

## Ecosystem-Based Management Strategic Action Plan Full Content Outline

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

**Definition:** Ecosystem-Based Management (EBM) is an integrated approach to resource management that considers the entire ecosystem, including humans, and the elements that are integral to ecosystem functions. EBM is informed by science to conserve and protect our cultural and natural 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.

### I. Overview of Priority Objective: Ecosystem Based Management

- The National Ocean Policy recommended EBM as a foundational principle to promote more effective and sustainable stewardship of our Nation's oceans, coasts, and Great Lakes.
- The Strategic Action Plan (SAP) for EBM will enhance our Nation's efforts to understand, use, manage, and conserve our valuable coastal and marine ecosystems. This SAP will provide a conceptual framework for integrating the management of diverse human activities that are linked to or depend on coastal and marine resources (e.g., shipping, fishing, energy production, military operations, coastal development).
- EBM differs from current approaches that focus on single-sector management (i.e., a single species or type of activity) by considering the whole ecosystem, including humans. The foundation for sustaining the long-term capacity of these systems to deliver a range of ecosystem services depends on ensuring the health and function of ecosystems.
- EBM plans and strategies must incorporate the cumulative effects of multiple human activities and varying levels of those activities on entire ecosystems, and address explicitly approaches for assessing trade-offs among these activities with the goal of maintaining ecosystem health and services.

### II. Context and Continuity

- The EBM SAP outlined below is founded on four themes:
  - EBM Leadership and Collaboration - Establishes a framework across Federal and non-Federal agencies and organizations at multiple levels to guide the implementation of EBM at multiple scales; defines the criteria for selecting the initial geographic areas where EBM will be implemented; and identifies a plan to phase EBM implementation into additional areas. This theme will complement the Coordinate and Support SAP.
  - Interagency EBM Science Framework - Develops and implements a hypothesis-driven, nation-wide framework of integrated observations, monitoring, and research to provide a sound scientific basis for understanding ecosystems and informing management decisions.

- Inform Decision-making - Promotes the sharing of knowledge regarding EBM by communicating the principles, best practices, and decision-support tools among the partners involved in the decision-making process. This theme will be integrated with the Inform Decisions and Improve Understanding SAP.
- Policy and Governance - Identifies legislative and regulatory impediments to implementing EBM, and identifies actions to incorporate EBM cohesively into the environmental statutory and regulatory regime, project planning, and management strategies at the Federal, regional, state, territorial, tribal, and local levels. This theme will be integrated with the Inform Decisions and Improve Understanding SAP.

### III. Body of the Plan

#### A. Action 1- EBM Leadership and Collaboration.

A Federal interagency working group will: (1) develop and propose an explicit framework for working with regional, state, territorial, tribal, and local management entities; (2) ensure that Federal agencies integrate EBM approaches into their decision-making processes; (3) identify strategies to increase understanding of EBM within the federal workforce; and (4) serve as a forum that monitors the integration of ecosystem-based activities within Federal agencies.

##### 1. Why Do This

- This action will lay the foundation for more efficient and effective management of the oceans, coasts, and Great Lakes by promoting a common understanding of and competence in leading implementation of the EBM approach to: (a) eliminate duplication of effort across agencies; (b) inform management decision-making with the best available science and data about the diverse interests of partners and stakeholders; and (c) build capacity and promote cooperation and leveraging of data, resources, and tools across all levels of government (Federal, regional, state, tribal, territorial, and local) and between governments and diverse stakeholders, including industry, NGOs, and the general public.
- This action will ensure the assimilation of EBM and its principles as the improved way of doing business and promote stewardship of our Nation's coastal and ocean resources. It will incorporate lessons from and promote the exchange of information derived from Federal and non-Federal EBM models that successfully use collaborative, stakeholder-driven, place-based tools and approaches to address coastal and ocean management issues. Examples of those efforts include, but are not limited to, regional fisheries management (e.g., State of Alaska, NOAA), the National Estuary Program (EPA), Landscape Conservation Cooperatives (DOI, NOAA, and NGOs), and regional Governors' agreements. This action will build on those regional, state, tribal, territorial, and local models that apply EBM principles and build leadership and collaborative decision-making competence in additional places/regions.

## 2. Timeframe –Mid-term

### 3. Outcomes

- Increased application of EBM by Federal and non-Federal agencies and organizations at multiple levels to support collaborative strategic planning and priority-setting in selected geographic areas. Federal and non-Federal parties will: a) develop and align place-based goals and plans; b) involve multiple stakeholder interests; c) improve the coordination of activities; and d) increase leveraging of each others' resources in support of outcome-oriented EBM. They will begin to better integrate and consider regional and local economic activity and human uses as well as the cumulative impacts on ecosystems. They will utilize scenario building, coastal and marine spatial planning (CMSP) tools, and other available decision-support tools.
- Enhanced integration of capabilities and resources among Federal and non-Federal parties. All partners will participate in the information sharing and promotion of holistic EBM and adaptive management approaches. Implementation of this action will promote the development and exchange of sound, accessible, and best-available scientific and socio-economic data regarding the condition and health of ecosystems and will highlight the results of efforts to apply EBM concepts at the regional, state, tribal, territorial, and local level.
- Criteria for identifying priority areas for EBM implementation will be selected. Representation on the working group will include consideration of unique marine environments, natural resources and cultural sensitivities as well as tribes' cultures, traditions, economic livelihoods, and public health.
- Place-based pilot projects will utilize best practices and promote understanding of and information about how to effectively implement EBM principles and concepts.
- A process is established to implement collaborative approaches to resource management, using EBM to set strategic goals and objectives and more effectively manage ecosystems. These processes will build upon the existing frameworks in those regions where Governors' agreements are in place.
- Educating and training a cadre of decision-makers and managers at all levels in EBM principles and practices will begin. The training and education will include transferring lessons learned from those entities already engaged in ecosystem-based management of coastal and ocean resources. These decision-makers and managers will be competent in leading the adoption of EBM approaches and of adaptive management principles and concepts.
- Regional, tribal, territorial, state and local stakeholders and decision-makers will begin collaborating to identify shared goals as well as common and divergent interests in each geographic region. They will develop and adopt strategies for addressing priority needs.

- As the EBM SAP is implemented, gaps in the coordination processes among state, tribal, territorial, and local authorities and regional governance structures will be identified and efforts undertaken to begin addressing those gaps.
- Efforts will be undertaken to align agency-specific and cross-agency EBM goals and objectives with existing regulatory and statutory management requirements.

#### 4. Milestones

- Establish a joint interagency-regional EBM Working Group.
- Develop a course catalog of a recommended curriculum for developing competencies in leading the adoption of EBM and adaptive management approaches.
- Identify geographic priority areas for EBM implementation based on a clearly defined set of criteria determined through an interagency process.
- Establish criteria for identifying priority geographic areas to implement EBM in cooperation and consultation with Regional bodies and utilizing CMSP and other available tools.
- Compile and disseminate information depicting examples of EBM capacity, as well as resources and tools to further EBM implementation at all levels. Utilize local community partnerships and build on existing EBM networks to facilitate implementation.
- Complete agency-specific guidance that provides direction for using EBM to achieve management requirements with existing regulatory and legislative authorities.
- Decision-makers and managers complete the recommended EBM curriculum and share a common knowledge base of EBM concepts, principles, and practices. Key decision-makers and managers include individuals working in Federal coastal, ocean, and Great Lakes programs and their counterparts at the state, regional, tribal, territorial, and local level.
- Decision-makers and managers develop the skills to integrate technical and scientific knowledge into ecosystem-based approaches to management at a regional scale. This knowledge includes information and tools such as adequate scientific and socio-economic data and information, ecosystem modeling expertise, engagement of diverse stakeholders in collaborative processes designed to identify management priorities, and incorporating external, time-sensitive drivers of EBM (e.g., loss of critical Northeast groundfish, expansion of offshore energy development).
- Develop and implement model agreements (e.g., Memoranda of Agreement) to coordinate intergovernmental EBM implementation processes.

#### 5. Gaps and Needs in Science and Technology

- Report on the status of marine and coastal ecosystems at a relevant scale through ecosystem research, monitoring, and observations, including key indicators of stresses on those ecosystems.
- Leadership and governance capacity: lack of knowledge about EBM and adaptive management on the part of policymakers, decision-makers, and managers could be an obstacle to agencies' support for the development of leadership competencies in EBM and adaptive management.

## **B. Action 2 - EBM Science Framework.**

Establish an interagency EBM Science Framework of integrated research, observation, and monitoring capacity to improve understanding of ecosystem functions and the degree to which interactions among and within human and natural systems effects ecosystem health and services. This action will incorporate many of the actions of the Inform Decisions and Improve Understanding SAP into the EBM science framework.

EBM needs a science framework that will:

- Identify and facilitate the fundamental research needed to inform, implement, support, and advance EBM across the country.
- Emphasize the need to understand the basic physical, biological, ecological, and socio-economic aspects of marine and coastal ecosystems, to assess the more complex interactions, cumulative effects, and trade-offs required to maintain ecosystem health and services.
- Identify ecosystem services, describe hidden costs associated with human use of those services, assess trade-offs in benefits versus costs, avoid or reduce user and management conflicts, improve management outcomes, and promote sustainable use of ecosystems.
- Identify spatial extent of ecosystems, or boundaries, in terms of both management needs and the natural environment. Identify potential connections at multiple scales for ecosystems that connect across multiple jurisdictional boundaries, including international.
- Provide the scientific basis for managing people and their actions in a manner that sustains healthy, resilient ecosystems and ecosystem services. Among other things, this will require more effective alignment of the spatial characteristics of human activities with the environmental characteristics of marine ecosystems through marine spatial planning.
- Include all forms of scientific investigation, including short- and long-term observations, hypothesis testing, adaptive experimentation, and predictive modeling.
- Provide a range of science information tools and their appropriate application to the decision-making process. These tools can be broadly classified as modeling tools, decision analysis tools, and indicators of ecosystem status.

- Promote interdisciplinary research to understand the structure and function of marine ecosystems, including the complex interactions that shape them, rather than simply assessing their various components without regard to their role in ecosystems.
- Emphasize and enable applied research to address existing and anticipated management challenges, but also support basic research to promote scientific creativity and ingenuity.
- Utilize innovative technology (e.g., remote sensors) and field research programs, and build upon and complement existing Federal and non-Federal scientific programs.
- Leverage existing resources and capabilities from Federal and non-Federal agencies and organizations to provide stable and sustainable long-term financial support for EBM science framework.

## 1. Why Do This

An EBM approach depends on a strong scientific foundation that:

- Provides the physical, chemical, biological, ecological, and socio-economic data required to assess the linkages, interactions, interdependencies, and cumulative effects that are the metrics of ecosystem health, resilience, and productivity;
- Capitalizes on and complements the research capacity of Federal and non-Federal agencies and organizations at multiple levels;
- Elucidates benefits and costs associated with human activities within marine ecosystems;
- Centralizes research information to ensure that results are transparent, accessible, organized, and archived for future use;
- Promotes research targeted to specific regional ecosystems and sharing of information relevant to all regions and ecosystems;
- Utilizes targeted regional ecosystem projects to address specific knowledge gaps and inform place-based management needs;
- Develops new technology to enhance scientific and management efforts;
- Promotes a research-to-practice path for new technology; and
- Evaluates indicators of ecosystem health to provide the necessary assurance that our use of ecosystems is, in fact, sustainable.

## 2. Timeframe – Mid-term

## 3. Outcomes

- Establishment of a defined framework for guiding science, monitoring, and observations to inform and support EBM.
- Improved understanding of natural and human-related changes in ecosystems over time, as well as the implications of these changes for ecosystem and human health and for socio-economic well-being.
- Improved ability to forecast future conditions and outcomes.

- Establishment of a comprehensive repository of governmental, non-governmental and private sector data and resources (e.g., Marine Protected areas, NOAA stock assessments, Navy monitoring efforts).

#### 4. Milestones

- Establish interagency EBM Science Work Group; develop charters setting forth goals and objectives.
- Coordinate with Federal and non-Federal agencies and organizations at multiple levels to initiate development of the EBM science framework.
- Catalog and inventory existing governmental, non-governmental and private sector research, programs, and assets aimed at or related to EBM (e.g., Ocean Observing Systems), and identify (1) areas of unnecessary redundancy or overlap and (2) gaps in science related to EBM.
- Establish a comprehensive repository of governmental, non-governmental, and private sector data and resources management (e.g., Marine Protected areas, resource stock assessments, monitoring efforts).
- Identify, develop, and implement tools for the effective execution of EBM (e.g., Integrated Ecosystem Assessment (IEA) approach). The results will provide a basis for balancing those uses through spatially and temporally explicit marine spatial planning.
- Set up an adaptive management process for the next-generation of EBM, based on lessons learned in the first two years of implementation of data architectures and IEA processes.
- Conduct regular reviews of the initial EBM scientific framework, examining its strengths, shortcomings, and key research topics needed to promote more effective EBM. These review and recommendation processes would be coordinated with the Observations, Mapping, and Infrastructure SAP.

#### 5. Gaps and Needs in Science and Technology

- Identification of key indicators of ecosystem health and spatial areas of high or unique value.
- Identification of existing and emerging technology that enables scientists, decision-makers, and the public to more easily input, archive, access, share, analyze, visualize, and explain data and information, such as mapping and geospatial analysis tools. This will be done in coordination with CMSP and Inform Decisions and Improve Understanding SAPs.
- Continued development of 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.
- Facilitation of data access 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.
- Development and adoption of protocols or standards for ecosystem service accounting and the valuation of EBM-relevant nonmarket goods and services that are not represented in the current economic literature.

### **C. Action 3 - Inform Decision-Making to Support EBM.**

Develop and provide products and services to assist entities responsible for implementing EBM. Examples of products and services may include an interactive data portal, a synthesis and analysis of lessons learned from existing EBM initiatives, and an inventory of adaptive management approaches and tools. These products and services will enable Federal, state, territorial, tribal, regional, and local entities to share and discuss ecological, economic, social, physical, and other types of data and information that are needed to facilitate EBM and adaptive management approaches. This action will complement the actions of the Inform Decisions and Improve Understanding SAP.

#### 1. Why Do This

Science-based products and services to support EBM are needed to:

- Ensure that decision-makers have access to the best available science, tools, and data;
- Ensure that the decision-making process reflects the interests of multiple stakeholders at Federal, state, territorial, tribal, regional, and local levels;
- Enable managers and stakeholders to consider all types of ecosystem services and the impacts to these services that may arise under alternative scenarios;
- Enable managers and stakeholders to assess the trade-offs associated with alternative policies and to minimize the conflicts that arise over multiple ecosystem uses;
- Promote collaboration and innovation among agencies responsible for managing our oceans, coasts, and Great Lakes; and
- Promote better informed and improved decision-making that will enhance our capacity to understand, respond, and adapt to a changing environment.

#### 2. Timeframe – Mid-term

#### 3. Outcomes

- Improved ability to balance the competing demands on ecosystems via improved understanding of ecosystem services, function, and resilience, and the interactions and feedbacks between human and natural systems.
- Enhanced management of resources due to the ability to evaluate trade-offs inherent in different management scenarios.
- An enhanced outreach and education program is available to inform stakeholders of EBM goals and underlying management and science principles.

- Promote sharing of data among all EBM constituencies (i.e., at the Federal, state, regional, local, tribal, and territorial levels).
- Improved ability to minimize environmental risk with the use adoption of adaptive management approaches.
- Improved understanding of data and information required to fully adopt an ecosystem approach to management.
- Enhanced societal resiliency in response to environmental changes via understanding of environmental trends, and the causes and consequences of change.
- Improved public partnership and increased environmental awareness through an understanding of the role of humans in ecosystems, including feedbacks that affect livelihood, human health and well being, and quality of life.

#### 4. Milestones

- Complete inventory, analysis, and synthesis of “lessons learned,” EBM pilot projects, and adaptive management approaches and tools pertaining to oceans, coasts, and Great Lakes.
- Assess agency data and information holdings related to management of oceans, coasts, and Great Lakes, and the development of data listings.
- Develop and initiate the implementation of an outreach and education program to inform stakeholders of EBM goals and underlying management and science principles.
- Implement and complete two to three pilot studies using adaptive management decision-making tools in selected geographic areas.
- Prepare case studies and document results of the pilot studies.

#### 5. Gaps and Needs in Science and Technology

- Reasonable approximations (including a range) of uncertainty and/or the scientific confidence associated with management actions that are not currently available must be developed.
- Mechanisms to provide comprehensive information from science and research to better inform EBM decisions.

### **D. Action 4: Incorporate EBM Principles into Policy and Governance.**

Incorporate EBM principles into Federal, regional, state, territorial, tribal, and local project planning and environmental review processes to support rapid and effective implementation of EBM throughout our Nation’s marine and coastal ecosystems. This will be coordinated with the Coastal and Marine Spatial Planning (CMSP) SAP.

#### 1. Why Do This

- EBM needs to be incorporated cohesively into the environmental statutory and regulatory regime and project planning and review processes (e.g., National Environmental Policy Act, Endangered Species Act, Coastal Zone Management Act,

Magnuson-Stevens Fishery Conservation and Management Act) to ensure a more holistic ecosystem-based approach.

- Management that is based on and more fully integrates physical, biological, ecological, and socio-economic information is more likely to meet human-related objectives while promoting healthier, more resilient, and productive ocean, coastal, and Great Lakes environments.
- Maintaining the health, resilience, and productivity of marine ecosystems is essential if our Nation's use of those ecosystems is to be sustainable for future generations.
- Opportunity exists to incorporate EBM principles into the regulatory regime under the Executive priority to improve regulation and regulatory review, which directs agencies to conduct a retrospective analysis of existing significant regulations (see Executive Order 13563, January 18, 2011).

## 2. Timeframe – Mid-Term

### 3. Outcomes

- Federal, state, tribal, territorial, and local project planning and review processes will incorporate EBM principles.
- An EBM approach will promote better stewardship because it takes into account the interactions among all the components of an ecosystem, including human activities.
- An EBM approach will provide a framework for managing multiple types of human activities in ways that do not diminish substantially the essential characteristics of marine ecosystems or undermine their ability to provide vital ecosystem services.
- Impacts to ecosystem services and functions will be addressed explicitly through environmental risk analyses, permits, and authorizations under the National Environmental Policy Act and other relevant Federal environmental legislation.
- Federal agencies will work collaboratively with regional, state, territorial, tribal, and local agencies and organizations through the regional CMSP process and other means to promote efforts such as the national system of Marine Protected Areas, Migratory Bird Joint Ventures, Landscape Conservation Cooperatives, the Marine Intertidal Network, and other ecosystem-based activities to conserve habitats.
- Targeted statutory and regulatory changes may be made to address relevant deficiencies in law and policy when deemed necessary in order to advance EBM.

### 4. Milestones

- Fully incorporate EBM into Federal agency environmental planning and review processes.
- Incorporate EBM principles into efforts responsive to legislative and regulatory environmental mandates.
- Review environmental statutory and regulatory regimes to determine areas of conflict and opportunities for integrating multiple agency management objectives towards achieving EBM goals.

- Prepare risk analyses and monitoring and mitigation plans that enable EBM to promote regulatory efficiency, consistency, and transparency across multiple management objectives.
  - Issue model legislation and/or regulations.
5. Gaps and Needs in Science and Technology
- Mechanisms for increasing awareness and understanding regarding EBM.
  - Getting near-term buy-in/agreement from Federal agencies that EBM is an integral approach towards integrating a science framework into current management.

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