

Testimony to the

U.S. Senate Committee on Commerce, Science and Transportation

National Ocean Policy Study

By

Dr. Michael K. Orbach

Professor of Marine Affairs and Policy and

Director

Duke University Marine Laboratory

Nicholas School of the Environment and Earth Science

Duke University

August 3, 2006

Ladies and Gentlemen,

I am pleased to testify before you today on the topic of United States coastal and ocean policy, how that policy is reflected in current and pending legislation in the U.S. Congress, and how the development and implementation of that policy could be improved. My own background is the social and policy sciences, including the human

and institutional ecology of coastal and ocean environments. I have worked with most of the federal agencies involved with coastal and ocean policy in the U.S., all of the coastal states in the U.S., all of the Regional Fishery Management Councils and Interstate Marine Fishery Commissions, and with several international marine resource management institutions. I also served as an advisor to both the U.S. Commission on Ocean Policy and the Pew Oceans Commission.

In my testimony today, I will emphasize the concept of *ecosystem management*, and the applications of that term to coastal and ocean policy.

The “Ecologies” of Coastal and Ocean Environments

My definition of the term “coastal and ocean environment” begins with the biophysical resources that occur from the heads of coastal watersheds to the deep ocean, and the interaction of those terrestrial and marine resources with the atmosphere. This environment can be bounded in various ways for particular place-based policy applications, such as in the Chesapeake Bay watershed; the watersheds and ocean jurisdictions of states or nations; or the environments of particular species or biophysical features such as the habitat of Pacific Salmon, the Gulf Stream, or the Sargasso Sea. These bounded biophysical resources and environments I term the *biophysical ecology* for a particular policy-making purpose.

Included in my definition of “coastal and ocean environments” are also two other ecologic systems, the *human ecology* and the *institutional ecology*. The *human ecology* are those humans and human behaviors that affect, are affected by, or are otherwise concerned with the elements of a defined biophysical ecology. I define the *institutional ecology* as those governance institutions that govern or affect the behavior of people in

the human ecological system. So, for example, if we are considering the salmon fishery of the U.S. Pacific Northwest, the biophysical ecology is defined by the salmon species and their habitats throughout their migratory range (Idaho, Washington, Oregon, Canada, and the North Pacific Ocean). The human ecology consists of those humans and their behaviors that affect the salmon directly (fishing) or the salmon habitats (development, agriculture, or hydroelectric power), or even the biophysical trophic linkages with salmon (predators, prey). The institutional ecology consists of those policy and management institutions (local, state, regional, national, and international) whose policies and rule-making affect the defined human ecology. There are, of course feedback loops among all of the elements of this “total ecology”, including the relationship between “civil society” and our formal public trust institutions.

Thus, when I use the term “coastal and ocean environment” for the purposes of policy-making, I am including all three of the above ‘ecologies’ – biophysical, human, and institutional.

It is also important to note at the outset that all public policy for coastal and ocean resources has biophysical, economic and social objectives, and when implemented has attendant biophysical, economic and social impacts. Public policy decisions, usually in the form of regulations or incentives, involve *changing human behavior*. Every public policy decision involves tradeoffs between some state of the biophysical environment (abundance of fish, water quality) and some flow of costs and benefits to humans (dollars, cultural traditions, aesthetic values).

My own definition of the term “ecosystem management” is the policy towards, and management of, human behaviors (human ecology), through a specific governance

structure (institutional ecology), that affect, or are affected by, a defined biophysical environment (biophysical ecology). I will frame my comments below within this definition, and discuss the policy frameworks necessary to address the biophysical, human, and institutional dimensions of ecosystem management of coastal and ocean resources.

Characteristics of Coastal and Ocean Environments

For most of the world's human population, the ocean is 'out of sight, out of mind' (Orbach, 2002). Not only do most humans not live or work on or in the ocean, but it is in fact an extremely hostile environment for humans. It is too salty to drink or to irrigate crops. Its density both smothers us if we are immersed in it and crushes us if we go too deep without elaborate protection. Its waves bash us on beaches and in boats, and its biochemical characteristics foul and corrode our machines and structures. We can more easily go – and commonly do go -- one mile up into the atmosphere than one mile deep into the ocean. Even though an increasing number of us live or work near the ocean, it is still not an “intimate environment” for most humans (Revelle, 1969; Orbach, 1982).

This matters precisely because humans develop governance institutions for those spaces and resources about which they care most, and with which they are the most intimately involved. This is why the most complete set of governance institutions evolved first for humans in relation to terrestrial, as opposed to ocean and atmospheric, spaces and resources, beginning several thousand years ago. Those are the spaces and resources for which we first developed awareness, and intimate and dense use.

In the ocean, on the other hand, human societies did not effectively begin to govern human behavior on the ocean through public policy in any large measure until late

in the 1700s with the adoption of the 3-mile Territorial Sea, and no substantial universal management of ocean resources occurred until the middle of the 1900s, beginning with the mineral resources of the continental shelves and eventually extending to the current 200-mile Exclusive Economic Zones (EEZ). Even with universal 200-mile Exclusive Economic Zones having been declared by riparian states, in accordance with the Law of the Sea Convention, approximately 40% of the world ocean remains outside of areas of national jurisdiction. Added to this are the twin notions of traditional “open access” to resources such as fisheries, and the companion principle of the “freedom of the seas”, elucidated in the early 1600s and still alive today as a basis for much policy-making for the ocean. The principles of private property and the appropriateness of the management of public trust resources, long established in terrestrial and even atmospheric environments, have only recently begun to be applied to ocean environments and resources (Orbach 2002).

Thus, the challenge of managing ocean environments and resources is a relatively new one compared to terrestrial ones and, at the moment, human society has more powerful and complete public policies for human activity on land -- and even in the atmosphere -- than for human activity in the ocean.

The Biophysical Ecology

In virtually every part of the coastal and ocean environment where human behavior is a significant presence, the biophysical environment continues to degrade. There are notable exceptions to this – some cases of improved water quality, recovered fisheries, or increases in the populations or threatened or endangered species – but they are truly the exception. There are three reasons for this continued degradation: 1) lack of

awareness or information regarding the issue; 2) an inadequate public policy framework within which to address the issue; or 3) a lack of political will, or political will that makes the policy tradeoff in favor of the conscious degradation of the biophysical ecology.

The ocean covers over 70% of the earth's surface, and throughout history much of that area has been relatively inaccessible to humans. Although humans have had significant impact on coastal and some nearshore resources for many centuries, it is only in the last 150 years that humans have had the capacity to impact oceanic resources to a significant degree. We have now demonstrated the effects of that capacity.

The important point to this testimony is that the biophysical resources of the oceans -- from fisheries, to mineral resources, to pharmaceuticals, to the ocean's role in weather -- are an immense potential resource and are critical for the future of humankind. Our scientific knowledge of these resources, which leads to awareness of their specific importance to, and potential use by, humans, is sorely lacking. Our investment in ocean research and exploration, for example, is only a tiny fraction of that invested in terrestrial or atmospheric research. We must make a comparable investment in ocean research and exploration to see the full potential of ocean resources.

Legislative Implications

This immediate application of the above situation to current pending legislation in the U.S. Congress is that authorizations and appropriations for coastal and ocean research should be significantly increased, in both the biophysical and social sciences, as is recommended in both the reports of the U.S. Commission on Ocean Policy (USCOP) and the Pew Ocean Commission (POC). This will give us the basis for the rational and

comprehensive management of ocean resources and environments, as well as the means for increasing awareness of issues involving these resources and environments.

The Human Ecology

As a society, in our conceptualization of “environmental issues”, in our research and data collection, and in our construction of public policy processes, we have made the error of focusing too much on the biophysical ecology of coastal and ocean issues. *It is imperative that we have as much documented, valid data and information about the human ecology of environmental issues as we do about the biophysical ecology.* This is not the case at present. For example, virtually all of the scientific components of our federal coastal and ocean management agencies are dominated by natural or physical scientists, with only a small smattering of social scientists. The result of this is that we have been unable to adequately document or judge the tradeoffs between the state of the biophysical ecology and the state of the human ecology that are required for rational, comprehensive policy and management decisions.

Legislative Implications

The immediate application of this situation to current pending legislation in the U.S. Congress is that every piece of legislation that makes reference to “ecosystems” or to “ecosystem management” (for example, the Magnusen-Stevens reauthorization bills) should include as much reference to the human ecology of ecosystems (often termed the “socio-economic” or “socio-cultural” characteristics) as to the biophysical ecology of ecosystems, and that this attention should carry through to the research and application funding process, both within the federal agencies and in extramural funding for social science research.

The Institutional Ecology

The institutional ecology of coastal and ocean governance – ocean and coastal legislation and those entities with authority and responsibility for the implementation of that legislation – in the U.S. is most often correctly characterized as fragmented and single-issue oriented. That is, we have one piece of legislation for marine fisheries, one for offshore oil and gas, one for shipping, one for marine sanctuaries. There is clearly insufficient coordination among these legislative mandates, and among the agencies to which the legislation gives authority and responsibility. There is also a lack of coordination among local, state, regional, national and international levels of policy and policy-making (Cicin and Knecht, 2002; USCOP; POC).

The authority and responsibility for developing, reauthorizing, and implementing this legislation is also fragment and not well-coordinated. For example, a myriad of different committees and subcommittees of the U.S. Congress have authority or responsibility for coastal and ocean legislation, and a myriad of different federal agencies and sub-agencies have authority or responsibility for implementing this legislation (USCOP, 2004; POC, 2003). The major federal “ocean agency”, NOAA, is famously placed in an inappropriate agency, the Department of Commerce (see Wenk, 1972, for the history of this placement). Major authority for coastal and ocean policy also resides in, among others, the departments of Interior (Fish and Wildlife Service, Minerals Management Service), Defense (Navy, Army Corps of Engineers), and in the Environmental Protection Agency (Oceans, Coast and Estuaries), often for policy and management topics very similar to those under the authority of various NOAA entities (National Marine Fisheries Service, Office of Ocean and Coastal Resource Management

(OCRM)). One case of this is the placement of the Coastal Zone Management Program in OCRM/NOAA under the Coastal Zone Management Act, while the National Estuary Program is in Oceans, Coast and Estuaries/EPA under the Clean Water Act.

Much of this split jurisdiction makes both overall policy-making and specific regulatory processes difficult. As an example of the former, a mechanism to mediate conflicts among the mandates of the Magnusen-Stevens Fishery Conservation and Management Act (marine fisheries); the Outer Continental Shelf Lands Act (offshore oil and gas development), and the Marine Mammal and Endangered Species Acts does not exist. All are based on different principles and values, and all direct the federal regulatory agencies towards different goals. Unfortunately, this occurs in a world where the biophysical and human ecologies of marine fisheries, offshore oil and gas development, and marine mammal and threatened and endangered species protection are inextricably intertwined. In the area of specific regulatory processes, one example is that NMFS/NOAA (Commerce) has authority and responsibility for threatened and endangered sea turtles while they are in the ocean, while the Fish and Wildlife Service (Interior) has authority and responsibility for the same turtles when they come ashore to nest (and local and state governments have authority over many of the factors that affect sea turtles, such as beach lighting and beach nourishment).

Legislative Implications

The immediate application of this issue to current pending legislation in the U.S. Congress is two-fold. First, in cases of conflicting legislative mandates regarding the same resources or environments, the legislation should be “harmonized” to give clear policy direction to the appropriate administrative agencies. Second, serious consideration

should be given to the recommendation of both the USCOP and POC that comprehensive ocean policy and planning legislation be passed to reconcile these fragmented and conflicting mandates, authorities and responsibilities under a comprehensive policy and planning framework for coasts and oceans. Such comprehensive legislation would include both attention to specific mandates and agencies (such as the need for organic legislation to establish the structure and function of NOAA, wherever that structure and function may ultimately reside, as proposed by both the USCOP and POC), and to authority and responsibility for overall ocean planning within the U.S. Exclusive Economic Zone in legislative vehicles such as the National Ocean Policy Act proposed by the Pew Oceans Commission. Such legislation could, for example, provide for a comprehensive framework for zoning of the different uses of the EEZ (see Crowder et al, 2006). The current federal Committee on Ocean Policy, established through Executive Order and which reports to the President through the Council on Environmental Quality, has the potential to provide administrative and some policy coordination for coastal and ocean issues. However, such a Committee will not be able to address the overall integration of policy principles that could be accomplished through comprehensive ocean legislation.

The above recommendations apply primarily to activities in the U.S. EEZ, and between and among the U.S. federal government and the states for activities in the EEZ. Bracketing the EEZ, however, are two needs referred to, once again, by both the USCOP and the POC. These are: 1) The need for an ecosystem-based, regional policy and management system for environments and resources that connect the watersheds and EEZ of the U.S. and its Territories, Commonwealths and possessions together, such as is

reflected in the idea of “Regional Ocean Councils” (Nicholas Institute, 2006) suggested by both the USCOP and the POC; and 2) the need for better international cooperation on coastal and ocean policy and management, such as would be reflected in the U.S. ratification of the Law of the Sea Convention and Treaty. Even though the U.S. has implemented virtually all of the elements of the Convention, the fact that the U.S. has not formally ratified the Convention and Treaty is an important omission in our necessary linkage with other countries on coastal and ocean policy issues and processes. This fact is also noted by both the USCOP and the POC.

Summary

The coastal and ocean resources and environments of the U.S. will be well-served by the advancement of the concept of “ecosystem management”. Advancing this concept should include attention to the biophysical, human and institutional dimensions of coastal and ocean environments. These three dimensions must be mapped onto one another to provide a complete picture of our coastal and ocean systems, and to allow rational, comprehensive policy and management processes to be developed, both within the U.S. and in the international community.

References

Cicin-Sain, B. and R. Knecht, 2000. *The Future of U.S. Ocean Policy: Choices for the New Century*. Washington, D.C.: Island Press.

Crowder, L., et al, 2006. Resolving mismatches in U.S. Ocean Governance. *Science* 313:617-18

Nicholas Institute, 2006. *Pathways to Ocean Ecosystem-based Management: Design Principles for Regional Ocean Governance in the United States*. Nicholas Institute for Environmental Policy Solutions. Durham: Duke University.

Orbach, M., 1982. U.S. Marine Policy and the Ocean Ethos. *Marine Technology Society Journal* 16:4:41-49.

Orbach, M., 2002. "Beyond the Freedom of the Seas: Ocean Policy for the Third Millennium". Washington, D.C. National Academy Press

Pew Oceans Commission, 2003. America's Living Oceans: Charting a Course for Sea Change. Washington, D.C.: Pew Oceans Commission.

Revelle, R., 1969. The Ocean. *Scientific American* Special Issue 221:3, September, 1969, pp 55-65.

U.S. Commission on Ocean Policy, 2004. An Ocean Blueprint for the 21st Century. Washington, D.C.: U.S. Commission on Ocean Policy.

Wenk, E., 1972. The Politics of the Ocean. Seattle, WA: University of Washington Press