

REGIONAL GOVERNANCE AND ECOSYSTEM-BASED MANAGEMENT OF OCEAN AND COASTAL RESOURCES: CAN WE GET THERE FROM HERE?

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I. INTRODUCTION

A regional, ecosystem-based approach to management of coastal and ocean resources has been recommended by two expert ocean commissions.¹ These reviews noted that the coastal and ocean resources are in serious decline, that the current management systems seem unable to address the challenges to those resources, and that this new approach to ocean governance is the best option for future policy.

General definitions of *ecosystem-based management* are provided in the reports by the Pew Oceans Commission² and the U.S. Commission on Ocean Policy.³ A consensus statement by more than 200 academic scientists has more fully defined the concept as follows:

Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can

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1. PEW OCEANS COMM'N, AMERICA'S LIVING OCEANS: CHARTING A COURSE FOR SEA CHANGE (2003) [hereinafter PEW REPORT], available at http://www.pewtrusts.org/pdf/env_pew_oceans_final_report.pdf; U.S. COMM'N ON OCEAN POLICY, AN OCEAN BLUEPRINT FOR THE 21ST CENTURY: FINAL REPORT OF THE U.S. COMMISSION ON OCEAN POLICY (2004) [hereinafter USCOP REPORT], available at http://www.oceancommission.gov/documents/full_color_rpt/000_ocean_full_report.pdf.

2. PEW REPORT, *supra* note 1, at 44 (“Ecosystem-based management entails . . . a new perspective that acknowledges[.] . . . limits to our knowledge; marine ecosystems are inherently unpredictable; . . . have functional, historical, and evolutionary limits that constrain human exploitation; . . . a fundamental trade-off in fishing . . . balanced between fish for human consumption and fish for the rest of the ecosystem; ecosystems are complex, adaptive systems.”).

3. USCOP REPORT, *supra* note 1, at 63 (“Ecosystem-based management looks at all links among living and nonliving resources, rather than considering single issues in isolation. This system of management considers human activities, their benefits, and their potential impacts within the context of the broader biological and physical environment.”).

provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors.⁴

This definition emphasizes the key elements of an ecosystem-based approach and important differences from the current management approach.

First, the goal for an ecosystem-based approach to management is to conserve ecosystem services, which are those processes and products provided by a fully functioning ecosystem that support human well-being. The Millennium Assessment categorized ecosystem services as follows: (1) provisioning services (food and fresh water), (2) regulating services (climate and flood regulation), (3) cultural services (spiritual and aesthetic values), and (4) supporting services (nutrient cycling and primary production).⁵ Current management approaches to fisheries, water quality, coastal development, or energy development are basically focused on single service or a small set of services, not an interlocking set.⁶

To be fair, many of the governing statutes, such as the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (“MSFCMA”), include language calling for the protection of ecosystems, but in operation, fishery management is overwhelmingly focused on fishery yield, which is a provisioning service.⁷ Fisheries’ yields cannot be conserved if habitat, water quality, and other attributes of the system continue to decline. Even in cases where statutes call for protection of the ecosystem more broadly,⁸ the governance structure actually only allows for protection from activities within a single sector. For example, the MSFCMA may provide some means of conserving fish habitat, mostly by protecting it from the impacts of fishing on fish habitat, but there are only weak interactions with other

4. SCIENTIFIC CONSENSUS STATEMENT ON MARINE ECOSYSTEM-BASED MANAGEMENT 1 (2005), http://compassonline.org/files/inline/EBM%20Consensus%20Statement_FINAL_July%202012_v12.pdf. The statement was signed by 217 academic scientists and policy experts with relevant expertise and published by the Communication Partnership for Science and the Sea.

5. MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: SYNTHESIS v-vi (2005), available at <http://www.maweb.org/en/Products.aspx?>.

6. A.A. Rosenberg & K.L. McLeod, *Implementing Ecosystem-based Approaches to Management for Conservation of Ecosystem Services*, 300 MARINE ECOLOGY PROGRESS SERIES 270, 271 (2005).

7. Magnuson-Stevens Fishery Conservation and Management Act of 1996, 16 U.S.C. § 1802 (2000).

8. See, e.g., *id.*

sectors of human activity such as coastal development or water quality.

Second, an ecosystem-based approach to management is cross-sectoral, meaning that management plans are comprehensive, with the goal of conserving ecosystem services, and inclusive of all types of human activity that may impact coastal and ocean resources. Therefore, the management strategy must take into account the interactions between the human impacts as well as between ecosystem services. Current management is fundamentally sectoral with weak interactions across sectors, even in management planning.⁹ Much of the existing interaction comes through the National Environmental Policy Act (“NEPA”) mandate for environmental impact analysis, which calls for a detailed review of “actions significantly affecting the quality of the human environment.”¹⁰ But even then, the mandate only calls for analysis with no clear goals outside the sectoral goals, not for management.¹¹ In my experience, the impact analysis is usually done from a strong sector perspective by agencies responsible for a given sector, without much reference to other agencies.

Third, an ecosystem-based approach must specifically address the cumulative impact of human activities on the ecosystem and, hence, ecosystem services. Impacts will accumulate even if activities are presented one by one. Wetland loss is a simple example. It is possible to analyze the impact of the loss of a particular piece of wetland, or even of a specific acreage at a given time. In an ecosystem perspective, however, what matters is whether the remaining wetland can provide the needed services, such as sediment trapping, water filtration, export of productivity, nursery grounds, storm protection, etc., to support the functioning of the ecosystem as a whole.

Clearly, there are some important issues of scale here, given that ecosystems can be thought of as a nested set of biophysical characteristics. Scale issues will always be an important consideration for management, whether or not ecosystem-based. Current management can only really look at cumulative impacts within a sector, and then the accumulation is probably only in a single dimension of the ecosystem, such as wetlands. Again, NEPA calls for some consideration of cumu-

9. See, e.g., Rosenberg & McLeod, *supra* note 6, at 271.

10. National Environmental Policy Act of 1969 § 102, 42 U.S.C. § 4332 (2000).

11. *Id.* (“The Congress authorizes and directs that . . . all agencies of the Federal Government shall . . . utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man’s environment.”).

lative impacts,¹² but only for analysis, not for management, and even this is very weakly implemented.

II. WHY ECOSYSTEM-BASED MANAGEMENT?

I have described what I believe are the major features of ecosystem-based management, and now turn to the question of why this approach should be taken instead of the current sectoral approach. The basic reason for the superiority of ecosystem-based management is articulated in the conclusion of the two ocean commissions: The oceans are in trouble.¹³

Ocean management is not new, with most statutes in place for about twenty to thirty years. Thus, it seems hard to argue that giving the system “time to work” will resolve the decline of resources. Nevertheless, some improvements due to management are occurring with cleaner water, some recovering fisheries, and so forth. Progress, however, is slow, and it is highly likely that some ecosystem services, particularly those that are not focused on provisioning, will not be addressed.

For example, a policy of no net loss of wetlands has been in place for many years, but wetlands are still lost at an alarming rate.¹⁴ Pollution abatement policy has made significant gains with respect to point sources of contaminants, but non-point source problems abound.¹⁵ Wildlife, fish stocks, and protected species such as marine mammals have been under intensive management since the 1970s, but loss of wildlife, overfishing, and declines of protected species are still persistent problems.¹⁶ One of the reasons for the observed declines is that just protecting some species or reducing point source pollution is insufficient to deal with the problems because of the interdependence of human impacts and ecosystem services. Fish stocks cannot rebuild without habitat and non-point source pollution cannot be dealt with without managing coastal development.

A second reason for adopting an ecosystem-based approach is that cumulative impacts are unlikely to be addressed on a sector-by-sector basis. After all, they are *cumulative*, and the whole of the im-

12. See Memorandum from James L. Connaughton, Chairman, Executive Office of the President, Council on Environmental Quality, to Heads of Federal Agencies (June 24, 2005), available at <http://ceq.eh.doe.gov/nepa/regs/guidance.html>.

13. PEW REPORT, *supra* note 1, at v; USCOP REPORT, *supra* note 1, at 1.

14. USCOP REPORT, *supra* note 1, at 178-79.

15. *Id.* at 212-22.

16. *Id.* at 274-76.

pact may well be greater than the sum of the parts. Consideration of cumulative impacts within a sector raises the question: the impacts on what? Framing management in terms of the conservation of the full set of ecosystem services creates focus on the assessment of cumulative impacts.

Lastly, there is no single ecosystem configuration that can be mapped to a fully functioning or “healthy” ecosystem.¹⁷ There are necessarily decisions to be made concerning tradeoffs in ecosystem services that must be analyzed in light of a set of human impacts. Weighing those tradeoffs based on a sector-by-sector approach is difficult, if not impossible, given a set of single-sector goals. For instance, fisheries productivity will predominate in the fisheries management arena and water quality will predominate in the pollution abatement arena. How are these to be brought together unless an ecosystem approach is taken?

III. WHY A REGIONAL APPROACH?

Should an ecosystem-based approach to management be regional or national? A national mandate for ecosystem-based management could give the authority to work across sectors and to set goals for the conservation of the broad set of ecosystem services. Such a mandate, in the form of a national ocean policy act, is needed to bring together sectoral management, set a framework for managing tradeoffs in services, and create a process by which sectoral goals can be nested within broader ecosystem goals.

Implementing such an overarching mandate requires authority to be vested in a lead agency for the ecosystem-based management of coastal and ocean resources. Though it may or may not be the responsibility of only a single agency, there does need to be a lead agency, as called for in the U.S. Commission on Ocean Policy Report.¹⁸ While the National Oceanic and Atmospheric Administration is logically the agency to take the lead, any agency vested with the requisite authority needs to be appropriately structured to take on the task of ecosystem-based management. Current agency structure supports the sectoral approach,¹⁹ but future agency structure needs to

17. SCIENTIFIC CONSENSUS STATEMENT ON MARINE ECOSYSTEM-BASED MANAGEMENT, *supra* note 4, at 1.

18. USCOP REPORT, *supra* note 1, at 109-10.

19. *Id.* at 108-18.

support an ecosystem approach because a major change in policy direction needs to be accompanied by a change in structure.

With such a national mandate, is it necessary to focus governance at a regional scale? After all, as noted above, ecosystems can be thought of as a nested set of biophysical attributes. Therefore, it is possible to think of a salt marsh ecosystem, a deep-water ecosystem, and so on. But no ecologist would think that any such defined ecosystem operates in isolation from other scales. The challenge, then, is not to define the ecosystem “correctly,” but to find a workable scale for the consideration of a set of services and for the management of human activities, assuming that whatever ecosystem boundaries are chosen will be “leaky.” Having leaky boundaries means that services and impacts that cross the boundaries should be considered in analysis and management planning. In other words, the ecosystem scale for ecosystem-based management should be a workable scale, encompassing a broad range of ecosystem processes nested within it. A regional scale, similar to regional fishery management councils, meets this criterion in general. The Large Marine Ecosystem concept also essentially embodies these principles—workability, coherence, and the nesting of attributes—with leaky boundaries to each ecosystem.²⁰

Another reason for regional management is that the sectoral management tactics are increasingly being implemented spatially and at diverse scales. Federal agencies are organized regionally for implementation of management.²¹ Additionally, state agencies work with other states within a “region.”²² Many of the sectors of human activity work at a scale that is broader than within a state, or a state’s waters, but are rather regionally focused. A regional ecosystem-based approach should serve to address a critical goal of improved management: providing management across sectors that is efficient, understandable, and coherent. It is important to make management across sectors work in concert, and not in opposition to one another. This is true from a business perspective, a public perspective, and also a conservation perspective.

Finally, implementation of ecosystem-based management happens on the coast and on the water, not with the creation of a national mandate. Here too, a regional scale for implementation makes sense

20. See FOOD CHAINS, YIELDS, MODELS AND MANAGEMENT OF LARGE MARINE ECOSYSTEMS 1-34 (Kenneth Sherman et al. eds., 1991).

21. USCOP REPORT, *supra* note 1, at 92.

22. *Id.* at 88-89.

to ensure that there is sufficient authority at a broad enough scale to address the conservation of ecosystem services, but also at a scale that enables public debate over tradeoffs. There would likely be clear regional differences with regard to the valuation of ecosystem services, which cannot can only be determined regionally, not nationally nor locally. A regional governance structure could use a general national framework for determining the appropriate tradeoffs, but the debate and implementation must be regionally specific.

IV. CONCLUSION: EMERGING NEEDS FOR IMPLEMENTATION OF AN ECOSYSTEM-BASED APPROACH

I have tried to make the case for regional ecosystem-based management. To implement such an approach, I see four major needs.

I believe there is a clear need for an overarching cross-sectoral mandate at the national level to convey authority, set a framework for goal setting, and enable tradeoffs. It may be possible to develop ecosystem-based approaches to management without an overarching mandate, but I am concerned that the process will be slow, inconsistent, and unstable.

By the same token, an overarching mandate is necessary, but not sufficient, for implementation. A regional forum is also necessary to involve diverse interest groups, including the public, to determine priorities and to enable a discussion of tradeoffs among services.

Dealing with tradeoffs will take more than just a regional discussion forum and the mandate for management. Some clear principles are needed for making tradeoffs. Can a region decide to forego certain services entirely? Are there local, national, or international considerations that must be included? How are decisions to be made: consensus, majority, vested authority?

There are also scientific and technical needs for an ecosystem-based approach to management. A common basis for analysis of services is needed across sectors of human impacts. A modeling basis that can incorporate a defined set of human activities that are impacting a given ecosystem, and describe the impacts on a set of services is essential. Finally, a data system that is as accessible, comprehensive, and as dynamic as possible is needed as the basis for analysis.

All of these needs can be met. The technical capability certainly exists. Public interest in the ocean is high. There is political interest at national and regional levels. But we ultimately must ponder: Does the political will to proceed exist?