

Getting Alice Through the Door: Social Science Research and Natural Resource Management¹

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Abstract: A number of trends are altering the role of science in natural resource management. These trends include the growing political power of science, the recognition that most natural resource problems are extremely complex and not prone to uni-dimensional solutions, and the increasing need to integrate an understanding of the human component into the planning and decision-making process. A sampling of the various roles of the social sciences and the types of questions amenable to social science are examined.

In Lewis Carroll's *Alice Through the Looking Glass*, Alice spies a strange-looking rabbit, follows it down a hole and ends up trying to get through a door that is much too small for her. In some ways we are faced with a similar analogy in natural resource management in which we have been confronted with a creature called heightened public awareness and interest in the management of our natural resources and followed that creature along unfamiliar terrain--public involvement in decision-making—and have come to a door that is difficult for us to get through—actually integrating the social sciences into policy and decision-making.

Ascertaining the management preferences of a small segment of a population is a much easier task than understanding the overall human dimensions of natural resource management. Sometimes it seems that the prime directive of natural resource agencies has shifted from “what can we do for the public” to “what can the public do to us?” Moreover, from a national perspective, questions such as value (Bengston 1993, Brown 1984), the impact of attitudes on behavior (Vincent and Fazio 1992), and the relationship between environment usage and the impact upon social structures (Force and others 1993) are not always easy to ascertain from local-based public meetings and issues. Many of the problems society now faces in the management of its natural resources transcend easy solutions because they are global in nature, represent a longevity of neglect, are cross-cutting in boundaries and disciplines, involve damage that, in some cases, is irreversible and requires long-term and expensive solutions. Landre and Knuth (1993) argue that the success of groups, such as public advisory committees, often depends on the situation and composition of the

community, and as such, is prone to a great deal of variance in both process and outcome. Therefore, a re-examination of the role of social science is needed to effectively develop natural resource policy and management.

This paper reviews some current trends surrounding science and natural resource management, discusses some potential roles for the social sciences and proposes a structure in which to “house” social science research in a natural resource agency, such as the USDA Forest Service.

Current Trends

Natural Resource Issues

The number of situations now confronting natural resource management far exceed the capability of any one scientific group or governmental organization to adequately deal with these issues. These issues include the following:

- Environmental degradation
- Global deforestation
- Global climate change
- Loss of biological diversity
- Changing demands for forest products
- Wilderness preservation and the proper role of reserve areas
- Sustainable production and harvesting practices
- Forest health
- Conflicting demands from society for preservation, recreation and commodity production

Because of the number and complexity of these and other issues, science is gaining political power (Dietrich 1992). This political power has increased because of the relatively objective nature of the research endeavor; the different scales of effects (e.g., site, forest, landscape, ecosystem, and global) that result in management solely based on intuition and past experience; and the overall lack of comprehensive data bases. In the latter case, the lack of comprehensive data sets allows the manager and policy-maker to develop premature closure on specific issues. For example, the belief that overharvesting is simply a result of leveraged buyouts and economic incentives of the timber companies tends to oversimplify a complex situation.

As a result of this incomplete information, scientists increasingly are asked to provide a foundation for the development of policy by defining the various alternatives. This implies that research serves an “up-front” role in decision-making that is used to develop policy rather than support for a decision already made. Research must also provide monitoring information about the outcomes and quality

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of the decisions and policies implemented, and maintain impartiality despite the pressure from the political process. And finally, another problem with the current role of research is the development of multi-approach and multi-discipline predictions rather than uni-dimensional solutions.

Values

A second trend is the growing diversity of values human beings place on natural resources. This diversity is not only situational but also a function of space and time. For example, to a person building a house, the wood products and price of those products are of critical importance. Most people, however, only build one or two houses in our lifetime and in the interim, other values take precedence in our value system. These other values might include forest preservation in order to escape the noise and congestion of the urban environment or cherishing the recreational activities offered by the forest environment. Others might value large wilderness landscapes as a way for the experience of adventure and challenge.

Westman (1977) has previously distinguished between the goods and services produced by the natural environment.

Goods include marketable products such as timber or forage or even the use of the environment for recreation. Services, on the other hand, are the functions of an ecosystem and how these various functions interact. These services include the absorption and breakdown of pollutants, the cycling of nutrients, and the fixation of solar energy. One example of this is the buffering effect of coastal wetlands.

Juxtaposed to goods and services is the concept of values. A number of authors have identified a wide range of values associated with the natural environment (Roston 1985). These values include scientific, therapeutic and recreational entities (Ewert and Carr 1993). Associated with all of these values are differing levels of potential conflict (*table 1*). For example, aesthetic values have a high potential for conflict because of the individual nature of aesthetics. One person's beautiful setting is another person's boring scene.

Human Impacts

A third trend surrounding the interface of science and management is the growing omnipresence and omnipotence of human impact upon the earth's landscape. There can be

Table 1—Selected values associated with wildland areas¹

Values	Level of Potential Conflict	Comments
Scientific	Low	Not well advanced; loss of wildlands is outstripping the ability to collect information.
Therapeutic	Low	Many acknowledge the cathartic and rehabilitation qualities of wildland environments.
Ecological/bio-diversity	Low	The importance of saving gene pools for future generations is widely recognized.
Recreation	Medium	Can conflict with other values such as scientific; as a highly personal quality of life issue, these values often invoke high levels of emotion.
Symbolic/cultural identity	Medium	Symbols from wildland areas such as the bald eagle or bison represent certain societal and national values (e.g., freedom, strength, "rugged individualism").
Aesthetic	High	The intangible and subjective nature of these values often lead to disagreement as to worth and value.
Inherent worth	High	For many, wildlands have an intrinsic value just being there. Others feel that wildlands should be more "productive" for the good of society.
Market	High	Usually are extractive and compete with most other values. This exclusivity creates high levels of emotion and conflict.

¹Sources: Roston (1985); Ewert(1990).

little doubt that few landscapes or sites now exist free from the influence of humans. Most scientists agree that the net loss of the world's forests due to human activity since preagricultural times is about 8 million square kilometers or an area about the size of the continental United States. Of this amount, more than three-quarters has been cleared since 1680. In addition, the annual human withdrawal of water from natural circulation is now about 3,600 cubic kilometers or an amount exceeding the volume of Lake Huron. In 1680, the annual withdrawal was less than 100 cubic kilometers. A number of other statistics indicate the decline of global and environmental health (Postel 1992).

Each of these trends suggests that *people need to be considered in any long-term management strategy*. The research community would be challenged to describe any major scientific advancement that ultimately did not involve a human dimension. Reidel (1992) poses the idea that in natural resource policy, perhaps management has been asking the wrong questions. The research community could also be asked the same question. What then would be the right questions and how can information be generated toward answering those questions?

The Role of the Social Sciences in Natural Resource Decision-Making

Bormann (1993) suggests that concepts of the environment such as sustainability, forest health, biodiversity, and ecosystem management are essentially human constructs that serve as expressions of human values. If we believe that natural resource management is one manifestation of the society in which we live, what type of scientific structure must be in place to provide the information necessary for effective natural resource decision-making? Machlis (1992) observed that biologists, ecologists, and other natural science professionals are now faced with a hard reality: ultimate solutions to natural resource problems are related to social, cultural, economic and political systems--the very systems that are the focus of the social sciences. While, traditionally, the social science disciplines have included political science, geography, anthropology, sociology, psychology, economics, and philosophy, more recent areas of inquiry could include the recreation and leisure sciences, education, demography, and social ecology.

What is the role of the social science disciplines in the formation of natural resource policy? Global climate change presents one scenario that is both timely and of profound importance. The irony in this example is that while the issue has primarily been defined in terms of meteorological and chemical processes, the causes are almost exclusively human. Indeed, Maloney and Ward (1973) suggest that most environmental crises facing our society and the world are really "crises of maladaptive [human] behavior." For instance, the various social sciences could affect the development of a comprehensive solution to any emerging changes in the global climatological systems:

- *Anthropology*—What have been the patterns of human adaptation in response to historical changes in the climate? Did communities develop large scale adaptive methodologies, migrate, or simply die-out? Knowledge of our ancestors' reactions may provide some insight into about the species general behavior in this type of crisis.
- *Political Science*—What political and/or governmental institutional structures have been effective in producing global awareness, monitoring, and enforcement procedures? As a global community, we already have some examples of international discussion and action on far-reaching environmental issues such as nuclear weapons, regulating the use of the oceans, and international cooperation on issues such as illegal trade of threatened and endangered species (Feldman 1991).
- *Economics*—What mixes of economic incentives would be most effective in altering behaviors to produce a more environmentally-friendly set of actions?
- *Education*—What educational vehicles would be most influential in modifying the behaviors of individuals? What will be the most effective mechanisms whereby methods of education can be translated into behaviors and knowledge that are not detrimental to the global environment?
- *Psychology/Sociology*—How can the individual and the society be more responsible in modifying their behaviors to lessen the overall impact upon the natural resource base? What specific attentional cues "tell us" that there is a threat to global health?
- *Recreation and Leisure Sciences*—Because outdoor recreation is often the primary avenue from which a large segment of the population experiences a direct contact with the natural environment, can the outdoor recreation experience be managed to increase the individual's sensitivity and willingness to act environmentally-conscious (Ewert, 1991)?

A growing set of literature now addresses the need to integrate the social, physical, and biological sciences (Heberlein 1988). The fact that our research community has failed to do so points to a message of inertia and lack of willingness on the part of the scientific institutions we have developed. Holden (1988) has argued that: The social sciences have lagged far behind in assessing the interactions between physical changes and human activities. Far more is known about the processes of global warming, deforestation, resource depletion, and pollution than about the processes of the human institutions that create these effects.

However, merely rallying against the status-quo can ultimately be counterproductive. As we seek to bring about a greater awareness of the need for the social sciences in the context of natural resource research and decision-making a number of points should be considered (Machlis, 1993):

- Include incentives for the integration of the biological and physical sciences such as competitive grants, research

proposals and workshops. These could frame the questions in such a way as to be of interest to the other sciences. For example, identifying the inelasticity of entrance fees at a particular location could also include the anticipated physical and biological impacts upon the resource based on the different use levels.

- Social science research programs need to be multi-scale including individuals, groups, communities, landscape and counties (human-equivalent landscape level), ecosystems, biomes, and global systems.
- Where possible, recreation and similar disciplines should be linked with the mainstream social science literature. Failing to do so tends to marginalize and downgrade the information our scientists generate in the eyes of other disciplines and the courts.
- From a funding agency perspective, design our cooperative agreements to meet natural resource management needs, both in terms of the actual science but also with respect to the overall visibility of the research. In addition, priority should be given to cooperative agreements that incorporate a consortia of universities and other research institutions in order to bring a variety of ideas and approaches to the issue under study.
- Increasing our sensitivity about our managers and public who are not always cognizant of the human dimensions of natural resource management. The social sciences need to focus on defining the human dimension in natural resource management in addition to identifying the potential research questions.

Although this list is incomplete, the emerging scientific challenge is to incorporate the social sciences into the policy and decision-making agenda because they bring a scientific focus on the human dimensions aspects of natural resource use.

A Proposed Structure for Doing Social Science Research

There is no prescription for success in any scientific endeavor. Any structure or “housing” arrangement has its drawbacks as well as advantages. Stern (1993) suggests some overriding and compelling questions to consider about the role of social science research in natural resource management. These questions include:

- What forces drive the types of human activities that contribute to environmental degradation?
- What are the mechanisms through which humans create environmental change?
- How and in what ways does this environmental change effect the things people value (e.g., agriculture, coastal sea-levels)?

- How do these changes impact social organizations such as governments, environmental/citizen groups and communities?

In addition to these macro-level questions, the actual mechanics of social science research and natural resource decision-making will require that social science expertise be available for a variety of micro-level, shorter-term and localized research needs, such as the study of the socio-demographics of the visitors to a particular location or how changes in harvesting have impacted specific communities.

In the case of social science research and global environmental change, Stern and others (1992) have recommended that the Federal government join with private funding sources to establish three to five national centers for research on the human dimensions of global change. This scenario consolidates social science efforts of the USDA Forest Service into two social science centers.

One center would be based in the west and the other in the east. Each center would have the dual responsibilities of providing contracted service to National Forests, districts and other research units in addition to conducting research about theoretical social inquiry. A number of pervading issues suggest that each center should be located on or close to universities that have strong social science programs. Research would be conducted through center-directed, investigator-initiated RFP's (Requests for Proposals), fellowships, or cooperative agreements. In addition, it would be of paramount importance for these centers to develop an extensive network of social scientists from a broad-spectrum of disciplinary expertise to study a particular issue.

Conclusion

The issues facing the social sciences now exceed visitor and experience characteristics and often include the very fabric of many of our social systems. Issues such as global climate change, the spotted owl, and old growth remind one of the Yukon traveler in Jack London's *To Build a Fire*. The man was wise in the ways of the world but not in their significance. He never “saw” the clump of snow hanging from the tree, directly over his fire; the clump of snow that ultimately caused his demise. Our failure to include the human component in our environmental decision-making, at the very least will increase the probability of making poor decisions as a result of incomplete information. People make the problems but they also create the solutions. Fortunately, at this point in time, we still have a choice about what the future holds for some of our natural resources and perhaps, even for us. However uncomfortable the fit, integrating the social sciences with the rest of natural resource decision-making is a door we need to pass through.

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ACCESS America's Great Outdoors: Public Lands Are for Everyone!¹

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With nearly 200 million acres of majestic mountains, deep rugged canyons, pristine high lakes, wild rivers, immense forests, and open meadows, the National Forest System provides the largest variety of outdoor recreation opportunities in the United States. Federal lands encompass a combined total of nearly one-third of this country.

Most outdoor recreationists have the freedom to choose the type of recreation activity they want, the setting they want, and the personal level of challenge they desire for a quality recreation experience. People are drawn to the National Forests for different reasons. Some seek the solitude of the primitive backcountry; others, a rustic campsite nestled in the woods; and others, a social setting with convenient facilities. **These visitors have a choice.**

Yet, for millions of Americans, choices for a desired recreation experience are limited. Historically, recreation facilities and programs were created by traditional design for the “average” person, which usually excluded people with disabilities. Thus, many people regard the great outdoors as inaccessible.

Recreation uses and customer expectations have changed. Recreationists, land managers, and designers are recognizing that all people should have the opportunity to participate in outdoor recreation. In response to this expectation, Play and Learning in Adaptable Environments, Inc. (PLAE)—a multi-disciplinary, non-profit organization—and the USDA Forest Service have developed *Universal Access to Outdoor Recreation: A Design Guide*. This state-of-the-art design guide is breaking new ground in the area of accessibility by focusing on integrating *universal design* into all outdoor recreation environments (PLAE 1994).

Universal Design Removes the Barriers

Universal design is a relatively new approach that considers the needs of all users—children, the elderly, and people with mobility, sensory, cognitive, and temporary disabilities. In this approach, aspects and elements of accessibility are incorporated in the earliest planning stages and are designed to blend with the natural environment. The

goal of universal design is to develop facilities, programs, and services that foster a sense of dignity, independence, and social integration for all visitors.

The philosophy and guidelines presented in *Universal Access to Outdoor Recreation* relate customers' expectations and choices with accessibility. Just as people seek different recreation opportunities and experiences in the National Forests, their expectations of accessibility also vary. To ensure that a diversity of recreation settings and customer expectations are considered, the USDA Forest Service and other natural resource management agencies use the *Recreation Opportunity Spectrum* (ROS), an innovative recreation management and planning tool that divides outdoor recreation settings and levels of accessibility into four broad categories: urban/rural (easy), roaded natural (moderate), semi-primitive (difficult), and primitive (most difficult).

Are Accessibility and Protection of the Natural Environment Mutually Exclusive?

Because urban/rural settings are generally highly developed, people expect an easy level of accessibility to facilities and programs, such as visitor centers and its displays and programs. Trails in such settings are likely to be paved, with only gentle slopes. Developments such as fishing sites and scenic overlooks would include handrails designed for both safety and accessibility.

Roaded natural settings are somewhat less developed than urban sites. People visit these areas expecting a moderate level of accessibility. Rustic campsites nestled in the woods may have leveled surfaces; instead of asphalt, campers might find compacted gravel surfaces. Trails, too, may be of natural compacted material, and slopes may increase slightly. Handrails at fishing sites may be replaced by natural materials such as boulders, giving anglers a greater sense of adventure and of being “out on the water.”

Semi-primitive settings seldom offer developed features, and expectations of a difficult level of accessibility prevail. Campers are usually left to their own devices to find a relatively flat piece of ground for their tents. Trails in rugged terrain are usually narrow and steep. Accessibility is a secondary consideration. Scenic views and fishing sites occur as part of the natural environment.

Primitive settings preserve the natural environment and accessibility standards are often not applicable because the primary concern is the sense of personal risk and challenge. As a result, people expect the level of accessibility to be the most difficult. People access primitive areas by various means, from canoeing and kayaking, to horseback riding and hiking.

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One important point to remember is that all developed structural elements—restrooms, water hydrants, picnic tables, and cooking units—will be designed to meet full accessibility standards at all sites.

Who Benefits?

More than half the American population will benefit from campgrounds, restrooms, trails, and other visitor facilities and programs that are designed with access for everyone:

- One in 5 Americans (43 million) experiences a disability
- One in 10 Americans (25 million) is temporarily disabled at any one time
- Nearly 1 in 3 older Americans (11.2 million of the 30 million people over age 65) has a disability.

In addition, if one family member cannot participate, most likely the entire family will be affected. So the initial figure of 43 million is actually just the beginning. Thus, the number of people directly benefiting from universal design can easily be multiplied three or four times.

What's on the Horizon?

In addition to facilities and activities, universal design should be integrated into all programs and services. This integration will benefit all ages, abilities and cultures, as well as increase customer satisfaction. Individuals visiting an interpretive center or a visitor station expect and desire equal access to the information and services offered there. Information should be available in a variety of formats: visual, audible and tactile. Programs should be offered with options that allow for the greatest range of participation.

The need for programmatic access underscores the importance of ensuring that service providers are sensitive to the needs of persons with disabilities and understand the vital importance of providing this access. Training and exposure to the issues and concerns of universal access is critical. Universal design improves the program and service for everyone.

Collaboration

American institutions are being encouraged and compelled to combine resources with other agencies for collaborative projects. The USDA Forest Service has developed several partnerships related to universal access which demonstrate that the whole is greater than the sum of the parts. One example of this is the Universal Design Short Course. For this partnership, the Forest Service formed a team with Wilderness Inquiry, Inc., a non-profit travel organization serving people with and without disabilities on wilderness adventures throughout the world, and the University of Minnesota, a land-grant university. The short course offered an intense exposure to universal design and presented guidelines on integrating it into the outdoor recreation environment. By acquiring personal experience,

course participants developed the understanding that universal design is the only design approach that makes sense in a democratic society.

The Forest Service has also established a partnership with Wilderness Inquiry, Inc., and America Outdoors, an association of trade outfitters. Through this challenge cost-share agreement, the outfitter industry and the Federal public land management agencies have developed a handbook to assist outfitters and guides in providing universal access to their programs and services (National Council on Disability 1992).

Currently the American Ski Federation (AFS) has collaborated with the USDA Forest Service to develop access guidelines for the ski industry. This effort reflects not only a legal response to requirements of the Americans with Disabilities Act, but also the industry's view that providing accessible facilities makes good business sense. Developing guidelines together will create workable solutions that focus on quality customer service.

Quickie Designs, a manufacturer of ultra-light outdoor recreation sport equipment for people with mobility disabilities, has formed a partnership with the USDA Forest Service and Wilderness Inquiry's state-of-the-art technology for accessing America's Great Outdoors.³

These examples of partnerships underscore the fact that agencies do not need to have or develop expertise in every area. However, they do need to know where to find specific skills and how to develop effective partnerships that will make the best use of that expertise.

Accessing the Wilderness

Another partnership involving the National Council on Disability and Wilderness Inquiry Inc. produced a Congressionally mandated report on *Wilderness Accessibility for People with Disabilities*. This study, presented to the President and Congress, focused on lands managed under the National Wilderness Preservation System (NWPS). The report concluded that people with disabilities were as concerned with protecting the integrity of the wilderness as non-disabled individuals; accessibility should be a secondary consideration to the preservation and protection of the environment in the NWPS.

The report also contained several recommendations to Congress related to the need for adopting policies that are consistent with Section 507c of the Americans with Disabilities Act, such as developing guidelines for special permits and modifications that are consistent with the Wilderness Act; conducting trainings for NWPS managers to raise awareness of disabilities issues and use of NWPS by people with disabilities; and providing information to the

³Trade names and commercial enterprises or products are mentioned solely for information. No endorsement by the U.S. Department of Agriculture is implied.

public about recreation opportunities in the NWPS for people with disabilities.

A significant majority of persons with disabilities surveyed in the report enjoy the NWPS. Further, 76 percent of those surveyed do not believe that the restrictions on mechanized use stated by the Wilderness Act diminish their enjoyment. People with disabilities visit the NWPS in the same ways and for the same reasons that people without disabilities visit the NWPS.

Conclusion

The ideals we have described are based on broad input from consumers of accessible outdoor recreation. However,

much additional research is needed. Two critical issues that warrant further study are: the social expectations of consumers of accessible recreation in the diversity of recreation settings; the energy consumption and physical capabilities required to utilize the universal design guidelines being established for outdoor recreation environments.

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