Naturalness and Wildness: The Dilemma and Irony of Managing Wilderness

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Abstract—This paper summarizes a dialogue session that focused on two concepts that strongly influence nearly all wilderness management: wildness and naturalness. The origin and value of these concepts are discussed, as well as the dilemma and irony that arises when wilderness managers contemplate manipulating the environment to restore naturalness at the risk of reducing wildness. To illustrate this irony, a case study of a proposed large-scale manipulation to stop the loss of cultural resources in the Bandelier Wilderness is discussed. It is concluded that large scale wilderness restoration based on manipulating the environment will always cause a dilemma and entail the irony of balancing wildness against naturalness. One of the biggest hurdles facing wilderness policy-makers and managers today, as well as the concerned public, is how to reconcile these views and manage wilderness for both wildness and naturalness.

Two independent but related concepts are intertwined in the idea of wilderness. In the 1964 Wilderness Act, wilderness is defined in Section 2.(c) as "...an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Later in this same section, wilderness is further defined as an area "retaining its primeval character and influence...which is protected and managed so as to preserve its natural conditions." The key words in these quotes are *untrammeled* and *natural*. When the Wilderness Act was passed, these key words undoubtedly were intended to be complementary because untrammeled areas were certainly natural. Today, however, we are witnessing regional ecological impacts to areas that are untrammeled in every other way, as well as new understanding of the long-term ecological consequences of natural resource management. As a result, we now have divergent philosophical views of what wilderness is and what it should be. These views are encapsulated by the words untrammeled and natural in a way that was likely unforeseen by wilderness proponents as they crafted legislative wording. This dialogue session explored the management dilemmas and social ironies resulting from these divergent views and presented a case study that brings these diverging views into sharp focus.

Terms and Concepts

In one of the first and clearest explanations of the word untrammeled, Zahniser (1956) wrote "...there is in our planning a need also to secure the preservation of some areas that are so managed as to be left unmanaged—areas that are undeveloped by man's mechanical tools and in every way unmodified by his civilization." Synonyms for untrammeled include unimpeded, unhampered, uncontrolled, self-willed and free. We suggest that the word "wildness" strongly connotes this sense of an area free from human control or manipulation. Use of this word is also supported by Zahniser's statement before a committee of the New York State legislature in 1953 that "We must remember always that the essential quality of the wilderness is its wildness" (Zahniser 1992). Synonyms for natural include native, aboriginal, indigenous and endemic, and we suggest that the term "naturalness" be used to capture this biological sense of wilderness.

While these concepts of wildness and naturalness differ from one another, both are essential elements of wilderness (Aplet 1999; Barry 1998; Worf 1997) and are highly valued in our society (Cordell and others 1998; Manning and Valliere 1996). As shown in figure 1, wilderness is the idea and place where the concepts of wildness and naturalness reach their highest expression. These concepts strongly influence, either directly or indirectly, virtually all of the decisions and actions taken in wilderness management.

An Emerging Dilemma

Traditionally, wilderness management was largely concerned with human-caused impacts to wilderness recreation experiences and to the plants and soil directly affected by this recreation, principally in campsites and trails. To mitigate these biophysical impacts, wilderness managers generally have few compunctions about closing a campsite or rerouting a trail. These actions take place over a relatively small area and don't violate most visitors' notion of wilderness.

In contrast, wilderness managers today face a set of problems likely unforeseen by those who wrote and debated

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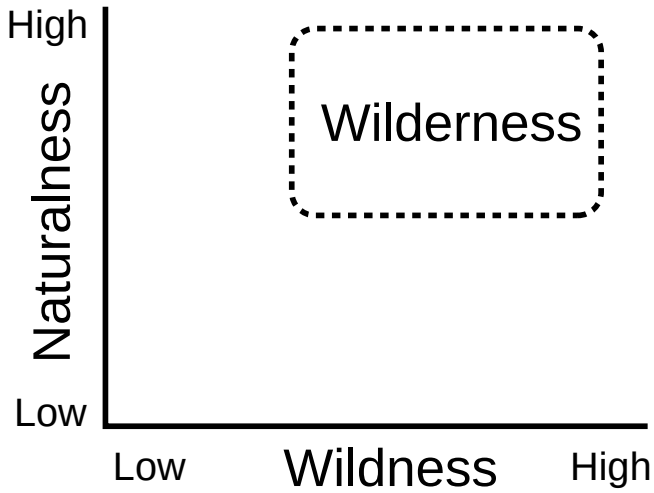

Figure 1—Naturalness and wildness are two related, but independent aspects of wilderness. Wilderness is the place and idea where the concepts of naturalness and wildness reach their highest expression.

the 1964 Wilderness Act (Brunson 1995). These problems are largely the result of broad-scale ecological impacts that pose significant long-term impacts to wilderness. Decades of fire suppression, for example, have increased fuel loads and allowed dense undergrowth of trees in areas where frequent, low-intensity fires were the norm, placing widely spaced old-growth trees at risk. The proposed solution is usually mechanical reduction of fuels, the use of management-ignited fire, or both to restore the natural fire regime. The widespread occurrence of exotic plants alters native plant and animal communities in wilderness, and the use of herbicides is often proposed to restore native plant communities. Acid deposition throughout the eastern United States and in certain areas of the western United States has significantly altered aquatic systems in several wildernesses. Liming these aquatic systems has been proposed to counter the acidity and restore these systems. The exotic white-pine blister rust has caused widespread mortality of high-elevation whitebark pine, and establishing forests of whitebark pine seedlings that have been genetically altered to be rust resistant has been proposed to restore these forests.

In each of these cases, the naturalness of the area has been compromised by broad-scale human actions, and some form of manipulation of the environment is proposed to restore this naturalness. The crucial issue this raises is whether large-scale manipulation, however undesirable, should be used to restore natural conditions, thereby sacrificing wildness for naturalness (Cole 1996). In these situations, where human-caused impacts have caused wholesale changes to the wilderness environment, should the wildness of present-day wilderness be compromised to restore naturalness? In other words, should an undesirable means, such as manipulation of wilderness, be used to achieve a desirable end, such as restoration of natural conditions in wilderness?

Different people hold strong views on this issue, which goes to the heart of whether wilderness is, or should at least remain from this point on, wild or natural. Some people think the provision in the 1964 Wilderness Act that "...these [areas] shall be administered...so as to provide for the protection of these areas, the preservation of their wilderness character..." is a clear mandate for restoring natural conditions in wilderness to overcome a myriad of human-caused insults. Indeed, restoration of these areas is often expressed in terms of an obligation and responsibility to correct human-caused problems (Windhager 1998). Others, citing the Wilderness Act definition of wilderness as "...an area where the earth and its community of life are untrammeled by man," claim that the fundamental character of wilderness is to be free of human manipulation (Worf 1997). Here, wilderness is the one and only place on our ever more crowded planet that is left free from our conscious manipulation, and these areas yield important and vital benefits to people and society because they are untrammeled.

The Central Dilemma of Wilderness Management: When to Take Action?

Deciding when to take action in wilderness was described by Landres and others (1998) as the central dilemma in wilderness management. Proposals to manipulate ecological conditions in wilderness to restore naturalness bring this dilemma to new heights, as well as raise significant and difficult questions: Does manipulation compromise the very values that are protected and preserved in wilderness? Is there sufficient technical knowledge to use large-scale manipulation to restore wilderness landscapes? What are the consequences and risks of taking action versus not taking action? Does the public sufficiently trust the agency to allow such large-scale actions? Does the desire to restore the ecological value of naturalness outweigh the social value of wildness? How much trammeling is necessary and tolerable in wilderness? Is it appropriate to even define a target for desired future ecological conditions in wilderness? Must we accept, albeit reluctantly, the human "gardenification" of wilderness, as suggested by Janzen (1998)?

Separating the concepts of wildness from naturalness helps clarify and partially resolve this management dilemma of when to take action. A two-way matrix of wildness and naturalness (figure 2) illustrates when a proposed action is not appropriate, when it is appropriate and when it entails weighing wildness against naturalness. Briefly, some proposed management actions, such as manipulating habitat to increase a wildlife species' density above natural levels, decrease both wildness and naturalness and should not be pursued. Conversely, proposed actions that support wildness or at least do not reduce it while increasing naturalness should be pursued. Closing and restoring a campsite, for example, doesn't manipulate the environment in a way that impedes wildness on a large scale, and restoring native plants increases naturalness.

Management dilemma and irony can be seen when either wildness or naturalness must be compromised to enhance the other (figure 2). For example, in forests where the natural fire regime is frequent, light, surface fires, a decision not to mechanically reduce fire suppression-caused buildup of fuels supports wildness, but it may decrease naturalness if the forest becomes more susceptible to catastrophic fire. Alternatively, reducing built-up fuels with mechanical thinning or management-ignited fire decreases wildness,

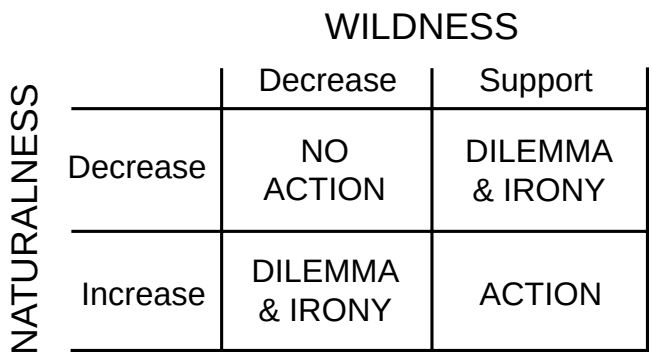

Figure 2—A two-way matrix showing suggested outcomes when proposed management actions support or decrease wildness and increase or decrease naturalness. Proposed actions that both decrease wilderness and naturalness should not be considered, while actions that both support wildness and increase naturalness should be considered. Proposed actions that compromise either wildness or naturalness create management dilemmas and social irony forcing wildness to be weighed against naturalness.

but it may increase survival of the forest. The appropriate course of action in either of these cases is not clear, any judgment needs to be based on the spatial and temporal scale of the proposed actions and their effects, and how well-defined the target conditions are. If the degraded area and restoration actions are localized, if the actions taken today will allow managers to reduce their interference with the "will of the land" in the future, and if there are good reference sites to know what the undisturbed condition is, manipulative actions are probably justified. In contrast, if restoration actions are being considered over a large area and there is uncertainty about the effects of these actions or about the target conditions, much more caution and scrutiny is warranted. Each of these criteria—spatial scale, temporal scale and knowledge of undisturbed conditions—span from small (for example, a small area, a short time frame and a small amount of knowledge) to large, and there are no rules or guidelines about how small or how large is sufficient to warrant taking action or not.

Understanding the differences between wildness and naturalness doesn't provide a definitive answer to solve this central dilemma of wilderness management. These concepts do help clarify when proposed actions are clearly inappropriate and when they are appropriate. Furthermore, they clarify what issues need to be discussed and weighed in determining whether proposed manipulative actions should be taken.

Understanding and Reconciling the Social Irony

Wilderness was established by Congress to uphold the social values of wildness and naturalness. As discussed above, wilderness managers now find themselves in the ironic situation of choosing between wildness and naturalness. In this section, we describe the social origins and implications of this irony. We suggest that differing philosophical views led us to see nature and culture as dichotomous or convergent, that the 1964 Wilderness Act codified the dichotomous view, and that two recent movements—ecosystem management and ecosystem restoration—have arisen from a re-emergence of the convergent view. Finally, we discuss how perceptions of risk and uncertainty in natural systems influence the outcomes of this irony.

Fine (1997) identified three overarching philosophical views of the relationship between nature and culture that have predominated over the course of human history. The first of these is the "utilitarian" perspective, in which nature is seen primarily as a storehouse of goods that can meet human needs. In this view, nature and culture are seen as two separate entities, with nature existing primarily for the benefit of culture. The utilitarian view is often said to represent the traditional Judeo-Christian idea about nature; while that is surely an oversimplification, it certainly was a dominant philosophy during the Industrial Revolution and era of American expansion (Nash 1967).

The second view, the "preservation" perspective, also holds nature and culture to be separate. But in this view, nature is seen to exist *in spite of* culture, and the best role for nature is to be protected from the influences of humanity. Fine (1997) calls this the "strong environmentalist" position. Some adherents equate it with non-Western cultures, which they see as being more biocentric than our own, but it is more properly identified with the romantic philosophies of Rousseau and Thoreau, which have found their fullest expression in post-war Europe and America.

The third view is the "organic" perspective. Fine (1997) points out that this is both the oldest and newest orientation toward nature—characteristic of many pre-industrial cultures, as well as the modern sustainable development movement, among others—in which the natural world and human world are integrated and even inseparable. The appropriate role for nature in this view is that it is one sphere of human action.

The Wilderness Act, passed at the beginnings of the modern American environmental movement, when our society was just beginning to recognize the full extent of environmental degradation caused by modern industrial expansion, is legislation born of dichotomy between nature and culture. The preservationist view is seen clearly in its description of wilderness as a place "...where man himself is a visitor who does not remain." Wilderness management has solidified this dichotomous perspective, as required by the language of the act itself, by distinguishing between natural and human-caused influences. Thus, for example, lightning-ignited fires typically are allowed to burn, but human-ignited fires are not, even if their ecological benefits to the health of wilderness ecosystems would be identical. Or bare ground may be mitigated if attributed to humans or domestic livestock but not wild ungulates.

Since passage of the Wilderness Act, however, other movements have begun to try to close the gap between nature and culture, even to inject culture into nature in order to redress some of the "sins" of culture. The dilemma over management action in wilderness today is born of our recognition of these later movements, which represent a re-emergence of the ancient holism seen in some pre-industrial views of humans in nature.

The first of these movements is ecosystem management, which acknowledges human dependence on biotic integrity and seeks to blur the boundaries between social and biotic systems (Yaffee 1999). The second movement is that of ecological restoration, which represents a recognition of society's ethical responsibility to try to "make things right" in our relationship with nature (Gobster and Hull 1999). Some thinkers such as Jordan (1985) have tried to create a "participatory ideal," in which restoration is best when it meets a wide range of human needs. Restoration is *not* simply fixing things and then leaving them alone, but rather a continued community action. The convergent view of nature/culture relationships has also made its way into wilderness management through adoption of the Limits of Acceptable Change planning process, which explicitly acknowledges that humans will be part of wilderness systems (as required under the Wilderness Act) and then gives society the responsibility for determining how extensive that role in wilderness is allowed to be (McCool and Cole 1997).

The dilemma we face—whether to err on the side of wildness by stressing the nature/culture dichotomy, or to err on the side of naturalness by restoring nature whenever possible — is rooted in the ongoing ambiguity of a wilderness policy and other environmental policies that are rooted both in the preservationist and organic views of nature and culture. Where we fall on the spectrum from dichotomy to convergence is often rooted in our view of risk and uncertainty: Do we dare trust science? Do we dare not? If we trust scientists to make wise, informed judgments about what "nature" would be without human intervention, we are more likely to approve of manipulations intended to produce those conditions. Alternatively, if we're concerned about the possibility of restoration going awry, we may be too risk-averse to allow restoration in wilderness.

Seen another way, if we believe that wild nature is doomed, we may be more likely to want to restrict further manipulation in order to save whatever's left in the least "damaged" condition possible. Alternatively, we may believe that leaving things alone will only make matters worse, as may be the case in systems we've simplified through fire suppression, so that the only justifiable action is to try to reverse the trends.

Our trust is not only in science, however, but in the people who apply it: scientists and managers. When people oppose manipulative restoration, is it the science they distrust or is it us? These are questions that we need to confront if we are to make reasoned decisions about whether to allow restoration of naturalness or protect wildness at all costs.

Case Study: Proposed Manipulation in Bandelier Wilderness

Bandelier National Monument was established in 1916 under authority of the 1906 Antiquities Act to protect the cultural resources left by ancestral Puebloan peoples in north-central New Mexico. Among National Park Service lands, Bandelier has one of the highest concentrations of cultural resources, with an estimated 3,500 archeological sites. In 1976, nearly 71% of the monument, 23,267 acres, was designated as the Bandelier Wilderness.

Approximately 70% (about 2,500) of the Monument's archeological sites are believed to be located in pinon-juniper woodlands within the Bandelier Wilderness. The woodland soils are 100,000 years old and, until the early part of this century, supported a dense herbaceous ground cover, which limited the rate of soil erosion and associated archeological site disintegration. Frequent surface fires through the abundant herbaceous fuels prevented widespread establishment of pinon and juniper trees. With the introduction of the railroad in the 1880s, livestock grazing increased dramatically and continued until the early 1940s. This grazing caused the loss of the herbaceous ground cover and precipitated severe ecological change, including the loss of fire in the ecosystem. Tree density has increased dramatically in the past century in the absence of frequent fires, setting up a positive feedback cycle that is exacerbating competition for scarce water and soil nutrients and decreasing herbaceous cover and diversity (Gottfried and others 1995). The herbaceous ground cover has dropped below a critical threshold (Davenport and others 1998), initiating an ongoing cycle of severely accelerated erosion that will strip most of the soils from these areas in 100-200 years (Wilcox and others 1996a,b). This modern, human-initiated, accelerated erosion is currently affecting at least 80 percent of the recorded archeological sites in the pinon-juniper woodlands. In one rainstorm during 1995, for example, 1,040 cultural artifacts were washed into a sediment trap from a 0.1- hectare study watershed.

The question facing managers at Bandelier is how to break this positive feedback cycle, increase herbaceous ground cover to pre-livestock grazing levels, restore fire as a viable ecological process and stop the accelerated soil erosion that is demolishing both the natural and cultural resources. Although livestock grazing officially ended in 1932, and feral burros were removed in about 1980, there has been no recovery of herbaceous ground cover because physical processes now dominate in the barren, desertified interspaces between trees. Research done in the Bandelier Wilderness and adjacent areas has demonstrated that thinning trees and leaving them on-site produces a two to seven-fold increase in herbaceous cover and significantly reduces soil erosion (Jacobs and Gatewood 1999).

To break this positive feedback cycle and set in motion changes to restore herbaceous cover and natural fires, as well as to reduce soil erosion and slow the loss of cultural resources, the management staff at Bandelier is considering thinning some of the pinon and juniper trees over portions of 8,000 acres in wilderness. Such action would require the use of chain saws and leave clear signs of human presence for about two decades--perhaps longer. The dilemma now facing these managers is whether to intervene to restore sustainable wilderness conditions and stop extreme soil erosion and concomitant wholesale loss of cultural resources for which the monument was established, or to take no action so that the "hand of man" is not imposed on this wilderness. Either choice has significant consequences.

In developing management direction in the face of this dilemma, managers are considering the following questions:

- Does the Monument's enabling legislation (or the NPS Organic Act) reign supreme and, if so, at what cost to other resource values, including wilderness values, recognized later in the Monument's history?
- Should federal land managers intervene if wilderness ecosystems are degraded and unsustainable due to

federally sanctioned overgrazing and fire suppression over the past century?

- Can the "natural range of variability" be restored, and will it be sustainable?
- If restoration is possible, what should the goal or target conditions be in federally designated wilderness?
- While current erosion conditions within the Bandelier Wilderness warrant urgent management attention, are drastic restorative measures justified?
- Is it appropriate to conduct large-scale ecosystem restoration work in wilderness?
- If managers start manipulating wilderness, when and where will management intervention end?

Faced with this dilemma and after considering each of these questions, the managers at Bandelier are evaluating options through the NEPA process to temporarily compromise the value of wildness for the longer term sake of natural ecological conditions and cultural resources (Sydoriak and others, this volume). While most wilderness managers do not face the added burden of complying with enabling legislation that emphasizes cultural resource protection, they may well have to confront the wider issue of whether to take actions that will may shift conditions toward the natural range of variability.

Conclusions

Large-scale wilderness restoration based on manipulating the environment will always cause a dilemma and entail the irony of balancing wildness against naturalness. In one way, this dilemma is good because it forces us to carefully consider our actions and their consequences. "Doing the right thing" for wilderness used to be fairly straightforward. Today, with our increased knowledge of regional-scale human impacts, coupled with our desire to restore areas known to be degraded, "doing the right thing" is no longer a simple path because it is based on a philosophical choice between wildness and naturalness. Two people or groups may differ, sometimes strongly, about what they perceive is "right" for wilderness, and both views are valid. If there are significant doubts about a proposed action, one view would err on the side of protecting wildness, while the other view would err on the side of naturalness. One of the biggest hurdles facing wilderness policy-makers and managers today, as well as the concerned public, is how to reconcile these views and manage wilderness for both wildness and naturalness.

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