

## ARCTIC COUNCIL ECOSYSTEM-BASED MANAGEMENT EXPERTS GROUP

### INTERSESSIONAL REPORT: KNOWLEDGE AND PROCESS NEEDS FOR ARCTIC EBM

## INTRODUCTION

### **Recap of agreements from the first EBM experts meeting:**

The first meeting of the Arctic Council Ecosystem-based Management (EBM) Experts Group was hosted by the United States at the U.S. Department of the Interior headquarters in Washington, D.C on October 18-19, 2011. Evan Bloom, Director of the Office of Ocean and Polar Affairs, U.S. Department of State, Magnus Johannesson, Secretary General, Iceland Ministry for the Environment, and Dr. Mia Dahlstrom of the Swedish Agency for Marine and Water Management co-chaired the meeting, which included nearly two dozen participants from seven of the eight Arctic countries, three permanent participant groups, and representatives from the CAFF and PAME working groups.

At the conclusion of the two-day meeting, the participating delegations agreed that this effort represents a timely and much-needed convergence of EBM expertise to review the state of the art and best practices in Arctic EBM, and to recommend further Arctic EBM activities to the Arctic Council.

In addition to an intersessional effort to adapt existing EBM definitions and principles to pan-Arctic needs, the delegations agreed to support an intersessional effort to compile an analysis of high-level science and capacity needs for marine, coastal, and terrestrial EBM implementation across the Arctic. This paper represents the culmination of this latter intersessional effort, and will inform the Expert Group's articulation of guidelines and recommendations to the Senior Arctic Officials and Ministers prior to the 2013 Arctic Council Ministerial.

### **Scope of Knowledge, Information, and Tools Intersessional Effort**

For this intersessional work, the Experts Group agreed that:

- There is a need for an analysis of needs in knowledge, information, and tools for marine, coastal, and terrestrial EBM implementation across the Arctic.
- This analysis would be conducted remotely rather than in-person, and focus on specific and accessible EBM needs rather than broader science issues, and consider ways to improve coordination of existing Arctic Council and member-state activities for the purpose of EBM.
- Topics to consider include access to and use of socioeconomic and traditional knowledge; international capacity for monitoring, developing baseline data, and forecasting; tool and data sharing needs; and Arctic ecosystem services.

## **Context for Arctic Ecosystem-Based Management**

The rapid changes taking place in the Arctic pose unprecedented management challenges for Arctic nations as they endeavor to balance the many trade-offs associated with maintaining the sustainability of the natural, cultural, and economic resources of the region. In addition to the highly uncertain but accelerating impacts of climate change in the region such as loss of sea ice, coastal wave erosion, permafrost decline, changes in wildlife movement patterns and cycles, and altered vegetation patterns – managers also face ocean acidification, substantially increased interest in resource extraction and tourism, prolonged stress on critical social needs such as food security, increased traffic in the maritime environment, and disintegrating transportation infrastructure in the terrestrial environment.

In the face of these transformations, sector-based management strategies that focus on permitting activities and species-based management strategies that focus on protecting single populations or species are becoming increasingly untenable as stand-alone strategies – often leading to more frequent management conflicts and increased management rigidity. In the absence of some transparent means for balancing trade-offs and distributing risk, such processes are increasingly likely to lead to a loss of resilience or system stability in the face of rapid change. Unstable systems are less likely to be sustainable, are less reliable in terms of the many ecosystem services they provide, and will impair the efforts of nations and agencies to meet management responsibilities.

## **Describing Ecosystem-Based Management**

Ecosystem-based management offers a framework that allows for the distribution of risk – fairly striking compromises across distinct and sometimes conflicting values – when facing difficult decisions. EBM is not a set of conservation measures but rather an inclusive management framework for balancing competing priorities. Although EBM integrates commercial, sociological, subsistence, and ecological values, the ecosystem aspect is “first among equals” because ecosystem failure would compromise all other values or goals; hence the term “ecosystem-based”. The bottom-line of EBM is ecosystem sustainability, without which there is no means to assure sustainable economic or social systems.

While this intersessional effort was tasked with an analysis of the significant knowledge and tool needs for EBM in the Arctic, it was clear from the feedback we received on the initial outline that this effort would be incomplete without an assessment of both the knowledge and *process* needs of effective EBM in the Arctic.

Knowledge: EBM uses the best available scientific and traditional knowledge about a geographic area to identify key indicators of change and recommend actions that will help ensure the long-term health and resilience of ecosystems while achieving sustainable use of its goods

and services. An EBM approach will usually start with the identification of significant ecological areas and the variables that define them, and will often require some means for addressing uncertainty and the complex interactions that drive the system. For example, resilience assessment is an effective means for determining the thresholds, or tipping points, at which systems – be they ecological or social – are at risk of transformation to an uncertain future state. EBM does not rely on such knowledge “snapshots” alone; one of the most important principles of EBM is ensuring adequate monitoring protocols so managers can adjust practices if the results show that goals are not being met.

Process: In addition to knowledge-based resources, EBM implementation depends upon a structure or process for integrating and balancing trade-offs. No amount of science will balance our values and make our decisions for us, so it is important to establish an adaptive framework for this difficult task. The level of organization this requires will differ in every circumstance, but best practices call for a clear articulation of values from all stakeholders, a transparent means for balancing and fairly distributing risks to these values, and some means for changing course when conditions dictate, such as with adaptive management. A key advantage of EBM is that the difficult process of balancing values takes place in advance of the emergence of conflict, providing management alternatives that avoid the costs of conflict and litigation.

In most cases the missing piece for implementing EBM is not the science but an effective process or organizational structure; without some means to translate the science into a meaningful management approach that meets certain agreed-upon objectives, EBM is just a series of interesting reports.

The following sections reflect input from the Arctic Council EBM Experts Group as well as EBM experts from academia and non-governmental organizations. Phrases or paragraphs in italics indicate quoted comments from reviewers.

## NEEDS: KNOWLEDGE

*“Implementing EBM is possible based on existing knowledge, information, and tools.”*

*“EBM will have benefits over purely sectoral or regulatory planning approaches at almost any level of information.”*

The EBM experts engaged in this effort made it clear that the knowledge and tools currently exist to implement EBM, and there is no need to postpone such work until further information is developed. Experts noted that it is important to start implementing such an integrated approach regardless of available information, that an inclusive and multidisciplinary approach such as EBM will improve natural resource stewardship regardless of the state of knowledge in a region.

There are important benefits to be derived by acquiring more complete information and diminishing the uncertainty associated with many Arctic conditions, predictions, and trends. However, given the place-based and scale-dependent nature of EBM efforts, it may not be particularly helpful to identify data gaps across the entire Arctic, as originally intended in this effort, but rather focus on the needs associated with crucial *categories* of information or knowledge. The following sections describe some of these important needs.

**Traditional and Local Knowledge:** One of the top-level needs identified by experts is some means to more effectively incorporate traditional and local knowledge into modern governmental decision-making processes. None of the experts identified gaps in the body of traditional knowledge, only the difficulties with which institutions examine, codify, or incorporate this knowledge. In particular, modern scientific institutions that rely on quantified, cited, and peer-reviewed information struggle to develop practices that allow the incorporation of traditional knowledge while recognizing its fundamental differences and respecting the interests of the source. In some instances, traditional knowledge is recorded in published literature, but in most cases it exists in, and belongs to, the oral traditions of local communities.

There are, however, instances of modern science finding a way to incorporate traditional and scientific expert knowledge that provide meaningful guidance and respect indigenous concerns about the use of the information. There is also considerable room for improvement in simply including traditional and local knowledge holders in the analysis of information and development of policy responses.

***Finding:*** A compilation of best practices for incorporating traditional and local knowledge would enable a more effective utilization of such resources in management decisions; such information has and will add considerable value to our understanding of a rapidly changing Arctic.

**Ecosystem Services:** At the local level, ecosystem services are at the heart of the subsistence economy in the Arctic, but work needs to be done to assess patterns of use, thresholds for harvest, and resource variability on land and at sea, where diminishing sea ice is negatively

impacting important subsistence species and access to them. The changing hydrology of the terrestrial environment also poses challenges; melting permafrost and changing patterns of stream-flow are dramatically transforming the availability of freshwater resources in the Arctic, but our understanding of the impacts upon these resources is poor. The indirect services provided by permafrost, such as food storage and transportation systems, are also in jeopardy and continue to be difficult to assess and predict.

The Arctic is known as an important breeding and feeding ground for many species of birds and other wildlife, but the consequences of a transforming Arctic for biodiversity, particularly migratory species, remain murky. Changes in the Arctic cryosphere have significant impacts upon global ocean currents and atmospheric dynamics, impacts that are only now beginning to be described. The loss of sea ice has exposed the ice shelf's important role as a buffer from coastal erosion; the receding ice has left coastal zones frequently unprotected from storm surges and wave erosion, leading to culturally and financially costly relocations of villages and services.

***Finding:*** There is an extensive body of literature describing the benefits of ecosystem services and the costs associated with their loss. There is not yet a thorough Arctic-specific articulation of these benefits and costs described in economic terms. In particular, documenting ecosystem services associated with sea ice and permafrost will be necessary to assessing the value of these services and the costs associated with losing them.

**Monitoring and Data-Sharing:** It is nearly impossible to assess change without a baseline, and the dearth of ongoing, standardized monitoring protocols has hobbled efforts to ground-truth predictions in the Arctic. There is an ongoing demand for resources to support continued Arctic ecosystem monitoring, and for tools to enhance the coordination and value of the monitoring that is currently taking place. The Arctic Council's Circumpolar Biodiversity Monitoring Program (Conservation of Flora and Fauna Working Group - CAFF) and Trends and Effects Programme (Arctic Monitoring and Assessment Programme - AMAP) are two efforts that deserve ongoing support both at the international level and the national level, where the monitoring efforts that underpin these programs are largely under-funded.

One of the primary impediments to gaining insight from the baseline data that do exist is the diversity of standards used to collect and compile data. Supporting and strengthening efforts to increase the consistency and comparability of data and metadata are clear needs. Experts acknowledged the work of the CAFF and AMAP Working Groups to address these needs, and the potential role of the ArcticData data-sharing effort of the CAFF and Protection of the Arctic Marine Environment (PAME) Working Groups.

***Finding:*** Mechanisms and standards to strengthen data and monitoring cooperation among Arctic Council Working Groups is a critical need. In addition to advancing the work of the Arctic Council described above, a circumpolar overview of Arctic monitoring programs could help to identify gaps and overlaps among the Arctic Council Working Groups. Inventories of

monitoring have been initiated by the Arctic Council's Sustaining Arctic Observing Network (SAON) and several working groups.

**Integrated Analyses, Risk Assessments, and Resilience:** Assessing risk and tipping points in natural or social systems requires analyses that consider information from a variety of disciplines and perspectives. There are numerous means for conducting such cross-sectoral and cross-discipline analyses. One of the most promising means for assessing risk, while addressing issues of uncertainty and cumulative impacts, is the use of resilience analysis, which is a method for understanding how linked social, economic, and ecological systems are likely to respond to disturbance. Resilience analysis identifies the controlling variables that determine a system's resilience and identifies tipping points at which that ecosystem or socio-economic system is more likely to transform into another state. This allows managers to more effectively plan management actions that enhance the ability of ecosystems or socioeconomic systems to undergo change while still retaining essential structures and functions. By identifying the strengths and weaknesses of a system and the factors that are driving change within that system, resilience analysis can provide the essential information necessary to effectively implement EBM. The Arctic Council Arctic Resilience Report (ARR) will advance management efforts in the region by providing this type of analysis and encouraging ongoing monitoring of resilience in key areas.

*Finding:* Integrated analyses are complex and by definition involve information and engagement from multiple sources. There are data available to support such analyses, but a limited capacity to share, process, and utilize these data, as noted above. Efforts to enhance cooperation among science organizations are needed, and would assist Arctic Council Working Groups as they endeavor to build scientific cooperation among Arctic Council members. An opportunity also exists to formalize the connections between the ARR and EBM efforts within the Arctic Council and among member states.

**Understanding Ecosystem Interactions and Implications for EBM Approaches:** One of the primary barriers to effective implementation of EBM in a rapidly transforming Arctic is a lack of understanding regarding the many interactions among marine, coastal, terrestrial, and aquatic ecosystems in the region. For example, it is well known that reductions in the extent of sea-ice and shore-fast ice are having dramatic effects on the exposure of coastal systems to rapid erosion and storm surge, but little is known about the effect of disintegrating permafrost and peat substrates upon benthic communities or the alteration of freshwater habitats from inundation due to erosion and sea-level rise. These phenomena can strongly impact ecological and cultural resources system-wide but the degree or scope of these impacts is largely unknown. Considering any one of these systems in isolation will leave managers exposed to far greater uncertainty and unexpected impacts. The same is true of socio-economic systems; it will be problematic to manage the impacts of offshore activities without regard to the impacts of the shore-based infrastructure that will be needed to support such activities.

In implementing EBM, it is important to note that there are often significant governance differences between marine and terrestrial systems. For example, marine environments are often considered common patrimony, while terrestrial, coastal, and aquatic environments are not. Consequently, EBM implementation in the latter areas is more likely to be national than international. Also, while marine management tends to be sector-focused on resources such as fisheries or marine mammals, land management agencies are often responsible for multiple resources and uses within a specific area. For this reason, terrestrial and aquatic management may already be highly interdisciplinary and inclusive of some of the principles of EBM. It is notable, also, that as systems change, protected areas or areas of special concern at sea may be moved to accommodate shifts in the resources under management. Boundaries and jurisdictions on land are unlikely to shift with changing biota or ecosystems.

*Finding:* The complex and little-understood interactions among Arctic ecosystems represent a significant knowledge gap that deserves attention in order to insure effective implementation of EBM across such systems. Increased coordination among Arctic Council Working Groups, in particular PAME and CAFF, will enhance our understanding of these interactions and further the development of cross-system best practices. A set of EBM best practices for both marine and terrestrial environments that also describes the important differences in governance would also add considerable value. However, Arctic conditions and circumstances are constantly changing – new best practices may emerge or other practices may need to be adapted to these changes. Some formal and ongoing means to exchange information on both successful and unsuccessful implementation of Arctic EBM across systems, and to further develop the canon of knowledge and practice, is critical to the success of EBM in this highly interactive environment.

**Ecologically and Culturally Significant Areas:** The identification of areas of high ecological, social, or economic importance, in particular those areas essential for sustainability, is foundational to the concept of EBM. Identifying such areas must be based on the best available scientific and traditional information.

There have been a great many efforts to identify such areas at the regional, national, and international scales – for a variety of purposes and using a variety of methodologies. Some Arctic states are compiling such information at the regional and national level; for example, Norway has developed maps of sensitive marine areas in the Barents Sea, the United States has begun an initiative to compile information on ecologically significant areas for both marine and terrestrial environments in the Alaskan Arctic, Canada has identified Ecologically and Biologically Significant Areas (EBSA) in all of its Arctic waters, and Greenland has developed maps of sensitive marine areas based on strategic environmental impact assessments covering most of the marine environment in Greenland. The Arctic Marine Shipping Assessment 2009 Recommendation IIC (AMSA IIC) has endeavored to identify Arctic marine areas of “heightened ecological and cultural significance”.

Perhaps the most exhaustive pan-Arctic effort to compile and map marine areas of ecological significance was completed under the auspices of the International Union for the Conservation of Nature, the Natural Resources Defense Council, and the Scripps Institution of Oceanography. Though orchestrated by non-governmental organizations, the 34 experts that produced this compilation were representative of government agencies, academia, and indigenous organizations with deep expertise in the Arctic region. The fundamental criteria for consideration were derived from the international Convention on Biological Diversity. An Arctic Marine Synthesis for the Chukchi and Beaufort Seas, produced by Audubon Alaska and Oceana, is another example of an exhaustive resource that identifies and describes sensitive areas.

*Finding:* One of the most pressing needs for EBM in the Arctic is finding a way to appropriately collect and combine these sources to establish a suite of significant biological and cultural areas for marine and terrestrial environments Arctic-wide. Such a compilation, updated and endorsed by Arctic Council members, is an important missing piece for EBM implementation in the Arctic marine environment. To compile similar information for the Arctic's terrestrial ecosystems, experts suggested utilizing international fora such as the CAFF sub-working group on Arctic biodiversity and the terrestrial circumpolar biodiversity monitoring expert group.

**Cumulative Impacts and Uncertainty:** The state of the environment is ultimately dependent on the overall pressures and impacts of all the different activities that take place both within and outside a given area. The impacts of all of these activities and conditions, and the interactions among them, are known as cumulative impacts. To ensure successful integrated, ecosystem-based management, it is important to have ways of assessing these cumulative impacts. Such assessments are complicated by a number of factors. For example, the combined impacts of different pressures such as harvesting, unintentional damage, pollution and climate change will not necessarily be the same on different trophic levels. Cumulative effects can differ widely from individual effects in terms of their magnitude, significance, spatial extent, and temporal distribution (e.g. in the course of a single year, or between years). Gaps in knowledge at the species level or related to ecosystem function and structure can add further uncertainty.

With such high levels of complexity and uncertainty, it can be very difficult to accurately estimate overall impacts on an ecosystem. Uncertainty is normal when planning for the future but can result in very different understanding, expectation, or operational changes among various stakeholders. To address these differences uncertainty must be identified early in the ecosystem-based management process to the extent possible.<sup>1</sup> One approach to assessing the overall

<sup>1</sup> To fully understand how uncertainty can lead to differing expressions it is necessary to differentiate between scientific uncertainty (i.e., risk as statistical probability) and uncertainty in the common sense of the word. Risk is an event with a known outcome (or at least a probability of a known outcome, statistically speaking) with the certainty of that outcome dictated by an understanding of the system in review and the precision of the data and analyses. Uncertainty (generally speaking) is an event with an unknown outcome, e.g. uncertainty can be very high when there is a limited understanding of the system and its thresholds of change. Many environmental issues have elements of both risk and uncertainty. An EBM approach accommodates both risk and uncertainty (as defined) as a basic component of decision-making at all levels.

pressure and impacts, or the way in which these pressures interact, is to identify the components of the ecosystem that are under the greatest overall pressure - an approach that can also aid in setting priorities.

*Finding:* In addition to the need for more information to reduce uncertainty and increase the effectiveness of management actions, methodological guidance should be developed, refined, and shared to better guide the assessment of cumulative effects. Consistent or regular cooperation and exchange of relevant knowledge among the Arctic Council working groups would help to reduce uncertainty and could serve as the basis for improving methodologies for assessing cumulative effects. The Arctic Council working groups and member states would also benefit greatly from regular opportunities for exchanging information on the components of various Arctic systems that experience the greatest overall pressure from cumulative impacts.

## NEEDS: PROCESS

*“Such [knowledge] gaps are indeed important, but it is my view that gaps in process, in communications, and in practices for gathering, assuring quality, sharing, and utilization of information will prove more critical, and that addressing these process gaps through appropriate coordination of effort, institutional development, and guidance will have the greatest impact on the future success of EBM in the Arctic.”*

*“The ecosystem approach and its application by management (e.g. EBM) requires a significant amount of capacity building, both individual and institutional, to create the necessary enabling environment. Stakeholders must learn to appreciate differing disciplines, perspectives and approaches and must be able to address cross-cutting issues. A key element for success anywhere is a recognition and appreciation for the time, complexity, and effort needed to design and establish programmes or projects which address the ecosystem approach and subsequent implementation via EBM.”*

As noted in the introduction, information does not make management decisions – implementing EBM requires a level of organization that can transparently translate the information into action in the face of uncertainty. Such frameworks must use the best available information to balance stakeholder values and identify means to distribute risk. The following sections highlight some of the top-level issues expressed by experts regarding the procedural elements of EBM implementation.

**Integration and Trans-Disciplinarity:** The difficulty of crossing disciplinary lines and integrating the efforts and knowledge of social and natural sciences is as true in the Arctic as elsewhere. To compound this challenge, the circumpolar Arctic features a particularly wide variety of governmental and non-governmental entities designed to meet ecological, commercial, and socio-economic needs. It is not common practice to integrate the work of these entities, and there are often legal structures that inhibit such integration, such as conflicting mandates.

**Finding:** Bringing organizational missions into harmony requires institutions to expand their capacity for interdisciplinary work and, where possible, to adopt or develop agreements or structures to allow such efforts. This is fundamental to EBM but a major challenge for rigid institutions. Formal EBM workshops and/or periodic information exchange among Arctic Council members and Working Groups, NGOs, and other Arctic stakeholders would advance efforts to integrate the efforts of the many disciplines involved in Arctic sustainability issues.

**Scenario-Building:** Targeting a single preferred outcome under a single presumed future is not an adequate management strategy in a rapidly-changing environment such as the Arctic. One means to help stakeholders envision the opportunities and barriers they face as they balance objectives is to build scenarios that describe a set of plausible futures for the system under consideration. This allows stakeholders to negotiate a favored, and more realistic, set of objectives or management strategies more easily. Scenarios may be developed qualitatively using

a narrative style to describe a suite of futures based on known trends and predictions; quantitatively using models and technical inputs; or in a hybrid of the two, in which models are used to “future-cast” the results of various management strategies and approaches. Scenarios have been used effectively to help businesses and governments plan more effectively in the face of uncertainty.

*Finding:* EBM in the Arctic would be well-served by increasing the national and international capacity for scenario-building, providing formal opportunities to communicate these scenarios across boundaries and among stakeholders, and compiling best practices for maximizing such efforts.

**Adaptive Management:** Due to the level of uncertainty inherent to changing natural and socio-economic systems in the Arctic, and the difficulty associated with predicting how any system will react to a management intervention, EBM requires a capacity for adaptive responses. Adaptive management is a form of structured decision-making intended to reduce uncertainty and improve management. Essentially “learning by doing”, adaptive management involves implementing an informed management action and carefully monitoring the impacts of the intervention or the changes in the system to determine if progress is being made toward goals. If the intervention is not adequately effective, adjustments can be made based on new information.

Adaptive management may be inappropriate for some applications, such as when dealing with highly sensitive or rare resources. It is most appropriate in situations where there is substantial uncertainty, and where there is some expectation that reducing uncertainty will improve management. Important component parts of the adaptive approach are stakeholder involvement, clear articulation of values, strong monitoring protocols, and institutional learning – all fundamental to EBM as well.

*Finding:* Adaptive management is one of the best-understood and described aspects of the EBM approach – abundant guidance and resources are available to advance such work in the Arctic. Adaptive management is reliant upon effective monitoring, however, so its implementation faces the same constraints described above regarding monitoring and data-sharing. Ongoing cooperation among the Arctic Council members and working groups regarding monitoring needs and best practices for adaptive responses in the case of scant data is essential.

**Transboundary Coordination:** Implementation of EBM is a scale-dependent venture. Objectives, stakeholders, and actions must be tailored to the context under consideration. Experts acknowledged that most EBM implementation would occur at the national or sub-national level, but also urged a cooperative approach among the Arctic nations, both bilateral and multi-lateral, to improve the likelihood of success in a highly interactive natural environment. Such approaches could be coordinated through the Arctic Council and its Working Groups to leverage information and maximize management efficiency and knowledge-sharing across all Arctic environments. Experts suggested that sharing best practices at the Arctic Council level could add

significant value to knowledge acquisition and management, establishment of transparency and accountability, definitions of standards and high-level guidelines, articulation of shared or common ecosystem management objectives, and identification of those ecosystems where transboundary cooperation is necessary for success.

*Finding:* The Arctic Council is in a unique position to encourage and advance transboundary efforts, and EBM provides a perfectly-suited framework for advancing such work. Suggested means for doing so included affirming the Council’s institutional commitment to cross-boundary EBM and establishing or supporting structures, processes, or convenings for information-sharing and coordination of efforts.

## CONCLUSION

As noted earlier in the document, this intersessional effort was intended to provide a compilation of data gaps and tool needs for implementing EBM in the Arctic. The team of experts involved in this effort determined that given the place-based and scale-dependent nature of EBM efforts, it may not be particularly helpful to generalize data gaps across the entire Arctic, as originally intended, but rather focus on the needs associated with crucial *categories* of information or knowledge. Additionally, it was clear from expert feedback that this effort would be incomplete without an assessment of both the knowledge and *process* needs of effective EBM in the Arctic.

The narrative in this document is intended to provide a summary of the high priority knowledge and process needs for implementing EBM in the Arctic. This document will be used by the EBM Expert Group as a starting point in the development of guidelines and recommendations to the Arctic Council Senior Arctic Officials and Ministers prior to the 2013 Ministerial.

In summary, the areas of EBM knowledge and process that arose as areas of particular need or importance are as follows:

<b><u>Knowledge</u></b>	<b><u>Process</u></b>
<b>Traditional Knowledge</b>	<b>Integration and Trans-Disciplinarity</b>
<b>Ecosystem Services</b>	<b>Scenario Building</b>
<b>Monitoring and Data-Sharing</b>	<b>Adaptive Management</b>
<b>Integrated Analyses and Resilience Assessments</b>	<b>Transboundary Efforts</b>
<b>Understanding Ecosystem Interactions</b>	
<b>Ecologically and Culturally Significant Areas</b>	
<b>Uncertainty and Cumulative Impacts</b>	

