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The Restoration and Management of Nature

A conference and forthcoming book explore restoration from the perspectives of the social sciences and humanities.

by Paul Gobster and Bruce Hull

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Although major advances have been made in recent years in the physical science and technology of restoration, we think there is an equally important human side to restoration that has received little attention from researchers and practitioners. This journal provides a good case in point. Even though its editor, William Jordan III, is a principal spokesperson for the human side of restoration and frequently begins a journal issue with a moving editorial dealing with this topic, contributed articles from the social sciences and humanities are still few and far between. Jordan himself recognizes this imbalance, and has on occasion pointed out both the need for more research in this area and the value of a kind of "affirmative" action on the part of the journal to solicit accounts of this research.

We think this is more than a matter of editorial balance, and a recent review of the environmental management literature supports our view. Raymond Bryant and Geoff Wilson, two geographers at King's College London, argue that the mounting criticism of environmental management is in large part attributable to the failure of the environmental sciences to support the day-to-day issues faced by environmental managers (see Bryant, R.L., and Wilson, G.A. 1998. Rethinking environmental management. *Progress in Human Geography* 22: 321-343). They contend that managers involved in such areas as restoration, forestry, and pollution mitigation have relied almost exclusively on traditional

"environmental" sciences such as biology and chemistry for solutions to environmental problems. Increasingly, however, managers are finding that these problems are imbedded in a political, economic, and social context, and that solutions often require guidance from other realms of environmental thought, particularly those that inform how people think about, act, and interact with the environment. Thus environmental management ultimately requires support from the social sciences and humanities if it is to be effective.

Ecological restoration offers some of the most cogent examples of how the social sciences and humanities can inform problems in environmental management. Restoration projects are often dependent upon a political process, and therefore require an understanding of the diverse values that people hold with respect to nature or a given site. The success of these projects depends on negotiating through public discourse land-management options that are socially acceptable and reasonably equitable. In addition, the implementation of restoration plans often requires community participation; because volunteers play an essential role in many restoration efforts, it behooves program managers to know how to attract, train, and retain volunteers. Moreover, many restoration efforts take place close to where people live, offering valuable opportunities for environmental education and nature interpretation. Finally, and most fundamentally, restoration directly

challenges our ideas about what nature is and what our society's relationship to nature is, can, and should be—questions central to a society's survival.

It is with these ideas in mind that we invited our colleagues in the social sciences and humanities to discuss "The Restoration and Management of Nature" at a special forum that was part of the biennial International Symposium on Society and Resource Management, held May 27-31, 1998 at the University of Missouri in Columbia. Due to the high level of interest in the topic, as evidenced by the large number of abstracts we received in response to our call for papers, our plans for a single session quickly expanded to encompass a separate theme of the conference, with 28 individual presentations spread out over six sessions. Enthusiasm for this topic continued through the conference—all of the sessions were well attended, and the presenters engaged in some excellent discussions with the attendees. Here, by way of introduction to the abstracts of the presentations that follow, we summarize four major themes that emerged from these conversations. We are now putting together a book of selected essays based on the presentations that focuses specifically on restoration from the perspectives of the social sciences and humanities. The book is to be published by Island Press, and we hope this will encourage further work in this area.

Philosophical Perspectives

We began our presentations with a session that laid out for discussion and debate some of the principal philosophical questions raised by the practice of ecological restoration. Chief among these questions is whether there is a fundamental difference in value between "real nature" and "restored nature." Maintaining that there is, philosopher Eric Katz of the New Jersey Institute of Technology (*R&MN* 9(2) pp. 90-96) argued that restored landscapes must be considered as less valued "fakes" or artificial products of human technology. To illustrate, he offered several scenarios for the reintroduction of wolves to Yellowstone National Park. He asked the audience to consider which of the following



Psychological and social benefits of restoration projects, long taken for granted by practitioners working with volunteer and school groups, are being documented and characterized—and in some cases questioned—by researchers in social science disciplines. Photo by Robert Grese

scenarios for wolf reintroduction would represent "real nature": 1) wolves migrated into the park from across the Canadian border, 2) wolves were captured in Canada and released into the park, 3) wolves were captured in Canada and bred extensively in captivity before their offspring were released, 4) wolves were cross-bred in captivity from the stock of various zoos across the nation, and their offspring were released, or 5) wolves were first cloned, then bred in captivity before their offspring were released. Katz maintained that anything other than the first scenario would have less value than "real" nature. Countering this view were Bill Jordan and State University of New York-Binghamton philosopher Andrew Light, who argued that under the right circumstances a restored ecosystem might have even more value than one that was totally pristine. Light said that restoration is as much about restoring the human-nature relationship as it is about restoring the physical and biological components of the land. Jordan endorsed this idea and maintained that the practice of restoration infuses a site with a value and an authenticity that is not present without the human-nature relationship. Through this engagement, Jordan says, we can also help promote an

understanding of humans as responsible and active stewards of the land. This view challenges the conventional environmental view of people as "pests"—destructive agents that only degrade ecosystems and compromise the value of natural landscapes. Together, the presentations and discussion by Katz, Light, and Jordan revealed nothing less than a fundamental difference in worldview about the place of humans in nature, a difference that surfaced repeatedly throughout the subsequent sessions and talks.

The Social Construction of Nature

Naturalness, biodiversity, authenticity, ecological health, and integrity are often mentioned as overarching goals of restoration efforts. However, these goals may be interpreted differently by different parties because the ideas that define them are, in large measure, socially constructed. As evidence of this, several presenters showed how concepts of nature and related ideas can vary among people and groups. For example, in studying attitudes toward management of urban natural areas in southeastern Michigan, University of Massachusetts landscape architect Robert



Photo by Reid Helford

Eric Katz: "If we humans think we can restore nature, then we will believe that we are omnipotent in our ability to effect, mold, and heal the natural world."

Ryan found that, while most people valued natural landscapes highly in these areas and supported their preservation, many "experts" (including volunteer restorationists) were in disagreement with "public" groups (such as local neighbors and recreational visitors) about how nature protection programs should be accomplished. Experts tended to favor active management to promote native species, while the public's preferences ranged from manicured landscaping to hands-off approaches—three very different concepts of "nature" and its management. University of Michigan landscape architect Gary Purdum also noted differences in definitions of nature between experts and the public in his research on attitudes toward ecological management of national forests in Michigan, as did Virginia Tech social scientists Troy Hall and Joe Roggenbuck in their comparison of public and expert ideas of "wilderness." These and other studies also showed, however, that the "public" is far from uniform in the views and values it holds on this matter. In a study based on interviews with residents who lived near a national forest in Virginia, for example, Virginia Tech social scientists David Robertson and Angelina Kendra identified differences in definitions and in physical indicators of "nature." Robertson

found that residents saw at least four different qualities of nature in the Virginia forest landscape: "wild," "authentic," "healthy," and "cultured" qualities. Kendra further examined how residents judged forest health and found that they relied more on visible, aesthetic indicators of forest health that show signs of human care than on the more abstract measures of soil erosion or species diversity that environmental scientists might use.

Negotiating Nature

Although it is important to recognize that "nature" means different things to different people (and can even mean many things to the same person), we also need to know how these varying and sometimes conflicting values can be negotiated during the design and implementation of restoration and management activities. Presentations on a diverse range of case studies revealed a wide range of approaches related to this question—and an equally wide range of conclusions. Two studies, one by anthropologist Carol Raish of the USDA Forest Service's Rocky Mountain Research Station in Albuquerque focusing on northern New Mexico forest lands, and another by geographer Simon Cubit of the University of Tasmania focusing on

the Tasmanian Wilderness World Heritage Area, showed how plans by newly formed environmental groups to preserve and restore natural landscapes were successfully challenged by traditional users of the land. Cubit referred to these challenges as "tournaments of value," in which each group competes to legitimize its own symbolic construction of the world"; in both cases, these challenges resulted in revised land management policies that accommodated a wider range of values. Another study by Paul Gobster and Susan Barro, social scientists with the USDA Forest Service's North Central Research Station in Evanston, Illinois, showed how public input is being used to develop design options for the management of a natural area in Chicago's Lincoln Park, to take into account the desires of diverse constituent groups. Finally, Loyola University Chicago sociologist Reid Helford, who has been studying the dynamics of the "restoration controversy" in Chicago (*R&MN* 15(1) pp. 16-37 and 16(1) pp. 9-15), showed how progress toward the resolution of conflicts has been stymied by restoration activists who, by appropriating the authority of science for their cause, have created boundaries separating the "expert knowers" of nature from those "unquali-

Andrew Light: "In restoration, what we are actually doing is quite different than just trying to restore nature (which we cannot); we are trying to restore the human relationship with nature."



Photo by Reid Helford

fied" to participate in land management decisions on public forest preserves.

If a single conclusion could be drawn from these diverse case studies, it would be that if restoration of natural areas is to be successful it must be viewed as a social process that involves a socially negotiated strategy for managing (or not managing) the landscape. In this process, restoration "experts" may become only one voice (albeit a powerful and respected voice) in the dialogue to established shared definitions of restoration and management goals. While such a result may be perceived as time-consuming and/or threatening to some managers who are used to operating with a wide amount of individual or agency discretion, managers who engage in a process of dialogue and negotiation with stakeholders often find they can accomplish their long-term goals more effectively than if they forget or ignore stakeholders.

The Restoration Experience

A fourth theme of the presentations focused on restoration as an experience. As a volunteer activity, restoration has in recent years attracted thousands of people from all walks of life to get involved in hands-on efforts to restore their local ecosystems.

These efforts not only have helped restore the health and diversity of damaged ecosystems, but have also helped to restore the physical, psychological, and social health of participants and their communities. For example, a study of natural-areas volunteers in Michigan by Robert Ryan, University of Michigan landscape historian Robert Grese, and University of Michigan environmental psychologist Rachel Kaplan showed that: 1) the hands-on quality of volunteer efforts may be an important factor in sustaining volunteer interest; 2) desire for recreation and rewarding use of leisure time is an important motive for participating in restoration; 3) continued work by volunteers at a specific natural area may build strong emotional attachments, not only to that place but also to particular ecosystems; and 4) knowledge gained through volunteering for restoration projects can transform laypersons into amateur ecologists, in the process creating more-effective advocates for the environment. This and other case studies in urban and wildland settings provided impressive examples not only of how restoration programs can supply personal and social benefits, but also of how managers might improve programs to attract and retain a broader and more diverse group of participants.

Conclusion

Perhaps bound by tradition, restoration programs are typically guided by the natural sciences, while possible contributions of the social sciences and humanities are often overlooked. As social scientists working in institutions dominated by physical and biological concerns, we do not find this too surprising, but we do see it as a problem with major implications for programs involved in the restoration and management of natural landscapes. One purpose of our sessions at the conference, and in the book we are now putting together, has been to help motivate scholars in the social sciences and humanities to develop and apply their methods and theories and logic to restoration and management efforts. We welcome comments and suggestions about this goal and about the project we have undertaken in its behalf.

Abstracts of Presented Papers

I. Philosophical Perspectives

Another Look at Restoration: Technology and Artificial Nature

Eric Katz, *New Jersey Institute of Technology*

Philosophical consideration of ecological restoration leads us to fundamental questions about the meaning of "nature" and human activity. Although the concept of nature is complex, a central aspect of its meaning must lie in notions of evolutionary adaptations free of human technological intervention. I contend that the human technology used in restoration turns nature into an artifact, a product designed for human satisfaction. Consideration of these philosophical issues will have an influence on policy decisions concerning the restoration of natural ecosystems.

Ecological Restoration and the Culture of Nature: A Pragmatic Perspective

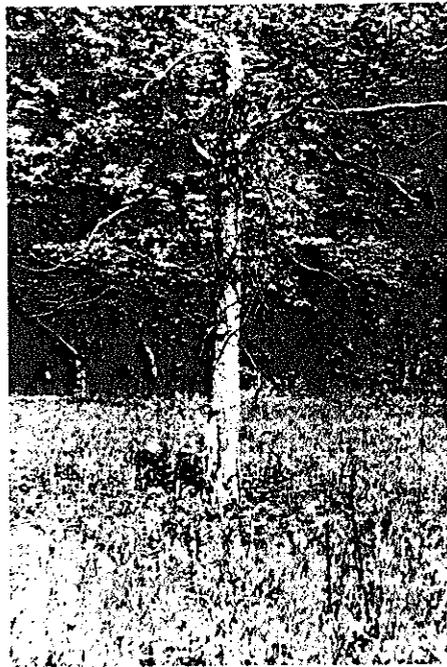
Andrew Light, *State University of New York at Binghamton*

Recent philosophical critiques mistakenly view ecological restoration solely as restoring nature itself rather than restoring an important part of people's relationships with nature. I argue that such critiques are far too crudely cast; a more nuanced view is that ecological restoration is more like restoring great works of art rather than "faking nature" or producing "big lies." This view offers a more practical approach to the development of restoration policies and provides a richer characterization of restoration as revitalizing the culture of nature.

The Origins of Authenticity

William R. Jordan III, *University of Wisconsin-Madison Arboretum*

The critical question is not whether the restored ecosystem is authentic or fake, it is what do we mean by authentic? I argue that the idea of authenticity implicit in some recent critiques of restoration is



Restoration—or abuse? Opponents of restoration have used photos like this one, showing a mature tree killed in the process of grassland restoration, to support their arguments that restoration involves undue interference in natural processes. Debates over restoration often reflect differences in values. Articulating these values, and finding ways to accommodate them, are critical aspects of the restoration process. Photo courtesy of Reid Helford

essentially anti-ecological since it is based on the assumption that the authentic or real is merely discovered and is ultimately independent of relationship. An alternative to this ontology, characteristic of many pre-modern cultures, grounds reality in relationship. In this view, participation and ritual are actually the basis or source of authenticity, so that a restored landscape is—or can be—more real than its natural counterpart.

II. The Restoration Experience

The Motivations and Values of Ecosystem Restoration Volunteers

Herbert W. Schroeder, *USDA Forest Service, North Central Research Station-Chicago*

Volunteers are an important labor force in many ecological restoration projects around

the country. To find out more about these individuals, I analyzed the contents of newsletter issues published by nine Chicago-area volunteer restoration groups during 1991-1995. I found repeated themes mentioned by the volunteers that characterize how they view themselves and their work. These themes can help managers understand what motivates volunteers and how volunteer programs can be designed to keep volunteers interested and involved (*R&MN* 16(1) pp. 66-67).

Motivations for Continued Participation in Volunteer Stewardship Programs

Robert L. Ryan, *University of Massachusetts*; Robert E. Grese and Rachel Kaplan, *University of Michigan*

These researchers examined the psychological benefits of volunteering in ecological restoration to learn more about factors that are key to continued participation. The results of the study suggest that stewardship programs that take into consideration volunteers' motivations at different stages of their participation have the opportunity to contribute to individual growth as well as to the health of the environment.

"A Warm Personal Understanding of Land": How Knowledge and Experience can Affect Appreciation of and Involvement in Ecological Restoration

Paul H. Gobster, *USDA Forest Service, North Central Research Station-Chicago*

Philosophers from Aldo Leopold on have stressed the importance of knowledge and experience in the aesthetic appreciation of nature, yet few have studied how the development of this appreciation varies from individual to individual. In analyzing the accounts of restoration volunteers, I found some important variations that seem to be related to educational background and the nature of the encounters with nature. I also identified several themes related to changes in perceptions of the landscape, the evolution of attitudes toward land management, and the expansion of ideas of what constitutes natural beauty. In the paper I discuss

the implications of these findings for management, education, and research.

Social and Psychological Aspects of Citizen Involvement in Urban Tree-Planting Projects

Maureen E. Austin, University of Michigan

Volunteer commitment in restoration was explored in a study of individuals involved in a vacant lot tree planting program in Detroit. Important themes arising from in-depth interviews and surveys include the social interactions of neighbors around the projects, the differing perspectives of neighborhood leaders and members about what the project represents, motivations for resident involvement in ongoing maintenance of the projects, and resident attachment to the restored lots. These findings suggest how managers might attract and retain participants.

Restoration and the Normative Language of Professionalism

Andrew Light, State University of New York at Binghamton

I have argued elsewhere that restoration has an inherent democratic potential (R&MN 14(2) pp. 140-144). Extending this argument, I see that a key determinant to fulfilling this potential is to maintain the open content of the language of restoration. With respect to increased efforts to professionalize restoration, do regulation, accreditation, certification, and similar activities close the language of restoration, making it less tolerant of a variety of meanings and hence less powerful? In addressing this question, I examine recent controversies over public restoration projects in Chicago and other areas.

III. The Restoration and Management of Nature in Urban and Rural Settings

Public Views on Ecological Restoration: A Case Study from Cook County, Illinois

Susan C. Barro, USDA Forest Service, North Central Research Station-Chicago; Alan D. Bright, Washington State University

In this study we examined people's beliefs, attitudes, and knowledge about ecological restoration. A mail survey of Chicago area residents showed that most had positive general attitudes toward ecological restoration, but did not think it should be done if it involved cutting down mature trees, using herbicides, or losing wildlife habitat. These findings imply that general polls on the acceptability of ecological restoration may not account for specific costs and benefits. The results suggest caution in planning large-scale efforts to "educate the public" to gain support for restoration (R&MN 16(1) pp. 59-65).

The Psychology of Environmental Restoration

Joanne Vining and Elizabeth Tyler, University of Illinois at Urbana-Champaign; Byoung-Suk Kweon, Texas A&M University

Recent controversies surrounding ecological restoration activities raise intriguing questions about people's perceptions of such terms as "ecosystems," "nature," and "restoration"; the role of public involvement in restoration activities; and the bases of conflict among interested groups and individuals. We asked questions about these issues to a sample of Chicago area residents and use our findings to formulate some ideas about the psychological aspects of restoration and how managers can more effectively work with the public when planning restoration activities.

Restoring the "Chicago Wilderness": Expertise and the Production of Appropriate Urban Nature

Reid M. Helford, Loyola University Chicago

Drawing from work in the sociology of scientific knowledge and the public understanding of science, Helford explores an ongoing controversy over ecological restoration in the Chicago area. Findings reveal the understandings of nature held by restoration advocates and critics and explore their experience of the local landscape. From these findings, he delineates relationships between differing ways of conceiving urban nature, criteria for deciding which "nature" is appropriate in various situations, and the science and expert practice set in motion by these understandings.

Disciplinary Differences in Designing for Nature

Jo Ann Musumeci, University of Minnesota; Joan I. Nassauer and Robert C. Corry, University of Michigan

Experts from eight disciplines in the social and biophysical sciences and design collaborated in a workshop to design alternative scenarios for Cornbelt agricultural watersheds in 2025. There were dramatic differences in participants' concepts of ecological health and their sense of what kind of "nature" is achievable or even imaginable for these watersheds. Disciplinary differences in concepts of nature are identified through content analysis and by the alternative watershed designs that were produced by the iterative interdisciplinary design process.

Negotiating Nature in an Urban Park Context: Exploring Diverse Interest Groups' Perceptions and Values

Paul H. Gobster and Susan C. Barro, USDA Forest Service, North Central Research Station-Chicago

Issues related to enhancing the naturalness of urban open spaces were explored in an effort to restore a passive-use area in Chicago's Lincoln Park. Interviews and focus groups with diverse groups were conducted to help inform the design and management of the site. While each group had its particular interests and emphases, most people agreed on the uniqueness of the site and the values of nature related to its

management. This dialogue is helping in the development of appropriate, negotiated definitions of nature which will guide future planning efforts and has important implications for design and management.

IV. The Restoration and Management of Nature in Wildland Settings

Managing Naturalness as a Continuum: Bridging the Nature/Culture Gap

Mark W. Brunson,
Utah State University

While many natural scientists see social constructivism as an attack on the foundations of their work, I argue that a constructivist view points toward an "organic" model of natural area management that may actually be more effective than conventional natural science models. Such a model avoids the nature/society distinction, and has particular utility for ecosystem management strategies where managers must balance their quest for achieving pre-settlement "reference conditions" with strategies to integrate socioeconomic and biological imperatives.

Sense of Naturalness: A Framework Organizing Public Discussions About "Nature"

David Robertson and Bruce Hull,
Virginia Tech

The numerous scholarly and lay definitions of "nature" can confuse public discussions of natural resource management. To address this confusion, we developed a conceptual framework based on the social constructivist environmental literature and on interviews with residents living near a national forest in Virginia. We identified four themes underlying how people thought of nature: "wild," "authentic," "healthy," and "cultured," and four themes underlying how people thought nature should be managed: "balanced nature," "technology," "disturbed nature," and "changing nature."

The Environmental Movement and the Traditional, Hispanic Rancher of Northern New Mexico

Carol Raish, *Rocky Mountain Research Station-Albuquerque*

The environmental movement, with its emphasis on preservation of natural areas, is in apparent conflict with the use-oriented ethic of Hispanic farmers and ranchers. Litigation by environmental groups is restricting the resource-use practices of these traditional communities, which are responding in a variety of ways, from protest demonstrations to litigation. This paper discusses growing conflicts between traditional communities and environmental groups, and reviews solutions proposed by local community action groups.

What Does the Wilderness Act Mean for Exotic Species Management?

Mike Patterson, *School of Forestry, University of Montana*; Alan E. Watson, *Aldo Leopold Wilderness Institute, Missoula, MT*

The concept of wilderness management has been described as a paradox. While some have tried to clarify its meaning by distinguishing between managing human activities and allowing natural processes to operate freely, for the issue of invasive exotic plant species this perspective breaks down. Recent essays by David Cole and Bill Worf reflect two different perspectives on the acceptability of such manipulations. This presentation explores these views, the dimensions on which they differ, and the implications for exotic species management in wilderness.

V. Factors Influencing the Acceptability of Nature Restoration and Management

Aesthetics, Naturalness, or Health: Which Criteria Should the Public Use to Judge Management of Natural Landscapes?

Angelina Kendra and Bruce Hull,
Virginia Tech

Aesthetics, naturalness, and health each have been used to justify how we manage landscapes. Interviews with community leaders living near a national forest in

Virginia suggest that forest health is among the most desired qualities. However, informants felt they did not truly understand the conditions of forest health, but relied instead on visual cues, such as maintenance, that show the forest is being managed with good intentions. Interestingly, many of these cues were similar to those informants used to assess the beauty or naturalness of an area, suggesting that for many people these concepts are closely related.

Seeking a Balance: Public Acceptance of Forest Conditions and Management Practices

Bruce Shindler, *Oregon State University*

Shindler examines the factors influencing public acceptability of various forest conditions and management practices. His findings suggest that public acceptance hinges on: (1) impacts on individuals, their families and communities, and the surrounding biophysical environment; (2) the feasibility, uncertainty, and risk of alternative conditions and management approaches; and (3) the processes by which potential outcomes are evaluated and decisions are made. He concludes with a discussion of implications for long-term resolution of disagreements based on differing perceptions and values.

Muddling Through Distinctions in Environmental Aesthetics

Cheryl Foster, *University of Rhode Island*

In controversies surrounding ecological restoration, discussion has often been focused on doubts concerning the purpose and feasibility of returning landscapes to earlier, more "natural" states. Aesthetic questions sometimes emerge in these discussions, and these include questions about the appropriateness of the intervention. One theory of possible relevance to these questions is the hyperreality thesis of Jean Baudrillard. Hyperreality offers a background against which some cases of intervention might be better understood, since it provides a context for considering the relationship between simulation and realness or authenticity.

VI. "Nature" and the Recreation Experience

Disneyland and Disney World: Constructing the Environment, Designing the Visitor Experience

William T. Borrie, *University of Montana*

Disney's natural and social environments are popular and in high demand. For some, Disney constructs nature and recreational experiences better than can be found in the wild. The challenge for natural resource managers is to consider such demands in the context of what existing qualities of settings and experiences might be lost in catering to these demands. The very unique wildness of our wildland resources and the recreational opportunities they provide are at issue here.

Social Constructions of Nature in Outdoor Recreation

Nancy L. Menning and Donald R. Field, *University of Wisconsin-Madison*

Constructionist perspectives have been explicitly employed in analysis of the meanings of nature, especially wilderness, but little attention has been paid to the social construction of nature within more ordinary outdoor recreation contexts. In this paper Menning and Field develop a constructionist framework for planning and evaluating studies of resource-oriented recreation and management. Insights gained from philosophy and sociology suggest approaches and questions

that may be useful in the analysis of place-based meanings and behaviors in resource-oriented recreation.

Whose Place Attachment? Exploring the Effects of Environmental Experience on Attachment to Urban Natural Areas

Robert L. Ryan, *University of Massachusetts*

Ryan explored the relationships between place attachment and the ways various people experience urban natural areas. Findings from a survey showed that people's attachment to places depends on their experience of it. Neighbors and recreationists tended to show a place-based attachment; while volunteers, staff, and others with a high degree of natural areas knowledge had a more conceptual attachment. Such differences can become a source of conflict unless attachment is recognized as a multi-faceted and far-reaching aspect of people's relationship to a place.

Tournaments of Value in the Tasmanian Wilderness

Simon Cubit, *University of Tasmania, Hobart*

Land-management conflicts can be usefully thought of as "tournaments of value," where groups compete to legitimize their own symbolic construction of the world. Such is the case in the Australian state of Tasmania, where preservationists' campaigns to protect wilderness have been

challenged by both traditional and recreational land users. These latter groups' constructions of nature as a living, cultural landscape have changed the management philosophy for certain areas of the Tasmanian Wilderness World Heritage Area to recognize a wider range of values.

Cultural Models of "Wilderness"

Troy E. Hall and Joseph W. Roggenbuck, *Virginia Tech*

These researchers used semi-structured interviews with visitors to backcountry and wilderness areas in Shenandoah National Park to identify underlying cultural models of wilderness and to contrast them with "expert" models. They used methods from cognitive anthropology to understand individuals' mental images of "wilderness," the internal coherence of their models, the factors contributing to a quality wilderness experience, and their reasoning about appropriate management.

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