

Human Dimensions in Ecosystem Management: A USDA Forest Service Perspective¹

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Abstract: For many decades, the natural resource profession has approached the management of public lands as exclusively a natural science endeavor requiring purely technical solutions. With the adoption of an ecosystem management philosophy, the USDA Forest Service has acknowledged the centrality of people in land management policy and decision-making. This paper explores the human dimension of ecosystem management, with emphasis on the role of social science research in the implementation of ecosystem management.

At its very heart this debate is about people...it's about people who care deeply about their communities and a way of life passed from one generation to the next, rich in tradition, strengthened over time. It is about people who care about the forests, water, and fish.

Vice President Albert Gore
Forest Conference (1993)

The needs of people drive the use and misuse of the forest. Our efforts to understand how people think about and act on forests have been minimal, and yet most controversies and shortages ultimately arise from human activity.

National Research Council (1990)

Most of the critical issues facing the natural resource profession—including global change, endangered species, commodity production, wilderness preservation, wildfire, and forest health—share a common bond: they are all inherently human issues. These issues arise from human activity, are brought to light because of human concerns, and are addressed through human ingenuity.

For many decades, the natural resource profession has approached these issues as if they were exclusively natural science questions requiring technical solutions. Recently, however, because of changing expectations about the stewardship of public lands and perceptions of the “problem,” a different understanding of the nature of these issues has emerged.

This paper examines these changes and their implications for social science research within the realm of natural resource management.

Changing Expectations

Several changes have occurred in the American public's expectations related to the stewardship of public lands. Specifically, environmental protection has become more central to the concerns of the American public (Dunlap and Mertig 1992). Consequently, citizens have become increasingly aware of and involved with the stewardship of public lands. The impact of this change is compounded by a society-wide decrease in willingness to allow professionals the exclusive right to make policy value judgements on issues of concern (Probst and Crow 1991). As concern about the environment grew, a wider array of publics and values have been involved in the stewardship of public lands (Bullard 1993).

These many changes have come together to present natural resource professionals with a startlingly (some might say shockingly) different social context in which to do their jobs. Decisions about caring for the land that were once viewed as straightforward must currently be evaluated from a seemingly endless set of perspectives. The best natural science and technical expertise used to manage forests has been questioned by citizens who are reacting from the range of their experiences and concerns for the environment; thus, natural resource professionals are uncertain about the needs of the American public.

During this climate of change and uncertainty, in 1992 F. Dale Robertson, former Chief of the USDA Forest Service, announced the Agency's shift to a new management philosophy of ecosystem management. After much work and interagency coordination, the Forest Service has defined ecosystem management as “the use of an ecological approach that blends social, physical, economic, and biological needs and values to assure productive, healthy ecosystems” (USDA Forest Service 1994).

Ecosystem management offers a significantly different view of the goals of land stewardship: from single value commodity production to a more holistic sustaining of natural and social systems (Mrowka 1993). By using this definition of ecosystem management, the Agency has shifted toward a much different conceptualization of natural resource issues—it has moved into the realm of wickedness.

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From Innocence to Wickedness: Is this Really Progress?

In their article “Complexity, Wickedness, and Public Forests,” Allen and Gould (1986) detail the differences between “innocent” and “wicked” problems and relate these problem types to the management of public forests:

	Problem type	
	Innocent	Wicked
Approach	Tactical	Strategic
Worldview	Complex	Holistic
Arena	Science	Politics
Solutions	True/False	Good/Bad
Tools	Analytical	People

Innocent problems represent a more traditional view of problems. They are seen as complex, but solvable, eventually yielding one correct solution. Many of the natural science aspects of ecosystem management would be characterized as complex—needing extensive scientific and technical expertise in order to operationalize an ecological approach to management.

Wicked problems are those that have no right or wrong answer, only more or less useful solutions. They do not simplify into a system of inputs and outputs, but rather are an intricate grouping of interwoven factors that cannot be separated from one another. Solutions are seen as good or bad rather than true or false. People, rather than analytic methodologies, are the tools for resolving a wicked problem. Once a solution is chosen, the problem frequently decomposes into a series of innocent problems. For example, ecosystem management contains many wicked problems arrayed around a series of questions related to a desired future condition within a range of sustainable ecological conditions that will be selected and managed. Questions about what will be sustained (e.g., rural economies, biological diversity, recreation opportunities, commodity production, etc.) are not inherently right or wrong and must be resolved before the complex, but solvable, task of managing for the chosen desired future condition can begin.

The issues associated with ecosystem management put people and the social sciences at the center of Agency concerns.

The Human Dimension of Ecosystem Management

The importance of people within an ecosystem management framework was recognized early in the implementation of the new policy. For many this recognition was more an intuitive acceptance than a professional understanding of the role of people within ecosystems or the social sciences. Through the work of many individuals, as well as regional and national human dimension task teams, the human dimension is defined as:

An integral component of ecosystem management recognizes that people are part of ecosystems, that people’s pursuits of past, present, and future desires, needs and values (including perceptions, beliefs, attitudes and behaviors) have and will continue to influence ecosystems and that ecosystem management must include consideration of the physical, emotional, mental, spiritual, social, cultural and economic well-being of people and communities (USDA Forest Service 1994).

This definition contains two important points. First, it recognizes that people are an inextricable part of ecosystems. Human desires, needs, and values have impacted ecosystems and the need for management. Second, it establishes ecosystem management as an inherently human endeavor, seeking the well-being of people and communities as well as the health of ecosystems. Within this human dimension both wicked and innocent problems should also be addressed.

Wickedness Within the Human Dimension

Much of the wickedness in ecosystem management is within the realm of the human dimension and tough social and political choices have to be made. Competing and conflicting values are healthy symbols of the diversity of the many publics who care about their public lands. The wicked challenge to the natural resource profession is in devising processes and policies that integrate this diversity into the solutions.

A significant component of understanding and incorporating any phenomenon into ecosystem management is the ability to predict the future. Although no subject area is perfectly predictable, the future as it relates to the human dimension is, perhaps, less “knowable” than that of the natural sciences. This problem arises in part from less information available about the human dimension (an innocent problem that is discussed below), but is also attributable to the seemingly more volatile nature of the human dimension relative to the physical and biological dimensions. But although physical and biological phenomena are not unchanging and absolutely knowable and human phenomena are not absolutely unknowable or unpredictable, the range of predictability is currently greater within the natural sciences compared to the social sciences.

The changeability of the three dimensions of ecosystem management leads to short-lived solutions. Optimal solutions (if they can be found) are fleeting achievements. This changeability is recognized and addressed within an ecosystem management framework by the adoption of adaptive management strategies (Bormann and others 1993).

In addition to these wicked problems, implementing and practicing ecosystem management is an information intensive endeavor because of the complexity involved. This is particularly true for the human dimension where work in the social sciences lags behind that in the natural sciences (National Research Council 1990).

Complexity Within the Human Dimension

Two primary factors add complexity to the consideration of the human dimension. First, ecosystem management requires the consideration and incorporation of information at varying geographic and temporal scales representing both human and ecological units of measurement. The complexity of working within this framework is obvious and requires the incorporation of a much broader array of information as well as new analytical and visual tools.

The second factor is the development of the information necessary to fully integrate the human dimension into an ecosystem management framework. Several recent national reports addressing future information needs of the natural resource profession (National Research Council 1990, Society of American Foresters 1993, Bormann and others 1993) recognize both the need for and lack of social science information. These reports provide only a brief, but useful, beginning to identifying human dimensions research needs.

The National Research Council's (NRC) report, *Forestry Research: A Mandate for Change* (1990), perhaps provides the most detailed account of "human/forest interactions" research needs. The report identifies six areas of research to be pursued:

(1) *Community Systems*—Research focusing on "social structure, the network of institutions providing order to human affairs" is needed to understand the linkages and interactions between human and ecological systems. Research within this area represents a wide variety of subject matter and academic disciplines examining actual geographic communities as well as the communities created through social ties (Stowkowski and Lee 1990).

(2) *Urban Forests*—Research focusing on the urban environment and its residents is crucial to ecosystem management. The majority of people in the United States reside in urban environments. Consequently, the majority of political influence also resides in urban areas. Understanding and integrating urban dwellers' relationships to the country's wildlands is of key importance to the successful implementation of ecosystem management. Equally important is gaining an understanding of what urban dwellers need and want from their urban forests—frequently their only contact with the natural environment. Research in urban forestry incorporates many issues including those of land use (e.g., expanding urbanization and issues of the wildland/urban interface), the relationship of urban dwellers to urban and wildland areas (e.g., the role and benefits of urban forests and ethnic/racial minority's relationship with public lands), and urban influences on public land policy (Dickerhoof and Ewert 1993).

(3) *Regional Resource Systems*—Research in this area is critical to developing and incorporating geographic scale into ecosystem management. Research focusing on the human and ecological context of ecosystem management policies and decision-making is needed. This includes developing an understanding of the human ecology of areas and integrating human and ecological units of scale. Additionally, successful

implementation of ecosystem management requires integration and cooperation across numerous administrative boundaries, which also requires a more thorough understanding of institutional structure and function.

(4) *Recreation and Aesthetics*—Much of the existing human/forest interaction research has focused on recreation and aesthetics and will continue to be an important aspect of human dimensions research. The NRC report (1990) suggests that the focus of this research needs to shift toward understanding recreation experiences in a wider array of recreation settings and developing basic research programs to supplement the problem-driven research that is currently more prevalent.

(5) *International Context*—The logical extension of the philosophy behind ecosystem management is the extension of concern to the global environment and its people. Research in this area would add diversity of cultures and a global context. Additionally, research in developing countries within the realm of social forestry contributes greatly to the quality of life and conservation of local resources for local peoples and provides information, theory, and methods to further human dimensions research in developed countries.

(6) *Extension Services*—A significant barrier to the implementation of the human dimension within ecosystem management is the gap between social science data and information useful for the policy development and decision-making process (Ewert and Carr 1994). Within the physical and biological sciences, the current extension service network in large part fills this void. Given the limited number of individuals with social science expertise currently employed by land management agencies, a social science extension service is critically important for the implementation of ecosystem management.

The preceding categorization of human/forest interaction research needs is presented as a starting point for further elaboration of human dimension research needs. The research examples are meant to be illustrative, rather than an exhaustive listing of research topics.

Rather than focusing on the specific content of research, Baerwald (1990) lists characteristics of what he deems successful human dimensions of global climate change research. Although the reader should define the quality of successful research, this listing provides a useful set of characteristics by which potential human dimension research program options (including those not focusing upon global climate change) can be compared. Baerwald's characteristics are:

(1) *Research must be both basic and applied*—Basic and applied research are not mutually exclusive.

(2) *Research should evaluate processes and phenomena across the globe*—Understanding the interaction of human systems with physical and biological systems requires comparison across diverse human systems.

(3) *Research should pay more attention to the role of location as a factor affecting the human dimension*—Frequently social science research is conducted with no reference to or understanding of the geographic space in

which people are found; it is as if the social phenomena being studied occur separately from the physical world.

(4) *Research must make stronger connections among analyses at different scales of inquiry.*

(5) *Research should focus on the direct links among different human, natural, and physical systems*—Developing both conceptual and mathematical models that elaborate the linkages among these three dimensions will yield significant advances in policy development and decision-making capabilities.

(6) *Research should also examine the indirect links among different systems*—Given the complexity of the interactions among the systems, indirect linkages need to be considered and incorporated in policy development and decision-making as well.

(7) *Research will require more “industrial-style” efforts rather than the “craftwork” projects in which social scientists usually have participated*—Social science information requires participation in large-scale, multi-disciplinary efforts that have not been traditionally undertaken in the social sciences.

Conclusion

This paper has attempted to present ecosystem management, particularly the human dimension, as both an innocent and wicked problem. The ideas that wickedness is good and science and technology are but a tool for resolving problems both tend to contradict the typical notions about natural resource management. We do not like to accept that problems and their solutions can be messy. Schroeder (1993) addresses this issue:

Like it or not, we are all active participants in an ongoing and acrimonious debate over values, in which no one group can force others to accept its views. We can only try to play our role responsibly in this debate, by encouraging open and respectful discussion of diverse views, trying to understand the views of others, and identifying and questioning our own values as an agency [referring to the Forest Service]. Social science can help a great deal in this human process of understanding and dialog but there are no data or models, social or otherwise,

that can calculate the “right” answers for us. There is no easy way out, no formula, no research, no technology that will free us from the responsibility, uncertainty, and pain of being in conflict with other people over some of our most deeply held values.

The wickedness Schroeder describes so well clearly makes our job as natural resource professionals more difficult than it has been in the past, but the wickedness can, to a degree, be tamed. If we persevere, we will be rewarded with a more diverse and vibrant profession and a strengthened relationship with the publics we seek to serve.

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