

Demystifying Ecosystem Management

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I want to relate a few things that struck me as I was listening to the presentations yesterday. One of the questions about ecosystems is, what are they? It seemed to me that most of the talks yesterday failed to address this question. I don't think I have an answer for it either, but it is a question that runs through the literature about ecosystems. What are they? Where are they? What are the boundaries around an ecosystem? Where does it start and where does it end? In some ways, ecosystems do not end anywhere.

One way to think about ecosystems is through an operational definition. For example, IQ is what is measured by IQ tests. According to this approach, an ecosystem is whatever is managed by ecosystem management.

We heard a lot about ecosystem management yesterday. It seems to require a complicated coordination among various levels of government and different agencies, all of which bring in a variety of interested actors or stakeholders. This occurs throughout a given region; ecosystem management has a geographic element as well. All this suggests that what is being managed, the ecosystem, is also complicated. It is a messy mix of resources, which taken together form some kind of a single stock in some region. All these resources form a unit with lots of products—lots of inputs that interact with each other to produce certain outputs.

Besides ecosystem management, we have other institutions for managing complicated, messy, diverse resources. In fact, we have one great big institution for this: the market.

Although the market plays a role in managing ecosystems, it is not well-suited to the task. Consider the Long Island Sound. This is an ecosystem that owes its current condition to the market, albeit modified by an overlay of regulations like the Clean Air Act, the Clean Water Act, and so forth. It is an ecosystem—because we are always in some kind of ecosystem—but it is not the one people involved in ecosystem management want. Long Island Sound does not have enough fish. It has too much crud. Its water and air are not

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clean enough. Its views are not good enough. It does not produce the outputs that we want.

What is wrong with the market's involvement in ecosystems? The market works well for what can be owned. However, ecosystems cannot be owned. An ecosystem cannot be owned as a whole because it is too big. All of the Long Island Sound region, with all its tributaries, is too big for anyone to own. Nor can it be owned in parts. I think this point is actually more important. It cannot be owned in parts, because the parts all interact. For example, I have a house with a lawn in Hamden, Connecticut. I do not like my lawn. I would like to have crabgrass, but my neighbors would not let me. They have nice looking lawns, so I have to have one, too. I need to apply fertilizer and pesticides to keep my lawn looking nice. Some of these chemicals run off into the Sound. Thus, I am part of that ecosystem. My lawn is a part of it too. Although I own my house, I cannot own even a part of the ecosystem to which my lawn belongs, because the part is not separable; what I am doing with my house and lawn interacts with the whole.

Thus, an operational definition leaves us with an image of an ecosystem as a stock of resources that interact with one another. Because an ecosystem as a whole cannot be reduced to property, and because its parts cannot be reduced to property, we lack adequate market signals for determining the value of the parts or of the stock as a whole. Nevertheless, this big interactive stock would benefit from management. It is like a renewable resource. If we treat it well, it will produce more and more of the outputs we want.

We frequently discuss the health of an ecosystem, the need to preserve it in some appropriate condition. For example, we seek to increase the number of wild plants and animals in an ecosystem. But there are competing claims on those resources. In Long Island Sound, one of the competing claims stems from the sewage treatment plants. It will cost a lot to upgrade them to the point where they are not dumping so many nutrients into the Sound. Professor Michael Blumm discussed the Columbia River yesterday and its competing claims.¹ Both the salmon and the dams that produce cheap electricity compete for the ecosystem's resources. Protecting the salmon and the ecosystem as a whole will raise the costs of electricity. However, because we cannot reduce the ecosystem's values to property, it is difficult to estimate their worth. How many salmon do we want? How much of the stock that produces them do we want? How healthy would we like

1. Michael C. Blumm, Remarks at the *Ecology Law Quarterly* Symposium, The Ecosystem Approach: New Departures for Land and Water (Berkeley, Cal., Feb. 21, 1997). See also Michael Blumm, *The Amphibious Salmon: The Evolution of Ecosystem Management in the Columbia River Basin*, 24 *ECOLOGY L.Q.* __ (in this issue).

the ecosystem to be, supposing that we know what ecosystem health really means?

Let me address another issue. It is not clear to me that the preservation of an ecosystem in the abstract is of much interest to anybody, except perhaps to the people in this room. It is a nebulous concept. I have pondered what gets people interested in this great nebulous stock. The answer, I think, is that you need a hook.

What are examples of hooks? One hook is an economic use of a product of the ecosystem. I do not think it is an accident that among the first ecosystem studies were the fish studies in Northern Europe that Dean Harry Scheiber described yesterday.² People wanted to study fish because people eat fish. Fish are valuable in the market. Because fish are a product that people buy and eat, they get people's attention. Thus, an economic use of an ecosystem catches people's attention. It may not do everything for us that we want, but it is a start.

Another hook is property rights. Yesterday Professor Blumm described the property rights of tribes on the Columbia River.³ I once reviewed a book about the industrial development of a river in Massachusetts during the 19th Century.⁴ One of the few things that limited the big dams that industrialists were building was the fact that people had private property rights in the fisheries on the river. This forced those building the dams to install fish ladders. These property rights did not do much, but they were the one thing that stood between the developers of the river and their desire to domesticate it. So property rights are a hook that gets people's attention.

Certain plants and animals can also be a hook. I do not think it was a surprise that the Endangered Species Act⁵ led people to think about ecosystem management. People complain about the Act and about all those warm and fuzzy animals we seem to be protecting. But those warm and fuzzy animals get people's attention. Elephants are charismatic animals, as are tigers and any of the big predator birds. Turning to the Columbia River again, the salmon act as a hook. There are few charismatic fish, but the salmon is charismatic. Thus a particular animal gets people's attention.

2. Harry N. Scheiber, Remarks at the *Ecology Law Quarterly* Symposium, The Ecosystem Approach: New Departures for Land and Water (Berkeley, Cal., Feb. 21, 1997). See also Harry N. Scheiber, *From Science to Law to Politics: An Historical View of the Ecosystem Idea and Resource Management* in this issue.

3. *Supra* note 1.

4. Carol M. Rose, *A Tale of Two Rivers*, 91 MICH. L. REV. 1623 (1993) (reviewing, *inter alia*, THEODORE STEINBERG, NATURE INCORPORATED: INDUSTRIALIZATION AND THE WATERS OF NEW ENGLAND (1991)).

5. 16 U.S.C. §§ 1531-1544 (1994).

Certain locations can also be a hook. When people discuss ecosystem management, they are not talking about ecosystems in a general, abstract way. They are talking about particular places, such as the Long Island Sound, the Chesapeake Bay, the Columbia River Basin. I think the spotted owl controversy was not actually about the spotted owl, but about the old growth forests in the Pacific Northwest. I think that this ecosystem attracted people's attention. The spotted owl was used as a symbol because it permitted the use of a legal hook. The same was probably true of the snail darter controversy years earlier.⁶ I do not think anyone really cared about snail darters. They cared about the ecosystem around the Tellico Dam. They cared about the place. Locations that people become attached to and/or concerned about give them some sense of the value of ecosystem management. An ecosystem approach needs to take advantage of these hooks, and to find the hook in a particular ecosystem that will get people's attention.

Ecosystem management can also expand these hooks. Yesterday Dr. Joy Zedler described educational programs that invite people to look at birds and plants and help them develop an interest in ecosystem preservation.⁷ This is one way that ecosystem management can give people new hooks—more subtle hooks than pandas or eagles.

In summary, I think you need a hook to get people's attention and to show them the value in viewing ecosystems as a whole. However, I think using hooks in *management* is the wrong strategy. Let me explain what I mean. One hook in management is to regulate as much as possible the element that is easiest to regulate. This causes problems. We first encountered these problems in connection with fisheries. Harry Scheiber pointed out that the easiest thing to do was to regulate fishermen; therefore, fishery management focused on regulating the catch in pounds.⁸ This strategy undermined the idea of an ecosystem approach as an interactive system that looks at all the different parts.

The same occurs in other areas. For example, in pollution control, under the Clean Water Act,⁹ we particularly regulate point sources. However, non-point sources, which are harder to regulate, are often the real problem. We should manage the more difficult things, too, because otherwise we lose the sense of a river system or

6. See generally, *TVA v. Hill*, 437 U.S. 153 (1978).

7. Joy Zedler, Remarks at the *Ecology Law Quarterly* Symposium, The Ecosystem Approach: New Departures for Land and Water (Berkeley, Cal., Feb. 21, 1997). See also Joy Zedler, *Adaptive Management of Coastal Ecosystems Designed to Support Endangered Species*, 24 *ECOLOGY L.Q.* __ (in this issue).

8. *Supra* note 2.

9. 33 U.S.C. §§ 1251-1387.

any kind of marine system as an interactive whole. This is also true of strategies for habitat restoration. The easiest target is new land development. The problem is compounded by the fact that the targets realize they are targets, and become angry. If we limit ourselves to regulatory hooks, we are going after a narrow base to protect our ecosystems. Further, the targets know they are a narrow base. Landowners feel put upon, and wonder, "Why me? Why me and not everybody else?" Ultimately, they fight back by bringing takings cases.

Instead of going after the regulatory hooks, we should spread out the costs of supporting ecosystem management. If we do not spread out the costs, we do not get a good gauge of how the public values a given ecosystem, or of the extent to which people are willing to preserve the ecosystem. We need to find a way to determine the level of health at which we desire to maintain the ecosystem stock. Spreading out the costs is one way to assess the strength of our own desire.

Moreover, by failing to spread out the costs of ecosystem management, we are losing a chance to let a broader public think, "This is ours. We helped to pay for this. This is ours. We have a stake in this." Spreading out the costs broadens the base of stakeholders. Ecosystem management needs to use hooks to get people's attention. However, in selecting a management strategy, it should move beyond those hooks and seek ways to distribute the costs, for example by expanding licensing or mitigation requirements.

Finally, there is much discussion in ecosystem management about the importance of science. Science is unquestionably extremely important in helping us to determine how the various parts of the ecosystem interact and what will happen if we pull out one thread. But *we* are the real target of ecosystem management. Not only natural science is important; we also need to employ the social sciences—psychology, economics, and sociology, and we could use the aesthetic and persuasive knowledge of the humanities as well. Ultimately, we need to figure out ways to manage ourselves, to manage the demands we place on these large interactive systems. That seems to me to be the essential task of ecosystem management, and it will require us to deploy a great variety of our intellectual resources.

