Environmental Values and Their Relationship to Ecological Services

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Abstract

Natural environments give rise to value in diverse ways for different people and groups. In this paper, I present a conceptual scheme for how different kinds of value may arise from a natural environment. I use this scheme to illustrate the different ways in which people value natural environments and to clarify the relationship between environmental values and ecological services. The concept of ecological services calls attention to beneficial ecological functions of natural environments that have historically been neglected because they are not priced or traded in markets. When first introduced, the idea of ecological services focused on certain biological and physical services that are important for human well-being, but that often go unrecognized in environmental design and management. As the concept has gained in popularity, however, there has been a tendency to broaden its definition, so that the definition of ecological services now commonly includes all forms of environmental values, from tangible products to cultural, aesthetic, and even spiritual values. Although some of the ways in which value arises from natural environments involve services that nature provides for people, people also may value an environment (or some part of it) for its own sake, even if it performs no services for them. Thus, it is inappropriate to equate environmental values with ecological services. The concept of ecological services contributes to environmental design and management by giving a more complete account of how nature benefits human well-being, including ways that have heretofore been overlooked in society's decisions about natural environments. Attempting to understand all environmental values in terms of ecological services, however, may lead us to misunderstand or leave out of our thinking other important ways in which people value natural environments.

Introduction

Natural environments give rise to value in diverse ways for different people and groups. Various systems and models have been proposed for identifying, cataloging, and considering these values in environmental decisions. Recently, increasing attention has been focused on the idea of ecological services (also called ecosystem services or environmental services; see for example Daily, 1997; Farber, Costanza, & Wilson, 2002; National Research Council, 2004). There does not appear to be consensus on precisely what this term means, but the general intent seems to be to provide a fuller accounting of the contributions that natural systems make to human well-being, in a form compatible with the economic criteria that dominate public and private decision-making in the modern world. By doing this, it is hoped that environmental design and management decisions will give appropriate consideration to essential ecological functions that have historically been neglected because they are not priced or traded in markets.

Because so much of decision-making about environments and land use in modern society is driven or constrained by economic considerations, framing environmental values in economic terms seems like a logical approach to getting them included in society's decision-making process. Indeed, advocates for protecting natural environments and incorporating natural features into the design of built settings have been eager to embrace research showing that natural features and systems provide tangible services that can be measured and assigned an economic value. Despite the current enthusiasm for ecological services, however, I wish to argue for taking a broader view of environmental values, even when doing so does not lend itself to an economic assessment of benefits. Value is a complex concept that relates to many different aspects of human experience and behavior. It may be difficult or impossible to encompass all the relevant senses of the word "value" into a single analytical or conceptual framework. Taking a broader view of values can help us to keep in mind aspects of the human-nature relationship that might be overlooked in an analysis of ecological services, and to grapple with the complexities and ambiguities that often arise in discussions of environmental values.

In this paper, I describe a conceptual scheme for thinking about how different kinds of value may arise from a natural environment. I use this scheme to discuss some of the different ways in which people value natural environments and to examine the relationship between environmental values and ecological services.

Pathways to environmental value

The word "value" is defined in different ways in different disciplines (Brown, 1984). Readers wishing an introduction to the literature on values in natural resource management are referred to review articles by Dietz, Fitzgerald, and Shwom (2005), Farber et al. (2002), and Satterfield and Kalof (2005). For the purposes of this essay, I approach the concept of value in terms of human experience. That is, I understand "value" to mean the feeling or sense of importance, worth, or significance that something has for someone.

Figure 1 illustrates several different ways in which an experience of value may arise from a natural environment. The large rectangle on the left side of the figure represents an environment, with the perimeter of the rectangle corresponding to the environment's spatial boundaries. The smaller boxes located inside the large rectangle stand for things or processes that are part of or that take place within the environment, and the boxes located outside the rectangle stand for processes or things that can take place outside the boundaries of the environment (although they might occur within it as well). Value is experienced at the endpoints of different pathways that begin within the environment. When a symbol indicating value lies inside the rectangle, it means that a person must be physically within the environment to experience that value. When the value symbol lies outside the rectangle, it means that a person may experience that value when they are outside the environment's boundaries as well as when they are within it. The boxes for "design" and "management" at the top of the figure reflect how the values associated with an environment are influenced by human interventions and modifications.

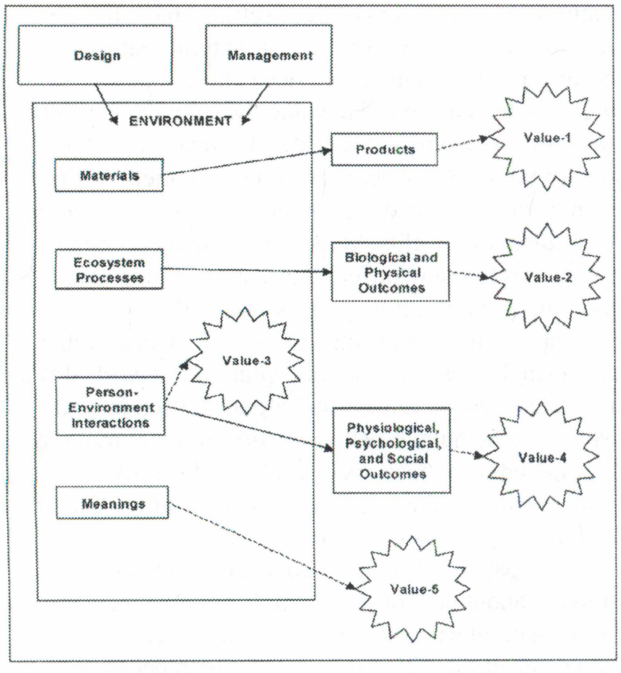

Figure 1. Pathways to ecosystem value.

Natural environments are a source of physical materials, which can be transported out of the environment and used in various ways. These materials may be of value when directly consumed, or they may be used to manufacture products that people value. In the diagram, this is represented by the pathway leading to *value-1*. In terms of the user's experience, value-1 is directly associated with the materials or products at their final point of use, not with the environment from which they came. A person does not have to be in the environment to experience this value, and may not even know where the materials to make the valued product came from. For example, a person can experience the value of owning and living in a house without stopping to think that some of the materials to build the house and its furnishings came from trees and other plants harvested from a natural environment.

A second pathway begins with biological and physical processes taking place within the boundaries of the environment. These may lead to outcomes (that is, changes in the state of the world) that people value or that positively affect their quality of life. Some of these outcomes may extend beyond the boundaries of the environment, for example improved air and water quality in the surrounding region, buffering of storm surges, and mitigation of global warming (Daily, 1997). This is represented by *value-2* in the diagram. A person's experience of this kind of value is directly associated with these final outcomes, rather than with the environments in which the outcomes originated. As with value-1, a person may experience this kind of value without actually being in the environment and may not be aware of where or how the valued outcome arose from the environment. For example, a resident of a flood-prone region may enjoy the benefit of a dry basement without being aware that flood water retention in the watershed upstream from their home helped to create that outcome.

A person's experience of both value-1 and value-2 occurs one or more steps removed from the environment in which the pathway leading to that value

originates. A person may experience these two kinds of value without being involved in any direct contact with the environment itself. *Value-3*, by contrast, occurs only when a person is within the environment and is engaged in some form of direct interaction with it. Value-3 represents the enjoyment or appreciation that occurs during the person's immediate experience of that interaction. The interaction may involve physical activity and movement, such as kayaking on a river or riding a bicycle on a forest trail, or it may be less physically active and more focused on the perceptual experience of the environment, for example the aesthetic appreciation of a scenic landscape. In either case, the value arises in the person's direct experience of their interaction with the environment, which occurs while they are physically within it.

Value-4 also has its origin in a person's direct interaction with the environment. In this case, however, the value derives from subsequent psychological, social, or physiological outcomes of this interaction, which might not occur until after the person has left the environment. For example, as a consequence of walking on a trail in a park, a person may experience improved cardiovascular health, which improves their quality of life beyond just those occasions when they are recreating in the park. Time spent in natural environments may help a person to recover from mental fatigue (Kaplan, 1995) and may reduce symptoms of attention deficit hyperactivity syndrome (Kuo & Taylor, 2004), which may bring subsequent improvements in their performance at work or at school. Other people might also benefit from outcomes of a person's contact with a natural environment. For example, an increase in job performance may mean higher productivity and more profits for the person's employer. A reduction in mental fatigue may make a person less irritable and more enjoyable for their family and friends to be with. As with value-1 and value-2, a person's experience of value-4 is directly associated with these subsequent outcomes and not with the environment itself. A person might experience this value without being aware that it is a result of their (or someone else's) earlier interaction with a natural environment.

Value-5 stems from the many ways in which the experience of being in a natural environment or a place can evoke meanings that are important for a person. Examples of such meanings might include sense of place (Williams & Stewart, 1998), community identity, and knowledge of the natural, historical, or cultural aspects of a place. Value-5 also includes meanings that a place or environment has for a person when they are not currently in it, such as memories from visiting a place in the past, family connections to a particular area, or symbolic meanings associated with a particular kind of environment or land use, such as wilderness (Cole, 2005). Meanings are readily communicated from one person to another and can be formed based on indirectly obtained knowledge about an environment, for example by reading about it, hearing friends tell about it, or seeing it in movies or on TV. Thus, to experience value-5, a person does not necessarily need to have ever been in the environment.

Relationship between environmental values and ecological services

The diversity and complexity of ways in which value can arise from a natural environment leads to the question of how the different value pathways in Figure 1 relate to the notion of ecological services. When the idea of ecological services first began to appear, the discussion focused mainly on biological and physical functions of natural environments that are important for human well-being, but which often go unrecognized. In a National Research Council (1999) report about the values of natural systems, for example, ecosystem services were included as one heading under the general category of biological values. Ecosystem services in that report included things like water purification, erosion control, pollination, and protection of coastal zones from storm damage. Ecosystem services were seen as a special subset of biological values, while social and cultural values were treated as a separate class of values.

But as the concept of ecological services has gained in popularity, there has been a tendency to broaden its definition, so that now many people define ecological services as an all-inclusive category that covers all forms of environmental values, from production of tangible products to social, cultural, aesthetic, and even spiritual values. For example, the Millennium Ecosystem Assessment (2003), following the lead of De Groot, Wilson, and Boumans (2002), includes four broad categories of ecosystem services, ranging from products such as food, fresh water, and fuel to "cultural services" such as spiritual and religious benefits, aesthetics, inspiration, sense of place, and cultural heritage. Thus, the tendency now is to subsume all forms of environmental value under the rubric of ecological services.

A service by definition is an activity performed by

someone or something for the benefit of somebody else. Thus, when we speak of "ecological services," we are viewing the environment in terms of how it serves our desires and needs. Our focus of concern—what we value—is not the environment itself, but the things that it does for us. This way of looking at environmental values seems appropriate when we consider value-1, value-2, and value-4. For those kinds of value, it is the products and outcomes derived from the environment that have value, and as noted above, a person might experience the value of these services without even realizing that a natural environment was involved in creating them. An ecological services approach makes an important contribution by explicitly identifying these kinds of values and their linkages to the natural systems from which they originate.

Some instances of value-3 might also be appropriately conceptualized as ecological services. For example, for a person engaging in a recreation activity, the environment may have value because it provides the necessary conditions and features that allow the activity to be enjoyed. What the person actually values is the recreation activity, and the environment performs a service by enabling the activity to occur. In other cases, however, a person's immediate experience may involve a sense of appreciation for the environment (or some part of it) in and of itself. In this case, the experience of value is not so much concerned with what the environment can do for the person as with the environment as an entity that is valued for its own sake. For at least some people, experiencing aesthetic appreciation for an environment involves valuing the environment for the beautiful place that it *is* rather than for what it *does* for the person. To speak of this kind of value in terms of ecological services may not be an accurate representation of the way in which such people value places and things that they love.

Similar considerations apply to value-5. In some instances, an environment or place may play an enabling role in evoking or representing a meaning that is central to a person's or group's sense of identity. For example, a natural feature such as a tree might take on symbolic meaning because of a key historical event that occurred there. If the feature is not valued for its own sake but functions as a carrier of a valued symbolic meaning, then it might be appropriate to consider this to be an ecological service. On the other hand, the meanings that people find in natural environments and places sometimes do focus on the environment or place *per se*, as an entity worthy of admiration for what it is in itself. A person's attachment to a natural environment may involve a sense of respect and obligation that motivates the person to care for and protect a place for its own sake. If the term "ecological service" is to be applied to this situation, then it must be understood more broadly, to include not only how environments serve the needs of people, but also how people feel called on to serve the needs of environments, places, and ecosystems.

The distinction I am making here—between valuing a natural environment for the services it provides to humans versus valuing it (or some part of it) for its own sake—is similar but not identical to the distinction between instrumental and intrinsic value, which is a focal issue in discussions and debates about environmental values and ethics (Light & Rolston, 2003). I am not, however, arguing that natural environments and systems have objective value or moral standing independently of the human beings who value them. I am simply pointing out that people are capable of valuing and caring about natural environments, places, and things for what they are in themselves, rather than only valuing them instrumentally as a source of goods and services (see Sagoff, 2009).

The fact that people can and do value nature for its own sake is reflected in several areas of environmental research. Economists have created the concept of existence or nonuse value to account for the fact that people may value a natural place or thing even if they never make any actual use of it (Freeman, 2003; Krutilla, 1967). Research on existence value suggests that it may be based in part on a moral and ethical concern toward nature that cannot be captured in economic cost/benefit analysis (Brookshire, Eubanks, & Sorg, 1986). In a study of environmental attitudes and beliefs, Stern and Dietz (1994) drew a distinction between egoistic, altruistic, and biospherical value orientations, with the latter defined as a concern for the wellbeing of non-human species or the whole biosphere. Biospheric concern may be related to a personal sense of empathy with and inclusion in nature (Schultz, 2000; Schultz, Shriver, Tabanico, & Khazian, 2004). Studies of ecosystem restoration volunteers found that they may be motivated by a strong desire to defend and help threatened natural organisms and systems that they perceive as struggling for survival (Grese, Kaplan, Ryan, & Buxton, 2000; Schroeder, 2000). In the place attachment literature, Brooks, Wallace, and Williams (2006) suggest that recreationists develop committed relationships with

valued places in much the same way as they do with other people. In all these cases, it appears that natural environments and organisms are valued and appreciated for their own sake and not just as a source of services.

Attempting to cast all environmental values as ecological services could lead us to draw some inappropriate conclusions concerning human interactions with natural places. For one thing, if what we value are the services provided by the environment and not the environment itself, then we must consider whether there are other ways to provide these same services. Perhaps we can substitute a service provided in one environment for an equivalent service provided in another environment some distance away—or perhaps we could even derive the same service from a non-natural source. This assumption of substitutability is the basis for establishing markets for trading ecological services, for example carbon credits (Hoover, Birdsey, Heath, & Stout, 2000). This is a reasonable assumption for carbon sequestration and for many other instances on the value-2 pathway, but it may not be so reasonable for some instances of value-3 and value-5.

If, for example, we think of sense of place as an ecological service, then we might conclude that a unit of sense of place in one location can substitute for a unit of sense of place somewhere else. If a management action diminishes sense of place in one location, then we might think we could compensate by creating an equal or greater amount of sense of place at a different location. We might even set up a market for trading sense of place, analogous to what has been done for carbon credits. But this runs counter to the very definition of sense of place, which is place-specific and non-substitutable (Mitchell, Force, Carroll, & McLaughlin, 1993; Williams, Patterson, Roggenbuck, & Watson, 1992). It may be inappropriate to think of sense of place as an ecological service, because it is not the *sense* of a place that is valued, but the unique *place* itself.

The distinction between valuing something for what it *is* versus valuing it for what it *does* for us is not always clear-cut, however. An awareness of the many ways in which an environment enhances a person's life may, over time, lead the person to have a sense of appreciation for the environment itself, that goes beyond a simple valuing of the services provided. At the same time, when a person cares about an environment or a place for its own sake and not simply out of concern for their own self-interest, this may create a deeper sense of meaning and purpose in that person's experience of their own life. This enhancement of a person's life experience arguably could be considered an ecological service. Thus, valuing natural environments for the services they provide is not mutually exclusive with valuing them aesthetically, emotionally, or spiritually for what they are in and of themselves. In a person's experience of an environment, these two different ways of valuing may exist side-by-side, mutually reinforcing each other. Thinking about all environmental values *only* in terms of services, however, could limit the ways in which we can understand and experience environmental values and the human-environment relationships on which they are based.

Conclusions

The concept of ecological services makes an important contribution to environmental design and management by increasing awareness of certain ways in which nature contributes to human well-being—ways that have often been overlooked in society's decisions about natural environments. It is not appropriate, however, to subsume all the ways in which people value environments under the umbrella of ecological services. Services represent one way in which value can arise in the relationship between a person and a natural environment, but it is not the only way. In a person's relationship with the natural world, as much as in their relationship with another person, the experience of value can arise out of a sense of gratitude, compassion, justice, obligation, attachment, identity, respect, or beauty, even when no service is being performed.

A key question in this regard is whether it is the environment *per se* that is valued, versus some product or outcome provided by the environment. If the latter, then it seemingly would make no difference whether the service is provided by the environment or in some other way. Attempting to encompass *all* environmental values in an ecological services framework seems to imply that natural environments in and of themselves have no value for people, that their degradation or destruction need not concern us as long as we have alternative ways of obtaining the same services at a reasonable cost. This does not accurately describe the full range of ways in which people experience and care about nature.

The concept of ecological services seems most useful and relevant for the pathways to value-1, value-2 and value-4 in Figure 1. Much of the current interest in ecological services does in fact focus on value-2 and value-4, which have hitherto not been adequately

recognized in environmental design and management. Research on ecological services is providing the conceptual and analytical tools we need for identifying and taking into account these important services. But if we come to rely on a single concept such as ecological services to understand all forms of value that arise in the relationship between humans and nature, we may misunderstand or leave out of our thinking other important aspects of how people value environments and places, particularly for value-3 and value-5. By keeping our thinking open-ended and drawing on a broad range of concepts for environmental values we may be better able to understand and represent these values in environmental design and management.

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