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Communicating EBM: Facing the Challenge of Describing a New Management System to Various Audiences

In the two years that MEAM has been published, the most common questions from readers have related to terminology. Namely readers have wondered about the distinctions between *ecosystem-based management* and other resource management terms that have gained favor at different times or in various regions — like *ecosystem approach to management*, or *integrated coastal management*. A Google search of these terms will yield multiple definitions for each, with enough overlap to blur the distinctions.

MEAM has avoided assigning specific definitions for these terms, partly out of recognition that there is room for reasonable debate on them. We would rather focus on how to implement better management than argue over which term, or whose definition, is best. Nonetheless, communicating the concept of EBM remains a serious challenge for practitioners. Confusion about terms and what they mean can lead to public misconceptions on the intent of management, and obstacles to implementation (see “Countering common misconceptions about EBM and marine spatial planning” on page 3).

Practitioners and communications experts are facing the challenge of describing EBM to its different audiences. MEAM asked some of them how it can best be done.

EBM as the new paradigm/buzzword

“EBM is the new paradigm that donors, governments, and practitioners are using,” says Alan White of The Nature Conservancy. White has advised and implemented coastal and marine resource management programs in Southeast Asia for the past three decades, including in the Philippines and Indonesia. He is now co-leading a project to implement EBM in the Coral Triangle region (www.nature.org/wherewework/asiapacific/coraltriangle/initiatives). In the 1990s, *integrated coastal management* (ICM) was the main management buzzword in Southeast Asia, and it remains familiar to many coastal communities. Now EBM is the goal.

“For the most part, the importance of whether it is ICM or EBM, or a combination thereof, is lost on local stakeholders and communities,” says White. “In my experience in the Philippines, because communities and the government have endorsed an ICM approach to their coastal areas through legislation and action, they tend to see EBM as a refinement but not a replacement for their ICM framework. In contrast, other areas where there was no particular coastal and marine resource management framework in place may adopt a so-called EBM system for their needs without pause.”

White himself sees significant overlap and complementation between ICM and EBM, with the main distinction being that ICM has more of an emphasis on institutional integration while EBM has more of an emphasis on ecosystem considerations. White calls that a simplistic separation and acknowledges that academic theory on management would likely draw finer distinctions.

“In the real world of coastal management, though, the perception of stakeholders and local managers is the bottom line, and their view of the world determines if management gains are to be achieved,” he says. “Thus, whether it is ICM or EBM or some other management framework is not the main point. First learn what is already being accepted and implemented, then decide how to improve that. If you introduce your system in a manner that complements and augments current approaches, it will have a greater influence than if it is promoted as the ultimate new solution.”

Should you avoid the term “EBM”?

At the International Marine Conservation Congress this past May, a journalist on a panel of media professionals suggested that resource managers should avoid using the term EBM all together when talking to the public. He said such jargon would cause more confusion than clarity. Instead, he suggested, managers should use terms that would mean more to the average person, such as “comprehensive management”.

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Describing ecosystem-based management

“Ecosystem-based management is a balanced approach to managing the ocean and its coasts that aims to restore and protect the ocean’s functions — including the ocean’s provision of things that humans want and need — by improving ocean health. Ecosystem-based management is a shift toward long-term perspectives that places humans as integral to ecosystems and a move beyond current management plans that have jurisdictional limits, offer short-term perspectives and consider humans independent of nature.”

— From *Talking about a Sea Change* (2009, SeaWeb). To order a free PDF copy, e-mail SeaWeb’s EBM Communications Associate Alex Danoff at adanoff@seaweb.org.

SeaWeb — an NGO that uses strategic communications to advance science-based solutions to ocean issues — conducted a study from 2006-2008 that reached the same conclusion. Its research on how best to communicate EBM recommended that managers not tie themselves to the term, and instead use alternative descriptors that would resonate with different audiences. In its report *Talking about a Sea Change*, SeaWeb concluded,

“With some exceptions, audiences such as coastal residents, ocean industry workers, fishers, and elected officials are less familiar with ecosystem-based management and may be confused by the term or interpret it incorrectly. To avoid these potential traps, you may want to avoid saying ‘ecosystem-based management’ at first (and especially avoid using ‘EBM’ as shorthand) and focus on other words that were found to resonate with these audiences. Our research showed that the best alternative words were ‘integrated’, ‘comprehensive’, ‘effective’, ‘holistic’, and ‘balanced’.”

The study draws on in-depth interviews with scientists, NGOs, management agencies, and ocean industries, as well as a US nationwide poll of 1500 adults. It describes tailored strategies and messages for communicating EBM to each of nine groups, from commercial fishermen to resource managers. SeaWeb hopes that although the research was US-based, it could apply to situations elsewhere, providing value to NGOs and international bodies. SeaWeb operates a website on EBM communications at www.seaweb.org/resources/Ecosystem-basedmanagement/SeaWebsEBMCommunicationsProject.php.

Shared resources, but different languages and cultures

Marine ecosystems often cross national boundaries. As a result, EBM can require international management of resources. Obstacles to communicating EBM within one country can be magnified when communication is necessary across multiple nations, languages, and cultures.

The EU-funded BALANCE project, active from 2005-2007, aimed to develop joint methods and tools for marine spatial planning and management through the Baltic Sea region. The Baltic region consists of nine countries — Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden — each with a different language and culture. Jan Ekebom of the Finnish Environment Institute said of the communication and coordination issues involved, “If marine spatial planning can be done in the Baltic, it can be done anywhere.”

The BALANCE project involved a broad alliance of partners from nearly all nine countries, including conservation agencies, fisheries agencies, geological institutions, scientists, and NGOs. Åsa Andersson of WWF-Sweden, who led the project’s work on MPA networks, says communication on the project had to be in English in light of the language barriers. Although this meant communicating in a language that was foreign to everyone, it also presented all partners with an equal challenge, which was a good thing overall, says Andersson.

“The language challenges were just something that had to be taken into account, such as when developing time plans or writing reports, since it takes a bit longer when using a language that is not your own,” says Andersson. “It was also important to meet face to face every now and then, and not communicate only via telephone and e-mail, to avoid misunderstandings.”

The countries’ different histories and cultures also meant that there were various levels of awareness of environmental conditions, and of EBM and marine spatial planning as management strategies. In addition, there were different priorities, expectations, and reasons for joining the project. “One way of dealing with the different priorities and expectations was to define, as early and as clearly as possible, the expected outcomes of the project, what had to be delivered by each partner, and the absolute deadlines for delivery,” says Andersson.

It was critical to set ambitious but realistic expectations, she says. “One of the main objectives of the project was to compile coherent maps of basic information such as sediment, salinity, light, and bathymetry covering the entire sea area,” says Andersson. “This might sound simple, but because of the challenges of being nine countries — with nine different languages and 19 sediment classifications, for example — this was a great achievement and something to be proud of. Having these maps for the region now is a great step forward and crucial for future planning and management of our joint sea.” **M**

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Communicating EBM, Part II: Countering Common Misconceptions about EBM and Marine Spatial Planning

As with new concepts in virtually any field — particularly ideas that involve change from the status quo — misconceptions exist about marine ecosystem-based management and marine spatial planning (MSP). Held by practitioners and stakeholders alike, these misconceptions pose obstacles to implementation. Below, authors of two new publications describe some of the most common misunderstandings they have encountered on MSP and EBM, and how they respond to each.

From Charles Ehler and Fanny Douvere

Authors of *Marine Spatial Planning: A Step-by-Step Approach toward Ecosystem-Based Management* (2009, UNESCO's Intergovernmental Oceanographic Commission and Man and the Biosphere Programme, www.unesco-ioc-marinesp.be/mssp_guide):

• **MSP Misconception 1:** My jurisdiction does not have the authority to apply MSP.

Reality: While some countries have specific legislation for MSP (e.g., the UK is preparing a new Coastal and Oceans Access Bill), most do not. Many countries use existing authorities — including environmental legislation (like Belgium) or biodiversity legislation (like Australia) — or existing land-use planning legislation that is extended to the sea (The Netherlands and Germany) as a basis of authority for MSP. Wherever the authority for MSP comes from, it is critical that the final plan is legally binding and enforceable.

• **MSP Misconception 2:** We do not have enough data to apply MSP.

Reality: Perfect ecological and economic data are never available. It is more important to get started with the best data available. Even more important is the definition of clear goals and objectives for MSP. That critical step in the MSP process should guide the collection and analysis of data. International examples illustrate MSP is successful when conducted as a continuous, iterative process that is flexible to adapt when new information becomes available.

• **MSP Misconception 3:** We do not have any conflicts among users, so we do not need MSP.

Reality: MSP is a future-oriented activity. The absence of conflicts today among human uses of marine areas or between human uses and nature conservation should not be a rationale for postponing planning and decision-making about the future use of marine areas. The benefits of avoiding conflicts and other problems in the future will far outweigh the costs of MSP today.

From Karen McLeod and Heather Leslie

Editors of *Ecosystem-Based Management for the Oceans* (2009, Island Press, www.islandpress.org/ebm):

• **EBM Misconception 1:** A management effort is ecosystem-based only if it implements all the elements of the “theory” of EBM, such as the one outlined in the 2005 Scientific Consensus Statement (www.compassonline.org/pdf_files/EBM_Consensus_Statement_v12.pdf).

Reality: In truth, there are many “right ways” to move forward. EBM will be implemented differently in different historical, social, and ecological contexts. It is possible to move forward with EBM even in situations with little information or minimal management or governance already in place.

• **EBM Misconception 2:** EBM needs to be done at a particular “X” scale (local, regional, national, etc.).

Reality: We see from case studies of EBM in practice that it can be implemented at any spatial scale — from local, site-based efforts to entire large marine ecosystems. In many cases, management plans will need to include multiple scales, due to the ecological and human connections among different places.

• **EBM Misconception 3:** EBM will involve much more work for managers.

Reality: Managing the full array of human activities in the ocean and explicitly considering tradeoffs among them is a fundamentally different way of doing business. While this shift will require some new personnel and funding, EBM will build on many of the scientific and technical activities already underway in coastal and marine areas. Also, it may help ease workloads by leveraging resources, reducing redundancy, and increasing certainty for managers and stakeholders about the current and future institutional landscape.

• **EBM Misconception 4:** EBM is an academic theory, and is not actually being applied “in the water”.

Reality: Key elements of EBM are already being implemented in many locations around the world, such as in the US (Chesapeake Bay, Elkhorn Slough, Florida Keys, Great South Bay, Massachusetts, Morro Bay, Port Orford, Puget Sound); in Australia (Great Barrier Reef); Canada (Eastern Scotian Shelf); and Mexico (Gulf of California). ■

From Watersheds to Coral Reefs: Working to Manage Coastal Ecosystems in Fiji in an Integrated Way

In the Western Pacific, the archipelagic nation of Fiji includes more than 800 high islands, cays, and islets. Holding roughly 4% of all coral reefs in the world, Fiji includes the third-longest barrier reef on Earth — the Great Sea Reef, or Cakau Levu. Most of the country's population of 945,000 people live along the coast, and many rely on the sea's resources for food and income. Fijian lifestyles, history, and customs — including the traditional use of *tabu* areas in Fijian resource management — all reflect the islanders' relationship with the sea.

Despite the importance of Fijian seascapes, they are under threat, partly from direct overuse (i.e., overfishing of reefs) and partly from the downstream effects of various land-use practices, including rapid land conversion from forestry and agricultural activities. "These threats are compounded by a weak national legislative framework and enforcement capacity, and the lack of alternative livelihoods," says Stacy Jupiter, director of the South Pacific program for the Wildlife Conservation Society (WCS). Her organization is partnering with other NGOs, academics, government, and villages to address the threats in an integrated way.

Four-pronged approach

The program aims to promote an EBM-based plan for Fiji's watersheds, coral reefs, and fisheries. It is doing this through a four-pronged approach:

- (1) Establishing community-managed protected areas linking ridge to reef;
- (2) Assisting communities to diversify fishing- and forest-based incomes;
- (3) Providing recommendations to national and local managers to strengthen policies for natural resource management and biodiversity conservation; and
- (4) Applying scientific tools to understand the nature of ecosystem linkages and community capacity to adapt to changing environmental conditions. The scientific tools include analyses of long-term coral records to assess impacts of runoff from nearby mining operations; underwater video surveys of fish responses to fishing pressure; and high-resolution habitat maps to create spatial models of fish assemblages.

Aaron Jenkins of Wetlands International-Oceania (WIO), an institutional partner on the EBM project, says a threat to Fijian seascapes is the "myopic partitioning" of habitat types and sectors in conserva-

tion and development. "Actual ecological and social processes interplay across habitats and sectors," says Jenkins. "At a broad level we are trying to address unsustainable fishing practices and land-use practices at the scale at which ecological and social processes are operating. While we have a lot of resources and effort dedicated to marine protected area network design and monitoring, we are also trying to get beyond an MPA approach."

So in addition to MPA network development, the program is involved in establishing and encouraging adjacent locally managed forest protected areas in strategic areas of rivers (such as critical headwaters that provide for recharge of water), as well as setting up community-based re-planting of river buffer zones. "With local participatory consultation and science, we have developed the first ecosystem-scale management plan for one of our project sites," says Jenkins. "We are striving continually to be more holistic in our approach to management and see where crucial intersections for management intervention are within the 'ecoscape'" — a term he uses to describe the combination of landscape, seascape, and human well-being.

Institutional partnering

To manage these integrated factors requires the partnering of institutions, each with its own strengths. Responsibilities have been divided accordingly. The main NGO partners on the Fiji EBM program are WCS (responsible for marine surveys and intervention), WIO (freshwater/estuarine surveys and intervention), and WWF (socioeconomic studies and community engagement). The NGOs are also members of the Fiji Locally Managed Marine Area network (FLMMA), and collaborate closely with the University of the South Pacific, the Fiji Department of the Environment, and the Fiji Ministry of Forests and Fisheries.

"Communication is the key to successful partnerships," says Jupiter of WCS. "From the start, it was important to agree on a common vision and objectives. The Fiji EBM partners meet regularly to keep each other informed on project progress. Having multiple organizations speaking with a common voice has made government departments and other conservation partners more receptive to EBM principles and science."

Jenkins says a major positive move has been the hiring of a full-time project coordinator who is answerable to the project and not to any one organization. The

On communicating EBM in Fiji

"When communicating with local communities, the media, and non-scientific audiences, we tend to use the term 'ridge to reef management'. The term is readily understood by Fijians who have traditionally governed their natural resources from terrestrial forests out to the reef's edge. However, when we speak to government and organizations in the conservation sector, we use the terms 'ecosystem management' or 'ecosystem-based management' as a way to incorporate human dynamics, cross-sectoral engagement, and ecosystem linkages into national-scale planning."

— Stacy Jupiter, Wildlife Conservation Society

project coordinator is Sunil Prasad, a local Indo-Fijian with a master's degree in conservation biology. He organizes regular meetings and exchanges, and keeps the partners on track for project deliverables. Says Jenkins, "Between all of our organizations, we have dozens of projects going on simultaneously that are not necessarily related to the EBM project. With the coordinator answerable to the EBM project only, this allows him to remain focused and unbiased."

Land-based industry has been relatively slow to partner on the project to this point. "We are still having difficulties in meaningfully engaging with some of the more land-based extractive sectors such as logging, mining and large-scale agriculture," says Jenkins.

Management indicators

The vision for the project is "Healthy people, processes, and systems", which is reflected in its study of indicators. The project is measuring factors from the effect of protection on river and reef fish species, for example, to the effect of that same protection on fishers' incomes (the findings of which have been used in Marxan-based analyses of potential closed areas).

"Thus far, our results from coral reef areas show that the positive benefits of no-take closures — i.e., significant increases in fisheries biomass and abundance — can be wiped out by a single, intensive fishing event or too-frequent, less-intensive harvests," says Jupiter. "In freshwater systems, we have found that catchment

land clearing and the presence of introduced tilapia have strong negative effects on native fish diversity. However, community controls on activities within riparian zones and freshwater streams may reduce these threats."

Eventually the project will assess an even broader array of indicators. "We are hoping to expand the measurement of ecosystem health to incorporate a set of waterborne disease indicators for adjacent populations of people," says Jenkins. "This will hopefully provide some guidance on the intersection of ecosystem scale management and human health, and is part of our future plans." ■

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Ecosystem-Based Implementation of Management in Marine Capture Fisheries: Case studies from WWF's Marine Ecoregions, (2007, WWF). Includes case study on WWF's marine ecoregion work in Fiji: http://assets.panda.org/downloads/wwf_ebm_toolkit_2007.pdf

Letters to the Editor

The article in our last issue on whether conservation should be considered a use of the marine environment (MEAM 3:1) drew reactions from readers who were opposed to the concept.

Dear MEAM,

With all of the major issues confronting our oceans and marine resources, why are we creating new ones? Conservation management is not a use but rather a way to regulate or manage a use or activity. Its benefits are for the public good, not for the unrestricted use of private industry. In fact, extractive uses of any resource are rarely sustainable without some form of regulation or restriction. If we place conservation on the same level as a "use", how can we achieve economic stability and environmental quality for the greatest number over the long term? Conservation involves having the goal of sustainable resource use for successive generations. Please put this debate to rest and let's get on with the protection of our ocean resources.

Gib Chase

Biologist (retired), US Fish and Wildlife Service

Dear MEAM,

To deal with the question of whether conservation is a use, the term *conservation* should have first been defined. But I agree entirely with Elliott Norse: conservation, as I understand the term, is a policy goal, a process, and a condition of use.

Sidney Holt

Biologist and consultant, Italy

How Conservationists, Industry, and Government All View Risk Differently, and What This Means for EBM

Risk plays a role in any situation where decisions must be made based on uncertain information. In finance, for example, investors must often choose between putting their money in a bank account with a low but guaranteed interest rate, or in a stock that may yield high returns but also has a chance of losing all value. The amount of risk that the investors are willing to accept is called risk tolerance. Inversely, the amount of risk the investors are *unwilling* to accept is called risk aversion. Both considerations affect investors' decision-making.

There is much uncertainty in marine resource management. Managers must regularly make decisions without knowing exactly how the ecosystem, or stakeholders in some cases, will respond. As a result, there is risk. To make matters more complex, each group involved in marine resource management views risk in different ways, says Jake Rice, senior national advisor for ecosystem sciences with Canada's Department of Fisheries and Oceans. In particular, he says, conservationists, industry, and government managers all exhibit different types of risk aversion. And each type affects management in a different way.

MEAM spoke with Rice about the implications of risk aversion for EBM, and how the differences can be bridged:

MEAM: How do conservationists, industry (fishing or otherwise), and government view risk aversion differently?

Jake Rice: Risk aversion should be viewed relative to two very different types of management errors. One error is termed a "miss": when a conservation threat exists but management does not take action appropriate to address the threat. The other type of error is a "false alarm". This is when management acts to substantially restrict harvest (or otherwise reduce social or economic benefits) on the basis of perceived conservation needs, when in fact a lesser degree of restriction would have avoided serious ecological consequences just as effectively.

It is well documented in decision-theoretical research that, faced with uncertain information about threats and outcomes, error-free decisions are impossible. For a given degree of uncertainty, decision-makers have to make trade-offs between the two types of errors. One cannot lower the risk of one type of error without raising the risk of the other. Optimal trade-offs depend on the cost of a miss compared to the cost of a false alarm.

This is a useful framework for addressing these questions. The risk aversion of the various communities — conservation, industry, government — can be explained in terms of their views on the relative costs of the errors inherent in decision-making. First, it is important to note that all communities want low error rates. Beyond that, in my view the evidence indicates that:

- The conservation biology community is very risk averse to misses. They consider a miss to have very high cost (on the ecological dimension) and are willing to accept a high false alarm rate if needed to have a low probability of any misses;
- The fishing industry, not surprisingly, considers false alarms to have high costs on social and economic dimensions, and look for a balance between the two types of error or a small bias toward avoiding false alarms; and
- Subjectively, it appears that politicians are particularly risk averse relative to false alarms on the social dimension of sustainability (making decisions that cause unnecessary social hardship, even if temporary), but I have never seen that documented experimentally.

MEAM: How do those differences in risk aversion impact management?

Rice: The difference in risk tolerances for misses and false alarms are rarely understood by participants in inclusive decision-making processes — or when lobbying top-down decision-making processes. When the different communities apply different weights to the costs on the three dimensions of sustainability, no amount of dialogue will find a compromise that seems equally fair from all perspectives. The result is polarization of viewpoints and inability of inclusive processes to find consensus solutions. It also reduces the ability of processes to learn from experience, because the experiences (namely, what errors really did or did not occur) are felt and interpreted on different grounds.

MEAM: Are there ways for managers to bridge those differences?

Rice: First of all, better knowledge of the ecological, social, and economic aspects of a fishery always helps — to the extent that better knowledge reduces uncertainty and makes the likelihood of either type of error lower. Beyond that, differences can be bridged only by reducing unconstructive dialogues that are

likely between the conservationist community and fishers, each failing to acknowledge that the risk aversion profile of the other is a legitimate starting point for seeking a mutually acceptable decision.

There are constructive discussions that could occur regarding the costs of misses and false alarms on each dimension of sustainability (ecological, social, and economic). Were it possible to find common ground on the individual costs, it might be possible to have a more constructive dialogue about which trade-offs have a fair balance of costs. It would also ensure that the “transition costs” of inflicting short-term social and economic constraints for short-term ecological benefits leading to longer-term social and economic

opportunities are part of the dialogue from the outset — rather than something done at a late stage in the overall decision-making process.

I am not sure this framework for applying risk aversion will solve all problems or allow the various communities always to interact harmoniously. However, it is practical and will not make things worse. If it helps at all, every perspective — and the ecosystems and the industry — will gain. ■

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Tundi's Take Marine Spatial Planning in Europe: Trying to Achieve EBM without Ocean Zoning?

By Tundi Agardy, MEAM Contributing Editor
E-mail: tundiagardy@earthlink.net

The European Commission has embraced the concept of marine spatial planning (MSP) as a way to promote ecosystem-based management. But will its endorsement of MSP lead to active changes in management and, more specifically, to the development of ocean zoning? It is a key question. A commitment to MSP without a commitment to ocean zoning is like two people living together and vowing to be faithful, but who are unwilling to take the plunge into marriage for fear of commitment.

The process of marine spatial planning allows for doing many good things, including engaging stakeholders from multiple sectors and attaching values to certain uses of the marine environment. However, in developing marine spatial planning programs, some countries have focused solely on those aspects while backing away from talking of ocean zoning, wary of a public backlash based on fears of what ocean zoning could entail (i.e., restrictions on use). These countries' hope is seemingly that, following the planning process, stakeholders and agencies will simply do the right things on their own without needing a zoning system in place to direct them. This is a colossal missed opportunity.

It is clear that the EU feels a solution to status quo marine management is within reach. The EU Marine Strategy Framework Directive (http://ec.europa.eu/environment/water/marine/index_en.htm)

spells out what kind of changes need to be made. The Directorate-General for Maritime Affairs and Fisheries has calls for proposals for MSP in the North and Baltic seas, while an initiative in the Mediterranean is expected soon. And the 2006 Maritime Policy states, “The mapping of existing and planned activities in the water and on the seabed is essential.”

But what these MSP efforts will actually lead to is not at all clear, at least not from the information that has been made public. Even the EC Maritime Spatial Planning Roadmap (http://ec.europa.eu/maritimeaffairs/spatial_planning_en.html) fails to articulate the connection between MSP and ocean zoning, nor to detail how planning will operationally change management.

The EU has led the world in many aspects of marine management, and European policies around EBM and MSP are still in a state of play. I am hopeful that the European Community will recognize the immense potential of ocean zoning, and not shy away from it. By advocating a larger vision — to develop a strategic, comprehensive, coordinated planning effort in member states and in regions that member states border — European countries face an unprecedented opportunity to develop an integrated spatial plan regulating activities and uses at EBM scales. Further developing the EU Integrated Maritime Policy through zoning in which environmental protection is harmonized with uses of the sea is likely the most effective approach to mitigating and possibly reversing the impacts of current and emerging uses. ■

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Notes & News

US interagency task force releases proposal for new national ocean policy

A US task force composed of representatives from multiple federal agencies has released an interim report with proposals for a comprehensive national approach to ocean policy. The plan would set up a new interagency National Ocean Council to guide a holistic, ecosystem-based approach to management, unifying what has been a piecemeal, sector-by-sector approach by US agencies toward ocean policy and development. If enacted as proposed, the policy would represent sweeping change for US ocean policy, including an embrace of marine spatial planning as a principal strategy. The plan aims to “serve as a model of [...] use, management, and conservation within the global community.”

President Barack Obama established the task force in June 2009 to develop a national ocean policy. Its interim report is undergoing a 30-day public review and comment period; the comment period ends around 17 October. The report is available at www.whitehouse.gov/oceans. Public comments on the report may also be submitted on that website.

Editor’s note: The goal of The EBM Toolbox is to promote awareness of tools for facilitating EBM processes. It is brought to you by the EBM Tools Network (www.ebmtools.org), a voluntary alliance of tool users, developers, and training providers.

The EBM Toolbox by Sarah Carr

Tools for determining marine connectivity

Marine connectivity refers to the concept that areas in the ocean are linked through the exchange of organisms (larvae, adults) or non-living things (nutrients, sediment). When areas are connected, management decisions for one area may also affect the other areas. Tools for modeling this connectivity include:

- **CONNIE** (www.per.marine.csiro.au/aus-connie), which maps statistics on particle diffusion over time and can be used to predict larval dispersal, recruitment, and contaminant dispersion around Australasia and Southeast Asia; and
- **Marine Geospatial Ecology Tools** (<http://code.env.duke.edu/projects/mget>), which include an ArcGIS tool for modeling dispersal of larvae between patches of suitable habitat (such as coral reefs) by ocean currents.

As connectivity is variable among locations and species, managers should consult with experts and literature in their region before using tools. Learn more about these tools and related resources at www.ebmtools.org/faqs.html (FAQ #9).

(Sarah Carr is coordinator for the EBM Tools Network. Learn more about EBM tools and sign up for Network updates at www.ebmtools.org.)

Report examines governance of transboundary resources

A new report from IUCN examines the characteristics of effective transboundary resource management, particularly through the use of ecosystem-based management. It includes case studies of the Mediterranean Sea, Red Sea, Antarctic waters, the Benguela Current, the North Atlantic, and the Western and Central Pacific region. Common themes emerge, such as the need for a holistic approach, environmental impact assessments, and precaution. *Shared Resources: Issues of Governance* is available at <http://data.iucn.org/dbtw-wpd/edocs/EPLP-072.pdf>.

World Bank calls for ecosystem-based approaches to adaptation and mitigation

Nations should include ecosystem-based approaches to mitigation and adaptation as an essential strategy in their efforts to address climate change, according to a new report from the World Bank. The report explores opportunities to benefit populations, protect natural capital (including via protected areas), and utilize green technologies to address climate-change impacts. It describes specific strategies for wetlands, mangroves, coral reefs, and ocean ecosystems. The report *Convenient Solutions to an Inconvenient Truth: Ecosystem-based Approaches to Climate Change* is at http://siteresources.worldbank.org/ENVIRONMENT/Resources/ESW_EcosystemBasedApp.pdf.

Paper: ocean zoning can be catalyst for ocean governance reform

A new article in the *Bulletin of Marine Science* proposes multiple potential benefits to come from taking a robust approach to ocean zoning, including opportunities for user groups to form long-lived institutions and a reassessment of the focus and scope of ocean regulatory institutions. The paper’s authors say such benefits will lead to improved conflict resolution, efficiency of use, and ecosystem stability. The article is available for free; a link is at www.ingentaconnect.com/content/umrsmas/bullmar/pre-prints/8621.

Survey: seeking North American experience with adaptation strategies to climate change

A baseline survey is underway to assess past, current, and proposed climate change adaptation projects in North America. Conducted by EcoAdapt, a US-based NGO, the assessment focuses on coastal and marine efforts in the US, Canada, and Mexico. To participate in the survey and describe your experience with adaptation activities, go to www.surveymonkey.com/s.aspx?sm=bvAhrVsD7IzZS93_2bA_2fHRg_3d_3d. Survey responses will be gathered and presented in a synthesis report and online database.