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## EBM Perspectives

**Editor's note:** James Dobbin is a Canadian coastal planner with several decades of experience conducting coastal and marine assessment and management worldwide.

### EBM Perspective: A Planner's View on Working Across Spatial Scales

By James Dobbin

I believe it is impossible to achieve EBM without a comprehensive and integrated planning process. Planning helps to determine issues and identify solutions (i.e. management interventions) across both sectors and spatial scales. It can also help engage everyone, including stakeholders, in achieving coherent strategies that solve not only local management problems but also steer whole regions toward sustainability.

My background as a landscape architect and coastal planner has taught me the need not only to work across spatial scales, but to keep going back and forth across scales to find a set of solutions to management that are appropriate to the local situation, yet advance the sustainability of ecosystems and ecoregions.

Planning involves the "resolution of issues in context." When planners assess coastal and marine management issues to offer management solutions, we involve various stakeholders: first at central or national levels, then at provincial or state levels, and finally at the district or local community levels. Assessing issues at each level leads to priority actions necessary to resolve the issues - but these actions are specific to the scale of stakeholders, and do not in and of themselves constitute wider-scale EBM. Planning then becomes an iterative process to winnow through many management options, evaluating how the full complement of actions work together at all scales. As long as the focus remains on resolving the issues in context and the necessary management, investment, communication, marketing and education actions that emerge are feasible (appropriate to the scale), and as long as the actions are evaluated with regard to how they complement one another, the sum total is an EBM plan that will have significant impact.

I cannot overstate the power of graphical presentations to overcome challenges of scale. Having people actually see the scale of marine and coastal ecosystems, the distribution of free-ranging species, the connections between habitats, and the scale of human use and impacts, is so much more powerful than just describing it in words. This is where my landscape architecture background has come in handy for addressing the challenges of eco-regional planning coupled with site-level planning and management.

Maps are also critical to show the linkages - for instance, the linkages between upstream and downstream processes, such as land-sea interactions and watershed impacts on coastal zones. Maps can also forge better stakeholder participation and improve understanding of linkages across sectors. I have been repeatedly amazed that local people who are most affected by EBM approaches may have never seen maps before. When planners provide these graphic tools, local users immediately relate to them and often refine and correct the work of the science community. This cross-linkage - between scientists and users - is also facilitated by mapping and GIS tools.

A project with which I have been involved for the last 16 years in Cuba illustrates these points.

The project was originally conceived as a biodiversity protection assessment of Cayo Coco, a small island off the north coast of Cuba. However, a rapid assessment indicated serious environmental degradation of the coral reefs, beaches, sand dunes, and coastal vegetation. Given that Cuba's Ministry of Tourism had a proposal to construct 50,000 new hotel rooms on the fragile and sensitive cays of the north coast, it was clear that a large eco-regional approach that addressed different issues at different scales was necessary.

The project ended up as a multi-phased Global Environment Facility project, managed by the Cuban Ministry of the Environment, covering the last remaining frontier in Cuba - the Sabana-Camaguey Ecosystem region, comprising almost the entire north coast. This region, encompassing 75,000 km<sup>2</sup>, spans five provinces and includes watersheds, coral reefs, coastal lagoons, and more than 2500 islands. It extends out to the limits of the 200-nm Exclusive Economic Zone. Our strategic planning process involved over 600 experts and 63 institutions, and developed a 100+ theme GIS database on all relevant socioeconomic and biophysical factors as one key tool for analysis and decision-making.

No one ministry or agency could address the myriad of inter-connected problems and develop institutional actions to address these. Bringing a wide variety of authorities together into an iterative planning process resulted in a host of complementary management actions. These actions now steer development of the north coast of Cuba in a sustainable direction, and provide benefits to people at the local, sub-regional, and national level. We achieved good results through inter-sectoral and inter-disciplinary teamwork and by working up and down the different scales. We have used similar processes at different spatial scales in other parts of the world, too, including in the Arctic's Lancaster Sound region, in the Anosy region of Madagascar, and at central, provincial and district levels in Mozambique.

There is no single, simple pathway from science to management. Planners recognize this and undertake concerted and comprehensive eco-regional processes, working across all scales continually, to achieve large scale, ecosystem-based management.

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## **EBM Perspective: Globalization and Scaling in Ecosystem-based Management**

**By Michael Sissenwine**

The inaugural issue of *Marine Ecosystems and Management* (MEAM, Vol. 1, No. 1) was interesting reading and should provoke a healthy exchange of ideas over the months and years to come. I particularly like Jake Rice's essay on ecosystem-based management titled "Investigating the roots of confusion". I want to extend Jake's investigation by addressing another source of confusion about EBM. It is the issue of scale. A closely related issue is fragmentation.

Some think of EBM at the scale of the MPA that's important to them (as a manager, researcher, or stakeholder). Others have promoted EBM at much larger regional scales, such as the scale of Large Marine Ecosystems (LMEs). However, with globalization, even the LME scale is not large enough for some aspects of EBM.

Globalization affects people, institutions and ecosystems on all scales from local to global, and is enabled by advances in technology that allow rapid communication, and movement of people and commodities. As a result, products that were once exchanged only locally are now bought and sold on global markets. Globalization is also a natural feature of our biosphere, connecting local environmental conditions to global processes that regulate climate, ocean circulation, and ocean and atmospheric chemistry.

Globalization is a reality that presents new challenges for ecosystem-based management. Globalization can increase demand for some ecosystem goods and services, such as increasing the demand for fish products as a result of global markets. One new challenge is that not only must conservation and management of these resources balance local needs and desires with sustainability of ecosystems, but they must also respond to global pressures. Even locally, culture and traditional values are evolving rapidly in response to globalization of communications and information, which challenges institutions for conservation and management to be flexible and adaptive so that they can keep pace.

So what is the proper scale for implementing EBM in a globalized world? Ultimately, EBM needs to be implemented at a nested hierarchy of scales from global to regional to local. The appropriate scale of a particular EBM project within the nested hierarchy depends on the (a) characteristics of the ecosystem that are priority considerations for EBM, (b) natural processes that are most relevant to the priority ecosystem characteristic, (c) anthropogenic drivers of change in the priority ecosystem characteristics, and (d) the governance institutions that are available to implement EBM. It is interesting that three of the four factors related to the appropriate scale for EBM are determined by humans, not nature. Let me elaborate.

### **(a) Characteristics of the ecosystem**

In general, EBM is aimed at conserving and sustaining ecosystem services to benefit current and future human generations. No one disputes such a generic goal for EBM or something like it, but it does not give practical guidance for implementing EBM, setting priorities or deciding on scale. In practice, EBM is usually implemented to protect a place that many people value, such as an estuary, bay, gulf or the site of a coral reef. In such cases, practical or operational objectives are formulated usually focusing on a few characteristics, such as aesthetics, recreational opportunities, fishery production, and factors that affect public health and safety. I refer to this type of EBM as place-based, and the size of the place of interest determines scale.

Ecosystem-based management can also be sector-based. For the fisheries sector, it is often referred to as an ecosystem approach to fisheries (EAF). Of course, EAF also occurs in a place. But there is an evolution from traditional fisheries management (which usually has the goal of a large sustainable yield) to EAF - which takes account of non-fishing factors that affect fisheries, as well as direct and indirect impacts of fishing on ecosystem services other than fishery yield. Like traditional fisheries management, the starting point of EAF is typically at the scale of fish stocks. But it may evolve from there to take account of non-fishery factors that impact fisheries, and impacts of fisheries on non-fishery services of ecosystems.

Place-based EBM and sectoral approaches such as EAF should not be viewed as competitive, or either superior to the other. Depending on the specific situation, they will evolve at different paces. For example, the legal framework for traditional fisheries management may also allow progress to be made with EAF in situations where there is not a framework for place-based EBM. This is generally the case in the U.S., although there are some specific places that are exceptions. Ultimately, place-based EBM and sectoral approaches, such as EAF, should converge and be mutually supportive.

### **(b) Natural processes**

Marine ecosystems do not have impenetrable barriers that create closed ecosystems. Regardless of the location of ecosystem boundaries established for the purpose of EBM, there are almost always some biotic and abiotic exchanges across the boundaries. However, boundaries can be chosen to minimize these exchanges based on topography and ocean circulation.

### **(c) Anthropogenic drivers**

In some cases, the anthropogenic drivers that affect priority characteristics of ecosystems occur on the same scale as the ecosystem characteristic. For example, fish productivity may be primarily affected by fisheries that take place at the same scale as the range of target fish stock. However, there are many cases where the scale of priority ecosystem characteristics and anthropogenic drivers of change do not match. For example, the health of a coral reef may be more affected by anthropogenic ocean acidification at the global scale, or sedimentation resulting from coastal development, than by any of the activities that occur in the vicinity of the reef. Globalization is a generic anthropogenic driver that affects ecosystems at all scales.

### **(d) Governance institutions**

Governance includes both (i) non-binding arrangements that facilitate communication, priority identification and goal setting, and coordinated planning, and (ii) legally binding instruments that can be used to regulate human activities. Legally binding instruments are often available to implement sectoral EBM, such as EAF. Non-binding arrangements may be a useful vehicle for harmonizing sectoral approaches. In practice, the scale at which EBM is implemented will depend on the scale of available governance instruments (local, regional, global). It will often be necessary to decide if it is better to use existing governance institutions even if their scale is not very appropriate, or to delay EBM until a governance institution with a more appropriate scale can be created.

The scale for EBM will usually require a compromise between considerations of factors (a-d). These compromises should not be much of a problem if there is good connectivity (in terms of communication and integration) among the elements of the nested hierarchy of EBM implementations. This connectivity needs to be both vertical and horizontal. An example of horizontal connectivity is adjacent community-based EBM projects taking account of how their actions impact their neighbors. Vertical connectivity needs to be two-way. EBM at lower levels needs to fulfill higher-level policies and goals. Higher-level EBM needs to control anthropogenic drivers that impact lower levels. Unfortunately, there is relatively little experience creating effective connectivity between EBM at a hierarchy of scales. This could lead to fragmentation. In a globalized world, fragmentation has the potential to undermine even well-executed EBM at any particular scale.

For more information:

