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ADVANCING ECOSYSTEM BASED MANAGEMENT (EBM) IN THE WORK OF THE ARCTIC COUNCIL

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This paper builds on the intersessional document “Definition and Principles of Ecosystem Based Management in the Arctic”, the findings identified in the “Knowledge and Process Needs for EBM in the Arctic” intersessional document, and the “Compendium of key EBM-related activities by the Arctic Council Working Groups”.

Within the context of a common definition for EBM in the Arctic, key findings related to knowledge and process requirements, and the existing work of the Arctic Council’s Working Groups on EBM, the purpose of this paper is to identify potential areas where additional focus by the Arctic Council, including through its Working Groups, can serve to advance EBM and promote its implementation in the Arctic.

1. Measures to advance EBM

Throughout the Arctic States there exist a varied set of practices for ecosystem-based management, diverse geographical scope and different administrative traditions and cultures. The ecosystems range from boreal to high Arctic, and the challenges countries face with regard to ecosystem-based management therefore vary considerably. The need to implement EBM also varies across the Arctic region.

The EBM definition that has been proposed for use within the Arctic Council includes four elements: integrated management, knowledge about ecosystems, addressing influences on ecosystems, and conservation and use objectives.

a) Integrated management

An important element of EBM is the integrated management of ecosystems. EBM differs from conventional resource management in that it addresses entire ecosystems, rather than their individual components. Also, in the context of EBM it is important to address the socioeconomic aspects relating to the use of ecosystems and their resources. Integrated assessments of cumulative impacts provide a holistic picture of changes in the Arctic and what the impacts are – providing valuable information that can be used by policy makers. Successful EBM solutions are dependent upon this type of information.

Integrated analyses and assessments have not been the norm within the Arctic Council or the work of the Arctic Council's Working Groups. Arctic States have undertaken integrated assessments and face challenges in terms of sharing, processing and using the data. In addition, while data may be available either from Arctic States or through mechanisms such as SAON (Sustaining Arctic Observation Networks), challenges remain as to how to compare data, as well as how to define observation and monitoring programs so that available data is meeting the needs for EBM. Within the Arctic Council Working Groups there are different approaches regarding how they collect, use, and make available the science for their work. Efforts to build scientific cooperation among Arctic Council members should also address the challenge of environmental baseline information and monitoring.

The following could therefore advance these issues in the context of the Arctic Council:

- Where appropriate, future assessments which Working Groups consider undertaking should be integrated assessments.
- A "how to" manual for integrated analyses/assessments, or guidelines for undertaking integrated assessments, could be developed
- Building scientific cooperation among Arctic Council members could be done through a pilot project between two or more Arctic Council states, and can demonstrate how data is collected, shared, processed and used to contribute to EBM in the Arctic.
- A cross-Working Group project on consistency and comparability of data could be undertaken.
- A workshop could be held to identify and discuss approaches to, and experiences with, integrated management and the design of assessments for this purpose, including the role of indicators.
- A workshop could be held to discuss experiences with previous Arctic Council assessments and to learn from those.
- An inventory of ecosystem status reports could be prepared.
- Data/information from all Working Groups could be identified and compiled, e.g., what type of information is available and how it can be accessed.
- Socio-economic and cultural data should be reflected in SAON
- A common data framework that can be used across all AC working groups should be developed.
- A manual to be used as a guide for how to use integrated assessments to identify cumulative impacts should be developed
- Regular reporting on high risk Arctic systems that are most threatened by cumulative impacts would help the Arctic Council focus its Working Group activities.

b) Knowledge

EBM is knowledge intensive. To manage an ecosystem, scientific knowledge about its properties, structure and function is fundamental. Also, knowledge about the pressures affecting the ecosystems and resulting vulnerabilities are critical to EBM. Scientific input has been important to the Arctic Council's assessment projects such as the Arctic Climate Impact Assessment or the Arctic Biodiversity Assessment. But the six Arctic Council working groups have different approaches to how they relate to and use science in their work.

There are a number of scientific bodies and programs relevant to the Arctic and ecosystem-based management, such as the International Arctic Science Committee, the SAON, and the International Polar Year and its follow-up. The need to establish baseline data of ecosystem properties at a pan-Arctic level has been raised in a number of these bodies and programs.¹ The ongoing work of the Arctic Council's Circumpolar Biodiversity Monitoring Program addresses some of these concerns.

Also, the complex and little-understood interactions among Arctic ecosystems represent a significant knowledge gap that deserves attention in order to ensure effective implementation of EBM across such systems.

The following could enhance EBM-related science and its use within the Arctic Council:

- Support should be given to dedicated EBM research programmes under, for example, IASC.
- A workshop could be developed on the design of EBM monitoring programmes.
- A workshop could be developed on methods for selection of valuable and vulnerable areas.
- Support could be provided for pan-Arctic monitoring of ecosystems and pressures (SAON).
- The Arctic Council should adopt some means to compile and compare the results of ongoing scenario-building and predictive efforts in the Arctic. Such "future-casting" will advance the ability to implement effective EBM initiatives.
- A PAME/CAFF expert group could be established, with a one-time task of improving understanding regarding ecosystem interactions (between marine, coastal, terrestrial, aquatic in the Arctic Region).

Also, in many areas traditional knowledge is relevant to EBM. Arctic Council Working Groups and the Permanent Participants have relevant information and experiences which could be a useful contribution to a compilation of best practices for incorporating traditional and local knowledge.

¹ See, for example:

http://www.arcticobserving.org/images/stories/files/Final_Updated_SAON_Brochure.pdf

The following could enhance the Arctic Council's ability to advance the incorporation of traditional knowledge and, in so doing, advance EBM within the Arctic:

- A compilation of existing/ongoing efforts to incorporate traditional and scientific expert knowledge would be useful. This would allow an examination of useful methods and best practices.
- An explicit Arctic Council Working Group policy or agreement could be developed focusing on the incorporation of traditional and local knowledge in Working Group activities, where relevant and appropriate.

c) Addressing influences on ecosystems

Some influences are more critical to the health of ecosystems than others, and some components of ecosystems are more valuable and vulnerable than others. In EBM it is therefore important to identify those pressures that are the most significant, as well as their cumulative effects. Identifying and defining valuable and vulnerable areas in ecosystems is critical in order to be able to protect those ecosystem properties that are vital for ecosystem structure and function.

For example, an important feature of large marine ecosystems is their vulnerable and valuable areas, where ecosystem properties are particularly important for the functioning of the ecosystem as a whole and the delivery of ecosystem services. This is an area where much can be gained by comparing notes across different EBM cases, to identify criteria, methods for arriving at them, and approaches to monitoring.

Both AMAP and CAFF have undertaken initiatives upon which assessing the value of ecosystem services could eventually be based. CBMP work on indicators of Arctic change could also contribute to this work. However, the working groups have not gone as far as articulating the benefits and costs of ecosystem services in the Arctic. 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. PAME has identified "large marine ecosystems", which could be used as a basis for ecosystem based management. There is nothing similar for terrestrial ecosystems. Through follow-up work on the Arctic Marine Shipping Assessment, AMAP, CAFF and SDWG are identifying ecologically and culturally significant areas in the Arctic.

Adaptive management is an important aspect of EBM. 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 the Working Groups

regarding monitoring needs and best practices for adaptive responses in the case of scant data is essential.

Also, the Arctic Council is in a position to encourage and advance transboundary efforts in EBM where relevant.

Possible actions in the Arctic Council regarding measures to address critical influences:

- A workshop could be held to address common issues in defining ecosystems, both marine and terrestrial.
- A workshop could be held to share experiences in identifying and monitoring valuable and vulnerable areas.
- Compilation of information on implementation of EBM across Arctic ecosystems would be useful.
- A joint Working Group project to assess the value of ecosystem services, perhaps associated with sea ice and permafrost could be value added.
- A terrestrial equivalent of “large marine ecosystems” (LMEs) should be developed, possibly by CAFF.
- Ecologically sensitive terrestrial areas should be identified (in addition to already identified marine areas) based on best available scientific and traditional information
- Working Groups should all be engaged in helping to suggest ecological objectives for the marine and terrestrial areas identified.
- At the Working Group level, there could be a joint meeting of WG chairs to develop input for a common EBM work plan, from which specific activities would be reflected as an element in each of the Working Groups’ ongoing two year work plans.
- Alternatively, or in addition to the above, a mechanism to coordinate a common approach to the work on EBM within the Arctic Council, focusing on both marine and terrestrial EBM and engaging representatives from all of the Working Groups, could be considered.
- A regular meeting/workshop on EBM in the Arctic could be organized – focusing on the integration of economic, social, ecological components of EBM and highlighting examples of how EBM is implemented in each of the Arctic States.
- Pilot projects between two or more Arctic States could be developed (ideally one with a marine focus and one with a terrestrial focus), which would showcase movement towards EBM implementation in the Arctic.

d) Conservation and use objectives

EBM is distinct from conventional management of nature in that the unit of management is the ecosystem as such, not its constituent parts. Therefore an overriding concern is the cumulative impacts of all pressures on the structure and functions of ecosystems.

Adding to the natural variability of ecosystems, which is very large in the Arctic, pressures from economic activities can affect ecosystem health. For most sectors, conservation and use objectives exist. Effective or not, such sectoral objectives have different metrics and do not easily add up to EBM objectives. In the context of EBM, it is therefore important to build on such sectoral objectives for conservation and sustainable use, adding a layer of EBM-related objectives that address the need to maintain ecosystem health.

In practice, the implementation of conservation standards in the context of EBM have been done through the continued development of Ecological Quality Objectives (EcoQOs) or some variation on that.

Given the diversity of the ecosystems in the Arctic and the different governance systems in the Arctic states, possible actions in the Arctic Council to address use and conservation objectives and develop ecological quality objectives include:

- Establish an inventory of conservation and use objectives relevant to EBM, including how they can promote and/or prevent the implementation of EBM.
- Hold a workshop to address examples of practical implementation of conservation standards in an EBM context, with a view to learning and dissemination of experiences.
- Hold a workshop to identify methods and criteria for developing Ecological Quality Objectives.

2. Conclusions

The Arctic Council is a “High-level forum”² for the promotion of cooperation and interaction among Arctic states and others, overseeing and coordinating its work programs, and disseminating information about Arctic-related issues.³ Worldwide, substantial efforts are being committed to the development of ecosystem-based management; this paper has discussed the Arctic Council’s potential role and activities to advance this work in the Arctic environment.

Specifically, on the basis of an understanding of ecosystem-based management as “...comprehensive integrated management of human activities based on best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of ecosystems thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity...”, we have discussed four elements of EBM: integrated management of human activities, best available knowledge, addressing influences on ecosystems, and conservation and use objectives. For each of these four elements we have identified a broad menu of EBM-related actions that the Arctic Council could pursue in order to further advance the implementation of EBM in the Arctic.

² Ottawa Declaration, paragraph 1.

³ Bloom, E. T. (1999). Establishment of the Arctic Council. *The American Journal of International Law*, 93(3), 1–1712–722.