOAA; 2014)
- Conduct research to identify the types of marine debris producing significant negative effects on the marine environment, and quantify these impacts to focus targeted prevention, removal, and mitigation efforts. (NOAA; 2014)
- Identify principal sources of debris and areas of accumulation in coastal waters, along shorelines, and in marine areas in each region. (NOAA; 2016)
- Improve use of existing regulatory tools (e.g., TMDLs, Combined Sewer Overflow controls, waste management, storm-water management, and Superfund) to reduce land-based sources of trash and marine debris (EPA; 2014)

Action 7: Identify, seek to protect, and maintain high-quality near-shore ocean, coastal, and Great Lakes waters.

Abundant, high-quality coastal waters provide billions of dollars annually in economic benefits to the Nation. Identifying and maintaining high-quality waters—those waters in healthy watersheds whose existing quality is better than the established standards–is a key to ensuring the continued resiliency and adaptability of aquatic ecosystems. Protecting high-quality waters and healthy watersheds is an economically beneficial long-term solution for ensuring the sustainable conditions of ocean, coastal, and Great Lakes habitats, along with the services healthy, high-quality waters provide, including human uses.

This action will identify and assess high-quality ocean and coastal waters and the waters that drain into them, establish new or modify existing water quality monitoring protocols and programs, and reduce or eliminate the impacts of vessel discharge on marine waters, with a special focus on invasive species. This action will also establish a comprehensive ocean and coastal water quality monitoring framework that will be integrated with other Federal, State, Tribal, and regional governance structures and local activities, as well as with existing freshwater water quality monitoring programs.

Outcomes

Maintaining the integrity of high-quality waters will sustain the valuable services they provide.

Agencies: DOI, EPA, NOAA, USDA, USACE, USFWS

Milestones

- Produce a biennial report card on the status of water quality in identified Federally managed or protected areas and outline success of management actions to conserve or enhance water quality. (DOI, EPA, NOAA, USFS; 2013)

- Protect, restore, or enhance 100,000 acres of wetlands, wetland-associated uplands, and high-priority coastal, upland, urban, and island habitat. (USDA, USACE, NOAA, DOI, EPA; 2014)
- Develop, coordinate, and integrate stakeholder/partner monitoring programs to encourage community involvement, education, and stewardship in the protection of healthy watersheds. (DOI, EPA, NOAA, USDA; 2015)
- Develop tools (e.g., climate change models) and water quality protection measures (e.g., BMPs) aimed at assessing and mitigating the impact of future climate change within existing ocean and coastal programs (e.g., National Wildlife Refuge System, National Park System, National Forests, National Estuarine Research Reserves, National Estuary Program, and State counterpart areas). (DOI, EPA, NOAA, USFS; 2015)
- Implement the design of the National Water Quality Monitoring Network for U.S. coastal waters and their tributaries through the National Water Quality Monitoring Council. (DOI, EPA, NOAA, USDA; 2017)
- Assess and augment water quality information in the NFHP National Assessment (see Action 7 in Regional Ecosystem Protection and Restoration), to identify high-quality coastal and Great Lakes waters. (DOI, EPA, USDA, NOAA; 2017)

GAPS AND NEEDS IN SCIENCE AND TECHNOLOGY

Our ability to address overall water quality, as well as hypoxia and harmful algal blooms, would be greatly enhanced by a coordinated monitoring network to assess nutrients, suspended sediment, and other chemicals. Basic information about new chemicals is also needed to improve predictions of impacts. In addition, resources could be prioritized if the costs associated with poor water quality, marine debris, and harmful algal blooms could be quantified.

- Initiate a showcase project linking healthy watershed protection to estuary protection, and evaluate the success in protecting and conserving high-quality coastal waters. (EPA, USDA; 2017)
- Protect 2 million acres of lands identified as high conservation priorities, with at least 35 percent being forestlands of highest value for maintaining water quality. (USDA; 2025)
- Improve control and regulation of water pollutants and other constituents in discharges (e.g., invasive species, pathogens, toxics, sediments) from vessels and ocean dumping. (EPA, USCG; 2015)
- Propose a draft permit, take public comments, and finalize a Vessel General Permit that will reduce the risk of the introduction of invasive species via ballast water from vessels through effective treatment and management of ballast water discharges. (EPA; 2012)
- Evaluate and disseminate lessons learned from efforts to improve the quality and quantity of freshwater flow into priority estuaries to protect their health and resiliency. (NOAA, , EPA, 2014)

Changing Conditions in the Arctic

Address environmental stewardship needs in the Arctic Ocean and adjacent coastal areas in the face of climate-induced and other environmental changes.

The Arctic is rapidly changing. The United States has broad interests in this region, from national security and territorial sovereignty to sustainable management of domestic energy and living resources, environmental protection, cultural heritage, and scientific research, all of which must be addressed in the context of these dramatic changes. The Nation, the State of Alaska, Tribal governments, and coastal communities are faced with critical decisions about how best to maintain natural resources and manage sustainable human activities in this region. They must do so in concert with other countries which share a stake in the Arctic.

One of the most dramatic changes in the Arctic is the decrease in sea ice. Protective barriers provided by the sea ice are diminishing, leaving large coastal areas vulnerable to threats from rising sea level, stronger storms, and increased erosion. Marine and terrestrial ecosystems, regional weather patterns, and even the global climate system are affected by the retreat of sea ice. Ice-diminished transit routes in the Bering, Chukchi, and Beaufort Seas and other regions of the Arctic invite increased international resource development, commerce, and transportation, which will, in turn, bring new socioeconomic and environmental stressors.

Such rapid changes underscore the need for better and timelier information across diverse scales and disciplines to provide effective stewardship, ensure that natural resource management and economic development in the region are environmentally sustainable, and support effective early warning and emergency response systems. Improved science and technology are needed to help the scientific community forecast changes with greater certainty and provide guidance for local communities, resource managers, and commercial interests in this remote region. Improvements in daily and weekly sea ice forecasts, for example, would benefit local community activities and safety, while also helping to provide a safe, secure, and reliable Arctic marine transportation system.

Improved mapping resources for mariners and other users of marine transportation systems are also needed. These resources could reduce the risks of maritime incidents and facilitate more resilient ocean and coastal economies. Another crucial resource will be a distributed biological observatory that will allow us to collect and share baseline ecosystem data, and better monitor, assess, and forecast environmental conditions under changing climate scenarios.

For the Arctic region, this draft Implementation Plan strives to balance economic growth, community resilience, and environmental stewardship. By working through interagency structures, and by placing an emphasis on improved coordination among Federal, State, and local governments; academia; the private sector and non-governmental organizations; and native communities and entities, the draft Implementation Plan will ensure that initiatives to advance national priorities in the Arctic are informed by the latest developments in science and technology and that this new information is shared across sectors. The transboundary effectiveness of all of these activities, including meeting the needs of the indigenous communities of Alaska, will be enhanced primarily through sustained cooperation within the Arctic Council.

ADDRESSING A CHANGING ARCTIC: PROGRESS THROUGH COORDINATION

Undertaking a comprehensive approach to U.S. Arctic Ocean policy relies on a foundation of coordination among Federal, State, and local entities; engagement with Alaska natives; and clear links between domestic and international Arctic activities. Through partnerships and collaboration, Federal resources and capabilities will be better leveraged and awareness of Arctic Ocean activities will increase. For example, collaborative planning can help address the increased risk of pollution incidents and help mitigate impacts of pollution events should they occur. Coordinating Arctic research will increase data sharing and improve understanding of the Arctic Ocean, providing more and better information to guide natural resource management. Clearer communication among Federal agencies will also benefit interactions between Federal groups and the State of Alaska, Alaska native communities, and international organizations.

In the United States, a number of interagency groups have coordination roles when it comes to Arctic Ocean policy. These include the Arctic Policy Group, led by the State Department to coordinate domestic efforts that relate to initiatives and activities of the Arctic Council (see below), and the Interagency Arctic Research Policy Committee, established through the Arctic Research Policy Act of 1984 to convene leadership from Federal agencies to develop an integrated Arctic Research Program Plan based on the recommendations of the U.S. Arctic Research Commission. The Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska facilitates coordinated and efficient domestic energy development and permitting in Alaska, and ensures the integrity of scientific, environmental, and cultural information that supports the permit evaluation process of energy development projects there. Internationally, the Arctic Council is an intergovernmental forum for promoting coordination and interaction among the Arctic States and other entities to help strengthen cooperation. Collaboration among these and other groups is essential to implement the Arctic priorities in the National Ocean Policy, as well as the overarching U.S. Arctic Region Policy, which guides interagency coordination and provides guidance on security, economics, energy, science, and environmental protection across the Arctic region.

Achieving a comprehensive approach to U.S. Arctic Ocean Policy requires taking full advantage of Federal interagency efforts now focused on the Arctic region, clarifying the division of labor and responsibilities among these groups, and strengthening interaction with local, State, and native entities. To this end, a number of Federal entities are developing a joint report describing interagency roles, responsibilities, and mechanisms for coordinated decision-making. We also are working toward routine coordination with regional groups such as the Alaska Climate Change Executive Roundtable, the North Slope Science Initiative, the Landscape Conservation Cooperatives, and the Arctic Ocean Observing System. The United States is also increasing its involvement in the Arctic Council to help strengthen cooperation among the Arctic nations and increase the involvement of the Arctic's indigenous communities in decisions that affect them.

Action 1: Improve Arctic environmental response management.

The melting of sea ice will facilitate access for developing natural resources in the Arctic. A commensurate rise in marine traffic could increase the potential for significant marine accidents and pollution incidents. Preparing and responding to emergencies related to resource development and marine transportation in the Arctic requires improved coordination, planning, and training; stronger interagency research; and enhanced international cooperation and collaboration.

In the event that responsible private parties fail to meet their statutory responsibilities for prevention, mitigation, and cleanup of marine pollution events in the Arctic, this action addresses development and implementation of response coordination, procedures, and decision support systems to protect communities and ecosystems from oil spills and other incidents associated with resource extraction (e.g., oil and gas) and Arctic marine transportation (e.g., commercial shipping and tourism). Specifically, this action supports the development and implementation of response coordination and decision-support mechanisms to support agency responsibilities, such as the Arctic Environmental Response Management Application (ERMA®), Alaska Joint Assessment Team, State–Federal Alaska Data Integration Working Group, and Alaska Regional Response Team (ARRT). A number of Federal departments and agencies are charged with ensuring that resource development projects and marine transportation comply with health, safety, and environmental protection standards. Implementation of this action will require close coordination with a number of existing entities, including the Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska, and internationally with the working groups and task forces of the Arctic Council.

Outcomes

A coordinated and prepared response management system will mitigate the impacts of pollution events on protected Arctic communities and ecosystems.

Agencies: NOAA, USCG, BSEE, DOT, DOS, ARRT, BOEM, NOAA, EPA, DOD

Milestones

- Compile integrated datasets needed to populate an Arctic oil spill planning, coordination, and response tool such as ERMA® and complete and deploy a public and responder Arctic ERMA®. (NOAA; 2013)
- In cooperation with other Arctic Council members, participate in the U.S. co-chaired Task Force on Oil Spill Preparedness and Response to develop an Arctic-wide instrument on oil spill preparedness and response and provide technical expertise and political support. (USCG, NOAA, DOJ, DOS; 2012-2013)

- Participate in joint training and workshops with other Arctic nations on oil spill response activities in the Arctic, such as the use of mechanical recovery, dispersants, and in situ burning following major spill events. (USCG, MARAD, NOAA, BSEE, DOT; 2012)
- In cooperation with other Arctic countries, develop international guidelines for both spill prevention and for spill response activities in the Arctic, such as the provision of improved sea ice forecasts for mariners and the use of mechanical recovery, dispersants, and in situ burning following major spill events. (USCG, NOAA, BSEE, DOJ, DOS; 2012)
- Identify resource and infrastructure shortfalls for high-risk scenarios and assess strategies to address those shortfalls. Complete a resource-neutral plan to address the significant logistical issues (e.g., housing and feeding personnel, staging and deploying equipment, and managing waste) that would be involved in a large-scale oil spill response in the Arctic during any season. (BSEE, NOAA, USCG, ARRT, DOT; 2014)
- Improve oil spill prevention, containment, and response infrastructure, plans, and technology for use in ice-covered seas, using all available sources, such as Federal agencies, industry, academia, and international partners. (BSEE, USCG, DOT, NOAA; 2013)
- Make available through ocean.data.gov assessments of current scientific research as well as traditional knowledge related to the impacts of resource development and pollution applicable to the Arctic. (USCG, BOEM; 2013)
- Initiate interagency research and integration of data to improve models for spill trajectory, oil fate, and weathering, and natural resource maps based on Arctic conditions in order to feed scenario development and risk assessment. (USCG, BSEE, BOEM, NOAA; 2013)
- If permits can be secured, complete scientifically based field experiments and tests of response tools in U.S. Arctic marine waters. If not, continue to conduct experiments in test tank facilities (e.g., National Oil Spill Response Research and Renewable Energy Test Facility (OHMSETT)) and partner with non-U.S. entities in Norway and Canada to conduct field experiments in foreign waters. (USCG, BSEE, EPA; 2013)
- Identify options to minimize and/or mitigate the risk associated with vessel use and carriage of heavy-grade fuel oil in the Arctic. (NOAA, DOS, DOJ, USCG; 2013)

Action 2: Observe and forecast Arctic sea ice.

Sea ice forecasting is one of the most urgent and timely ocean issues in the Arctic region. Continued rapid loss of sea ice will be a major driver of changes throughout the Arctic. Polar regions, although physically remote from major population centers, have profound significance for the global climate. They act not only as regulators of global temperature, but also as barometers of change. The loss of sea ice affects marine access, regional weather, global climate, marine and terrestrial ecosystems, and coastal communities. For example, a better

understanding of how loss of sea ice in the Bering Sea, the largest commercial fishery in the United States, will influence the entire marine ecosystem is of critical importance.

All-season observations from spaceborne and airborne platforms, ships and ice camps, and instruments on and under Arctic sea ice provide short-term information on ice conditions for tactical users. Such observations also support research into understanding Arctic processes and environmental variability and in improving forecasts, predictions, and projections. This action will improve daily to weekly sea ice models and provide forecasts and new seasonal predictions in formats that are amenable to a wide variety of government agencies and regional users.

Outcomes

Improved sea ice maps, analyses, and forecasts will support the management of protected marine resources, community and subsistence activities, homeland and national security, and safe ship operation and navigation through Arctic waters. It will also provide the information needed to forecast changes in the composition of three Large Marine Ecosystems (LMEs) that make up the U.S. Arctic.

Agencies: NOAA, DOD, USCG

Milestones

- Initiate international activity to improve sea ice forecasting through generalization of buoy/mooring data from a single point to a broader area and satellite data calibration using this buoy/mooring data. (NOAA, DOD; 2012)
- Initiate a study of the marginal ice zone to better measure the rate of sea ice melt and regrowth. (NOAA, DOD; 2012)
- Initiate data cataloging to improve and update the existing U.S. Arctic Sea Ice Atlas. (NOAA; 2012)
- Train and expand Volunteer Observing Ship and coastal community participation in the sea ice observation program, and catalog user requirements for sea ice products, services, and delivery. (NOAA; 2012)
- Deliver tactical-scale sea ice analysis and forecasts in GIS-enabled broad-scale format to meet USCG requirements. (NOAA, DOD, USCG; 2012)
- Deliver tactical-scale sea ice analysis and forecasts in formats that meet additional user requirements. (NOAA, DOD; 2014)

- Develop better maps of the ice edge, and make field data available early enough in the year to be useful for seasonal ice forecasts (NASA, 2013).

Action 3: Implement a distributed biological observatory.

Changes in location and timing of the seasonal ice edge can have profound effects on benthic and pelagic marine ecology and human activity. These changes affect the distribution and abundance of baleen whales, and the ability of ice-dependent marine mammals to reproduce and rear young on ice. Likewise, stranding of ice-dependent species on land reduces their likelihood of survival or reproductive rate, and may make the animals less available to subsistence hunters. The effects of these changes on Arctic ecosystems and Alaska Natives who depend on these species are poorly understood.

Continued observations are needed to form the basis of understanding the changing processes in the Arctic region. A distributed biological observatory (DBO) is one distinct component of the integrated Arctic Observing Network. A distributed biological observatory will improve our understanding of how changes in climate and the Arctic ecosystem will affect subsistence cultures in the region. New collaborations and partnerships will increase our capacity to monitor and assess changing environmental conditions. In addition, all participating agencies will be better able to determine and mitigate the effects of their decisions on marine resources, resulting in improved conservation, protection, and management of Arctic coastal and ocean resources.

Outcomes

A distributed biological observatory will help experts track and understand changing environmental conditions in the Arctic.

Agencies: NOAA, USFWS

Milestones

- Conduct and coordinate multi-year DBO research cruises with Federal, State, and international partners to document change in distribution, abundance, biomass, species composition, and rates of primary production at two of five stations along the DBO latitudinal gradient. (NOAA; 2012)
- Review pilot DBO activities and plan upcoming cruises in collaboration with international partners via Pacific Arctic Group meetings. (NOAA; 2012)
- Complete pilot phase analysis and prepare international report on distributed biological observatory activities and results to date. (NOAA; 2013)
- Update DBO concept and Implementation Plan for longer-term implementation. (NOAA, USFWS; 2014)
- Execute DBO plans and prepare annual assessments on physical and ecological state of Pacific Arctic marine environment. (NOAA, USFWS; 2015)

Action 4: Enhance communication systems in the Arctic.

Communications are essential to implementing the Arctic priorities in the National Ocean Policy and the overarching U.S. Arctic Region Policy. Early warning and emergency response systems would improve our ability to assess the timing and nature of emerging events in the Arctic region, such as environmental disasters, and will improve responses to them.

The Federal Government will advance two aspects of communications: technical capabilities and outreach. On the technical side, the Federal Government will strengthen existing communication systems to allow vessels, aircraft, and other users to effectively communicate with each other and to receive information (e.g., real-time weather and sea ice forecasts) that will significantly decrease the risk of environmental damage and loss of life and property at sea. On the outreach side, special emphasis will be placed on communications with native communities. This is in addition to enhancing the technical capabilities in these areas. The enhancements described here will build upon and support the guidelines and responsibilities in the Arctic Search and Rescue Agreement, to which the United States is a signatory.

Outcomes

A stronger communications infrastructure will improve our capability to prevent and respond to environmental disasters and maritime incidents, which will reduce loss of life or loss or damage to property at sea.

Agencies: DOD, USCG, DOT, NOAA, USAF

Milestones

- Complete inventory of existing DHS, DOD and partner communication capabilities in the Arctic region. (DOD, USCG; 2012)
- Coordinate and integrate common assets for voice/data and distress communications. (DOD, USCG, DOT; 2012)
- Incorporate the inventory above into GIS-based decision-support tools for planning, preparedness, and response such as Arctic ERMA®. (NOAA, 2013)
- Establish and strengthen at least one partnership each with industry (e.g., oil companies, ship operators), other governments (e.g., Canada, Russia, Norway), and Alaska native organizations to build on existing and new communications solutions and capabilities, such as the Canadian Space Agency Polar Communication and Weather Mission. (DOD, USCG, NOAA; 2012)
- Establish baseline of the performance capabilities of mid-frequency (MF), high-frequency (HF), very high-frequency (VHF), and ultra high-frequency (UHF) communications systems to air and surface vessels in the Arctic. (USAF; 2012)

- Establish baseline of the performance of air-, surface-, and available shore-based sensors. (USAF; 2013)
- Identify, analyze, rank, and implement the most cost-effective options to reduce communication gaps and boost Federal capabilities in the Arctic Operational Region, commensurate with available resources and user needs. (DOD, USCG, NOAA; 2014)

Action 5: Advance Arctic mapping and charting.

Maps and charts are central to our understanding of the Arctic region, and they are essential for effective stewardship of this rapidly evolving environment. Knowledge of Arctic marine ecosystems, marine transportation, Arctic sovereignty and governance, and climate change adaptation strategies that coastal communities must develop to sustain their cultures and traditions all fundamentally rely on maps to visualize and depict critical aspects of the operating environment.

While ocean and coastal mapping in general is part of the *Observations, Mapping, and Infrastructure* priority objective in this draft Implementation Plan, this action will support the unique needs for accurate hydrographic surveys and shoreline mapping essential to modernizing nautical charts of U.S. Arctic waters and the Alaskan coastline. The action will enhance maritime commerce and help coastal communities develop adaptation strategies and disaster preparedness plans. It will increase the effectiveness of decisions regarding permitting, future ecosystem studies, and environmental stewardship. Mapping also supports biological habitat characterizations for ecosystem stewardship and restoration, development of storm readiness adaptation strategies for coastal communities facing the impacts of climate change, and emergency preparedness and response tools such as Arctic ERMA®.

Outcomes

Advanced mapping and charting will improve navigation and reduce the risk of maritime incidents, loss of life, and environmental damage.

Agencies: NOAA, IC-OCM, DOD, DOS, USGS, USCG, CMTS

Milestones

- Establish mapping guidelines, standards, vessel of opportunity protocols, and standard operating procedures to facilitate integrated ocean and coastal mapping and acquisition of Arctic hydrographic, shoreline, habitat mapping, and water column data in the Bering, Chukchi, and Beaufort Seas. (NOAA, IC-OCM, DOD; 2013)
- Prepare the material that could support a U.S. submission on Extended Continental Shelf delimitation. (NOAA, DOJ, DOS, USGS; 2015)

- Archive a minimum of 1 terabyte of Arctic physical and biological mapping data annually at national data centers to facilitate additional uses and scientific study. (NOAA; 2012)
- Update nautical charts, environmental sensitivity indices, and other Arctic feature maps with mapping data acquired during annual field seasons. (NOAA; 2012)
- Refine, in collaboration with stakeholders, a priority list of Arctic maritime regions and shorelines for surveying. (NOAA, USGS; 2012)
- Conduct coordinated interagency ocean and coastal mapping operations and incorporate results into the Ocean and Coastal Mapping Inventory. (IC-OCM, NOAA; 2013)
- Conduct Waterway Analysis and Management System (WAMS) assessments and Port Access Route Studies (PARS) of the Arctic region, beginning with ongoing PARS for the Bering Strait, and focusing on other areas indicated by risk/return analysis, to support decisions on mapping and charting priorities and waterways management. (USCG; 2013)
- Complete electronic navigational chart coverage as agreed to by the Arctic Regional Hydrographic Commission. (NOAA; 2013)
- Advance appropriate tidal or hydrodynamic models, and datum transformation tools to foster accurate and efficient Arctic surveys. (NOAA; 2013)
- Conduct airborne gravity data collection over the State of Alaska to help correct meters-level errors in Arctic positioning. (NOAA; 2013, (over the Aleutians, 2019))

GAPS AND NEEDS IN SCIENCE AND TECHNOLOGY

In the Arctic, research is needed to describe ecosystem changes and impacts from ocean acidification, sea ice retreat, increased use of land, human disturbance, and food web dynamics. In the area of communications, current capabilities restrict effective operation and management in the unique Arctic environment, particularly to support safe maritime operations. Also critically needed are real-time monitoring and measurements of atmosphere, ice, and ocean variables that control sea ice movement, melt, and growth, as well as the foundational geospatial infrastructure upon which to base operational and scientific decisions. Improved applications of remote sensing and buoy/mooring data collection technology are needed for sea ice characteristics and related scientific variables—including new real-time *in situ* observational technologies. Research, development, and testing of oil spill response and containment in Arctic conditions is another area in need of attention. All involved agencies and officials must understand the assets and capabilities in the U.S. Arctic in the event of an oil spill or other emergency.

In addition to this section on Coastal and Marine Spatial Planning, there will be a supporting Handbook to assist regions as they implement the framework for effective CMSP. This priority objective identifies national CMSP objectives, specific actions, and milestones to support implementation of CMSP on the regional level.

Coastal and Marine Spatial Planning

Implement comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management in the United States.

Americans treasure the ocean, our coasts, and the Great Lakes as sources of food, income, energy, and security, and as places to recreate and connect with our cultural history. However, our uses of the ocean are expanding, and it is becoming increasingly challenging to effectively coordinate sometimes competing uses through traditional management approaches that historically were designed to manage single activities and sectors independent of other objectives. Today there is a need to consider human uses through a broader lens that more accurately reflects the connectivity and diversity of marine resources. To that end, an ecosystem-based approach to management is required, and an effective way to advance such an approach is through CMSP.

The national framework for effective CMSP assumes increased coordination and collaboration across the Federal Government, leading to a more efficient, streamlined, and predictable decision-making process on activities in the ocean, coasts, and Great Lakes. CMSP is an important tool to meet today's challenges by empowering coastal communities through a public planning process to use integrated data and information to make decisions about ongoing and emerging activities in their ocean and coastal regions. CMSP is a tool for looking across the full spectrum ocean, coastal, and Great Lakes activities and for using the best available science and information to identify specific areas that can simultaneously sustain desired activities and the ecosystem services they require. Through this open and transparent science-based participatory process, industry, government, and citizens can work together to evaluate broad categories of current and emerging ocean uses, such as renewable energy and aquaculture, and to consider how those uses might be most appropriately pursued.

Benefits of State and Tribal participation in the CMSP process

- Encourage and inform the Federal Government to better manage resources or address processes that transcend jurisdictional boundaries
- Define local and regional objectives and develop and implement CMSP in a way that is meaningful to regionally specific concerns
- Leverage, strengthen, and magnify local planning objectives through integration with regional and national planning efforts
- Proactively address concerns over proposed activities impacting State and Tribal interests and minimize use conflicts before they escalate
- Leverage support from the Federal Government to build CMSP capacity, access CMSP data, and acquire scientific, technical, and financial assistance
- Access data through CMSP portals and use science tools developed, established, and maintained for CMSP efforts
- Improve intergovernmental decision-making
- Achieve regulatory efficiencies, reduction in administrative delays, and cost savings

For CMSP purposes, the United States is geographically subdivided into nine regional planning areas based on recognized LMEs and the Great Lakes (with modifications as necessary to ensure inclusion of the entire U.S. EEZ and Continental Shelf and to allow for consistency with existing regional ocean governance bodies). This geographic scope may include inland bays and estuaries, and excludes privately owned lands as defined by law. Each region may also decide to consider inland areas in the planning area. Each of the nine planning regions may decide whether one coastal and marine spatial plan (CMS Plan) for the whole region can meet the regional objectives for the process, or whether a sub-regional approach may better suit regional needs.

The NOC will work with the States and Federally-recognized Tribes, including Alaska Native Villages, to create nine regional planning bodies—coinciding with the nine regional planning areas—for the development of regional CMS Plans. The membership of each regional planning body will consist of Federal, State, and Tribal authorities relevant to CMSP for that region (e.g., resource management [including coastal zone management and fisheries management], science, homeland and national security, transportation, and public health). Members will be of an appropriate level of responsibility within their respective governing body to be able to make decisions and commitments throughout the process. Each regional planning body will identify Federal and non-Federal co-leads. Appropriate State and Tribal representation will be determined by applicable States and Tribes.

A core component of CMSP is integrating ocean and coastal data and developing innovative visualization and other decision support tools. Providing access to data for transparent, science-based decision-making will translate to businesses and all stakeholders knowing what information government agencies have, and being able to use it without having to spend time and money searching for it. Today, when an industry proposes a coastal or ocean activity, the information needed to obtain permits or to determine the most suitable placement is often hard to find or is fragmented. The National Ocean Policy calls

for the creation of an information management system and portal to provide public access to those data and information in support of coordinated planning. The prototype portal, www.ocean.data.gov, is designed to provide streamlined access to the full suite of data needed for transparent and science-based collaborative planning. Relevant visualization and analytical tools to support the planning process will also be provided through the portal. The public is invited to provide feedback and suggestions through a forums page, and the NOC will further develop and expand the portal based upon the feedback received. While only Federal data will initially be accessible through the portal, users of the portal will eventually be able to discover and access both Federal and non-Federal data to combine for their own needs.

This priority objective differs from the other eight in this draft Implementation Plan because it includes elements (e.g., national objectives) specifically identified in the CMSP Framework. The CMSP Framework describes the scope and elements of CMSP. Topics not covered in this draft Implementation Plan will be included in a CMSP handbook as discussed in Action 1 below.

NATIONAL OBJECTIVES AND ACTIONS

This draft Implementation Plan identifies the Council's two preliminary national objectives and five actions for the successful implementation of CMSP.

National Objectives

The national objectives afford the regional planning bodies maximum flexibility in developing regional objectives. These national objectives should serve as models for regions to develop their own regional objectives based on their unique circumstances. The two national objectives are based on and complement the national goals and guiding principles described in the CMSP Framework. Designed to tier off these goals and guiding principles, these national objectives are not a stand-alone list of objectives. Rather, the national objectives will help inform a regional planning body's participation in collaborative regional planning and the development of CMS Plans and subsequent Federal implementation.

National Objective 1: Preserve and enhance opportunities for sustainable ocean use through the promotion of regulatory efficiency, consistency, and transparency, as well as improved coordination across Federal agencies.

Efficient regulatory processes are essential to preserve and enhance sustainable use of the ocean, coasts, and Great Lakes. Sustainability in this context means compatibility of current and proposed ocean and coastal uses with the long-term maintenance of important ecosystem services, including other uses. Improving efficiency and coordination across Federal agencies and with States, Tribes, territories, and international partners, where appropriate, will help reduce

conflicts among user groups, promote compatible uses, illustrate the net benefits of alternative uses, ensure effective environmental protection, and minimize the burdens of regulatory processes on both agencies and ocean users.

Most Federal laws prescribe timeframes within which review and analysis of permitted activities must be completed. However, it is currently difficult to meet these timeframes, which often leads to increased scrutiny, legal filings, and even financial constraints for the industries seeking the permits as well as the responsible Federal, State, and local agencies. A well-designed and data-supported CMSP process can reduce these delays and reduce costs by pre-assessing areas where certain uses may be better suited; providing frameworks for compiling all the relevant environmental, economic, and social data and information; and identifying in advance those uses that might have synergistic relationships. Coordinated efforts for data integration as outlined above through ocean.data.gov will also provide efficiencies and consistencies, and should aid in the reduction of effort and time (by both Federal and private entities) required to support comprehensive determinations under NEPA and other Federal law. An example of how this approach could work—although for only a single type of activity rather than on a comprehensive basis as will occur under CMSP—is the Department of the Interior's "Smart from the Start" initiative for offshore renewable energy projects, which looks at existing uses and resources in the NEPA process.

This national objective will help meet the Administration's goal of creating more efficient Federal regulatory review. An overall reduction in delays and costs through CMSP allows for the mandates of environmental laws such as NEPA to be fulfilled more efficiently and should not be interpreted as weakening them or subverting their requirements in any way.

National Objective 2: Reduce cumulative impacts on environmentally sensitive resources and habitats in ocean, coastal, and Great Lakes waters.

A cumulative effect to sensitive ocean and coastal resources and habitats is that which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Properly accounting for cumulative effects can be challenging. The CMSP Framework allows for a comprehensive look at multiple sector demands, which would provide a more complete evaluation of cumulative effects.

Regional CMSP should strive to improve our ability to characterize the past, present, and, if possible, potential future conditions of an ecosystem spatially—*before* any particular new activity is implemented. Past conditions provide information on what ecosystem services we already may have lost, in order to maintain or restore natural ecosystems. As comprehensive integrated assessment tools and analytical methods (e.g., bioassessment, modeling) are developed and strengthened, so too will be the outputs of these efforts. Thus, this objective strives to provide tools and information that will improve the ability of decision-makers to

identify and define sensitive areas and habitats, identify opportunities to mitigate or completely avoid impacts to sensitive areas, identify areas where future activities would cause the least amount of negative impact, maximize sustainable and beneficial uses of the marine environment, and protect the integrity of marine and coastal ecosystems.

Actions

The following are specific actions to implement regional CMSP.

Action 1: Distribute a *Handbook for Regional Coastal and Marine Spatial Planning.*

The NOC is developing a *Handbook for Regional Coastal and Marine Spatial Planning* (Handbook) to assist regional planning bodies with the CMSP process. As called for in the CMSP Framework, the Handbook will provide further guidance and information intended to support the regional planning process, identify potential ways ocean.data.gov could enhance regional efforts, and provide more detailed information about visualization and analytical tools and their development to help compare proposed alternatives for future ocean uses. Engaging the public and stakeholders in the CMSP process is essential, and the Handbook will also provide relevant informational guidance, including how to comply with the Federal Advisory Committee Act (FACA). Such information will assist regional planning bodies in determining how best to engage with certain groups of scientific, technical, and other experts or establish regional advisory councils, as appropriate.

Agencies: NOC Office, Federal regional planning body co-leads

Milestones

- Provide the Interim Handbook to Federal agency regional planning body co-leads. (NOC Office; 2012)
- Concurrently post the Interim Handbook on the NOC website. (NOC Office; 2012)
- Finalize the Handbook and distribute to Federal agency regional planning body co-leads. (NOC Office; 2012)
- Circulate the Handbook among State and Tribal co-leads and regional planning body members. (Federal regional planning body co-leads; 2012)

Action 2: Convene regional workshops and CMSP exercises

In June 2011, the NOC brought together more than 500 Federal, Tribal, State, territorial, and local government representatives; indigenous community leaders; and stakeholders and members of the public from across the country for a National CMSP Workshop. This workshop allowed

the Federal Government to collaboratively identify key challenges, solutions, and strategies for regional CMSP, and respond to stakeholder priorities. Workshop participants emphasized the importance of science, evidence-based data, and traditional knowledge in the CMSP process; representation and coordination with existing local and regional entities; and the challenges associated with balancing the value of national consistency with the need for regional flexibility.

The National CMSP Workshop provided an overview of the CMSP process, presented an opportunity to bring together future CMSP practitioners from across the Nation, and helped set the stage for future locally focused regional workshops. Like the National CMSP Workshops, the regional workshops will have the following objectives:

- Develop and carry forward a shared understanding of regional CMSP and the development of CMS Plans.
- Build greater understanding of the value of regional CMSP in the United States.
- Identify key challenges, solutions, and collaborative strategies for regional CMSP, including next steps for developing the tools, resources, and guidance to implement regional CMSP.
- Engage the public and other stakeholders in a dedicated session that provides further opportunity to educate, listen to, and connect with the American people about CMSP.

Technology such as webinars and teleconferencing will be considered as low-cost mechanisms for engaging a large number of people in these workshops.

Agency: NOC Office, Federal regional planning body co-leads

Milestones

- Hold, in conjunction with regional, State, and Tribal partners, CMSP workshops and simulation exercise in four regions. (NOC Office, 2013)
- Hold, in conjunction with regional, State, and Tribal partners, CMSP workshops and simulation exercise in five additional regions. (NOC Office, 2014)

Action 3: By 2015, all of the applicable non-confidential and other non-classified Federal data identified for inclusion will be incorporated into a National Information Management System and Data Portal (ocean.data.gov).

The underpinning of the National Ocean Policy and its CMSP framework is science-based decision-making. While additional data are needed in some sectors or regions, the United States has a solid information foundation to begin CMSP. However, not all existing data are accessible or in a useable format for CMSP purposes. This action calls for integrating data across the Federal Government, as well as creating the opportunity to extend this approach to State, local, Tribal, and territorial governments and to industry, academia, and nongovernmental

organizations (NGOs). The ocean.data.gov portal provides open access to the National information management system called for in the National Ocean Policy. It not only targets the integration of diverse datasets, but also makes these data readily available to decision-makers, ocean users, stakeholders, and the public. These data will directly support the development of new and/or improved decision support tools critical to the CMSP process.

Agencies: NOC Interagency Information Management System and CMSP Data Portal Working Group, NOAA, USCG, DOD, DOI, EPA, DOE, USACE, NOC Office

Milestones

- Develop a prototype data portal and adoption of minimum data standards. (NOC Interagency Information Management System and CMSP Data Portal Working Group; 2011)
- Complete initial individual agency data plans for accessibility through ocean.data.gov. (NOAA, USCG, DOD, DOI, EPA, DOE, USACE; 2012)
- Identify and begin making available analytical decision support tools and visualization capabilities via ocean.data.gov. (NOAA, USCG, DOD, DOI, EPA, DOE, USACE; 2012)
- Implement data integration plans into the complete ocean.data.gov portal. (NOAA, USCG, DOD, DOI, EPA, DOE, USACE 2013)
- Integrate and synthesize the ecological, social, and economic data provided by Federal agencies and non-Federal partners for inclusion in ocean.data.gov. (All NOC agencies; 2013)
- Launch initial ocean.data.gov system and CMSP national portal. (NOC Office; 2015)

Action 4: Establish Regional Planning Bodies

As envisioned by the National Ocean Policy, nine regional planning bodies will bring together Federal, State, and Federally-recognized Tribal partners to engage in collaborative regional planning and develop regional CMS Plans to improve stewardship and streamline processes. The regional planning body structure acknowledges the sovereign status of Federally-recognized American Indian and Alaska Native Tribal Governments, preserves the principle of government-to-government consultation, recognizes the authorities and responsibilities delegated to the various Federal agencies by Congress, and improves intergovernmental processes. While membership on each regional planning body is currently reserved for Federal, State, and Tribal entities with authorities relevant to CMSP, the policy is explicit about the importance of stakeholder participation throughout the key steps of the process. To contribute to its success and scope, CMSP will also ensure coordination and collaboration with existing ROPs, engagement with stakeholders and the public, and consultation with scientific, technical, and other experts.

Agencies: Regional planning bodies

Milestones

- Phase 1: Establish a regional planning body in up to four of the nine regions, and complete initial regional steps as described in the CMSP framework. (Regional planning bodies; 2013)
- Phase 2: Establish regional planning bodies in the remaining five regions, and complete initial steps as described in the CMSP framework. (Regional planning bodies; 2015)

Action 5: Within 3 to 5 years of their establishment, nine regional planning bodies (i.e., one per region) will have developed Council-certified regional CMS Plans for the sustainable use and long-term protection of the ocean, our coasts, and the Great Lakes.

Regional planning bodies will implement CMSP leading to the development of CMS Plans appropriate for each region. Each region is unique in geographic scope, natural resources, cultural expectations and sensitivities, economic homeland and national security attributes, and existing structures and planning for environmental protection and resource management. This action is premised on the Council's recognition that development of CMS Plans will occur along different timelines among the regions—including differing timelines for establishing the regional planning bodies—with differing specific regional objectives consistent with the national goals and objectives for CMSP. Each region under the framework for CMSP has 3 to 5 years to develop and secure NOC certification of its initial CMS Plan.

Agencies: Regional planning bodies

Milestones

- Complete regional capacity assessments in at least four regions—beginning with Phase 1 areas—within 2 years of release of this draft Implementation Plan, identify initial regional steps, develop NOC-approved work plans, and initiate the CMSP process as described in the CMSP Framework. (Regional planning bodies; 2014)
- Complete regional capacity assessments in remaining Phase 2 regions within 4 years of release of this strategic action plan, identify initial regional steps, develop NOC-approved work plans, and initiate the CMSP process as described in the CMSP Framework. (Regional planning bodies; 2016)
- Complete initial regional CMS Plan and submit for NOC certification within 5 years of a regional planning body's establishment. (Regional planning bodies; 2019)

CONCLUSION

Since long before our Nation was founded, the ocean has been a source of nourishment, protection, employment, inspiration, and adventure. The National Ocean Policy responds to more than a decade of bipartisan discussions and was established to resolve a long-standing, well-recognized, and significant problem: the oceans, coasts, and Great Lakes are a crucial resource for America and they are in trouble. This Implementation Plan presents the initial actions Federal agencies will take to change how we conduct our work to realize the benefits that the National Ocean Policy will provide to our Nation by supporting our people, resources, economy, security, and opportunities.

We realize improvements must be centered on EBM to managing resources and uses. This approach considers all ecosystem inhabitants, processes, and impacts as a holistic unit rather than focusing on each in isolation. It recognizes humans and human activities as part of ecosystems. Making progress on this new management foundation is not something a single agency, or level of government, can do on its own. Nor is it something government can do on its own. But it will be done without creating new bureaucracy and without negative economic impacts, by improved incorporation and use of solid science, collaboration and efficiency in action, and a focus on regional issues and interests.

The actions for each of the priority objectives in this draft Implementation Plan were developed to meet high standards for ecosystem-

It is the policy of the United States to:

- Protect, maintain, and restore the health and biological diversity of ocean, coastal, and Great Lakes ecosystems and resources;
- Improve the resiliency of ocean, coastal, and Great Lakes ecosystems, communities, and economies;
- Bolster the conservation and sustainable uses of land in ways that will improve the health of ocean, coastal, and Great Lakes ecosystems;
- Use the best available science and knowledge to inform decisions affecting the ocean, our coasts, and the Great Lakes, and enhance humanity's capacity to understand, respond, and adapt to a changing global environment;
- Support sustainable, safe, secure, and productive access to and uses of the ocean, our coasts, and the Great Lakes;
- Respect and preserve our Nation's maritime heritage, including our social, cultural, recreational, and historical values;
- Exercise rights and jurisdiction and perform duties in accordance with applicable international law, including respect for and preservation of navigational rights and freedoms, which are essential for the global economy and international peace and security;
- Increase scientific understanding of ocean, coastal, and Great Lakes ecosystems as part of the global interconnected systems of air, land, ice, and water, including their relationships to humans and their activities;
- Improve our understanding and awareness of changing environmental conditions, trends, and their causes, and of human activities taking place in ocean, coastal, and Great Lakes waters; and
- Foster a public understanding of the value of the ocean, our coasts, and the Great Lakes to build a foundation for improved stewardship.

based management, sound data and information, efficiency in process, and coordinated effort. Through this draft Implementation Plan, Federal agencies will work together to take prioritized action to make a difference in the most pressing needs facing the ocean, our coasts, and the Great Lakes. Guided by the National Ocean Policy, the Federal Government will set out on a new science-driven, coordinated, efficient path to maximize the wise use of marine and Great Lakes environments, and the ecosystem services they provide. As we move ahead, we will regularly revisit this Plan and seek input from those who live and work on the ocean and along the coasts, as well as experts in science and traditional knowledge who know and understand these ecosystems and the communities they support. Simply put, the result of this draft Implementation Plan will be the environmental, economic, social, and cultural benefits that accrue from ecosystems and resources that are better managed.

This draft Implementation Plan presents what the Federal agencies will do to ensure healthy ocean, coasts, and Great Lakes now and for generations to come. But we also want it to serve as an open book for localities, States, Tribes, organizations, industry, and individual citizens to view and understand how and where the Federal agencies will focus their resources and attention. This draft Implementation Plan does not direct action beyond Federal efforts, but it is prefaced on the need for partnership and collaboration across the Nation at all levels to build *an America whose stewardship ensures that the ocean, our coasts, and the Great Lakes are healthy and resilient, safe and productive, and understood and treasured so as to promote the well-being, prosperity, and security of present and future generations*.

APPENDIX: PUBLIC COMMENTS ON DRAFT STRATEGIC ACTION PLAN OUTLINES

The National Ocean Council (NOC) released nine strategic action plan outlines for public review to provide an initial view as to how Federal agencies might address the priority objectives as described in the National Ocean Policy (Policy). The outlines, by design, were draft products that served as an early and valuable point in the plan development process for focusing public and stakeholder input.

During the public comment period June 2-July 2 2011, the NOC received over 400 contributions to the NOC web page from over 200 individuals and groups. In addition, about 1000 individuals and groups participated in and provided comments at 12 regional listening sessions.[2] The NOC agencies evaluated more than 850 specific comments from stakeholders and the public, many representing multiple submissions of very similar comments. The NOC considered all of the comments and accepted many of these, incorporating them into the draft Implementation Plan.

This Appendix summarizes the most substantive and frequent public comments and how they are addressed in this draft Implementation Plan. Reflecting the diversity of stakeholder input, this Appendix consolidates the comments and NOC responses under four themes, which the NOC used to guide the development of this draft Implementation Plan. These are: (1) adopt ecosystem-based management; (2) obtain, use, and share the best science and data; (3) promote efficiency and collaboration; and (4) strengthen regional efforts.

ADOPT ECOSYSTEM-BASED MANAGEMENT (EBM)

The public comments on EBM indicated broad support for this approach to management. Some mentioned that EBM has been used with success previously.

The Executive Order specifies that EBM is critical to how we govern and manage our ocean, coasts, and Great Lakes, and charges the Plan to address how it will be defined and implemented. In the draft Implementation Plan, the EBM section (pp. 9-17) focuses on actions that will provide the collaboration and science frameworks, training and education, and best practices for implementing EBM. In addition, actions to support EBM or apply it to specific regional efforts are included throughout the draft Plan.

[2] Washington, DC; Barrow, AK; Anchorage, AK; Chicago, IL; Jacksonville, FL; Honolulu, HI; Exeter, NH; Galveston, TX; Ocean Shores, WA; San Francisco, CA; West Long Branch, NJ; Portland, OR

Many comments pointed out the need for a clear and consistent definition for EBM that will be incorporated into management decisions, including project planning, policies, and programs.

The Final Recommendations of the Interagency Ocean Policy Task Force called upon the NOC to define EBM as it develops strategic action plans (now the draft Implementation Plan). The NOP started with MacLeod et al. (2005), which defined EBM as "an integrated approach to resource management that considers the entire ecosystem, including humans", and noted that the goal of EBM is "to maintain an ecosystem in a healthy, productive, and resilient condition so that it can provide the services humans want and need". The NOC built upon this definition, and its accompanying list of elements and characteristics, with modifications that reflect the views of multiple Federal agencies as they address implementation of EBM. The resulting definition is on pages 10-11 of the Plan.

Several comments suggested that potential actions to address the EBM priority objective should focus on the important beginning steps that will lead to EBM forming the foundation for management decisions regarding the ocean, our coasts, and Great Lakes. However, this must be based on good science and scientific information that is transparent to all participants and interested parties, and communicated to all levels of government and to all stakeholders and users.

Strategic use of EBM as an approach to implementing the NOP and science-based planning and decision-making is an incremental process. The Ecosystem-based Management section of the draft Plan describes actions establishing frameworks for the science to support EBM and for Federal collaboration. Other actions provide training and the conduct of EBM pilot projects. These are important initial steps toward implementing EBM nationally. Action 3 in the Inform Decisions and Improve Understanding section (pp. 21-22) supports EBM through robust science, information, and decision-support tools. Other actions throughout the draft Implementation Plan will apply these frameworks and tools to implement EBM regionally.

EBM should rely on science-based decision-support tools, including but not limited to CMSP, so that CMSP is not a goal, but a process to help inform and implement EBM.

The draft Plan clarifies that CMSP is an important EBM tool that provides transparent information about ocean use, relies upon significant public and stakeholder participation, and will inform management decisions affecting the ocean, coasts, and Great Lakes. It creates an inclusive, bottom-up, regionally-driven planning approach that gives Federal agencies, States, Tribes, and regions the ability to make informed decisions about how best to use ocean and coastal resources. The regional CMSP process will build upon and expand, as appropriate, successful regional efforts.

Some comments recommended that EBM should be included in non-Federal planning and regulatory frameworks for coastal development.

Action 3 in the Ecosystem-based Management section (pp. 15-16) will make training on EBM principles, best practices, and decision-support tools available to State, Tribal, and local government officials.

A range of comments was received concerning the use of the precautionary approach. Many comments supported its adoption while others were concerned it would restrict ongoing or future activities.

One of the Policy's guiding stewardship principles provides that decision-making will be guided by a precautionary approach as reflected in the Rio Declaration of 1992, which states in pertinent part, "[w]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" The United States has long taken the position that precaution is a tool or approach rather than a "principle," given the lack of a single definition or agreed formulation and the differing implications of its various forms. However, it is clear that the precautionary approach does not mandate action or prohibit activities. Application of a precautionary approach as so defined is consistent with the EBM approach and essential for improved stewardship.

Some comments expressed concern that potential changes in legislation to incorporate EBM principles into policy and governance are premature without a shared understanding of its meaning and application. EBM efforts should consider broader science-based authorities and regulations of marine resources, in addition to broader consideration of information and interactions.

As described above, the Plan provides a definition of EBM for the purposes of implementing the NOP. Any recommendations to seek changes to existing statutory or regulatory authorities–as part of any priority objective – would only be made based upon the experiences of those agencies charged with implementing the Policy. No such changes are mandated by the Policy and it would be premature to suggest any such changes at this juncture. The draft Implementation Plan calls for the NOC Legal Working Group to further analyze these efforts in Action 3 in the Coordinate and Support section (pp. 38-39).

OBTAIN, USE, AND SHARE THE BEST SCIENCE AND DATA

Many comments emphasized the great value of and need for the best data, science, analyses, information, and tools to guide managers and policymakers in evaluating trade-offs and decision support. The Implementation Plan should include actions that focus on better-informed decisions through improvements on the linkage between science and management actions.

The Policy places a great emphasis on increasing our scientific understanding. Under the Policy, a fundamental stewardship principle guiding U.S. management decisions and actions affecting the ocean, our coasts, and the Great Lakes is that such decisions will be informed by and consistent with the best available science. Accordingly, numerous actions, milestones, and national objectives set forth throughout the draft Implementation Plan have the specific intent to foster, strengthen, and improve the linkage between science and management actions. Further, the Inform Decisions and Improve Understanding section (pp. 18-25) of the draft Plan outlines actions to sustain and expand the science framework to provide knowledge for improved decision-making and an informed society and workforce.

One key to successful implementation of the Policy is to determine the critical science questions that can best inform decisions about emerging and future uses of the ocean, and to focus limited resources on understanding and addressing them.

Action 2 in the Inform Decisions and Improve Understanding section (pp. 20-21) focuses on providing the science to support emerging uses of the ocean and Great Lakes, which will increase opportunities for sustainable economic development and new jobs.

Many comments emphasized the great need for science-based data, information, and tools to implement the NOP. The foundation for better stewardship must include accurate and timely data and information about the environment and human activities. Active and continuous observations are necessary to obtain these.

Actions in the Observations, Mapping, and Infrastructure section (pp. 26-34) address the national need for maintaining and modernizing observing systems, and collecting and delivering data to better support decisions. The Changing Conditions in the Arctic section (pp. 75-84) includes actions to meet the specific observing and data requirements of the Arctic region. These are linked with actions from the Inform Decisions and Improve Understanding section (pp. 18-25) to ensure data and information meet high scientific standards and inform models, assessments, and decisions.

Data and information are a high priority for most stakeholder groups, as well as resource managers. Comments from a broad range of sectors expect actions in the Implementation Plan to make Federal data readily available, maintain existing observations and product sources, and provide new data that regions and stakeholders need. Socio-economic and traditional knowledge data and information should be made available and used in addition. Standards for including non-governmental and industry data need to be identified. A number of comments called for a national data and information management system.

Providing natural and socio-economic data and information to support management and business decisions is a high priority in implementing the Policy. A national integrated information management system is an essential component of the infrastructure that supports

the NOP. The NOC has established a prototype national information management system and portal (ocean.data.gov) as a mechanism to more easily discover and access Federal data and information for use in regional planning. Action 7 in the Observations, Monitoring, and Infrastructure section (pp. 33-34) will develop an integrated data collection, processing, and management system. Data and information will be provided through other actions in the draft Plan. Action 3 in the Coastal and Marine Spatial Planning section (pp. 90-91) provides that by 2015 all of the applicable non-confidential and other non-classified Federal data identified for inclusion will be incorporated into a national information management system and data portal (ocean.data.gov).

Several comments urged the development and application of new, efficient, low-cost technologies to assess environmental change across a broad range of spatial and temporal scales, and keep the nation in the forefront of ocean science and technology.

Modern observing systems are essential to ocean research and management. Cost-effective and advanced technology sensors and platforms are addressed in the Observations, Monitoring, and Infrastructure section. Actions 2 and 3 (pp. 27-29) focus on developing, testing, and deploying new observing and sampling technologies.

A number of comments highlighted the importance of improved seafloor mapping and bathymetry.

Coordinating ocean and coastal mapping efforts, improving access to mapping data, and upgrading mapping capabilities and products are the focus of Actions 5 and 6 in the Observations, Monitoring, and Infrastructure section (p. 31-33).

PROMOTE EFFICIENCY AND COLLABORATION

Numerous comments from many sectors called for improved coordination among all levels of government, including with the international community. Federal support for these coordinating activities should be the focus of actions in this Implementation Plan. All levels of government must participate in coordinating and planning, from local to Federal. Tribal governments should be consulted during these coordination efforts.

Improved coordination and increased efficiency are key elements throughout the draft Implementation Plan. The focus of the Coordinate and Support section (pp. 35-42) is to coordinate our response to ocean and coastal issues across jurisdictional boundaries and at all levels of governance. The actions are designed to strengthen and leverage partnerships and develop new partnerships. Federal agencies will support regional partnerships through grants, tools, resources, and other services. Agencies will consult with Tribal representatives on relevant activities.

The Implementation Plan should clearly define which Federal agencies will be responsible for which actions – both as lead and supporting agencies – and how collaboration between the agencies will be addressed. Lead agencies should be given clear guidance by the NOC on how to incorporate the implementation actions.

The draft Plan clearly identifies the Federal agencies responsible for accomplishing each action and milestone. Most milestones include multiple agencies who will work collaboratively to increase efficiencies, leverage resources, and improve the ability to achieve successful outcomes.

Several comments recommended that the Plan encourage the use of existing regulations and statutory authorities, and coordinate with them. It should include the promotion of uniform regulations.

The Policy emphasizes better coordination of existing authorities and does not impose new regulations. The NOC Legal Working Group will identify gaps, inconsistencies, and duplications in statutory authorities, policies, and regulation, and the NOC will work to reduce barriers to implementing the Policy, per Action 3 of the Coordinate and Support section (pp. 38-39).

Much is already known about how to solve problems using existing authorities; what is needed is action. A number of comments expressed concern that the strategic action plan outlines did not identify enough near-term actions. The Implementation Plan must include more concrete and immediate actions with specific timelines for which Federal agencies can be held accountable. More specificity to actions should be provided.

The draft Implementation Plan recognizes the need to include specific actions, with well-defined milestones, to establish Federal agency accountability. The draft Plan includes a better balance of near-term actions, to foster timely implementation of the National Ocean Policy. Milestones have been expanded and refined, and the NOC is also determining how to establish performance measures to track progress on actions.

Adaptability and flexibility should be built into the implementation of the Policy. The Implementation Plan should be adaptive to regional context and regulatory frameworks.

The Policy recognizes as a guiding stewardship principle the need for adaptive management in a coordinated and collaborative approach to respond to environmental, social, economic, and security challenges. The draft Implementation Plan adopts this approach through numerous actions, and affords flexibility in achieving these actions and milestones as conditions change, knowledge is updated, or new issues or uses emerge.

More efficient permitting was requested in some comments. Planning needs to ensure that the Federal permitting processes are well coordinated, grounded in standards that provide for changing conditions, and assure protection of the natural and built environments.

Action 5 of the Coordinate and Support section (pp. 40-41) will seek efficient, coordinated Federal permitting processes. It will consider ways to save applicants and permitting agencies time and money, and encourage economic investment without compromising public safety, health, and the environment.

Numerous comments called for the NOC to pick some priority areas to initiate projects. These comments recommended the use of pilot projects to develop realistic approaches to implementing the Policy, keep initial costs down, and determine approaches to maximize benefits-to-cost.

Action 4 in the Ecosystem-based Management section (pp 16-17) will identify and implement pilot projects to demonstrate the practicality of the EBM approach. Pilot projects are proposed elsewhere throughout the draft Plan.

Some comments advised that international coordination is required for many ocean, coastal, and Great Lakes issues, noting that some mechanisms for coordination are already in place and should be used.

The draft Implementation Plan recognizes the need for international coordination to address many ocean, coastal, and Great Lakes issues, and allows for Federal agencies to work through existing mechanisms as appropriate to achieve the best results. Actions in the Inform Decisions and Improve Understanding; Observations, Mapping, and Infrastructure; Adaptation to Climate Change and Ocean Acidification; and Changing Conditions in the Arctic sections highlight international connections.

Some comments recommended that the NOC develop a closer linkage between the actions to address the priority objectives.

This draft Implementation Plan builds upon the actions as proposed in the outlines submitted for public comment in June 2011 and, based on comments received, now reflects a more cohesive approach to addressing the nine priority objectives identified by the Policy.

STRENGTHEN REGIONAL EFFORTS

Many of the public comments focused on some aspect of regional coordination, planning, and implementation of the Policy. The Implementation Plan should support actions where Federal agencies work with States, Tribes, and regions. Actions should be

tailored to regional and local needs and priorities. Planning frameworks need to be national (providing for both horizontal integration across agencies, and vertical integration across levels of government), but adaptable to regional variations.

Throughout the draft Plan, the NOC places an emphasis on supporting regional activities and regionally-focused implementation, as appropriate, of the Policy. Five priority objectives include actions with a regional focus: Regional Ecosystem Protection and Restoration, Resiliency and Adaptation to Climate Change and Ocean Acidification, Water Quality and Sustainable Practices on Land, Changing Conditions in the Arctic, and Coastal and Marine Spatial Planning.

Many of the actions designed to address these priority objectives build upon the efforts of existing partnerships, priorities, and programs, and are adaptable to local, state, and regional needs. They also cut across the priority objectives to connect national frameworks for science, information management, or coordination, for example, to regional and local actions as varied as restoring coastal wetlands, reducing excess nutrients and sediment in local watersheds, developing climate adaptation strategies for vulnerable coastal communities, minimizing the impacts of harmful algal blooms, and observing and forecasting Arctic sea ice.

Actions need to explicitly include integration between Federal agencies and their partners. The Implementation Plan should encourage public/private partnerships and incentivize private-sector cooperation and investment. It should increase collaboration with outreach partners.

The draft Plan emphasizes the value of public-private partnerships in leveraging and incentivizing investments. Actions in the Coordinate and Support, Regional Ecosystem Protection and Restoration, and Water Quality and Sustainable Practices on Land sections promote opportunities for public-private partnerships and private investments.

Several comments recommended that the Implementation Plan should complement and build on regional activities and successes, existing programs, and pending actions, and not duplicate existing programs and processes. It should reinforce the implementation of existing regional or State management plans, rather than create new management systems. It should take full advantage of the existing resources, capabilities, and knowledge of the myriad organizations that play a role in the management of resources. The NOC should ensure that Federal agencies implement their activities to ensure increased and better coordination between and among these entities.

The draft Plan contemplates that Federal agencies will collaborate closely with existing Regional Ocean and Great Lakes Partnerships (ROPs) to apply the most successful approaches in those areas of greatest need. The nine regional planning bodies that will be established under the CMSP Framework provide for State and Tribal membership, and will

closely coordinate with existing ROPs. The CMSP Framework provides that the regional planning bodies will build upon the efforts of these existing partnerships. Essential steps of the CMSP require engagement with the public and stakeholders at key steps throughout the process, as well as consultation with scientific, technical, and other experts. The CMSP Handbook called for by Action 2 in the Coastal and Marine Spatial Planning section (pp. 89-90).

Several comments addressed the importance of partnerships between the NOC and States and Territories. Actions in the Implementation Plan should be developed and implemented in coordination with the States to ensure that Federal resources address States priorities. The development and implementation of Federal guidance, programs, and protocols should take into consideration existing State and Territorial priorities and protocols. ROPs can help identify the restoration projects of greatest concern in each region.

The Federal-State partnership is addressed directly or indirectly in actions for all priority objectives. Action 1 in the Coordinate and Support section (pp. 36-37) will support ROP priorities and facilitate access to information, training, and resources that meet ROP goals. State agency managers and decision-makers will benefit from the information, tools, strategies, and practices developed through actions in the Regional Ecosystem Protection and Restoration (pp. 43-53), and Water Quality and Sustainable Practices on Land (pp. 63-74) sections. The regional planning bodies established by Action 4 in the CMSP section (pp. 91-92) include States as members. In addition, CMSP National Objective 1 (pp. 87-88) notes the need to improve efficiency and coordination across Federal agencies and with States, Tribes, and others.

A number of comments emphasized the unique consultative relationship between the United States Government and the Tribal Governments, and the need for this to be reflected in the implementation of the Policy.

The draft Implementation Plan addresses the need to work with Tribes in a number of areas. For example, Action 6 in the Adaptation to Climate Change and Ocean Acidification section (pp. 61-62) calls for developing adaptation strategies in consultation with Tribes. Action 5 in the Water Quality and Sustainable Practices on Land section (pp. 70-71) addresses the need for enhancing contaminant monitoring and disease surveillance programs, ultimately producing a government-wide monitoring portfolio that links across States, Tribes, regions, and stakeholders. The regional planning bodies established in Action 4 in the CMSP section (pp. 91-92) include Tribes as members. In addition, CMSP National Objective 1 (pp. 87-88) notes the need to improve efficiency and coordination across Federal agencies and with States, Tribes, and others.

Some comments recommended scale-appropriate actions. Planning must initiate sub-regional development with full consideration of local impacts, empowering local coastal communities to care for and nurture the long-term well-being of the coast.

The draft Implementation Plan recognizes the importance of working at the local community level to provide resources, information, and projects for sound planning and decision-making. Actions in each of the priority objectives directly or indirectly address this need.

Several comments urged the NOC to work within the existing statutory framework, and to complement existing ocean and coastal resources management efforts.

As with the importance of engaging at the local level, the draft Implementation Plan recognizes the need to collaborate closely with existing ROPs to build upon existing programs, protocols, and successes, and to apply the most successful approaches in areas of greatest need, including interaction between the existing partnerships and the regional planning bodies that will be established under the CMSP Framework. Actions in each of the priority objectives directly or indirectly address this need.

Some comments recommended that the NOC incorporate the Policy and its guiding stewardship principles into agency procedures, rules, and guidance.

Federal agencies will implement the Policy consistent with existing legal authorities. Under Action 3 in the Coordinate and Support section (pp. 38-39), the NOC Legal Working Group will identify gaps, inconsistencies, and duplications in statutory authorities, policies, and regulation, and the NOC will work to reduce barriers to implementing the Policy.

Some comments endorsed the value of strict regional water quality and sustainable environmental waste management practices, and actions to promote them. A comprehensive approach is needed. Standards should be applied uniformly across similar industry activities.

Many of the regional comments refer to specific strategic action plan outlines submitted for public comment in June 2011, which were drafted to address specific priority objectives. Some of these objectives are addressed with a combination of national actions to develop the processes and tools to meet them, and regional activities that will apply those processes and tools on the ground and in the water.

A number of programs exist at various levels to address water quality and pollution. The draft Implementation Plan includes actions to coordinate, through existing regulatory and non-regulatory measures, protection and restoration efforts on land and in coastal areas that will enhance water quality. Actions in the Water Quality and Sustainable Practices on Land section (pp. 63-74) will develop consistent water quality standards, identify priority areas,

and support and implement projects between Federal, State, and local partners to improve and maintain healthy coastal watersheds.

Several comments called for science-based uniform standards for wastewater that are consistently and fairly applied. These standards should be based on the best available data, raise the standards for everybody, and not disadvantage local coastal communities.

Action 2 in the Water Quality and Sustainable Practices on Land (pp. 66-67) will enhance water quality in the ocean, along our coasts, and in the Great Lakes by reducing municipal wastewater and other urban sources of water pollution. A collaborative approach at the national level, along with targeted State, Tribal, and regional efforts, will apply national standards to reduce pollutant loadings during the near-term. Pilot projects will promote information sharing about reduction levels, improve water quality at the source and downstream, and increase economic activity in or near urban water bodies.

Several comments identified that reducing nutrients and sediment from regional land-based sources should be an area of focus. Increased monitoring is needed. Comments indicate trash debris, particularly plastics, is a major concern.

Actions 1 and 2 (pp. 65-67) in the Water Quality and Sustainable Practices on Land section address the major urban and rural sources of excessive nutrients and sediments, as well as toxics and pathogens. These actions will enhance water quality in priority watersheds through a collaborative national approach combined with targeted state and regional efforts. Action 6 (pp. 71-73) will increase research and monitoring of marine debris, to reduce its impacts through cooperative pollution prevention, reduction, and removal efforts.

Several comments requested action to strengthen coordination of environmental science, technology, and management of oil production and transportation to avoid unacceptable impacts on water quality and on environmental, wildlife, and human health.

The Federal government has a number of ongoing programs and regulations to prevent, prepare for, and mitigate oil spills. These are highlighted in the box on page 64. Agencies also coordinate with industry and international efforts. The Policy will help accelerate these programs and efforts nationally, foster greater cooperation, and help identify priorities.

Several comments focused on protecting and restoring ecosystem components on a regional level. An ecosystem protection and restoration plan developed by multi-stakeholders should be the basis for activity by the NOC. It should not place a disproportional burden on the viability of resource-based businesses and local coastal communities.

Actions in the Regional Ecosystem Protection and Restoration section address areas where improved coordination between Federal agencies and with non-Federal partners will enhance the effectiveness of conservation programs that will increase the success of these programs at the regional and local levels. Action 1 (p. 46) will institute collaborative partnerships to develop tools to identify land protection and restoration priorities for the Chesapeake Bay watershed, and make these tools available for other regions.

Several comments emphasized the need to build upon regional ecosystem projects that are underway across the country. The Implementation Plan should focus on sharing lessons learned, such as identifying successful restoration practices. In addition to existing coastal and Great Lakes activities, the Implementation Plan should identify ecologically important ocean areas for preservation or restoration. Some comments identified the importance of coastal ecosystems, particularly marshes, for carbon sequestration.

The draft Plan reflects the NOC's acknowledgement that there are many existing regional restoration and protection projects that support stewardship of the ocean, coasts, and Great Lakes, and their value to inform Federal programs. Action 2 in the Regional Ecosystem Protection and Restoration section (pp. 47-48) will enable Federal agencies to learn from and complement coastal wetland protection and restoration efforts in areas such as the Gulf of Mexico. Action 6 (pp. 51-52) will identify nationally significant ecologically and culturally areas in need of protection. Action 3 (pp. 48-49) focuses on carbon sequestration services provided by coastal habitats.

Several comments identified invasive species as an economic and environmental issue in many regions.

Action 5 in the Regional Ecosystem Protection and Restoration section (pp. 50-51) provides Federal activities to locate, control, and, where possible, eradicate invasive species in our nation's coastal and Great Lakes waters. This action is broader in scope than that proposed in the strategic action plan outline.

Several comments identified the rapidly changing conditions in the Arctic as warranting special focus on this region. Actions should improve forecasts of sea ice change to enable better planning for future human activities. Local coastal communities, which rely on the ocean, request research to improve understanding of the marine ecosystems and the changes that are occurring.

The draft Implementation Plan features a series of actions in the Changing Conditions in the Arctic section (pp. 75-84) that specifically address these comments. Actions strive to balance economic growth, community resilience, and environmental stewardship. Concern for the ability to respond to an unintentional release of oil is addressed through Action 1 on improving response management. Actions 2, 3, and 5 provide the observations and science to

improve understanding and support operations in the Arctic. Action 2 specifically addresses improving sea ice forecasts. These actions are linked with those in the Inform Decisions and Improve Understanding and Observations, Monitoring, and Infrastructure sections.

A number of comments asked for actions to address the full spectrum of activities necessary for resiliency and adaptation in the face of climate change and ocean acidification. These include forecasting impacts, integrating observations, delivering information, assessing vulnerability, developing and evaluating strategies, and implanting on the ground. It is important to define areas of high risk to climate change and to identify sentinel sites to monitor the effects of climate change. The Implementation Plan should recognize that resiliency and adaptation strategies will occur at the local level.

The draft Plan features a series of actions in the Resiliency and Adaptation to Climate Change and Ocean Acidification section (pp. 54-62) that specifically incorporate these comments. Actions 5 and 6 support the development and implementation of adaptation strategies that will allow vulnerable coastal communities to adapt and to increase the resilience of ecosystems, societies, and economies to climate change.

OTHER AREAS OF COMMENT

Several stakeholders recommended that the Implementation Plan should seek economic and environmental balance. This balance was not adequately emphasized in the strategic action plan outlines. The Policy must not create additional, unnecessary barriers to responsible development and use of natural resources. It should develop actions that allow managers to consider all consequences of a decision - economic, environmental, security, and social/cultural.

The Policy provides that Federal agencies will "ensure the protection, maintenance, and restoration of the health of ocean, coastal and Great Lakes ecosystems and resources, enhance the sustainability of ocean and coastal economies, preserve our maritime heritage, support sustainable uses and access, provide for adaptive management to enhance our understanding of and capacity to respond to climate change and ocean acidification, and coordinate with our national security and foreign policy interests". Through a number of actions, the draft Plan clarifies that effective stewardship of our ocean, coastal, and Great Lakes ecosystems is directly tied to a strong national economy, affecting multiple sectors and thousands of jobs in many ocean, coastal, and Great Lakes communities.

Many comments recognized the current fiscal climate and expressed concerns about funding programs or diverting resources from existing critical programs and activities. Regions and States need resources targeted to their priority areas.

The Policy provides a framework for the improved application of predominantly existing budget authorities across the entire portfolio of Federal ocean and coastal activities. The Implementation Plan will help agencies to structure their ocean and coastal activities to better complement those of other agencies. Action 4 in the Coordinate and Support section (pp. 39-40) will develop a cross-cutting analysis of the Federal ocean and coastal budget to make more efficient and economical use of limited financial resources. While we cannot speak to the details of the FY 2013 Budget at this time, agencies have been instructed to prioritize the Policy in their budgets, such as ocean.data.gov.

Several comments raised the importance of ocean education and literacy, including integrating ocean literacy into science education guidelines, and targeting K-12 or early childhood-adult age groups. What tools will the NOC provide the next generation of leaders in terms of education about the oceans and Great Lakes? Educating the public about the pressing issues facing our oceans is vital. Recognize the value of informal education programs in raising awareness, improving the public's abilities to assess risk and trade-offs, and to make informed and responsible decisions based. The NOC should increase collaboration with its aquarium and zoo partners.

Actions 5 and 6 in the Inform Decisions and Improve Understanding section (pp. 23-25) focus on developing a skilled workforce and increasing ocean and coastal literacy, respectively.

OTHER COMMENTS

A small subset of the public comments received were outside the scope of the draft Implementation Plan or would require changes to the Executive Order or to existing legal authorities, and therefore, are not addressed in the draft Implementation Plan.

Similarly, some of the public comments addressed the Framework for Coastal and Marine Spatial Planning. Action #3 in the Coastal and Marine Spatial Planning section (pp. 90-91) requires the NOC to develop a separate CMSP Handbook. This Handbook will provide further guidance, recommendations, and information intended to support the regional planning process, identify potential ways ocean.data.gov could enhance regional efforts, and provide more detailed information about visualization and analytical tools and their development to help compare proposed alternatives for future ocean uses. Engaging the public and stakeholders in the CMSP process is essential, and the Handbook will also provide relevant informational guidance, including how to comply with the Federal Advisory Committee Act (FACA). Such information will also assist regional planning bodies in determining how best to engage with certain groups of scientific, technical, and other experts or establish regional advisory councils, as appropriate.

While many of these comments will be addressed by the Handbook, the NOC has determined that the following comments warrant a response as they are tied to the development of the Handbook.

The planning process must bring everyone to the table through robust public and stakeholder participation. It must provide for significant input opportunities for regional, State and local stakeholders. The process should be regionally flexible.

CMSP is inherently a regionally-focused effort. The regional planning body would ensure there is frequent and regular stakeholder engagement throughout all phases of the CMSP process, including development, adoption, implementation, evaluation, and adaptive management phases. To better ensure all concerns and ideas are considered, stakeholder engagement should be emphasized with those most impacted (or potentially impacted) by the planning process.

Considerations should also be given to ensuring inclusion of underserved communities. Regions would establish an inclusive and transparent process for stakeholder participation (or, if applicable, utilize an existing process) that ensures engagement with a representative balance of major social, cultural, economic, environmental, recreational, human health, and security interests. The draft Implementation Plan provides for the development of a CMSP Handbook, which will recognize the need for maximum flexibility among the regions, and will provide specific suggestions and recommendations to regional planning bodies to maximize these engagement and outreach efforts.

Planning bodies should work with existing regional bodies and structures. There should be a mechanism to get input from industries and economic user sectors.

Per the CMSP Framework, an essential step in the CMSP process is the requirement to engage stakeholders and the public at key steps throughout the process. This necessarily includes industries and economic user sections. Further, recognizing that many of these same stakeholders have scientific, technical, and other knowledge relevant to the development of CMS Plans, the CMSP process also requires regional planning bodies to consult with scientific, technical, and other experts. The draft Implementation Plan provides for the development of a CMSP Handbook, which will provide specific suggestions and recommendations to maximize these engagement and consultation efforts, including establishment of regional advisory committees as provided for in the Executive Order.

The Administration should clarify that it will not be the purpose of Regional Planning Bodies to override the duties of regional fishery management councils.

The Executive Order expressly provides that Federal agencies will implement NOC-certified CMS Plans consistent with existing statutory authority, including the Magnuson-Stevens Act. Regional planning bodies will be established to develop these plans. They do not have any legal

authority or mandate that would override the statutory or regulatory duties of any existing entity, including Regional Fishery Management Councils.

Several commenters advocated that a formal role for non-governmental stakeholders is needed.

The CMSP Framework provides that the regional planning bodies are inherently intergovernmental bodies. The Framework, however, recognizes that substantial and meaningful public and stakeholder engagement is essential to the success of CMSP. Accordingly, essential elements of the CMSP process require engagement with the public and stakeholders throughout the CMSP process, and consultation with scientific, technical, and other experts. Each region has substantial flexibility in meeting these requirements, with options ranging from formal structures such as establishment of a Federal advisory committee (identified as Regional Advisory Committees in the Executive Order) to informal engagement mechanisms. Action 3 in the Costal and Marine Spatial Planning section (pp xx) calls for the development of a CMSP handbook, which will provide recommendations and guidance to regional planning bodies in meeting these requirements.

Appendix: List of Acronyms

ANSTF	Aquatic Nuisance Species Task Force
APG	Arctic Policy Group
ARC	Arctic Research Commission
ARPA	Arctic Research Policy Act of 1984
ARRT	Alaska Regional Response Team
BMP	Best management practice
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CDC	Centers for Disease Control and Prevention
CEQ	White House Council on Environmental Quality
CMECS	Coastal and Marine Ecological Classification Standards
CMSP	Coastal and Marine Spatial Planning
CWRP	Corporate Wetlands Restoration Partnership
DBO	Distributed Biological Observatory
DHS	Department of Homeland Security
DNI	Director of National Intelligence
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOJ	Department of Justice
DOL	Department of Labor
DOS	Department of State

DOT	Department of Transportation
DPC	Domestic Policy Council
EA	Environmental Assessment
EBM	Ecosystem-based management
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ERMA®	Environmental Response Management Application
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FACA	Federal Advisory Committee Act
FDA	U.S. Food and Drug Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FY	Fiscal Year
GHG	Greenhouse gas
GIS	Geographic Information System
GLRI	Great Lakes Restoration Initiative
GTS	Global Telecommunications System
HAB	Harmful algal bloom
HAPC	Habitat Area of Particular Concern
HEW	Health Early Warning
HF	High frequency
HHS	Department of Health and Human Services
HSPD	Homeland Security Presidential Directive

IARPC	Interagency Arctic Research Policy Committee
IC	Interagency Committee
ICCOPR	Interagency Coordination Committee on Oil Pollution Research
IC-OCM	Interagency Committee for Ocean and Coastal Mapping
IEA	Integrated Ecosystem Assessment
IMS	Information Management System
IOOC	Interagency Ocean Observation Committee
IOOS®	Integrated Ocean Observing System
IPC	Interagency Policy Committee
IWG	Interagency Working Group
IWG-FI	Interagency Working Group on Facilities and Infrastructure
IWG-OA	Interagency Working Group on Ocean Acidification
IWG-OSS	Interagency Working Group for Ocean Social Science
IWG-OE	Interagency Working Group on Ocean Education
JCS	Joint Chiefs of Staff
LCC	Landscape Conservation Cooperative
LME	Large Marine Ecosystem
LiDAR	Light Detection and Ranging
MARAD	Maritime Administration
MF	Medium frequency
MPA	Marine protected area
MRBI	Mississippi River Basin Healthy Watersheds Initiative
NASA	National Aeronautics and Space Administration
NEC	National Economic Council
NEPA	National Environmental Policy Act

NFHP	National Fish Habitat Partnership
NFWF	National Fish and Wildlife Foundation
NGO	Non-governmental organization
NISC	National Invasive Species Council
NOAA	National Oceanic and Atmospheric Administration
NOC	National Ocean Council
NOP	National Ocean Policy
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRTS&T	National Response Team Science and Technology Committee
NSF	National Science Foundation
NSPD	National Security Presidential Directives
NSS	National Security Staff
OA-IWG	Ocean Acidification Interagency Working Group
OCM	Ocean and Coastal Mapping
OHMSETT	National Oil Spill Response Research & Renewable Energy Test Facility
OOI	Ocean Observations Initiative
OMB	Office of Management and Budget
ORM- IPC	Ocean Resource Management Interagency Policy Committee
OST-IPC	Ocean Science and Technology Interagency Policy Committee
OSTP	White House Office of Science and Technology Policy
OVP	Office of the Vice President
PARS	Port Access Route Studies

PSP	Puget Sound Partnership
PCW	Polar Communication and Weather
PORTS	Physical Oceanographic Real-time System
ROPs	Regional ocean and Great Lakes partnerships
SCUBA	Self contained underwater breathing apparatus
SEL	Site Evaluation List
STEM	Science, Technology, Engineering, and Mathematics
TFUS	Task Force on Unmanned Systems
UHF	Ultra high frequency
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USCRTF	U.S. Coral Reef Task Force
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
VHF	Very high frequency
WAMS	Waterway Analysis and Management System