



Ecosystem management in the Greater Yellowstone Ecosystem : a coupling of human and natural systems  
by Crystal Carleen Stanionis

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Earth Sciences  
Montana State University  
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**Abstract:**

The Greater Yellowstone Ecosystem (GYE) is one of the last, relatively intact temperate-zone ecosystems in the world. It is often invoked as a region that is ideal for the application of ecosystem management, yet no single plan or initiative currently exists for the area as a whole. Ecosystem management is seen as an alternative to traditional natural resource policies—those that been carried out within the confines of administrative units and have managed for a single species or a certain natural resource use. Ecosystem management differs from these policies in that it is holistic in its approach: it strives to manage whole ecosystems, which can cross numerous administrative boundaries, with the goal of achieving environmental sustainability.

While there is an established body of literature that reviews the Greater Yellowstone Ecosystem in context of ecosystem management, no studies have explicitly explored the connections between stakeholder recognition of the Greater Yellowstone Ecosystem and ecosystem management. Thus, the two objectives of this study are to 1.) investigate the extent to which the GYE concept is recognized by various GYE stakeholders, and 2.) critically examine this recognition in terms of the prevalence of the ecological and human themes of ecosystem management. The research uses the information contained within management and land use planning documents from a variety of sources and administrations within the GYE. Additionally, a questionnaire survey of residents of Bozeman and Red Lodge, Montana and Jackson, Wyoming is used to assess current knowledge of, and attitudes towards, the GYE and ecosystem management. The results indicate that many GYE stakeholders recognize the Greater Yellowstone ecosystem concept, and they do so in a variety of ways that represent both the ecological and the human themes of ecosystem management. The geographic concept of “place” facilitates interpretation of these results and aids in developing a perspective of the GYE as a coupled human-environment system. This research extends the current definitions of ecosystem management that are largely ecological, to more fully include human systems.

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A thesis submitted in partial fulfillment  
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APPROVAL

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This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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## ABSTRACT

The Greater Yellowstone Ecosystem (GYE) is one of the last, relatively intact temperate-zone ecosystems in the world. It is often invoked as a region that is ideal for the application of ecosystem management, yet no single plan or initiative currently exists for the area as a whole. Ecosystem management is seen as an alternative to traditional natural resource policies—those that been carried out within the confines of administrative units and have managed for a single species or a certain natural resource use. Ecosystem management differs from these policies in that it is holistic in its approach: it strives to manage whole ecosystems, which can cross numerous administrative boundaries, with the goal of achieving environmental sustainability.

While there is an established body of literature that reviews the Greater Yellowstone Ecosystem in context of ecosystem management, no studies have explicitly explored the connections between stakeholder recognition of the Greater Yellowstone Ecosystem and ecosystem management. Thus, the two objectives of this study are to 1.) investigate the extent to which the GYE concept is recognized by various GYE stakeholders, and 2.) critically examine this recognition in terms of the prevalence of the ecological and human themes of ecosystem management. The research uses the information contained within management and land use planning documents from a variety of sources and administrations within the GYE. Additionally, a questionnaire survey of residents of Bozeman and Red Lodge, Montana and Jackson, Wyoming is used to assess current knowledge of, and attitudes towards, the GYE and ecosystem management. The results indicate that many GYE stakeholders recognize the Greater Yellowstone ecosystem concept, and they do so in a variety of ways that represent both the ecological and the human themes of ecosystem management. The geographic concept of “place” facilitates interpretation of these results and aids in developing a perspective of the GYE as a coupled human-environment system. This research extends the current definitions of ecosystem management that are largely ecological, to more fully include human systems.

## CHAPTER 1

### INTRODUCTION

The Greater Yellowstone Ecosystem (GYE) is located in the northwest of Wyoming, south-central Montana, and southeast Idaho. The GYE has been cited as the pre-eminent laboratory for ecosystem management (Primm and Clark 1996), yet currently, no single, area-wide ecosystem management plan exists in the GYE. Additionally, no analyses have been undertaken to determine if and how the GYE concept or facets of ecosystem management have become established in the area. This research will fill this gap through its two objectives: 1.) to investigate the extent to which the GYE concept is recognized by various GYE stakeholders, and 2.) to critically examine this recognition in terms of the prevalence of the ecological and human themes of ecosystem management. The findings that come forth from these enquiries will provide new and critical insights regarding management in the GYE, and do so through conceptual frameworks and methodologies that have not been used to-date for analysis of ecosystem management in the GYE.

The philosophy of ecosystem management will provide the overarching conceptual framework used in this study. The geographic concepts of space and place will be invoked as secondary frameworks, and explicitly in relation to ecosystem management. Although ecosystem management has not been extensively studied in relation to the geographic concepts of space and place, these concepts have great potential to influence the success of ecosystem management initiatives.

Chapter 1 explores ecosystem management and space and place in more detail, and provides a rationale of why the academic discipline of geography is positioned to study ecosystem management. Chapter 2 describes the physical, social, and administrative characteristics of the GYE, and explores the history of the GYE concept and past experience with ecosystem management in the area. Chapter 3 analyzes federal, state, and county GYE land use plans to determine if each plan does, or does not, recognize that particular unit's spatial inclusion in the GYE. These results are then analyzed in the context of ecosystem management themes. Chapter 4 presents two case studies of on-the-ground management in the GYE and then analyzes to what extent this management recognizes the GYE and how this recognition is, or is not, representative of certain ecosystem management themes. Chapter 5 presents the results of a survey conducted among GYE residents. This chapter draws conclusions about resident familiarity with the GYE and ecosystem management, and explores respondents' knowledge of and attitude toward ecosystem management themes. Chapter 6 reviews all of these findings within the context of how ecosystem management in the GYE might move forward.

### Ecosystem Management

Ecosystem management is a management philosophy that signifies a shift from commodity-based natural resource management to holistic-based natural resource management (Booth and Kessler 1996, Szaro et al. 1998b). Salwasser (1999, 87) states quite bluntly, "It is not just another name for the way things have always been done." Rather, ecosystem management is an ecologically based approach to management that

addresses whole systems and environmental relationships across varying scales, and while it allows for the management of single ecosystem components, the management is framed within a larger whole (Szaro et al. 1998a).

The emergence of ecosystem management stems in part from current environmental issues that exhibit greater political, economic, social, and cultural complexity than in the past—issues such as the maintenance of habitat corridors, and the protection of fisheries, for example (Haeuber 1996). Its popularity as a management philosophy also stems from a growing awareness and acceptance of environmental values that are seen as conflicting with traditional resource management objectives (Burroughs and Clark 1995, Cortner and Moote 1999, Bengston et al. 2001). Although ecosystem management philosophy is gaining ground in natural resource management, there is not a single, widely accepted definition of ecosystem management (Bengston et al. 2001). In fact, Yaffee (1999) notes that the only agreement about ecosystem management is that the term means different things to different people, and some have noted that the development of ecosystem management is reflective of a paradigm shift in natural resource management (Lackey 1998, Cortner and Moote 1999).

Yaffee (1999) argues that five natural resource management paradigms ultimately frame scientists' and managers' views of ecosystem management: dominant use, multiple use, environmentally sensitive multiple use, an ecosystem approach to resource management, and ecoregional management. According to Yaffee, these paradigms differ in their management goals and principles, their biotic and spatial focus, and their view towards the role of humans in ecosystems. Subsequently, these views have translated into different definitions of and approaches to ecosystem management. Still, Yaffee

notes that within the ecosystem management literature there is a “remarkable degree of consensus about the broad principles of ecosystem management,” and notes that most of these principles fall within the paradigm of an ecosystem approach to resource management (Yaffee 1999, 714). Yaffee states that despite academic and philosophical differences over ecosystem management, practitioners are implementing facets of ecosystem management philosophy because many see ecosystem management as a better approach to managing natural resources than the past status quo (Yaffee 1999).

Yaffee (1999) further notes that much consensus about the themes of ecosystem management has emerged. Three seminal works provide insight into this consensus. In 1994, in response to a growing body of ecosystem management literature, Edward Grumbine published a seminal paper in which he summarized what had been written about the topic through 1993 (Grumbine 1994). This summary produced 10 dominant themes common to ecosystem management definitions: 1.) hierarchical context, 2.) ecological boundaries, 3.) ecological integrity, 4.) data collection, 5.) monitoring, 6.) adaptive management, 7.) interagency cooperation, 8.) organizational change, 9.) humans embedded in nature, and 10.) values (Grumbine 1994). Grumbine offered his own definition of ecosystem management, which can be found in Table 1. In 1997, Grumbine revisited these ten themes, and found them to still be sound and applicable (Grumbine 1997).

Claudia Geotz Phillips built on Grumbine’s (1994) work by compiling an inventory of recent definitions of ecosystem management (Phillips 1997). Some of these definitions appear in Table 1, and have been augmented by selected definitions that have emerged since 1997.

Table 1. Ecosystem Management Definitions.

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Ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integrity over the long term. *Grumbine 1994,31*

Ecosystem management is the optimum integration of societal values and expectations, ecological potentials, and economic plus technological considerations. The philosophy of ecosystem management is to sustain the patterns and processes of ecosystems for the benefit of future generations, while providing goods and services for each generation. *Everett et al. 1994:7-8*

Ecosystem management implies a process . . . . . humans cannot avoid decisions about natural resources, and . . . those decisions should be supported with knowledge of the physical, biological, and social relationships that define ecosystems. *Lucier 1994, 21*

Ecosystem management is a system of making, implementing, and evaluating decisions based on the ecosystem approach, which recognizes that ecosystems and society are inexorably linked and always changing. *Maser 1994, 307*

Ecosystem management emphasizes the integration of ecological, social, and economic factors at different temporal and spatial scales to maintain a diversity of life forms, ecological processes, and human cultures. *Salwasser and Pfister 1994, 151*

Ecosystem management represents shifts in the way we do business, indeed in the way we view and interpret society. . . . Ecosystem management is not a static program with a beginning and ending date, but rather involves concepts and principles that evolve and adapt along with changes in science, economics, and demographics. *Staebler 1994, 5*

Ecosystem management is generally viewed as management that promotes ecological, economic, and social sustainability. *U.S. House of Representatives, Committee on Natural Resources 1994, xi*

Ecosystem management is the integration of ecological, economic, and social principles to manage biological and physical systems in the manner that safeguards the ecological sustainability, natural diversity, and productivity of the landscape. *Wood 1994, 9*

Ecosystem management is management driven by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure and function. *Christensen et al. (Ecological Society of America Committee on the Scientific Basis for Ecosystem Management) 1996, 665*

Ecosystem management is managing areas at various scales in such a way that ecosystem services and biological resources are preserved while appropriate human uses and options for livelihood are sustained. *Brussard et al. 1998, 9*

Ecosystem management is the process of managing and understanding the interaction of the biophysical and socioeconomic environments within a self-similar, self-maintaining regional or larger system. *Slocombe 1998b, 31*

Ecosystem management can be thought of as the minimum set of tools a land manager should have available in attempting to define sustainable alternatives for the interactions of people and the environment. *Sexton 1998, 103*

Ecosystem management is an approach that attempts to involve all stakeholders in defining sustainable alternatives for the interactions of people and the environments in which they live. *Szaro et al. 1998b, 1*

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Phillips also composed her own definition of ecosystem management:

Ecosystem management is an integrative, interdisciplinary, and adaptive approach to policymaking, planning, and management, at all levels, that is grounded on the best available scientific information, recognizes the uncertainties of science and the dynamic nature of ecosystems, and acknowledges that humans and ecosystems are inexorably linked. The primary goal of ecosystem management is to sustain and/or restore ecosystem integrity, which includes biological diversity and the ecological patterns and processes that support that diversity at all spatial and temporal scales. (Phillips 1997, 63)

In relation to those presented in Table 1, Phillips' definition is very inclusive in that it touches on several themes that Grumbine (1994) lists as major ecosystem management themes, including hierarchical context, adaptive management, interagency cooperation and humans embedded in nature. In common with Grumbine's definition in Table 1, Phillips also places significant emphasis on the importance of ecological integrity. Ecosystems with high ecological integrity exhibit a historical structure, species composition, and disturbance regime because of natural processes that occur in the environment (Brussard et al. 1998).

In support of her definition, and as a result of a thorough literature review, Phillips also developed a list of ten goals for ecosystem management initiatives. These goals are provided in Table 2.

Another seminal work in the field of ecosystem management appeared in 1996, when the Ecological Society of America published the final report of its appointed Special Committee on the Scientific Basis of Ecosystem Management. The Committee's own definition of ecosystem management appears in Table 1. In addition to this

Table 2. Goals of Ecosystem Management. Source: Phillips 1997, 64.

- 
1. Maintain ecosystem integrity—protect total native diversity and ecological patterns and processes.
  2. Manage based on natural processes—manage with regard to ecosystem constraints and ecological principles.
  3. Sustain ecosystems for the long-term—maintain and/or restore ecosystem diversity, health, and productivity.
  4. Manage within the context of an ecological hierarchical organization—study ecosystem patterns and processes at varied geographic and time scales or within ecological time frames; give priority to ecosystem boundaries over political boundaries.
  5. Develop and adopt an interdisciplinary approach—manage using interdisciplinary teams of researchers, managers, educators, and citizens.
  6. Facilitate public involvement—directly involve the public in the decision-making process; encourage collective decision-making or consensus building.
  7. Integrate scientific research, policy, and management—develop a strong scientific basis for management decisions; promote stronger teamwork among scientists, managers, and policymakers.
  8. Incorporate adaptive management procedures—develop site-specific monitoring and evaluation schemes to assess ecosystem changes over time.
  9. Develop educational programs and provide for informational exchange—promote awareness and understanding of ecosystem processes and constraints; facilitate the transfer of information within and across disciplines and agencies.
  10. Accommodate human use and occupancy—operate with people in mind; determine and incorporate human desires and requirements in the planning and decision-making process.
- 

definition, the Committee listed eight essential elements of ecosystem management: 1.) long-term sustainability, 2.) clear, operational goals, 3.) sound ecological models and understanding, 4.) understanding complexity and connectedness, 5.) recognition of the

dynamic character of ecosystems, 6.) attention to context and scale, 7.) acknowledgement of humans as ecosystem components, and 8.) commitment to adaptability and accountability (Christensen et al. 1996, 669). Additionally, the Committee noted four steps and actions that could facilitate moving ecosystem management from concepts, to practice: 1.) defining sustainable goals and objectives, 2.) reconciling spatial scales, 3.) reconciling temporal scales, and 4.) making the system adaptable and accountable (Christensen et al. 1996, 666).

Many commonalities can be found amongst the themes and goals of ecosystem management as described by Grumbine (1994), Phillips (1997), and Christensen et al. (1996). For example, the need for adaptive management and the need to give attention to hierarchical scales appear in the work of all three authors. Four commonalities, however, will frame most discussions within the research in this thesis—1.) the importance of ecological integrity, 2.) the need to work across administrative boundaries, 3.) the need for interagency cooperation, and 4.) the recognition of humans as ecosystem components. Each of these ecosystem management themes will be briefly discussed here, and later expanded upon as particular research warrants.

### Ecological Integrity

The maintenance of ecological integrity is explicitly noted by Grumbine (1994) and Phillips (1997) as necessary to ecosystem management. Ecosystem integrity, in a management context, entails protecting native diversity and the ecological patterns and processes that maintain diversity (Grumbine 1994). Christensen et al. (1996) do not specifically mention ecological integrity as an essential ecosystem management

component, but the notion is embraced through two components that they do list: sound ecological models and understanding, and complexity and connectedness. Christensen et al. note that ecosystem management based on sound ecological principles emphasizes the role of ecological processes and interconnectedness. Additionally, they note the importance of biological diversity in their discussion of complexity and connectedness.

### Ecological Boundaries

The need to work within an ecological boundary, as opposed to only within single administrative or political boundaries, is another common theme of ecosystem management that emerges from the work of Grumbine (1994), Christensen et al. (1996), and Phillips (1997). Boundaries imposed by humans on the landscape rarely coincide with ecological processes, and this can often result in piecemeal decision making that can be ecologically harmful (Christensen et al. 1996). Citing the work of Freyfogle (1996), Grumbine (1997) notes that boundaries are not influential because they can distinguish between public and private lands, but because they can constrain thinking. Grumbine (1997) also notes that managers are realizing through ecosystem management that responsibilities begin at boundaries, rather than end.

### Interagency Cooperation

To achieve management across ecological boundaries, there is a need for interagency cooperation, another dominant theme in ecosystem management. An ecosystem management approach necessitates a broad view, and traditional boundaries used in management and planning must be transcended. Inherent in this is the need for multiple stakeholders to collaborate in planning and management (Phillips 1997).

Christensen et al. (1996) similarly note that a productive way to reconcile conflicting spatial scales that are created through the presence of administrative boundaries is to identify stakeholders and coordinate activities. Although Grumbine, Phillips, and Christensen et al. do not specifically address planning at regional scales, other authors such as Reichman and Pulliam (1996), Sportza (1999), and Brunckhorst (2000) stress that regional planning is important in the context of ecosystem management. These arguments will be elaborated on in Chapter 3.

#### Humans as Ecosystem Components

The final theme that will be used in this research is the notion that humans are ecosystem components, and thus there is a human element to ecosystem management. Grumbine (1994), Phillips (1997), and Christensen et al. (1996) each recognize humans as part of ecosystems, and encourage public involvement in ecosystem management initiatives. While Grumbine (1994) and Phillips (1997) both explicitly mention humans in their definitions of ecosystem management, Christensen et al. (1996) do not. However, Christensen et al. (1996) do address the human component of ecosystem management outside of the context of an ecosystem management definition: "Ecosystem management is at least as much about managing human activities as it is about managing lands and waters. A major promise of ecosystem management is its potential to integrate human activities and conservation of nature" (Christensen et al. 1996, 676).

How to integrate human activities and the conservation nature is not a topic that has been extensively discussed within the ecosystem management literature, even though authors such as Szaro et al. (1998) and Yaffee (1999) argue that human activities are

often at the center of debates concerning ecosystem management. Many of the dominant themes of ecosystem management have been developed in the context of conserving nature (i.e. ecological integrity, ecological boundaries, ecosystem sustainability), and although Field (1996, 249) notes that "humans are back in the ecosystem" in twenty-first century natural resource management, it is not clear how humans fit into the ecosystem management equation. The definitions of ecosystem management that exist, and the discussions that occur throughout the ecosystem management literature, bring to the forefront the fact that there is no agreement on how humans should interact with ecosystems. As a result, there are competing visions of how ecosystem management might play out on the landscape.

For instance, several authors have called for human societies to live sustainably within their environments in order to achieve other ecosystem management goals such as ecosystem integrity (Slocombe 1993b, Grumbine 1994, Wood 1994, Galindo-Leal and Bunnell 1995, Brussard et al. 1998, Sexton 1998, Szaro et al. 1998b, Brunckhorst and Rollings 1999, Salwasser 1999). This argument suggests that societies may have to change their present way of interacting with the environment to ensure the success of other ecosystem management goals. On the other hand, other authors have argued that ecosystem management strategies must develop from and be based on local, cultural understandings of the ecosystem in question (Booth and Kessler 1996, Driver et al. 1996). This argument suggests that some ecological goals of ecosystem management may have to take on lesser importance in order to preserve or ensure the continuation of local culture.

Of course not all members of a particular society or culture view the ecosystem in which they live in the same manner. Within any society or culture there will be a diverse array of stakeholders who affect and are affected by natural resource management decisions. Including all of these stakeholders in ecosystem management initiatives has been noted as necessary for success, especially in terms of collaborative goal and decision making (i.e. Galindo-Leal and Bunnell 1995, Cortner 1996, Driver et al. 1996, Szaro et al. 1998b, and Bengston et al. 2001). Shindler and Cheek (1999) specifically note that broad public involvement is integral to environmental planning and management, because without it, very little public ownership of environmental plans will develop. As Booth and Kessler (1996) note, however:

People have complex cultural, economic, and spiritual linkages with the forests and rangelands, whether they actually reside there or are visitors. Human relationships to ecosystems include people's subsistence and recreational activities, their lifestyle choices and means of livelihood, their historical roots, their cultural identities, their family and community traditions, their environmental ethics (Booth and Kessler 1996, 235)

Thus, the challenge inherent in ecosystem management is how to reconcile the views of a potentially diverse set of stakeholders, and to do so while trying to promote the ecological goals of ecosystem management. This can be a difficult task. Cortner (1996) has noted that the inclusion of a value-diverse public can result in environmentally damaging decisions. Along the same lines, Slocombe (1993b) notes that local stakeholder involvement can lead to varying standards of ecosystem management.

Consequently, difficult questions arise when considering the human dimension of ecosystem management: To what extent should value-diverse stakeholders influence the outcome of ecosystem management goals such as ecological integrity? To what extent

should local stakeholder needs and wants be met first, and ecological needs met second? To what extent should current human cultures change to meet the various goals of ecosystem management?

There are no straightforward answers to these questions, which is perhaps why questions such as these are not readily addressed in the ecosystem management literature. Moreover, the academic interest in ecosystem management has been centered in the ecological sciences, and not the social sciences. As is presented in the following section, however, several concepts stemming from the social sciences could aid in the understanding and implementation of ecosystem management. The concepts will not answer the aforementioned questions, but they bring a fresh and important perspective to ecosystem management discussions.

### Space, Place, and Ecosystem Management

Many of the dominant themes of ecosystem management are grounded in the ecological sciences, but ecosystem management has a large social component as well. After all, ecosystems are social constructions (Wallace et al. 1996). Greider and Garkovich (1994) note that cultures transform natural environments into culturally meaningful phenomena [i.e. ecosystems] as cultures struggle with the meaning of nature and the environment.

Cronon (1996) provides additional insight into various cultural meanings of nature, noting that all meanings of "nature" are human constructions that are entangled with human values and assumptions. Thus, "nature" is a reflection of people, rather than the things labeled as "nature." He specifically notes that the commonly held view that

“nature” is “not of our own making” is problematic. Cronon describes this view as “nature as naïve reality” and criticizes it because “nature as naïve reality wants us to see nature as if it had no cultural context, as if it were everywhere and always the same. And so the very word we use to label this phenomenon encourages us to ignore the context that defines it” (Cronon 1996, 35).

Cronon brings to the forefront that nature is both a cultural construction and that it occurs within a cultural context. Because ecosystems are one way to describe nature, it follows that ecosystems, too, are cultural constructs and occur within a cultural context. Such a context relates to the geographic concepts of space and place. Agnew (2002, 5) explains both terms:

Space signifies a field of practice or area in which a group or organization (such as a state) operates, held together in popular consciousness by a map-image and a narrative or story that represents it as a meaningful whole. Place represents the encounter of people with other people and things in space. It refers to how everyday life is inscribed in space and takes on meaning for specified groups of people and organizations.

The notion of place has been explored by a variety of academics. Caragata (1998) notes that “place” brings to mind not only physical and spatial meanings, but social meanings as well. Tuan states, “What begins as undifferentiated space becomes place as we get to know it better and endow it with value” (Tuan 1977, 6). Sack notes that places are “fundamental means by which we make sense of the world and through which we act” (Sack 1992, 1). As cited in Smith et al. (1998, 4), Carter (1988) argues that, “by the act of place-naming, space is transformed symbolically into place, that is, a space with a history.” Foster (1995) notes that although one space can contain many different

meanings of place, all places have three primary characteristics: a landscape setting, a set of associated activities, and significance to people.

While places can be named and described, place boundaries are rarely concretely defined. Norton and Hannon (1998) note that physical geographers and ecologists usually employ place boundaries based on physical characteristics while planners and social scientists from geography and anthropology employ boundaries based on perception and cultural factors.

In relation to ecosystem management, the notions of space and place are relevant because currently, ecosystem management philosophy has the tendency to treat ecosystems as spaces, or "nature as naïve reality." From an ecology perspective, ecosystems are often spaces on a map that can be delineated with a line and spoken of in ecological terms, without cultural context. For instance, Christensen et al. (1996) state that ecosystem management is about managing human activities within ecosystems — as if human activities are separate from and inconsequential to the ecosystem. ✓

Ecosystems are much more, though: they are places. More often than not, people will live within an ecosystem that an ecologist delineates for the application of ecosystem management, or at a minimum, people will visit it or otherwise have some kind of personal affinity to it. Ecosystems, no matter their size, have meaning to people, to organizations, to institutions. Ecosystems can be symbols—to some perhaps a symbol of naturalness, perhaps to others a symbol of wildness that should be tamed. Thus, ecosystems are not only ecologically complex, they are socially complex because of the multiple meanings of place that people ascribe to an ecosystem. Additionally, multiple meanings of ecosystems as places can also stem from spatial variability on the landscape

itself, when for example, administrative units within an ecosystem have particular management strategies that result in different meanings of place.

Thus, when ecosystem management is proposed for managing particular ecosystems, recognizing these ecosystems as places can help in visualizing and understanding the complex cultural environment in which this management will potentially take place. This in turn allows a more comprehensive discussion of ecosystem management to emerge. Thus, in addition to discussing the ecological principles of ecosystem management, recognizing ecosystems as places can promote a discussion of human-environment interactions and bring forth a realization that ecosystem management will occur within a human-valued area. Ecosystem management has a better chance of success with such a realization, because the reality on today's landscape is one of coupled human-natural systems.

Additionally, recognizing ecosystems as places can aid in the implementation of ecosystem management itself. When ecosystem management is proposed as a way to manage an area in which people live, fostering a common place identity can be the beginnings of successful ecosystem management. Caragata (1998) notes that when there is a common understanding of place, this understanding can act as a social unifier, and can be helpful in forging public identification and ownership of an area. Similar arguments have been made by Graham and Healey (1999). Such identification and ownership (or connectedness) have been noted as important factors in environmental protection, which is arguably what ecosystem management strives to achieve. For instance, Foster (1995, 3) notes that "place connectedness" is important to environmental pursuits. He postulates that where similar meanings of place are found across a

landscape, a common environmental awareness will arise, which can subsequently be a powerful force for ecosystem-wide action. Similarly, Hough (1990, 179) stresses that connections between regional place identity and the sustainability of an ecosystem are “essential and fundamental.” He also notes that a regional environmental literacy is needed for a regional place identity, and stresses that for people to have a regional place awareness, the place in question must be a part of people’s everyday lives. Simonson (1989) notes that to know a place is to know its context. In speaking of the importance of human connections to place he adds, “We vandalize, pollute, plunder and ravage what is separate from us; we revere, protect and cherish what we belong to” (Simonson 1989, 145).

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These authors demonstrate the important connection between place identity and environmental protection. Foster and Hough specifically note the connection between regional place identity and regional environmental protection. Because ecosystem management commonly strives to sustain whole ecosystems, which are often found at a regional scale, these authors’ findings are appropriately extrapolated to ecosystem management. In other words, an important link exists between regional place connectedness (or identity) and the potential success of ecosystem management.

The challenge in fostering a common place identity is that a particular area can have several place-meanings. The key, then, is to find commonalities amongst a diverse public. Cheng et al. (2003) note that it is possible to find such commonalities even among traditional adversaries such as “environmentalists” and “loggers” and that it is important to do so in order to inspire collective action.























































































































































































































































































































































































