CHAPTER 9

Environmental Psychology: Mapping Landscape Meanings for Ecosystem Management[1]

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Ecosystem management should not be the end product of our inability to control ourselves. It should be the first step toward discovering place, coming home. Grumbine, 1992, p. 242).

Introduction

An intellectual map is a good starting point for any effort to integrate research on the human dimensions of ecosystem management. We must remember going into such exercises, however, that every map maker imposes a certain point of view, sense of order, or set of conventions in the effort to represent the world. Just as there are competing ways to divide the landscape into ecological or social units, there are many ways to divide intellectual territory. One interpretation of the relevant intellectual domains to be integrated and applied to ecosystem management is the list of disciplines (chapters) that make up the present section of this volume. Also influencing how the world will be represented is the selection of authors to write these chapters. This chapter was described as *social psychology* in the original prospectus for the book, but we prefer to characterize our subject matter as *environmental psychology*. We explicitly excluded subject matter from behavioral psychology, humanistic psychology, personality, psychophysiology, and cognitive science, though these are all relevant. On a broad intellectual map, psychology is the place where individual differences in attitudes, values, and beliefs are usually charted. For the purpose of identifying and suggesting ways psychology can contribute to this integrated effort we need to briefly describe how we would locate environmental psychology on the intellectual map before discussing the details of the terrain within its borders.

Environmental psychology is contextually rich and methodologically diverse—qualities that, for reasons we hope will become obvious, are particularly germane to the challenge of integrating social science into ecosystem management. It grew out of disciplinary challenges within psychology, particularly experimental social psychology, and also a broader "environmental" movement within social science and related design and planning professions (e.g., architecture, landscape architecture, and urban and regional planning planning). A relatively young subject area, its emergence in psychology coincides with the appearance of the

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late 1960s environmental movement, but also reflects concerns within social psychology about the external or "ecological" validity of laboratory experiments. Beyond the obvious emphasis on environmental matters, an important reason for focusing on environmental psychology in this chapter is that it is a particularly integrative and eclectic area within social science.

Environmental psychology involves studying human-environment relationships from a variety of perspectives, ranging from documenting relatively tangible and objective properties of the environment that shape and influence human behavior, to mapping relatively subjective and symbolic meanings attributed to landscapes or places by people. A key feature distinguishing research in environmental psychology from the rest of psychology is the emphasis of the former on embedding psychological phenomena within a large-scale or "molar physical" environment as opposed to examining human behavior in microsocial or laboratory settings. Thus, environmental psychology constitutes the branch of psychology that is most likely to situate the individual in an ecological context. It views the individual both as embedded in the environment and as actively defining and giving shape to it.

If we take seriously the view that people are part of the ecosystem, then good ecosystem management requires a thorough map of landscape meanings. An important theme in this chapter is that such a map necessitates adjustments in how we currently view human-environment relationships. This chapter will discuss the concept of environmental meaning, present a framework that characterizes different approaches resource managers may adopt to study and understand landscape meanings, review current applications and knowledge gaps associated with each approach, and conclude by suggesting six principles to guide the integration of social science into ecosystem management.

Environmental Meaning

The first step in developing our framework on human-environment relationships is to examine the concept of environmental meaning. The human mind is essentially a meaning-making system (Bruner, 1990). It seeks to impose meaning on the world through the acquisition and application of culturally transmitted cognitive structures or mental representations of the world, which in everyday parlance are commonly recognized as taxonomies, categories, norms, rules, grammars, and so forth. Most of the human disciplines in some way struggle to understand and articulate the meaning of places, things, events, and relationships and describe how these meanings are acquired and transmitted. Each discipline naturally has its own interpretation. For psychology, ***meaning*** refers to the interpretation or context an individual perceiver associates with a stimulus event and can generally be understood as constituting ideas, values, and beliefs (Sack, 1992). Sociological approaches emphasize symbolic meanings and how these are mediated through interaction with objects, events, or places in a social context (Greider & Garkovich, 1994). Anthropology seeks to understand the meaning system of a given culture (Geertz, 1973), hence symbols (objects, words, the environment) objectify meaning.

In this chapter we interpret meaning broadly. In addition to cognitive representations of the world in conscious awareness, we take meaning to include emotional interpretations of events and interpretations rendered at low levels of conscious awareness. Meaning includes adaptive or functional interpretations of the environment that seem inherent in the stimulus itself; e.g., properties such as stimulus complexity described by Ulrich (1983). Other meanings, perhaps some of the most important ones for ecosystem management and environmental conflict, constitute symbolic, cultural, and expressive meanings that develop through social interaction and are embedded in social practices and institutions.

Given the primacy of the concept of value in resource planning and policy, a few comments directed at disentangling meaning from value are in order. A perceiver can recognize that a tree affords (has meaning for) climbing, framing a house, making paper, sheltering spotted owls, or contemplating one's place in the universe. The value of an object like a tree to humans, however, is in the importance attached to its various meanings; that is, the value is derived from an object's various meanings (Page, 1992). To illustrate it another way, meanings that are never perceived cannot be valued. As new meaning is perceived, say for wilderness as heritage or a tree as a source of a cancer drug, then a value or preference can be assigned to it. In many contexts, however, the act of identifying something as holding a particular

meaning is to imply indirectly that one values that meaning, thereby confounding the two concepts. Focusing on meaning, particularly intangible or symbolic meaning, helps managers understand the broader social processes that create, negotiate, and assign value, and reminds managers that many important meanings and values are not identified through exchange or market transactions alone, if at all.

Even more important than understanding how meaning in general is created, maintained, transmitted, abandoned, or destroyed (ostensibly the work of social scientists), is for resource managers to be able to identify the particular meanings various individuals, groups, or cultures assign to specific pieces of the landscape and understand the extent to which people agree or disagree on these meanings. A pragmatic approach to the problem of meaning is simply to characterize the range and diversity of meanings people seem to associate with objects, events, and places. A particularly useful framework for structuring place meanings is Fournier's (1991) description of three characteristics of the meanings attached to objects: tangibility, commonality, and emotionality.

Tangibility refers to whether "meaning is primarily objective, tangible, and verifiable through the senses or whether it is primarily subjective, interpreted through experience and dependent on associations"—that is, whether "meaning is resident in the object itself or in the mind of the user" (Fournier, 1991, p. 738). Rapoport (1982) makes a similar distinction between instrumental/manifest meanings and latent meanings. *Instrumental* and *manifest* (also *functional*) refer to obvious, common-sense meanings reflecting concrete ways an object or place is used, ways that more or less transcend culture. Hence the smooth ground affords walking, a tree affords climbing, a body of water affords fishing. Moreover, new tangible meanings of objects and places can be "revealed" or created through natural science and technology. With technology, trees have come to afford framing a house or making paper. In contrast, latent or symbolic meanings carried by an object or place are assigned to it by a culture, social group, or an individual. Thus, a grove of redwoods might afford contemplating one's spiritual place in the universe or represent the home to an assortment of fabled and feared creatures.

Overlapping somewhat with tangibility, the *commonality* dimension refers to the degree to which meanings are shared versus being highly individualized (Fournier, 1991). For example, many tangible meanings are held in common because of their biological or instrumental (adaptive) significance. Infants quickly learn that a smooth ground surface affords locomotion. In addition, some intangible meanings, reflecting a social definition of an environment, are held in common to the extent they are shared through social interaction and communication among members of a group (Appleyard, 1979; Stokols, 1990). Wilderness and national parks come to mind, but an even more intangible example of commonality might be the way an historic site (e.g., the American Civil War battlefield at Gettysburg) comes to take on shared symbolic meaning. As little more than a grassy field, there is a dearth of tangible features in such a place to indicate the significance of the human events that transpired there. Consequently, monuments are added to consecrate or memorialize it. Shared meanings allow for effective communication and facilitate social integration; however, in some important contexts, highly personalized or unique meanings (such as those associated with favorite places or cherished objects) may serve an equally valuable function of differentiating the individual from society (Fournier, 1991). Thus, while many natural areas or parks have shared, culturally-specific public meanings, individual users often come to personally identify with such areas, transforming these cultural meanings into something of personal significance.

Where tangibility and commonality refer to the source of meaning, the *emotionality* of meaning is associated with arousal, intensity, or depth of attachment (Fournier, 1991). For environmental meanings, emotionality may vary in intensity from immediate sensory delight to long-lasting and deeply rooted attachment (Tuan, 1974). The emotional dimension can refer to ephemeral feelings and moods associated with a particular experience of a place, for example, when standing on the rim of the Grand Canyon for the first time or finding the name of a loved one on the wall of the Vietnam War Memorial. In a more enduring sense, emotionality often focuses on place attachment as a deep emotional or affective bond between an individual or group and a particular place (Giuliani & Feldman, 1993). Representing the intensity of meaning, emotionality is the most variable and individualized aspect of meaning and consequently a focal point for natural-resource conflict. In sum, emotionality can be thought of as an indication of the depth or extent of meaning with symbolic and spiritual meanings often associated with high levels of attachment to an object or place.

Building on this basic conceptual grounding for meaning, an important feature of our framework is to show that meanings exist within an ecological context, that places or landscapes represent socially constructed systems of meaning. The concept of *place*, as it is defined in human geography, involves understanding how the landscape is related to local human culture and history (Sagoff, 1992). Place constitutes meaning-filled space. As Tuan notes (1977, p. 6) "what begins as undifferentiated space becomes place when we get to know it better and endow it with value." Moreover, viewing meaning as place defining comports well with a major feature of ecosystem management, which is to enlarge the spatial and temporal context of management decisions. Attending to larger scale processes (moving from typically site or stand level to landscape or ecosystem level) presumably facilitates a more integrated view and understanding of the impacts of resource policies and management. Thus, the requirements of a social science suited to the needs of ecosystem management involve not just a more inclusive understanding of the realm of meaning, but must also address the expanded spatial and temporal scales emphasized in ecosystem management. For ecosystem management, the concept of place draws our attention to the processes by which resources and ecosystems are socially and politically constructed.

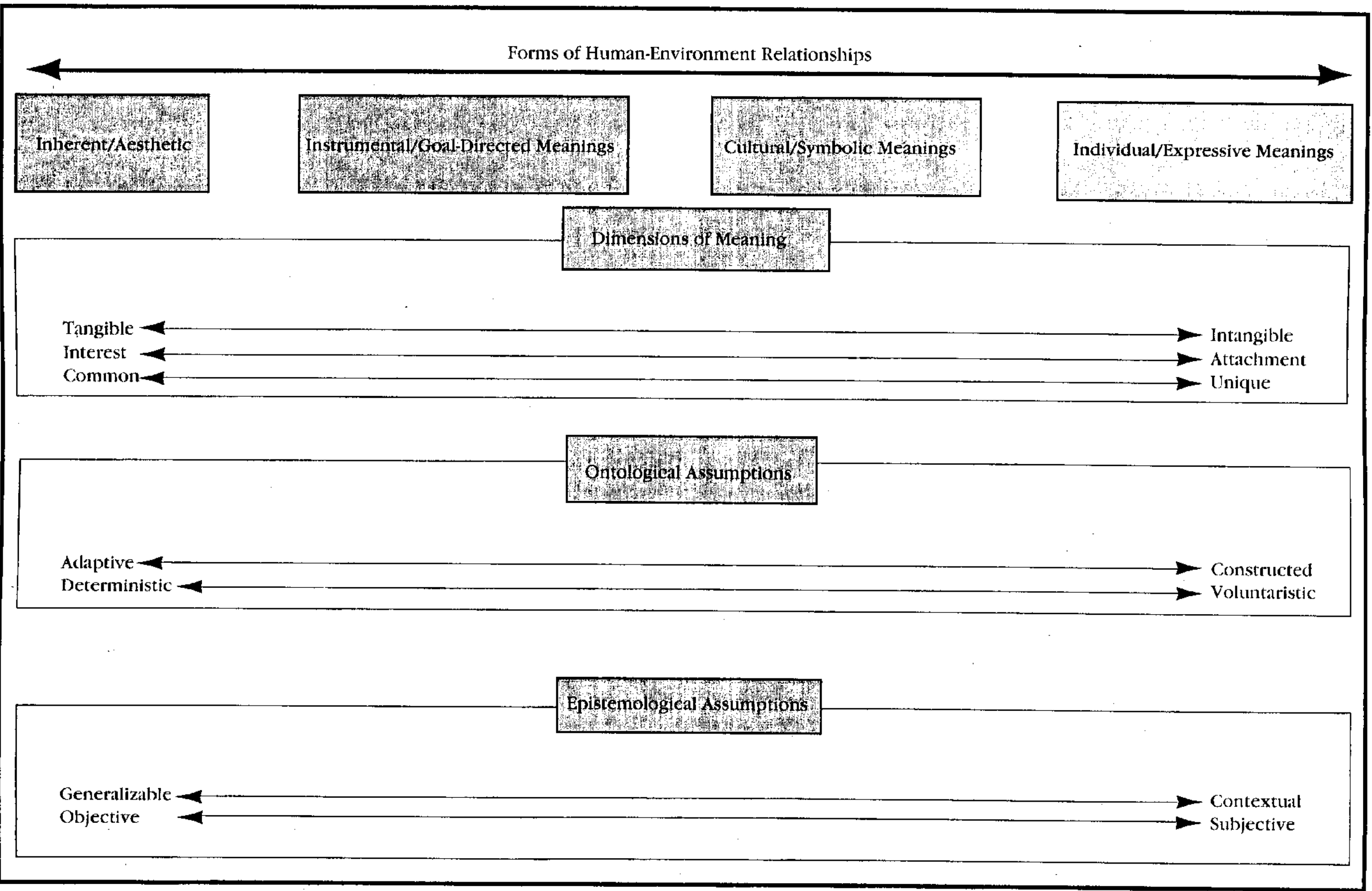
Finally, a very important goal of our framework is to clarify the ontological and epistemological assumptions behind the various models of human-environment relationships. The shift in management philosophy from multiple-use utilitarianism to ecosystem management implies more than a geographically explicit understanding and assessment of the meaning and value of a landscape; it also challenges fundamental philosophical assumptions underlying the conduct of science (Patterson & Williams, 1997). The ontological assumptions of social science refer to the assumptions social scientists make about the nature of reality. These assumptions differentiate forms of human-nature relationships as to whether human behavior is adapted to and determined by a reality composed of separable parts or involves the actions of voluntary agents actively constructing a more holistic reality. Epistemology has to do with how humans (and social scientists) come to know reality, with contrasting points of view ranging from generalizable and objective knowledge to contextual and subjective knowledge. In sum, viewing ecosystems as repositories of socially constructed meanings (i.e., places) has implications for what counts as ecosystem knowledge, how we conceptualize and value ecosystems, and how we integrate this knowledge into theory and practice.

A Framework for Mapping Landscape Meanings

Having developed some of the philosophical and conceptual background on human-environment relations, environmental meaning, and place, we can now describe our framework for mapping landscape meanings. This framework recognizes four approaches to understanding the meanings people assign to natural landscapes: inherent/aesthetic, instrumental/goal-directed, cultural/symbolic, and individual/expressive (Figure 9.1). In addition to their distinct ontological and epistemological assumptions, each approach conceptualizes environmental meaning in distinct ways as described by Fournier's (1991) three dimensions: tangibility, commonality, and emotionality.

To date, the application of environmental psychology to forestry and natural resource management has focused primarily on the first two forms of meaning: inherent/aesthetic and instrumental/goal-directed (Williams & Patterson, 1996). Each of these two forms is represented by several well-developed research topics within human dimensions research (e.g., Scenic Beauty Estimation and Contingent Valuation respectively). Moreover, because these approaches address relatively tangible environmental qualities that can be linked more or less directly to the physical properties of the environment, they have been readily integrated into the utilitarian philosophy that has long guided resource management and planning. This ability to link meaning to physical attributes has facilitated inventory strategies that allow resource managers, in principle, to integrate various and competing aesthetic and instrumental meanings in prioritizing land-management goals. In contrast, the cultural and expressive forms of meaning, often the most intangible and contentious forms of environmental meaning, have received little attention in resource management. While they have been the subject of environment and behavior research, there has been little systematic effort to map these meanings within natural resource management, a prospect made more difficult by the lack of correspondence to on-the-ground features.

Figure 9.1
Framework for mapping landscape meanings



Inherent/Aesthetic Meanings

Landscape aesthetics and scenic quality research have been vigorous and important research topics within environmental psychology. Much of this research, though by no means all, has followed the ontological and epistemological assumptions that are associated with Saegert and Winkel's (1990) adaptive paradigm in environmental psychology. Within the adaptive paradigm, research is tied to the premise that biological survival motivates behavior; hence, psychological functioning has evolved to meet adaptive needs. Human perceptual systems are seen as having adapted to facilitate functioning in an uncertain information environment. One implication of this is that human responses to viewing natural landscapes are theorized to be more preferred, pleasant, and beneficial than responses to viewing highly modified or developed landscapes. Aesthetic meaning, in this adaptive sense, carries certain assumptions about methods, limits, and the nature of our knowledge of adaptive reality. As adaptive responses, aesthetic preferences are embedded in innate relationships between the organism and its environment as opposed to being learned, socially acquired (constructed), or volitional responses. Moreover, responses are seen as determined by multivariate stimulus properties (e.g., intensity, pattern or complexity, color, etc.). Knowledge about the underlying determinants of aesthetic responses to the landscape is seen as objective and highly generalizable across time and place. Thus, meaning is determined at a biological level as a predictable response to features of the environment.

From these assumptions, aesthetic meanings can be characterized as relatively tangible, commonly held, and emotionally evocative. First, aesthetic meanings are readily tied to on-the-ground (tangible) features of the resource that can lead to generalizable predictions about the environmental factors that influence scenic quality judgments (Hull, 1989). Second, aesthetic evaluations reflect a widely shared (common) basis for evaluating the quality of amenity resources. Empirically-based scenic beauty research indicates that different observers generally make similar aesthetic judgments (Daniel & Vining, 1983; Ulrich, 1983). Third, empirical research on landscape aesthetics is very much anchored in theories of emotion and the adaptive value of affective appraisals of the landscape. Scenic or aesthetic responses are associated with immediate feelings of pleasantness and interest that appear to be innate reactions (i.e., involving minimal cognitive processing) to landscape properties (Ulrich et al., 1991).

As a basis for understanding meaning and value of natural landscapes, aesthetic meanings are more than cosmetic concerns about nature. Natural environments appear to have an intrinsic capacity to promote healing and mental restoration (Kaplan, 1995; Kaplan & Kaplan, 1989; Ulrich, 1993). Aesthetic models appear to map important meanings of the landscape with considerable reliability, sensitivity, and commonality (Daniel & Vining, 1983). Aesthetics research at this point supports the notion that aesthetic meanings can be sufficiently isolated from other meanings of the landscape to warrant some attempt to inventory them. Further, aesthetic types of meanings are tangible (in that they can be mapped onto the landscape using formal, psychophysical, and psychological theories of "beauty"), emotionally potent, and provide a widely shared and valued basis for natural resource decision making. Thus, a fully integrated assessment of an ecosystem should include some effort to map the aesthetic meanings of the landscape under consideration.

Instrumental/Goal-Directed Meanings

As reflected in the instrumental or commodity paradigm that has historically guided resource management, the predominant way of assigning meaning to natural landscapes has been to assess a resource's capacity to promote behavioral and economic goals. Most of 20th century natural resource management has been guided by this interpretation of resource meanings and values. Consequently, the social science of evaluating instrumental meanings is quite well-developed, drawing a great deal from social psychology and microeconomics (see Williams & Patterson, 1996) and a number of good reviews of these efforts are available (see Decker & Goff, 1987; Peterson, Driver, & Gregory, 1988). The assumptions behind an instrumental view of environmental behavior closely follow what Saegert and Winkel (1990) identified as the opportunity structure/goal-directed paradigm within environmental psychology. Humans are viewed as rational planners who select the best options within a system of sociophysical opportunities and constraints. Environmental appraisals are made based on the goal-fulfilling potential of the environment. Ontologically, the instrumental view gives the individual more autonomy (volitional choice) as to how to

prioritize needs and goals than the aesthetic model, but retains a level of determinism by assuming that, given a certain goal, there is some defined set of environment-utility contingencies (environmental features) that determine the usefulness of a given resource for a given goal. An individual's particular goals are subjective and contextual, but the relation between environmental features and the potential to meet particular behavioral goals is seen as objectively determined and more or less generalizable across space and time.

Within the instrumental paradigm (and much like the aesthetic approach), landscape meanings reflect tangible, goal-related properties of the environment. For the instrumental goal of producing saw timber, resource managers collect a wealth of data on the biophysical properties of the land to project or forecast "yields" of timber. The sciences of forest mensuration and silviculture are largely dedicated to the process of inventorying forest properties and prescribing management treatments to shape a forest's potential to enhance various meanings (i.e., produce economically, politically, and/or socially determined sets of forest products like sawtimber or scenery). Even amenity uses such as recreation and tourism presuppose functional or dependent relationships to the environment—a lake or stream affords fishing, remoteness affords solitude (Driver, Brown, Stankey, & Gregoire, 1987). As to commonality, instrumental meanings reflect shared biological or functional relationships (i.e., bodies of water afford irrigating crops, swimming, fishing, etc.) and cultural associations learned through socialization (i.e., nature as an opportunity to escape social pressures). Though cultures operate on shared "theories" of meaning (nature affords solitude), individuals often differ in the extent to which they value a particular meaning (goal). Thus, the sheer diversity of uses, goals, and potentialities that can be associated with a given environment (the diversity of the clientele groups and the uses they seek to make of the natural resources) limits the generality of instrumentally oriented assessments. Emotionality, from the instrumental perspective, represents a narrowly defined hedonic appraisal of the product, service, or experience, one lacking the intensity, depth, and dimensionality of many emotional assessments. In consumer research, these appraisals are generally defined using constructs such as satisfaction or quality. As Hunt (1977, p. 459) described it some time ago: "Satisfaction is not the pleasurableness of the experience, it is the evaluation rendered that the experience was at least as good as it was supposed to be."

Ecosystem management involves, at some level, recognition that this instrumental approach to defining environmental meaning is inadequate by itself. Though resource management will continue to benefit from assessments based on instrumental relationships, it has limitations. The emphasis of the instrumental, goal-directed view is to think of resources as means rather than ends (Gee, 1994; Williams, Patterson, Roggenbuck, & Watson, 1992). Inherent in the instrumental view of natural resources is the notion that environmental settings are theoretically interchangeable, even reproducible, given that the replacement provides a similar combination of goal-fulfilling attributes. This perspective works well for many commodities and services (e.g., sawtimber) that are relatively generic and homogeneous with respect to meaning. Ignored, however, are the intangible meanings attached to a given landscape—meanings not necessarily determined by the resource uses or activities that occur there. As we recognize that resources are also places and ecosystems, we begin to assign unique meanings to them. There is only one Yellowstone, one Great Barrier Reef. Some meanings associated with an environment do not derive so much from how it can be used but simply from what it represents symbolically. Meaning, instrumentally defined, fails to adequately address the more emotional, symbolic, and spiritual benefits of wildlands and how these are socially produced.

Cultural/Symbolic Meanings

Inherent/aesthetic and instrumental/goal-directed inventories represent important and widely used procedures for characterizing the meaning of natural resources. A third way of characterizing human-environment relations within environmental psychology involves mapping sociocultural or symbolic meanings (Saegert & Winkel, 1990; Stokols, 1990). The sociocultural approach reflects a conceptual shift away from predominantly stimulus-based (inherent) and intrapersonal (instrumental) explanations of behavior toward those that view meaning as socially constructed within the cultural, historical, and geographical contexts of day-to-day life. From a sociocultural perspective, for example, the same forest can symbolize ancestral ways of life, valued commodities, or essential livelihood to different groups of people. Thus, an

environment can acquire varied and competing social and political meaning through its association over time with particular activities or groups.

The primary dimension of meaning distinguishing sociocultural approaches from the others discussed to this point is tangibility. Stokols (1990) contrasts sociocultural/symbolic approaches (which he labels *spiritual*) with the dominant instrumental (tangible) view within environmental design and management. Stokols describes the instrumental perspective as providing the means to achieve technological solutions to environmental problems through an understanding of an environment's capacity to promote behavioral and economic goals. In contrast, the symbolic or spiritual approach to environmental planning views the environment as an end in itself rather than as a tool—"as a context in which fundamental human values can be cultivated and the human spirit can be enriched" (Stokols, 1990, p. 642). From the sociocultural view, natural resources are valued not only for instrumental purposes, but also exist as *places* that people become attracted to and even attached to because such places possess emotional, symbolic, and spiritual meaning. However, despite increasing recognition that symbolic meanings of the environment are important, they remain poorly represented in environmental decision making (Greider & Garkovich, 1994).

The question of how humans establish the commonality of social and symbolic meaning is a major theme within social theory. On the one hand, belonging to a community of shared meaning consists of responding to one another according to mutual expectations. On the other hand, each person has a unique biography that creates the potential for unexpected or idiosyncratic responses (Sederberg, 1984). Thus, meaning involves a dialectic tension between structural determinism and human agency. From the structural point of view, meanings are given by the culture/group and represent shared rules characteristic of a group (Giddens, 1984). From the human agency (voluntaristic) perspective, social reality is not a social fact imposed on the individual through the socialization process, but a meaningful construction arising from intersubjective experience (Greider & Garkovich, 1994).

Symbolic meaning is generally viewed as more emotionally rich than instrumental meaning (Stokols, 1990). For the more tangible aesthetic and goal-directed approaches, emotion or affect is viewed as an immediate experience of the environment (an emotional episode) arising from a specific interaction with a place (Hull, 1991). Thus, emotion is associated with "being in" the setting. From a sociocultural perspective, however, emotion is a relatively enduring affection for a place built-up through a history of experiences in the place. In this case, the emotion is not a direct result of any particular experience of the place, but involves some level of emotional investment in the place built up over time.

Individual/Expressive Meanings

Like the sociocultural approach, interest in individual expressive meanings emphasizes a socially constructed and more voluntaristic view of reality. The study of expressive meaning, however, is even more deeply rooted in a subjectively oriented phenomenology (Altman & Low, 1992), emphasizing individual-level processes and a recognition that individuals have the potential to assign intangible and relatively unique meaning to places and things. Unlike aesthetic and instrumental meanings, expressive meanings do not apply so much to abstract classes of environments or their separable features as they do to specific, holistic places. The significance of individual/expressive meanings is captured in the concept of *place-identity*. According to Cuba and Hummon (1993), "place identity arises because places, as bounded locales imbued with personal, social, and cultural meanings, provide a significant framework in which identity is constructed, maintained, and transformed" (p. 112). With involvement and attachment to places, individuals actively construct and affirm a sense of self. The places we frequent help to communicate to ourselves and others "who we are."

Interest in individually held meanings has often focused on concepts of place attachment and identity as affective bonds to place (Giuliani & Feldman, 1993). Place attachment can be thought of as an emotional dimension of meaning—as an indication of the intensity, depth, or extent of meaning—with symbolic and spiritual meanings associated with high levels of attachment. These attachments can be distinguished from other emotional processes (i.e., scenic beauty, subjective utility) by the emphasis of the former on bonds, ties, and linkages. In contrast, scenic-beauty research reflects the perspective of a temporary visitor reacting primarily on the basis of appearance and immediate, short-lived emotional responses

(Kerr, 1995). The distinction is that attachment refers to enduring affect associated with a place that must be developed through interaction with the setting over time. These bonds have generally been examined in association with home, neighborhood, and community, but some attempts have been made to relate place attachment to natural or outdoor landscapes (Williams et al., 1992).

Some might argue, as Rapoport (1982) has, that individual meanings are largely irrelevant to environmental planning, design, and management because they do not provide a common basis for understanding the meaning and value of place. The problem with this interpretation is that, in reality, people do assign individualized meanings to environments and respond to resource-management issues on the basis of these meanings. The process of "individualization" (differentiation of individual identity from society) is important within a modern, Western society. Within American society, the frontier, wilderness, and everyday natural landscapes have been, and remain, particularly important contexts within which individual identity is situated and affirmed. Along the same lines, Brandenburg and Carroll (1995) describe places as both ***enabling*** people to create individual meanings that deviate from those held by the primary social group or community and ***embedding,*** because places have meanings associated with them that can be passed along to the individual from the social group. Thus, it is important to recognize such meaning and use of nature in land use decision making even though the specific meanings are highly individualized. People are likely to resist management actions that threaten their individual sense of self.

Management Applications and Knowledge Gaps

The preceding section represents an attempt to map the conceptual domain of environmental psychology while identifying concepts relevant to ecosystem management. The present section attempts to (a) describe research efforts linking these broad and integrative concepts to more specific managerial concerns, and (b) indicate where there are gaps in the research. With respect to the application of environmental psychology to ecosystem management, one general aim of this research is to identify "inventoriable" environmental properties that characterize important aspects of human-environment relationships. Another aim is to map the relationship between these properties and human behavior. As we noted in the previous section, the procedures for identifying and mapping aesthetic and instrumental meanings are well-developed; however, significant conceptual, methodological, and substantive knowledge gaps exist in efforts to inventory and characterize cultural and expressive meanings of landscapes. Consequently, the discussion of aesthetic and instrumental meanings will emphasize existing applications over knowledge gaps, whereas the discussion of cultural and expressive meanings will emphasize knowledge gaps over substantive insights.

Mapping Aesthetic and Instrumental Meanings

Of the four approaches to understanding human-environment relationships characterized in Figure 9.1, approaches exploring the aesthetic properties of environments have the longest history in natural resource management. The driving force behind much of this research has been the National Environmental Policy Act and related legislation requiring federal agencies to assess the impacts of management activities (e.g., timber harvesting, roadside mowing, etc.) on the scenic quality of landscapes. From an applied management perspective, two different theoretical models have dominated attempts to address aesthetic concerns: formal aesthetic models and psychophysical models.

Formal aesthetic models assume that aesthetic preferences, judgments, or responses are a function of a landscape's formal properties (e.g., form, line, color, texture, etc.). Trained in formal theories of beauty, landscape architects are employed to inventory the occurrence and distribution of landscape properties that contribute to landscape attractiveness and develop scenic quality maps for large areas (e.g., a national forest). Following such an approach, the USDA Forest Service's Visual Quality Management System (VQMS) combines information on scenically important landscape features with sensitivity classifications (based on visibility and importance of scenic beauty to users of an area) to identify visual-quality management objectives for specific geographic locations. This approach generates a map that identifies the degree to which the scenic quality of a specific geographic location should be protected. The Forest Service also has made attempts to define and visually illustrate management practices that are consistent with various visual-quality management objectives (e.g., Walters, 1990).

The second dominant theoretical perspective in aesthetics research is the psychophysical approach. Unlike the formal aesthetic paradigm, psychophysical assessments employ aesthetic evaluations of a landscape gathered from the public and attempt to develop mathematical relationships linking these ratings to physical features of the landscape. An overall scenic-beauty rating is derived using a variety of scaling techniques in which individual scenes are rated by relevant stakeholders. The most widely applied procedure is the Scenic Beauty Estimation (SBE) method developed by Daniel and Boster (1976). One strength of the SBE method for managing scenic quality is the way it facilitates mapping the relationship between landscape features and aesthetic preferences. Because of their interval-level nature, SBE ratings can be used as the dependent variable in regression equations to predict the relationship between managerially relevant environmental properties (e.g., basal area, stems per acre, amount of down and dead wood) and aesthetic preference.

The gaps and limitations in scenic assessments are currently under review as the Forest Service is in the process of replacing its Visual Quality Management System with an updated planning/management framework, the Scenery Management System (SMS). In part, the basis for this change is grounded in the recognition that aesthetic quality takes an overly narrow view of the human-environment relationship. The psychophysical approach shares with the formal-aesthetic model the difficulty of establishing the appropriate definition and scope of "aesthetic response" (Hull, 1989). As Kerr (1995) argues, VQMS represents the view of a visitor or outsider who sees only the scenery and judges landscapes only in terms of appearance. Kerr points out that forest clientele also include "natives" who typically hold a more "complex attitude derived from . . . immersion in the totality of [the] environment"—a viewpoint that can be understood by an outsider "only with difficulty and indirectly through behavior, local traditions, lore, and myth" (Kerr, 1995, p. 1). In part, then, the goal of SMS is to integrate an understanding of landscapes as scenic resources with an understanding of landscapes as symbolic and emotional resources. Another significant knowledge gap is how to address scenic values at different levels of scale. The SBE approach has generally assumed a "stand-level" assessment of scenic beauty. While some research has attempted to model larger scenic quality at a panoramic or vista scale (Buhyoff, Wellman, & Daniel, 1982), it is not clear how to integrate these potentially divergent assessments.

In contrast to the aesthetic paradigm, which is comprised of a set of different theories addressing a similar problem, application of environmental psychology to the instrumental paradigm in resource management is perhaps more appropriately viewed as a set of similar theories applied to different problems. Although instrumentalism has been applied to every possible use of the environment from rock quarries to religious expression, natural resource managers have been particularly adroit in applying psychology to recreation and amenity uses of natural landscapes. Psychological models of human-environment relationships have been most useful for dealing with uses that are amenities or intangible and generally unpriced or extra-market. Hence, in the domain of instrumental meanings, environmental psychology is a competing discipline to economics (more like a poor stepchild) as a way to characterize the meaning, benefit, or value of a resource. The potential for "integration" of the two disciplines is well-recognized (see Peterson et al., 1988) and generally centered around contingent valuation studies. Where more tangible uses of natural resources are concerned (e.g., trees for lumber, water for irrigation), managers generally have not perceived a need to develop psychological explanations of the production of natural-resource benefits (the linkage of environmental attributes and human meaning), favoring instead the marketplace to sort out or rationalize the allocation of these meanings.

In addition to contingent valuation and related applications, psychological research within the instrumental paradigm has focused on how people process information from the environment to render a decision, action, or evaluation. This research approach can be seen in such natural resource applications as choice and behavioral modelling (Louvière & Timmermans, 1990); studies of environmental attitude-behavior relationships and the associated methods of modifying attitudes and behavior through education, environmental interpretation, and persuasive communications (Manfredo, 1992); and recreation motivation and satisfaction research (Williams, 1989). In behavioral modeling, research has examined the environmental features determining choice and preference and the use of different decision-making models (e.g., compensatory versus noncompensatory) underlying how people choose recreation and tourist destinations. These approaches often provide a very direct way to determine the most preferred

environmental features for a given type of use (e.g., a ski resort). A closely related topic has been the study of techniques for modifying choices, preferences, and behaviors (Manfredo, 1992). This research has supported the design of (a) decision-making aids that help potential client groups chose the areas most likely to provide the types of experiences sought, and (b) informational campaigns designed to achieve specific management objectives such as redistributing use from one site to another or to change public attitudes regarding an environmental issue (e.g., the use of prescribed fire).

Another area of research has focused on mapping the diversity and determinants of nature-based recreation experiences. The major aim is to identify the features of a setting that satisfy specific recreation goals or needs. Perhaps the most well-known effort to link environmental features to human experiences is the Recreation Opportunity Spectrum (ROS) concept (Driver et al., 1987). The primary goal of this research program is to identify mappable environmental attributes that can be used in supply-and-demand inventories for recreation opportunities. Additional goals include promoting diversity in recreation opportunities and a desire to "identify how different management activities might alter the character of these opportunities" (Driver et al., 1987, p. 207). This approach has been expanded in recent years around the concept of "benefits-based management" (Driver, Brown, & Peterson, 1991). A closely related approach involves evaluation of the actual quality or satisfaction associated with environmental experiences. Like the other research approaches within the instrumental paradigm, satisfaction research is based on the assumption that people engage in activities in specific environmental settings to achieve desired goals or outcomes. The quality of the experience is thought to be determined by the discrepancy between the outcomes that users seek and the outcomes actually received (Williams, 1989). Research in this area has focused on developing sensitive and valid measures of satisfaction and, using regression modeling, mapping the relationship between satisfaction and environmental features and situational conditions.

Overall, the instrumental paradigm has been very fruitful with respect both to development of concepts and applied research. However, there is growing recognition that key underlying ontological assumptions (e.g., humans are rational, analytical information processors whose behavior is motivated by specific goals and expectations) are not always the appropriate basis for understanding environmental attitudes, preferences, and behaviors. Consider, for example, the following limitations. First, while this goal-directed perspective may tell us that people visit parks to enjoy nature, it does not explore what is meant by "to enjoy nature" (i.e., the content of what is enjoyed, the process through which people attend to and perceive nature, or the emotional responses). Second, goals and expectations are often vague or ambiguous, especially for first-time users (Williams, 1989). Third, experiences often have an emergent quality. That is, experiences may differ from expectations and the most memorable or enjoyable aspect of the experience may, in fact, be the unexpected (Arnould & Price, 1993). And finally, a person with inappropriate expectations may receive the type of experience that management hopes to provide, but be very dissatisfied or unhappy with it. Thus, comparative (expectations-based) models of satisfaction or quality are not always the most appropriate basis for evaluating the quality of goods, services, and experiences (Williams, 1989). As a consequence of these concerns, there is increasing interest in developing research approaches that focus more directly on both the meaning and nature of human experiences of the natural environment.

Mapping Cultural and Expressive Meanings

Within the resource management community, procedures for classifying and mapping aesthetic and instrumental meanings have evolved into relatively well-defined research programs. Certainly, there are gaps in this knowledge (e.g., how to integrate stand-level or near-view assessments with larger scale vista and landscape-level assessments). However, the more substantial gaps are not how to refine our assessment of these landscape meanings, but rather how to extend our assessment to capture the intangible, symbolic, and socially constructed human meanings attached to a landscape, meanings that become increasingly apparent as we move from an instrumental view of the environment to an ecological view. The purpose of this section, therefore, is to describe promising efforts to develop broad inventories of cultural and expressive meanings of landscapes on the scale of aesthetic, recreational, and other resource commodities.

Investigations of social and symbolic environmental meanings have their origins in phenomenological studies of human-environment relations, including "sense of place" within human/cultural geography

(Buttimer & Seamon, 1980), place attachment within psychology (Altman & Low, 1992), and semiotic analysis within architecture and environmental design (Rapoport, 1982). With rare exceptions (see Driver, Dustin, Baltic, Elsner, & Peterson, 1996), natural resource management has not actively engaged itself in assessing sociocultural and expressive meanings of natural resources. Rather, concern for these meanings has often been deferred to or imposed by political and regulatory processes for assessing and assigning meaning. Essentially, the various formal, legal designations for public-land uses constitute politically constructed meanings that have created, particularly in recent decades, a considerable legacy of specialized land-use designations. These systems are often viewed as usurping agency/expert prerogatives to make sound resource decisions. Clearly, the intent of many of these policies is to "lock up" the meaning of specific tracts of land. However, from a sociocultural view, these policies constitute meaning-making efforts aimed at circumventing unresponsive or unsympathetic agency decision-making processes. In sum, resource managers need tools and conceptual frameworks that allow them to more actively assess the cultural and symbolic meanings that various constituencies attach to the resources being managed.

An essential characteristic of intangible, symbolic, and expressive meanings is that their identification and inventory cannot be tied to measurable (tangible) environmental features or the biophysical ecology such as soil, vegetation, hydrology, and so forth as can aesthetic and instrumental meanings. Rather, these kinds of meanings are embedded in a cultural ecology often known only by being an insider. Consequently, these meanings must be revealed and understood by focusing on the relevant people-place interactions using methods that involve direct contact with the individuals and groups who occupy and use the places of interest to resource managers. Though little comprehensive work has been attempted on the scale of scenic beauty assessments or recreation opportunity analyses, a number of promising efforts to map at least some of these cultural and symbolic meanings have been attempted.

Perhaps the best example of the early work on social meaning of places was Lee's (1972) study examining differences in meanings assigned to public parks across sociocultural groups. At a group level, parks were considered important for maintaining orderly relationships because they served as repositories of meanings that symbolized intergroup relationships, as well as being a spatial field in which social life was organized. For example, the meaning of a neighborhood park is likely to be given through local territorial definitions and understood by its occupants as belonging to them informally through knowledge rather than formal rules of ownership. In contrast, definitions of place in regional parks and wildland settings are governed by more formal rules of ownership and use—rules that are often seen by ethnic minorities as white, middle-class, and exclusionary.

Where Lee describes variations in meanings across groups for a given place, Hester's (1985) case study of a small, North Carolina coastal community describes a process for identifying (and mapping) the shared and valued meanings of a community potentially threatened by tourism development. Hester used a variety of techniques to "uncover" sacred or special places in the community. His methods included a community-goals survey, behavioral mapping (observing people's use of places in the community), and key-informant interviews. From these sources, Hester and a colleague drew up a preliminary list of "important places" and asked townspeople to rank them in order of significance and to indicate which they thought could be modified to accommodate tourism development. After the newspaper published the results, one resident, noting how many places ranked above the local churches and cemetery, dubbed it the "sacred structures" list. Until these meanings were mapped, many residents were not fully aware of the importance they assigned to these places, suggesting to Hester that meanings are sometimes subconscious until threatened or highlighted. Using the sacred structure map, the planning board was able to translate what are typically vague discussions about loss of valued landscapes into guidelines for town zoning ordinances and other forms of land-use planning.

Similar efforts have been developed to identify special places on national forest lands. Mitchell, Force, Carroll, and McLaughlin (1993) conducted personal interviews with visitors to the Chiwawa River drainage in central Washington state to identify attachment-oriented users who assigned specific social meaning to the drainage and point out how several planning technologies and frameworks are amenable to incorporating both utilitarian and place perspectives. They cited the Tongass National Forest Environmental Impact Statement as an example in which a Geographic Information System was used to record the location of over 1400 "favorite places" and evaluate the impact of forest -planning alternatives to these

sites. Schroeder (1996) asked people to write essays about the meaning and experience of being in an area known as the Black River (a Forest Service managed site in the upper peninsula of Michigan) to develop knowledge about places of special significance within the forest. Brandenburg and Carroll (1995) used public participation mailing lists from a national forest in Washington as a source for "stakeholder" interviews to identify symbolic and expressive meanings of a popular river drainage. Stakeholders from the most nearby community often exhibited strong attachment to the drainage and a desire to protect it regardless of their "multiple use" values. Stakeholders in more distant communities, who were rarely involved directly in the use of the drainage, valued it in terms that reflected the orientation of their dominant social group (utilitarian or preservationist). Moreover, locals who expressed personal affection for the place in private interviews exhibited quite different attitudes at public meetings when among members of their ostensibly more utilitarian-oriented neighbors.

Surveys of site users and communities have also demonstrated that the strength of place attachments can be quantified for multiple places and at multiple geographic scales. The survey approach has usually been associated with studies of attachment to home, neighborhood, and community (Altman & Low, 1992), with some efforts directed at resource- and tourism-dependent communities (McCool & Martin, 1994). Others have attempted to relate place attachment to national parks, wilderness, and other outdoor recreation settings (Williams et al., 1992). These studies generally represent place attachment as an emotional dimension of meaning—as an indication of the intensity, depth, or extent of meaning—with symbolic and spiritual meanings associated with high levels of attachment. Although survey research may not be able to probe detailed spatial patterns and subtle nuances of meaning, it may be useful for providing broad mapping of the emotional intensity individuals and groups associate with various places. Thus, an inventory of "special places" at a district or forest level might be obtained through such methods.

Taken together, these studies suggest that a variety of methods, from surveys to various forms of public involvement, can be structured to identify areas that can accommodate development while preserving areas that are symbolic of community and individual identity. More importantly, they demonstrate that it is important to distinguish spatially generalized values regarding public lands policy from place-specific meanings and values. These efforts demonstrate that the public can identify and classify land units that hold varied and often intangible meanings. They also suggest that a mix of both personal and public judgments about the meaning of places is important. The personal views of many can be at variance with the views of the social group or community and the sacredness of places often may be taken for granted until threatened.

Filling the knowledge gap on cultural, symbolic, spiritual, and expressive meanings of the landscape will require a long-term and continuous commitment by resource managers to acquire a local knowledge of place and integrate that knowledge with larger regional and national meanings and values. This represents a continuous engagement in public discussion about the meaning of places. Meanings, especially of the cultural and expressive sort, are not as stable across place, time, and group as aesthetic and instrumental meanings. Consequently, management is not so much a matter of applying technology and technique, but of building trust in a relationship with stakeholders and learning the art of participating in ongoing public dialogue. This dialogue is a major part of the process of creating and negotiating landscape meanings. Such ongoing discussion does not require any greater magnitude of effort than has been devoted to various forms of ecological analysis or resource inventory, but it does require an openness to diverse ways of knowing places and their meaning.

"Place" Principles for Ecosystem Management

Ecosystem management, as we see it, is really about contextually sensitive (spatial and temporal) management of a bio-social system. It is really a world view (a way of construing the world) and not a specific set of methods or procedures. Ecosystem management is a statement of intent. The difficult management question remains: What sort of specific translation of this intent will be necessary to apply it to one or more actual places? Below we summarize six principles (five of which have been described in greater detail elsewhere; see Williams, 1995) that may serve as a guide to the application of social science to ecosystem management.

Principle 1. Ecosystems are socially constructed places.

A forester sees a mature fiber-production system needing harvest and regeneration; a logger sees stumpage value; a hiker senses a spiritual connection to creation; a bird-watcher thinks of prime habitat for northern spotted owls; an ecologist sees a plant community in a late successional stage. Sociologists Greider and Garkovich (1994) note such differing visions of an old-growth forest and see competing symbolic transformations of nature. "The meaning of the landscape is not inherent in the nature of things." Rather, "cultural groups transform the natural environment into landscapes through the use of different symbols that bestow different meanings on the same physical objects or conditions" (p. 2). In effect, an ecosystem is a kind of place, socially created by conferring particular kinds of meaning (including scientific meanings) on some piece of ground.

Recognizing that ecosystems and ecosystem management are social constructions serves to remind us of the limits of highly generalizable theoretical and operational conceptions of ecosystem management. The heart of ecosystem management is to guide decisions affecting a place using a rich understanding of its natural and cultural history. The old utilitarian paradigm that guided resource management lacked specific context. Managers looked for general rules, procedures, values, inventories, best management practices, and so on. These approaches failed, in part, because they were constituted from abstract and decontextualized understandings of a particular forest (Larson et al., 1990). In contrast to the utilitarian paradigm, the new approach recognizes that highly generalizable procedures for doing ecosystem management will be of limited meaning within any particular context. Recognizing ecosystems as real places in which scientists attempt to understand and map local natural and social history increases the potential for integration across and within the various natural and social scientific disciplines.

Principle 2. As a socially constructed place, a given ecosystem can be described as the intersection of natural forces, social relations, and meanings.

The theoretical domain of modern social science involves understanding four sets or realms of forces: nature, social relations, meaning, and human agency (Sack, 1992). Ecosystem management requires mapping the interaction among all four forces. *Nature* refers to the physical, chemical, and biological aspects of phenomena and how these affect human life. Ecosystem management presumably pays greater attention to the systemic aspects of nature, the spatial-temporal distribution of natural phenomena, and hopefully the relationship of these forces to human experience. Sack notes, however, that humans are products of both nature and culture; the latter of which consists of the realm of social relations (social, economic, and political forces) and the realm of meaning (ideas, values, and beliefs that give meaning to the world). *Social relations* refers to structure, position, and interchange among people and includes social phenomena such as race, class, politics, markets, bureaucracy, and the distribution of goods and power within society. In utilitarian resource management, social relations emphasize economic relations over political and community relations. Resource planning involves the use of the economic and decision sciences to attempt an optimal allocation of resources for commodity production (Larson et al., 1990). Although some resource sociology addresses how policies are socially and politically constructed and the impacts of resulting policies on communities, under utilitarian management these issues have been secondary to economic efficiency analysis. The other two realms of forces, *meaning* and *human agency*, have been important underlying themes of this chapter and are described under Principle 3 and Principle 4, respectively.

Principle 3. Ecosystem management involves mapping the full range of meanings that humans assign to places.

Meaning, as we have already seen, "refers to the operations of the mind" and is generally understood as constituting ideas, values, and beliefs (Sack, 1992, p. 129). Forces from this realm are arguably the dominant feature of modern natural resource conflict (Appleyard, 1979), yet ways of conceptualizing and considering issues of meaning have been limited in at least two important ways. First, the meager attention given to meaning has been narrowly focused on the objective, tangible, and instrumental features of the physical environment, neglecting more intangible (symbolic and spiritual) meanings (Williams & Patterson, 1996). This instrumentalism fails to recognize that resource conflicts are frequently symbolic

in nature and most divisive when intangible, but deeply felt meanings are threatened (Appleyard, 1979). Second, meaning has been largely limited to the question of how individuals derive instrumental values and benefits from the use of natural resources, ignoring shared meanings and how meanings are socially constructed. This second critique applies to traditional tangible commodities such as wood and water, and also to less tangible commodities such as scenery and recreation. The psychological approaches to meaning that dominate the utilitarian paradigm are anchored in need-driven models of behavior that presume a sovereign or autonomous consumer. These models focus on individual meanings expressed through motivations, experiences, benefits, satisfactions, and goals (Williams et al., 1992) and psychological assessments of non-market values designed to mimic economic measures (Peterson et al., 1988).

This narrow focus on individual, instrumental, or tangible meanings and the tendency to treat intangible emotional and symbolic meanings as irrelevant have contributed much to the distrust of agencies and professionals involved in public-land management (Larson et al., 1990). Given the importance yet poor representation of environmental meanings in natural resource management, much of this chapter has attempted to illuminate the realm of meaning, document its significance, and identify strategies for addressing it in ecosystem management.

Principle 4. Ecosystem management requires post-positivist approaches to science.

In addition to the ontological issues implied in the first three principles, the shift from a commodity to an ecosystem paradigm has important epistemological implications. Ontology refers to the nature of reality and has been presented above as the socially constructed nature of ecosystems (places) organized around the realms of nature, social relations, and meaning. Sack's fourth realm, ***human agency***, emphasizes the epistemological realm and recognizes that the other three forces are not determinate. Epistemology has to do with how we come to know reality and involves employing differing perspectives or points of view. Some ways of knowing are thought to be more objective and produce generalizable and universal understandings, while others are more subjective, producing specific, contextually situated insights. Sack (1992) describes these differing ways of knowing as occurring along a continuum from somewhere to virtually nowhere. What is traditionally thought of as science involves the abstraction of a point of view from somewhere (the place of everyday experience) to a more remote, public, objective, and distant point of view that is virtually nowhere.

The process of abstraction, though profoundly useful in many cases, has two undesirable consequences that are highly relevant to ecosystem management. The first is that abstraction is a decontextualizing process that results in a loss or "thinning" (to use Sack's term) of meaning. In this late-modern age, many social critics see a kind of crisis associated with the decline or degradation of place-based meanings—a crisis aggravated, according to Sack, by the tendency of modern society to privilege the view from nowhere. This loss of meaning was evident to the Forest Service policy team that reviewed the process of national forest planning. Larson and colleagues. (1990) pointed out that such highly abstract models as FORPLAN, the linear-programming model used by the Forest Service to "optimize" the mix of forest uses, carried little meaning for the public with output that was incomprehensible even to the planners. No matter how scientific they appear to be, methods of knowing that minimize or obscure important emotional or symbolic meanings of objects, events, or places, will not be favorably received by those who sense the loss.

Second, as a process of moving from the highly subjective but integrated experience of place to the more public, external, and objective experience, scientific abstraction tends to fragment knowledge along disciplinary and theoretical lines (Sack, 1992). Focusing on place integrates theory by focusing on the overlap among the realms of nature, social relations, and meaning. In the utilitarian view of natural resources, however, models dealing with natural forces discount large-scale ecological processes. In social relations, resource management traditionally emphasized economic relations over political and community relations. Meanings were overly restricted to the tangible and instrumental while neglecting historic, cultural, and spiritual meanings. All the while, place was only considered in the abstract sense of the spatial and temporal distribution of resource commodities. Sack, in addition to broadening ontological considerations, shows that an adequate understanding of places requires developing multiple points of view between somewhere and nowhere. This has been described by Entrikin (1991) as an epistemological

position of "betweenness"—informed by scientific discourse, but also historically and spatially specific. Ecosystem management has the potential for just this kind of epistemological integration.

Principle 5. Socially constructed places are organized in a hierarchy of scales.

Perhaps the most perplexing issue facing ecosystem management is the appropriate spatial scale for organizing analyses and assessments. Like biological aspects of ecosystems, social structures, processes, and meanings need to be considered at multiple spatial scales. For a given context, the most appropriate scale will depend to a large degree on the specific policy questions being addressed and the types of social and biological data required. Moreover, social phenomena are not necessarily spatially organized nor determined by bio-ecological boundaries. Thus, the same scale for analyzing social and ecological processes should not be assumed *a priori* for resource mapping or management decision making.

Research efforts in human ecology and social geography suggest that the most appropriate strategy is to discover the effective scale empirically by starting at a relatively fine scale and working up as one gains experience and knowledge. From human ecology, a method known as *progressive contextualization* advocates working upward in scale to preserve the "holistic premise that adequate understanding of problems can be gained only if they are seen as part of a complex of interacting causes and effects" and avoid "*a priori* definitions of boundaries [such as] an ecosystem or human community" (Vayda, 1983, p. 266). This method involves focusing on significant activities or people-environment interactions in specific locations and times, and then explaining these interactions by placing them within progressively wider or denser contexts. Two particular advantages of progressive contextualization are noted by Vayda. First, consistent with the views arising from ecological theory that see systems as less inherently stable than once thought, this method avoids unwarranted assumptions about the stability of units or systems. Second, the focus on contextualized understandings allows investigators to put more attention directly on the questions of concern to policy makers and provides results of greater practical significance.

Principle 6. Ecosystem management involves managing the human system.

In structuring our framework around the notion of mapping landscape meanings, we have tended to follow a traditional mode of thought in resource management, which is to emphasize the problem of adequate resource description and mapping. In effect, we have attempted to present a spatially-oriented description of the human system that both embeds and is embedded in the biological or ecological system. In many ways the focus has been to emphasize the ecosystem part of the term *ecosystem management* to the neglect of the management part of the term. To speak as if we can, do, or should "manage" ecosystems risks overstating our human ability to rationally control and influence ecological processes. If we have the capacity to manage anything, at least directly, it is more likely the social system. Moreover, if we are to integrate the various social sciences with the natural sciences (let alone with each other), we need to give greater attention to the concept of management itself.

A recent illustration of the absence of attention to management (as well as a lack of appreciation of the potential contribution of social sciences to ecosystem management) comes from a plenary "dialogue" session at the 6th International Symposium on Society and Resource Management held at Pennsylvania State University in May 1996. What struck us about the exchange between the two panelists in the session "Ecology and Economy: Does There Have to Be a Conflict?" was not that they agreed they could work together, but what appeared to be lack of recognition of noneconomic social sciences. In noting that the driving force behind policy was often not science, but politics, what they really seemed to be saying was that the science of ecology and the science of economics were not driving policy. Science, in effect, equated to the "hard truths" of their disciplines and the rest of the world was "just politics." They appeared to share a sense of resignation that there would always be politics, but what they could not grasp, it seemed, was the relevance of a social system worthy of being described and understood beyond the ecosystem and the market. There was little sense of a need to theorize about the psychological, social, cultural, or political processes by which meanings and values are defined and negotiated. It was as if they could problematize extra-market decision making, but could not see a role for social science to address it.

In the spirit of integration, then, our sixth principle offers a broad interpretation of management. The implicit interpretation we have been using here is that resource decisions should be guided by an

understanding of the social processes that define, structure, and alter the meaning of landscapes. Thus at a broad level, management involves control and regulation of the actions of ourselves and others. Similarly, politics involves deliberate efforts to control meaning (Sederberg, 1984). In modern societies, as sociologist Alan Wolfe (1989) argues, the social sciences (broadly defined) contain not only a large body of empirical information of how people act toward one another, but "implicit (and often explicit) statements of what people's obligations to one another should be" (p. 6). These statements reflect three ways in which societies organize social relations and regulate moral obligations: market, state, and something Wolfe calls civil society. Too often the debate about management has been reduced to simplistic views of society—ecology versus economics, market versus state, economics versus politics. Wolfe's third way, civil society, which has received increasing attention from scholars in recent years, involves the recognition that neither markets nor states absolve us of our responsibility to others. In pre-modern times, civil society was the domain of local community. In the late-modern world this form of regulation is given over increasingly to the individual. We are each given the freedom to find our own moral rules, and neither states nor markets are capable of filling the void.

To advance ecosystem management we must advance the state-of-the-art of management (what our plenary discussants relegated to the messy business of politics). To do so requires just as much integration across disciplines as describing the biological and social systems (of course, management itself is part of the social system). Too often we have thought of management as a technical art employed by experts (economists, management scientists, and the occasional "social" scientist) rather than a well-functioning citizenry employing their own skill for making public or moral judgments (Yankelovich, 1991). It is a skill that many see dangerously close to withering away as society turns evermore toward markets and states for moral codes.

Conclusion

If modern society hopes to forge a more sustainable basis for human habitation of the planet, it will need to recognize the inherent assumptions underlying human-environment relations that guide environmental research and management, and endeavor to broaden and recreate new modes of thinking about its place and impact on the rest of the planet. An important argument of this chapter has been that the gaps in knowledge about human-environment relations are, in large part, a result of the dominance of certain guiding metaphors (e.g., commodity and production) used in natural resource management. The emergence of ecosystem management as a resource management philosophy is in many ways an effort to rethink these metaphors, to chart new ways of viewing the world. We have argued that if we think of our traditional approaches as efforts to identify and map landscape meanings, then we need to employ a wider conception of meaning. Metaphorically, if not literally, we need to map landscape meanings and the natural and social processes that structure or distribute these meanings across spatial and temporal dimensions.

The production, negotiation, consumption, destruction, and distribution of meanings across places and social groups becomes the focal point for research, planning, and policy making. Resource maps, in effect, describe how certain kinds of meaning are spatially distributed. We have argued that natural-resource management has sought, with considerable success, to map the more tangible forms of meaning (e.g., commodity and amenity uses). As intangible meanings (e.g., cultural/symbolic, expressive, and even spiritual meanings) have become increasingly legitimized within the emerging ecosystem management paradigm, the scope of human-dimensions research needs to be explicitly extended to embrace them ontologically and epistemologically. Meaning in this broader context includes socially or symbolically constructed interpretations of places or landscapes as well as their adaptive and functional potential.

With its emphasis on instrumental rationality, our own field of environmental psychology, at least as it has been applied to resource management, deserves its share of scrutiny. As Gee (1994) argues, instrumentalism is so pervasive in Western thought that it sometimes goes unnoticed and shows up in our language even when we seek to repudiate it. She cites the concept of the "user" in environmental psychology as a ubiquitous remnant of this pervasive instrumentalism. This continual reference to the person as user, and place as that which is used (or not used), traps us into a limiting conception of the person-environment relationship. Specifically it "connotes a kind of technical thinking in which all the world is a

resource for the purposes of humans" (p. 114). Such thinking leads to environmental degradation and even to human degradation as people become mere resources for others to exploit. Suggesting that our language should reflect a different relationship to the environment, Gee proposes we replace the term *user* with *participant* and *inhabiter*. For similar reasons, perhaps we need to replace *resource* with terms like *place, landscape, and habitat* which better reflect, in our view, both the social and biological aspects of an interconnected system. Ecosystem management is a path toward discovering a new ethic, an ethic of place.

Suggested Reading

Rather than replicate key references from the following section, we identify major books, edited volumes, or series that cover environmental psychology, environment-behavior studies, and items of particular relevance to ecosystem management or the framework outlined in this chapter. Our suggestions from the reference list are shown in bold.

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