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Weighing the Protection of Endangered Species vs. Entire Ecosystems
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Evaluation and Species Preservation

Bryan G. Norton

Since the passage of the Endangered Species Act in 1973, and perhaps before, it has been asked: How can we place a value on an endangered or threatened species?

Many times, this question is asked as if there is an expectation that, sooner or later, someone will give us a definition or a formula, and from that point forward we will be able to plug in a few variables, push a button, and calculate "the" value of species, *x*, and thereby state what we as policy makers should be willing to pay to protect *x*. Such an approach is seductively popular because, if we could get to that point, we would need only to aggregate the values of all species, and have at least a lower-bound estimate of the "value of biodiversity." I'm afraid, however, that if the question is posed in this way, we are no closer to answering it than we were in the 1970s.

Many suggestions have been made as to the best ways to describe, characterize, or measure the value of a species or some element of biodiversity. Perhaps we can begin by listing some of the methods and approaches that have been proposed over the years to place a value on units of biodiversity:

- Economic, Cost-Benefit approaches: Estimate the use, option, and existence values as the willingness of consumers to pay for units of biodiversity, directly or indirectly (Randall, 1986)
- Market approaches: Establish markets in genetic material and option values, and let free market bidders establish a price for units of genetic diversity (Vogel, 1994)
- Ecosystem Services: identify and measure dollar value of units of goods and services that are provided by functioning ecological systems to humans (Costanza, et. al. 1997, Daily, 1987)
- Inherent Values: Each species has inherent value by virtue of its existence (Ehrenfeld, 1979)
- Attributed Intrinsic Value: Humans attribute, out of love and respect for nature, value to elements and aspects of it (Callicott, 1989)

I have argued elsewhere that none of these approaches, taken singly, can capture the whole range of values that humans feel toward, and derive from, natural processes and systems. Here, I will apply this general conclusion to the specific case of biodiversity, and argue that the question, as asked and contextualized above, is unanswerable and best abandoned. I will follow that destructive task with a brief sketch of a new way of thinking about and talking about the process of valuing human-caused ecological change, and with a brief explanation of how the new approach would begin to evaluate threats to species and social values associated with biodiversity.

Part I: Problems in Valuing Biodiversity

A. Placing values on biodiversity: an impasse

Most attempts to place a value on biodiversity begin by characterizing biodiversity as an inventory of items or a list of "units" of diversity. For example, the most commonly used definition of biodiversity is: "The sum total of genetic diversity within species, the diversity of species, and the diversity of habitats in which species adapt and evolve." Then, it seems reasonable to ask, what is the value of a species? What is the value of a given genetic adaptation?

I wish to challenge this whole line of reasoning, and the formulation of the question it implies, because this formulation of the question has led to a confusing stand-off between economists and environmental ethicists. Most writing on environmental ethics concerns the dichotomy between humans and nonhumans, and much of the work in the field has been motivated by the effort to escape "anthropocentrism" with respect to environmental values. Writings in this vein have created an unresolvable conflict with environmental economists, blocking any integration of philosophical and economic discourse. Environmental ethics and environmental economics, as sub-disciplines of philosophy/ethics and of mainstream economics, emerged in the 1970s as academic sub-fields devoted to understanding the ethical and economic relationships between the human and nonhuman worlds. These subfields, unfortunately, came to embody the rhetorical positions of John Muir, the preservationist, and Pinchot, the utilitarian resource manager. Because economists insist that all values are values of human beings (consumers), they are in ontological disagreement with environmental ethicists, who wish to shift the line of moral consideration to include nonhumans and their interests. It is difficult to see what would resolve this disagreement. From 1970 until the early 1990s, these dichotomous formulations dominated environmental ethics because the question of where to draw THE LINE between those beings that are morally considerable and those that are morally irrelevant seemed so seminal a question that the field could not proceed without some resolution of it, and yet discussions of "intrinsic" or "inherent" value shed little light on practical questions about what to do.

We can begin to escape the dilemma by noting that the two theories of value share a common assumption: that prior to *evaluating* a change in nature, we must first identify an element—a *"chunk" or "chunks"* of nature, such as an organism, a species, or an ecosystem. What would happen to the valuational process if we were to reject the idea that values will be assigned to entities or chunks? Suppose, rather than taking our unit of analysis to be an *element* of nature, we take the unit to be a "development path"? A development path can be understood as a way our society or community can move into the future—a scenario that might unfold if we make certain choices.

B. An alternative?

By the 1990s, a few philosophers began to see that this unfortunate stalemate between economic approaches and environmental philosophy rested mainly on ideological commitments and a priori theories. These theories create an impasse because their advocates, for ideological reasons, attempt to reduce all environmental value to a single valuational currency. As noted above, no empirical evidence can be brought to bear upon whether nature has intrinsic value; and commitments to valuing objects as consumable items with a price are likewise based on a priori assumptions, and the choice of a metaphor of nature as a productive machine. Worse, the categorical nature of the debate has encouraged all-or-nothing answers to complex management

problems, and a conceptual polarization that leads to direct oppositions and an inability to frame questions as open to compromise.

If one instead adopts pluralism, accepting the fact that humans value nature in many ways, and if one considers these values to range along a continuum from purely selfish uses to spiritual and less instrumental uses, it is unclear—and not really very important—where to "separate" value into "human" and "nonhuman". If we think of natural objects as having many kinds of value, arguments about why we should protect nature slide into the background and the focus moves to protecting as many of the values of nature as possible, for the longest time that is foreseeable. Leopold, Rachel Carson, and all of the great second-generation conservationists have believed that protecting nature is protecting the future of mankind, and that protecting the future requires protecting nature. By defining humans as ecological beings, it was obvious to them that the destruction of nature would be the destruction of humans.

From Muir to Leopold to Adaptive Managers, there has been a commitment to a convergence on a set of policies that would serve both the goals of saving humankind in the long run, and of saving present elements and processes of the natural world. Of course there will be disagreements about priorities and immediate objectives, but if policies are devised to protect as much of nature as possible for the use and enjoyment of humans for as long into the future as possible, then it is perhaps not crucial whether those values preserved are counted in one theoretical framework or another. Remaining disagreements are more likely to be formulated as testable hypotheses about possible effects of actions, or as disagreements about priorities in the expenditure of resources to pursue various goals. Unlike ideological and ontological disagreements, these latter disagreements are open to test or to negotiation.

The viewpoint advanced here is referred to as *environmental pragmatism*, which is a philosophy of environmental action that begins with real-world problems, not with abstract, theory-dependent questions regarding what kind of value nature has. Environmental pragmatism bypasses the theoretically grounded questions of environmental ethics and focuses on learning our way out of uncertainty in particular situations. Adaptive management is social learning; and pragmatism provides an epistemology adequate to support social learning through experimental adaptation.

Part II: A Fresh Start

Rather than "chunking" nature and aggregating it into entities that are "commodities," and other entities that have intrinsic value and are "consumers," I suggest we set out to evaluate *development pathways*—which are possible paths that development can follow in a place. These pathways can then be evaluated *according to multiple indicators*—which are variables judged important enough to monitor in the process of adaptive management. Adaptive management, and public participation in its discourse, can thus provide a forum for discussion and revision of management goals. Accordingly, its discourse and deliberations must be normative as well as descriptive in nature. Public values will be embedded in the discussion, as arguments are made, and compromise policies are forged, as participants try to influence policies by placing emphasis on one indicator or another. Once important variables are identified for monitoring, public discourse can address questions of priorities: which of the indicators is highest priority. Monitored variables would then represent social values indirectly, as easily measurable indicators are chosen, and priorities are set.

In this way, values can be integrated into a rational decision process without being measured as increments in consumption or welfare associated with a particular chunk of nature, human or otherwise. Evaluation will be by multiple measurable indicators, possibly including economic indicators, but applied holistically to paths of system change rather than as increments to an aggregated sum of utilities of individuals. Since these indicators measure trends in processes believed important by the community that inhabits a place, they allow the comparison of various possible futures according to a variety of value-laden yardsticks. Public debate about values would then shift away from its currently ideological formulation, which causes discourse to get stuck on the question of whose well-being counts, and toward real public policy choices about which variables to monitor as indicators, which goals to set with respect to management performance with respect to those indicators, and how to weight and prioritize the various indicators that emerge from public discussion and stakeholder negotiations. These questions will ultimately come down to questions about how communities, acting through an adaptive management process, expend their resources on management projects. Every management initiative thus becomes an experiment to learn how to do something better—as measured against the list of indicators endorsed as expressing community goals—and goals as well as accumulated scientific wisdom can be reconsidered in the light of new experience.

Once ideological theories are stripped of their a priori claims to represent all environmental value in their single, tortured conceptualizations—once we embrace pluralism of value, the useful ideas that provoke ideological rhetoric—economic analysis may provide useful analysis of how to achieve the goals set by the community efficiently. Intrinsic value theorists—even as they argue among themselves in a cacophony of voices regarding what intrinsic value is—remind us that there are also many situations when our values and principles—of fairness toward others and of non-economic love of a place for what it is—should often trump purely economic considerations. As such, these former ideologies, once they advance their value arguments as explicating one of many kinds of value are reborn as voices advocating strongly for certain values in a participative process of deliberation, problem re-formulation, and deliberation. Central to this deliberation must be a cooperative spirit and a commitment to pursue social learning by testing various possible actions and policies in pilot projects that will improve our understanding by enhancing our experience. The special sciences can be enlisted to seek reliable, and measurable, indicators. The community can then concentrate on choosing goals with respect to those indicators. If one then asks: "But what will the scientists use to guide their recommendations for setting goals with respect to a given indicator?" it is now possible to answer: "We have studied the process that has been chosen as an indicator, and in our scientific opinion, this indicator ought not to fall below X, *because measures below X make it unlikely that the social values and associated goals chosen by the community will be met.*

Part III: Valuing Biodiversity

So far, I have argued that, while the problem of evaluating changes in biodiversity has proved recalcitrant, this difficulty is actually a symptom of a broader confusion about evaluating human-induced changes to natural systems. Attempts to reduce all value of natural entities, including units of biodiversity, to measurable and interchangeable measures of value have proved impossible in the area of biodiversity, but they have also failed more broadly, resulting in ideological disagreements and irresoluble disagreements expressed as ideological commitments. I have also argued that this failure has not been an accident. Attempts to separate nature into

elements or parts inevitably miss the importance of processes that are continuous, inter-related, and impossible to atomize. If we wish to improve our ability to evaluate change to ecological systems, including losses of species and ecosystem functions, we cannot continue to think in terms of elements—whether organisms, species, or functioning ecological systems.

It is time to forge a new path forward. While I cannot provide a detailed map of the way forward, I can suggest some linguistic innovations that may be worth experimenting with. While the concept of biodiversity seems to resonate well with professional scientists, and I think it is important that it maintain its scientific integrity; in the policy world, however, it is difficult to get much traction because the concept of biodiversity has not captured the public imagination. Here is a suggestion; scientists and policy makers should make a conscious effort to find and use rich analogies to describe biodiversity to wider audiences. In keeping with my suggestion that we avoid "chunking" nature when we value it, I suggest that, in conjunction with their use of biodiversity in professional contexts, also communicate the more holistic notion of "the web of life." Empirical research establishes that this concept has much wider resonance and evokes much deeper feelings than does "biodiversity." So, I suggest that, in communicating with the public, we often speak of protecting the "web of life, what biologists call, 'biodiversity.'" This linguistic innovation could lead to a broader conversation about social values associated with biodiversity.

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