

Society for Wilderness Stewardship

White Paper on Stewardship Issues

**ECOSYSTEM INTERVENTION, RESTORATION, AND RESPONDING TO CLIMATE CHANGE IN WILDERNESS:
AGENCY POLICY NEEDS TO BE STRENGTHENED TO PROTECT THE FUNDAMENTAL VALUES OF
WILDERNESS**

This is one of a series of white papers developed by the Society for Wilderness Stewardship that focus on important issues wilderness stewards struggle with. Each paper will explore the nature of the issue, how it is being dealt with and reasons why wilderness stewards struggle with making decisions and/or implementing effective stewardship. Each paper concludes with recommendations regarding how the issue could be dealt with more effectively, appropriately and professionally.

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Executive Summary

Should wilderness stewards intentionally manipulate wilderness ecosystems to compensate for human influences that have altered natural conditions? Or should they refrain from intervening and allow these systems to adapt and evolve as they will? This is the question that wilderness stewards are confronted with as they consider how best to protect wilderness character and values given inevitable, pervasive and accelerating human impact—in an age increasingly referred to as the Anthropocene (Crutzen and Stoermer 2000, Kaye 2014). As awareness of the magnitude of climate change, other large-scale stressors and their effects on wilderness conditions increases, the issue of wilderness restoration becomes even more unavoidable and central to wilderness stewardship. It is something that every wilderness steward will need to come to terms with. When and where is it appropriate and desirable to actively respond to human-caused climate change and other anthropogenic disturbances and, if so, how? Decisions about whether to intervene in wilderness ecosystems and processes in an attempt to restore naturalness have not been consistent, and debate escalates regarding the appropriateness of intervention and restoration.

Why is there still inconsistency, paralysis and unresolved divergent opinion on this issue, given that it has been discussed and debated for decades? Our analysis suggests several reasons. First, there are opposing perspectives on whether or not the Wilderness Act considers protection of the untrammeled (or wild) and natural qualities of wilderness to be equally important stewardship goals. Second, agency policy is contradictory, providing little explicit guidance about whether restoring natural conditions or avoiding further trammeling is preferable. Finally, the recommended process for making stewardship decisions, a Minimum Requirements Analysis (MRA), provides little guidance regarding the relative importance of protecting the natural and untrammeled qualities of wilderness.

To improve the situation, **we recommend that the agencies form a task force to consider developing guidance and policy that is less contradictory and more specific. Further, we recommend that such a task force reject the current situation and develop more meaningful policy and guidance that helps wilderness stewards make decisions about intervention and restoration when there is conflict between the untrammeled and natural qualities of wilderness.** These decisions are too important to be so strongly influenced by the value system of whoever happens to be responsible for making decisions, with stewards who see wilderness primarily as a reservoir of biological diversity tending to support intervention and those who see wilderness primarily as a sanctuary of wildness tending to not intervene.

Our analysis reviews policy and literature, providing a starting point for an interagency group tasked with developing new policy and guidance. At its most basic, policy and guidance should provide more specificity regarding the relative emphasis to be given to the untrammeled and natural qualities of wilderness. In situations where protecting one of these will compromise the other, which should generally have primacy? Emphasizing the untrammeled will result in less management intervention and a wilderness system in which nature is more autonomous but where ecosystems may be substantially affected by anthropogenic influences such as climate change. Emphasizing the natural will result in more management intervention and a wilderness system in which ecosystems are subject to more human control but where, if interventions are appropriate and successful, conditions might be less affected by anthropogenic influences such as climate change. The compromise between these two desirable wilderness qualities could be expressed in the form of specific criteria for when interventions are and are not appropriate. With clear policy, guidance and definitions in place, the foundation would exist for the agencies to develop improved frameworks and decision tools for evaluating where and when ecological restoration and intervention is appropriate.

The Issue

The Wilderness Act makes it clear that wilderness should be protected from threats to its natural, primeval and wilderness character. Threats are human activities (direct effects) and their consequences (indirect effects) with the potential to alter wilderness conditions. It is easier for wilderness stewards to protect wilderness from direct, internal threats, such as recreation, because agencies generally have jurisdiction over and more control of what occurs inside wilderness. Moreover, such impacts are often more localized. Widespread impacts that come from outside the wilderness (e.g. climate change, air and water pollution, loss of predators, species introductions, landscape fragmentation and loss of historic fire regimes) are more difficult to respond to. Although they can sometimes blunt the full force of such threats, wilderness stewards are often unable to keep such threats from impacting wilderness values. The result is human-caused alteration of the natural conditions of wilderness, changes that can represent a loss of wilderness values. Given this, one of the few remaining strategies for protecting natural conditions is to intervene in wilderness ecosystems and ecosystem processes, manipulating them as needed to compensate for the adverse effects of human activities.

Clearly, the loss of naturalness diminishes wilderness values. Protecting naturalness from threats provides benefits, particularly in preserving some of the native biodiversity that exists in wilderness areas. However, manipulating wilderness conditions to offset the effects of anthropogenic impacts adversely affects wilderness character. Wilderness systems are supposed to be wild and untrammelled and restorative interventions trammel wilderness and diminish its wildness. Moreover, the effectiveness of interventions is often uncertain. There is no guarantee that they will lead to more natural conditions let alone restore naturalness.

The nature and benefits of wildness are perhaps less obvious and appreciated than those of naturalness. Wild landscapes are characterized by their freedom from the human intent to alter, control, or manipulate its components and ecological and evolutionary processes. Wildness is the state wherein the processes of an area's genesis—free from human purpose, utility, or design—are allowed to shape its future (Kaye 2014). Maintaining some areas in this state serves many and varied purposes. From the time of Emerson, Thoreau, Muir and on, the cultural, aesthetic, and symbolic values of wildness were a primary inspiration for the wilderness literary tradition. For many visitors, part of the wilderness experience lies in knowing that the land or wildlife they see are wild, and not a product of management programs. Wild areas can serve as baselines for understanding how unmanaged ecological systems respond to anthropogenic change. They can serve as a “control” for assessing the effectiveness of interventions and restoration efforts implemented elsewhere. But as baselines, wild areas can also provide understandings that go beyond how ecosystems function and transform when left alone. They can serve as reference points “essential to a true understanding of ourselves, our culture, our own natures, and our place in all nature” (Zahniser 1956). Thus, wild areas can be left as living museums of unhampered evolution for the same reason we preserve historic places, structures, and artifacts—as connections to our past, as touchstones to ways of knowing and relating to the world that shaped us as a species. They can serve as reference points as humankind reshapes its world. On a planet increasingly permeated with human intentionality, areas we allow to be there for themselves, that we allow to become what they will, can stand in contrast to human hubris. They can counter the dominating presumption that everything exists in relation to us. Their perpetuation is a gesture of environmental humility, and an encouraging demonstration and reminder of our capacity for restraint (Nash 1982).

Howard Zahniser, the primary author of The Wilderness Act, recognized that managers are prone to intervene and want to actively manage. He argued that intervention should be avoided and admonished wilderness stewards to be “guardians rather than gardeners” (Zahniser 1963a). To emphasize the point,

he stated that “We must always remember that the essential quality of the wilderness is its wildness (Zahniser 1953).

Graber (1985, 1995) was perhaps the first person to call attention to the irony of using human artifice to combat the widespread impacts of humanity on wilderness. Cole (1996) wrote the first detailed article on the nature and importance of this dilemma, suggesting that choosing to manipulate or not can be characterized as a choice between naturalness and wildness (Cole 2000a), terminology that while evocative has proved problematic given the varied definitions of naturalness and wildness (Ridder 2007). As discussed at length in the book *Beyond Naturalness: Rethinking Park and Wilderness Stewardship in an Era of Rapid Change* (Cole and Yung 2010), naturalness can mean lack of human control, a meaning similar to wild and untrammled. It can mean historical fidelity, where conditions remain much as they have been in the past. Finally, it can mean lack of human alteration and impact, where conditions are restored to those that might have occurred without human influence and disturbance. This latter meaning is the meaning of naturalness that Cole (2000a) intended when he contrasted managing for wildness (emphasizing minimizing human control) with managing for naturalness (emphasizing minimizing human impact).

In this paper, for convenience, we will continue to use the terminology of managing for wildness vs. managing for naturalness. When that terminology is used in this paper, we intend for the phrase “managing for wildness” to mean taking a non-interventionist approach, which preserves the autonomy of nature. That is, when anthropogenic disturbance occurs, nature is allowed to respond to that disturbance without the presumption that human intervention can restore wilderness character. The result is wilderness that is untrammled and not humanly controlled but where conditions may be substantially affected by anthropogenic influences such as climate change. “Managing for naturalness” is intended to mean taking an interventionist approach where, when anthropogenic disturbance occurs, interventions are taken in an attempt to mitigate those disturbances to some extent. The result is wilderness that is less untrammled and subject to more human control but where, if interventions are appropriate and successful, conditions might be less affected by anthropogenic influences such as climate change. It is important to note that taking a non-interventionist approach can also be considered managing for natural conditions (Cole and Yung 2010). As will be discussed further below, some argue that this is the correct interpretation of naturalness in the context of The Wilderness Act and that if naturalness was not misinterpreted, there would be no dilemma of managing either for wildness or naturalness (Steinhoff 2010, Kammer 2013).

Should wilderness stewards intentionally manipulate wilderness ecosystems to compensate for human influences that have altered natural conditions or should they refrain from intervening? This is the question that wilderness stewards are increasingly struggling with as they consider how best to protect wilderness, given inevitable and pervasive human impact. Almost 20 years after Cole (1996) suggested that this was the foremost dilemma facing wilderness stewardship, the issue is finally receiving widespread attention. Kaye (2012) discusses the implications of this dilemma for wilderness in the National Wildlife Refuge System, particularly given the specter of climate change. Moreover, numerous popular articles written to coincide with the 50th anniversary of the Wilderness Act’s passage discuss the importance of this issue to wilderness stewardship (e.g. Ferguson 2014, Smith 2014, Solomon 2014, Zaffos, 2014).

The critical question is under what circumstances (if any) should wilderness ecosystems be intentionally manipulated and under what circumstances should they be left to adapt and evolve as they will? The appropriateness of manipulations might vary with the nature of the altered attribute, the threat to those attributes, other agency mandates, and effects on adjacent lands. Responses to long-term,

widespread impacts to rare components, such as endangered species, might appropriately differ from responses to impacts to more common components, particularly if impacts are short-term and localized. Should the propensity to intervene vary substantially with the degree to which stakeholders pressure wilderness stewards to intervene? Perhaps intervention should be aggressive in some wildernesses and avoided in others, as Cole (1996, 2000b) has suggested.

The purpose of our analysis is to explore how this issue is being dealt with, in the actions that wilderness stewards take and (just as importantly) do not take, and recommend ways that stewardship could be improved. Improvement would come from clarifying, expanding or changing the existing policy and guidance that each of the four management agencies provides regarding ecosystem manipulation in wilderness. It would come from improved decision-making processes, more scientific and technical information and better training. It would come with increased resources or institutional changes that result in greater incentives or accountability to “do the right thing.”

Current Practice

There are already a number of decisions that have been made about interventions¹ and many other possible interventions are being discussed. Management ignitions are used in some Forest Service wildernesses (e.g. Big Gum Swamp) to replace fires that no longer burn into wilderness. In the Saint Mary’s Wilderness, helicopters have dumped lime adjacent to the Saint Mary’s River in order to buffer the river from the effects of acid precipitation resulting from industrial air pollution. In the Bandelier Wilderness, woodland ecosystems have been so altered by grazing and fire suppression that the land is eroding and cultural artifacts are being exposed and washed away. Since eliminating the original causes of this problem will no longer fix these problems, stewards have proposed forest thinning as the best means of restoring naturalness and avoiding the further loss of cultural values (Sydoriak et al. 2000). Across much of the mountain West, whitebark pine populations have been decimated by the non-native pathogen that causes white pine blister rust and by outbreaks of mountain pine beetles that are exacerbated by fire suppression and climate change. Other five-needle pines (e.g. limber and bristlecone pines) are threatened as well. Concern about sustaining populations of these trees is expressed in a desire to restore populations through such interventions as actively protecting seed trees from mountain pine beetle and fire and planting rust-resistant trees (Schoettle et al. 2013). But perhaps the most critical reason to clarify the issue and appropriate response in wilderness comes from questions about how we should respond to human-caused climate change. Numerous interventions in response to climate change are likely to be proposed, including habitat manipulation to promote connectivity, placement of watering structures, reducing the effects of other stressors on conservation targets (e.g. through predator control) and assisted migration.

Most of the restorative interventions that have been undertaken so far are small-scale and not very controversial². For example, disturbed campsites and rerouted trails have been restored in many

¹ The interventions this paper is concerned with are intentional manipulative actions taken within wilderness, involving elements of the ecosystem, for the purpose of offsetting the effects of anthropogenic actions (human impact). That is, the intent of the intervention is to protect or restore naturalness. Suppressing fires and building trails, for example, are interventions that affect ecosystems, but they are outside the purview of this paper because their purpose is not to protect or restore naturalness. Using human ignitions to restore a more natural fire regime is an example of an intervention that, because it is undertaken to restore naturalness, is within the purview of this paper.

² Our concern in this paper is with interventions that, if undertaken, are substantial enough to represent a significant trammeling of wilderness. We do not attempt to define the line between what we refer to as significant and insignificant interventions at this juncture, although we fully recognize that this line must eventually be defined. Although much

wildernesses. Use of herbicides to control non-native invasive species is also rather common, although more controversial. Given how widespread unnatural conditions are across wilderness lands (reflecting fire suppression, air pollution, loss of predators, fragmentation, invasive species and now climate change), the relative paucity of large-scale intervention is notable. To some degree this reflects a lack of resources available to do restoration work. It may reflect a pervasive philosophy that intervention is generally inappropriate, even if it is the only way to restore the natural qualities of wilderness. It may reflect the real or perceived impossibility of restoring natural conditions, uncertainty regarding how to do so and a concern for unforeseen and adverse consequences. Or it may reflect inaction in an environment where the lack of clear policy makes it unclear what the right thing is to do for wilderness.

Climate Change

Recently, particular attention has been devoted to climate change, its effects on wilderness character and questions about how best to respond (Cole and Yung 2010, Graber 2012, Stephenson and Millar 2012, Kaye 2012, 2014). Conceptually, questions about how to respond to climate change are no different from those regarding whether to intervene in response to any other anthropogenic disturbance. However, climate change represents an extreme in terms of disturbances that wilderness stewards might respond to. No amount of intervention can negate the effects of climate change on wilderness ecosystems.

What the specter of climate change makes clear is that the wilderness management agencies must confront the dilemma of wilderness restoration and intervention. This is not a minor issue of relevance in only a few places. Virtually all wilderness lands have been and are continuing to be altered by human influence, which degrades the natural qualities of wilderness and threatens native biodiversity. This would be true even without climate change, given the prevalence of altered disturbance regimes, habitat fragmentation, absent top predators, air and water pollution, and non-native invasive species (Stephenson et al. 2010). Some suggest that these pervasive pressures, affecting even the most remote wilderness lands, represent the emergence of a new Anthropocene Era (Crutzen and Stoermer 2000, Kaye 2014). What the issue of climate change does, when added to these other anthropogenic insults, is to clarify the situation and to raise the stakes.

Analysis of Policy, Process and Implementation

The Role of Policy and Guidance³

Through their wilderness policy and guidance, each of the four agencies that manage wilderness can determine how decisions are made about restoration and intervention in wilderness and strongly influence what those decisions are. Clear policy and guidance increases the likelihood that decisions will

debate needs to go into this decision, significance will likely be determined largely by the spatial scale, frequency and invasiveness of the action. So, restoring a trail that was relocated might be considered insignificant, while using human ignitions to restore a more natural fire regime would likely be considered significant.

³ In this document we use the terms policy and guidance in their colloquial and interchangeable sense, although we recognize that these terms have specific meaning to the agencies and carry varying degrees of procedural requirement and burden. When we speak of changing policy and/or guidance, we are not advocating a particular policy-changing procedure (such as publishing new rules in the Federal Register). We are merely asking for a change in the agency language that directs and constrains the decisions that are made, however that might be accomplished. This might be accomplished, for example, by developing instructional memoranda, director's orders or other agency equivalents that elaborate on and give more specificity to established policy.

be consistent over time, rather than constantly changing with changes in personnel. It also is more likely to result in effective consideration of the cumulative effects of multiple decisions. Policy and guidance can encourage a coordinated attempt to ensure that the collective outcome of individual decisions achieves some desired set of conditions—both for individual wilderness areas and for the entire National Wilderness Preservation System. Alternatively, by not articulating a desired outcome for the wilderness system, policy can endorse, by default, case-by-case decision-making. Cole (2001) has argued that case-by-case decision-making based on a framework that seeks compromise between conflicting values, will result in a more compromised wilderness system. A classic example of “the tyranny of small decisions” (Kahn 1966), future wilderness conditions will be “shaped by countless independent decisions made over many years by hundreds of individuals” (Cole 2001), many of whom differ in the importance they assign to the naturalness and untrammelled qualities of wilderness. Joly (2013) makes the same point, arguing that “a piecemeal, unit-but-unit, or even issue-by-issue approach would lead to ad hoc decision-making that fails to take an entire conservation system’s units into account.”

Policy could guide decisions by suggesting the relative importance of seeking to restore naturalness through active intervention or of protecting nature’s autonomy and the wild, untrammelled qualities of wilderness by refraining from active intervention. For example, prior to passage of the Wilderness Act, Spurr (1963) argued for intervention given the ubiquity of human impact even in remote wilderness. More recently, Graber (2003) argued that “aggressive actions will be required to preserve even a semblance of the elements that comprise natural ecosystems” in wilderness and that “nature-maintenance activities reflect the sad reality that many designated wildernesses...are simply too small or isolated to sustain their full suite of ecosystem functions without intervention.” He argued that the loss of wilderness character that results from disturbance introduced by ecological restoration is often a small price to pay for the benefits of restoration, particularly given that, in his opinion, the loss of character “need not represent permanent loss.” This view is shared by many others, particularly ecological scientists who believe we need to intervene in wilderness ecosystems to compensate for adverse impacts of humans on wilderness conditions they value, from the integrity of pinon-juniper woodlands (Sydoriak et al. 2000), to the sustainability of five-needle pine forests (Schoettle et al. 2013, Zaffos 2014).

This view has been countered since at least the rejoinders of Zahniser and Brower to Spurr’s (1963) talk at the Sierra Club Wilderness Conference (Fincher n.d.) by those who seek to elevate the importance of the untrammelled quality of wilderness, even if that means accepting substantial human impact to wilderness conditions. Turner (1996) and Zahniser (2014) have been eloquent spokesmen for this position. Cole (1996) provided an early articulation of the benefits of a largely “hands-off” approach on at least some wilderness lands, including the importance of such lands as a control or reference for manipulated landscapes; and Landres (2010) has more recently and thoroughly discussed these benefits. Cole (2005) notes that “the ecological and experiential values that can be found on wilderness lands - while highly significant - can also be found on lands outside wilderness” whereas “what is most unique about wilderness are the symbolic values, particularly wilderness as untrammelled - lack of intentional manipulation, humility, and restraint.” In his article “The wilderness paradox,” Smith (2014) provides a popular accounting of the opposing views of those who differ in their views of the appropriateness of intervention in wilderness.

Policy also guides how decisions are made by describing a particular process or framework for making decisions. The decision-making process that has been most commonly used is the Minimum Requirements Analysis (MRA). Through this process, interventions are warranted if they are deemed “necessary”, with necessity typically being determined by whether action is required to maintain or restore the naturalness of wilderness. Cole (2007) argued that a better way to frame the decision is in

terms of whether wilderness values and wilderness character would increase or decrease following intervention. Particularly given human-caused climate change, the natural qualities of wilderness character are being adversely affected throughout wilderness. Therefore, the “need” to actively intervene in order to attempt to protect this one quality exists on most wilderness lands; but this does not mean it is “desirable” to actively intervene so frequently. Graber (2003) also advocated a cost/benefit analysis approach to deciding whether or not to intervene, although he framed the trade-off as one between “conservation of nature and the intent of the Wilderness Act.”

Finally, where interventions are undertaken to enhance natural conditions, policy and guidance could emphasize the importance of monitoring the outcome of the intervention. Learning from what happens is important to adaptive management and improved future decision-making. Also, where naturalness is to be enhanced, policy could define the desired outcomes of intervention more clearly. Before the prevalence of climate change was appreciated, desired outcomes were typically thought of as restoration of conditions (often characterized as an historic range of conditions) that existed sometime in the past (Landres et al. 1999). With climate change, however, past conditions can be a poor future referent; the new “natural” may be a condition that is very different from what existed in the past (Cole and Yung 2010).

Current Policy and Recommended Process

There are opposing perspectives on whether or not the Wilderness Act considers protection of wildness and naturalness to be equally important stewardship goals. The language in the Wilderness Act has been used to justify both intervening to restore more natural conditions and not intervening in such situations (Cole 1996). The language of the Act does not clearly state, in situations where humans have altered conditions, whether it is preferable to attempt to restore naturalness or to avoid further trammeling by refraining from active intervention. This has led Landres et al. (2008, 2015) to assert that natural and untrammled conditions are two different qualities of wilderness character that are often in conflict. In *Keeping It Wild*², they state that “the Untrammled Quality (of wilderness character) is preserved or sustained when actions to intentionally control or manipulate the components or processes of ecological systems inside wilderness (for example, suppressing fire, stocking lakes with fish, installing water catchments, or removing predators) are not taken. However, not taking such actions can degrade the Natural Quality of wilderness character which they state “is preserved when there are only indigenous species and natural ecological conditions and processes, and...improved by controlling or removing non-indigenous species or by restoring ecological conditions.” Landres et al. (2008, 2015) also assert that the natural and untrammled qualities are equally important and, therefore, that neither has clear priority when it comes to making stewardship decisions. Wilderness stewards, given this perspective, are left to make trade-offs between natural and untrammled conditions as they see fit (Hahn and Landres 2014).

The alternative perspective is that wildness and untrammled qualities are the essence of wilderness character and, therefore, that policy should emphasize refraining from intentional manipulation (Cole et al. 2015). As mentioned above, in early testimony on the wilderness concept, Zahniser (1953) stated that: “We must always remember that the essential quality of the wilderness is its wildness”. A decade later Zahniser (1963a) clarified what this means for wilderness stewardship when he famously wrote that wilderness stewards should be “guardians rather than gardeners.” Over the years, this opinion has repeatedly been upheld. In a report commissioned by the four agencies that manage wilderness, an esteemed panel led by Perry Brown, Dean of the School of Forestry at the University of Montana, concluded that “since wild is a fundamental characteristic of wilderness that is not attainable elsewhere,

if there is a choice between emphasizing naturalness and wildness, stewards should err on the side of wildness” (Pinchot Institute for Conservation 2001).

Fincher (n.d.) has written about the controversy caused by Dr. Stephen Spurr at the Sierra Club’s 1963 Biennial Wilderness Conference when he argued that because ecosystems are endlessly dynamic and affected by many anthropogenic forces, both intentional and unintentional, we should give up on the idea of preserving wild nature and instead fashion wilderness ecosystems to meet our desires. Howard Zahniser, David Brower and Brower’s assistant, Robert Golden, all published contrary opinions in the conference proceedings, arguing for nonintervention. As Brower concluded, “... let us give top priority to the saving, right now, of as much unspoiled and unmanaged wilderness as possible, just in case Professor Spurr happens to be wrong” (Golden and Brower 1963).

Scott (2001-2002) argues that the preeminent responsibility of wilderness stewardship is the protection of wilderness character, that the essence of wilderness character is untrammelled wilderness and, therefore, that management of wilderness ecosystems “should occur almost entirely by restraint on human influences from its boundaries, rather than by manipulation from within.” Scott presents evidence for these statements from a variety of resources, with the strongest statements coming from legislative history and from Zahniser himself. For example, in 1983, the Committee of Interior and Insular Affairs of the House of Representatives stated: “The overriding principle guiding management of all wilderness areas, regardless of which agency administers them, is the Wilderness Act (section 4(b)) mandate to preserve their wilderness character” (U.S. House 1983). Zahniser (1963b), in the final Senate hearing on the Act, described how to interpret the two-sentence definition of wilderness in section 2(c). “The first sentence defines the character of wilderness; the second describes the characteristics of an area of wilderness.” According to Zahniser, then, wilderness character, the preeminent goal of stewardship, is primarily about maintaining wilderness as an untrammelled, wild community of life and contrast to areas where man and his works dominate the landscape. Attributes such as natural conditions, lack of permanent improvements and habitation and outstanding opportunities for solitude are important characteristics of wilderness that should ideally be protected, but they are not the essence of wilderness character and, therefore, their protection is not as high a priority as protection of the wild and untrammelled qualities of wilderness. His son, Ed Zahniser (2014) continues to argue for the primacy of protecting the wild and untrammelled qualities of wilderness when managing wilderness.

The rules of statutory construction also suggest that interventions to restore particular conditions are not consistent with the Wilderness Act. In a recent article on wildlife restoration in wilderness, Kammer (2013) seeks to resolve the apparent conflict between untrammelled conditions and preserving natural conditions. He notes the need to follow rules of statutory construction when interpreting legislation, namely that a term in a statute should not be interpreted so as to create contradictions with other terms if contradiction can be avoided by using another reasonable interpretation based on a plain reading of the term. That is, we should interpret the mandate to preserve “natural conditions” in a manner that supplements instead of contravening the requirement that wilderness lands retain their wildness. As Kammer (2013) notes, this can easily be done because as used in the Act, “natural conditions” are contrasted with conditions arising from the occupation and modification of lands by humans or from the development of lands through the construction or imposition of “permanent improvements” or settlements. In each case, naturalness is more a matter of freedom from human manipulation and intervention (occupation, modification, development, improvement and habitation) than freedom from human influence. Kammer (2013) concludes that “whatever can be said regarding the continued merits of preserving the wildness or natural autonomy of protected areas at the expense of certain environmental values (such as biodiversity, ecological integrity, or resilience) which may be threatened by pervasive human influence—this is precisely what the Act requires.”

Agency policy is contradictory, providing little explicit guidance about whether restoring natural conditions or avoiding further trammeling is preferable. Although the agencies vary widely in terms of the amount of guidance they provide regarding the appropriateness of interventions, the policy and guidance that is provided is generally consistent between agencies (see Appendix). Policy makes it clear that intervention should be undertaken only where necessary and as a last resort. This suggests an emphasis on untrammelled values. However, it goes on to identify a number of situations in which restorative interventions should be undertaken--situations that are common and pervasive across the wilderness system. This suggests an emphasis on natural values. Both the BLM and NPS have recently adopted the Landres et al. (2008, 2015) definition of wilderness character in their policies. According to this definition, wilderness character consists of five distinct qualities, of which untrammelled and natural are two. Since the untrammelled and natural qualities are considered to be equal in importance, no preference is given to intervening or not. Neither the FWS nor the FS has adopted the Landres et al. (2008, 2015) definition of wilderness character, but they also have no stated preference for intervening or not.

Policy states that if human disturbances can self-correct, it is not appropriate to intervene. Unfortunately, this is the exception rather than the rule. On most wilderness lands, anthropogenic influence is ever-increasing, resulting in directional change away from natural conditions (Graber 2003, Cole and Yung 2010). What is a steward to do if intervention should be avoided and yet wilderness conditions are being impacted in such a way that protection of natural conditions will require pervasive intervention? The question for which there is no explicit policy is the desirability of intervention in situations where naturalness has declined as a result of human activity and conditions are likely to remain that way in the absence of intervention.

Although there is no clear general statement about whether to give preference to the natural or untrammelled qualities of wilderness, most specific policy statements support widespread intervention. For example, all four agencies have policy that allows for prescribed management ignitions to restore more natural conditions, at least under certain circumstances. All four agencies allow for the use of herbicides to deal with invasive species. FWS, NPS and BLM policy all state that intervention is generally allowable to restore natural conditions where restoration will not occur by natural processes. In contrast, the importance of maintaining the untrammelled qualities is seldom stated assertively. Rather, the value of not intervening is only invoked by language that encourages use of "the least disruptive technique" (BLM), to take action "as a last resort" (FS) or to only take action if it is "necessary" to restore "natural processes" (FWS), or "to correct past mistakes, the impacts of human use, and the influences originating outside of wilderness boundaries" (NPS). In short, current policy is highly permissive (and in some cases encouraging) regarding intervention wherever natural processes have been disrupted and cannot be restored through natural processes. Concern for the trammeling that such interventions represent is only reflected in guidance about how to undertake the intervention, using the "minimum tool" and intervening with humility and restraint.

This is particularly the case in National Park Service policy. The NPS provides the most explicit guidance on how to make decisions about interventions in a white paper prepared by the NPS' National Wilderness Steering Group, titled *What Constitutes Appropriate Conservation and Restoration Activities in Wilderness* (National Park Service 2004). The paper, essentially a reprint of Graber (2003), strongly supports restorative interventions, particularly where it is believed that a one-time intervention will result in self-sustaining reversals of anthropogenic change.

The recommended process for making stewardship decisions, a Minimum Requirements Analysis (MRA), provides little guidance regarding the relative importance of protecting the natural and

untrammeled qualities of wilderness. Consequently, decisions continue to be inconsistent and largely dependent on the personal preferences of individual decision makers and local politics. The MRA was originally developed to decide whether certain uses prohibited by Sec. 4c of the Wilderness Act (temporary roads, motor vehicles, motorized equipment or motorboats, landing of aircraft, mechanized transport, structures and installations) should be allowed because they are “*necessary to meet minimum requirements for the administration of the area for the purpose of the Act*” (emphasis added). For this original purpose, an MRA logically began with an assessment of whether action is necessary. If it was deemed necessary, the second step involved identifying the minimum level of activity that would meet the need. This means vs. ends approach is a logical one for deciding whether using an undesirable means (a prohibited use) to attain a desired end is worthwhile. It presumes, as directed by the Act, that meeting the purpose of the Act (the end) is ultimately more important than violating a use prohibition. The MRA is a useful tool for considering whether to make allowances for a prohibited activity.

Since its original development, however, the MRA approach has been extended from evaluating prohibited uses to evaluating any action in wilderness that might adversely affect wilderness character. It is not unreasonable to consider an intervention to be equivalent to a prohibited use and to begin by asking the question “is the intervention necessary?” Rewritten MRA guidelines now state that evaluating the effects of any stewardship action on wilderness character is key to assessing whether the action is necessary. In the case of an intervention, is wilderness character better protected by intervening or by not intervening? With large-scale interventions particularly, certain wilderness values will be adversely affected if we do not intervene; other values will be adversely affected if we do intervene. If it is determined that wilderness character is better protected by intervening, the second step should answer the question, which interventions conducted in which places are the minimum necessary to achieve the desired outcome. These revisions to the MRA process are consistent with Graber’s (2003) suggestion, repeated in National Park Service guidance (National Park Service 2004), that decisions be based on weighing “the restoration benefits to the ecosystem against the impacts to other aspects of wilderness character.”

The National Park Service, again, has gone furthest in providing detail about how to make decisions. They recommend using the qualities of wilderness character (as defined by Landres et al. 2008, 2015) as a “filter” within the MRA for deciding if an intervention is necessary or not (NPS 2014). However, they fail to resolve the inherent conflict between qualities. They state that a proposed action might be considered necessary if it seeks to preserve or improve one or more of the qualities of wilderness character. Since virtually all restorative interventions attempt to preserve or improve at least the natural quality of wilderness, this suggests that all interventions are necessary. The problem is that they also degrade the untrammeled quality. So, again, we are forced to conclude that, without resolving the question of the relative importance of the natural and untrammeled qualities of wilderness, little meaningful guidance has been provided.

The most recent guidance on process is a decision-making framework developed by scientists from the Aldo Leopold Wilderness Research Institute (Hahn and Landres 2014). Their framework builds on and elaborates on the MRA process. The first step, “describe the situation”, involves answering the question “is restoration action needed here and now in this wilderness?” The crux of this step is an articulation of why action is more important to the preservation of wilderness character than inaction. The second step, “frame the evaluation”, involves deciding if the restoration proposal being assessed is sufficient, given the complexity of the situation. The third step, “analyze the proposal”, involves predicting the effects, uncertainties and risks of each of a range of alternatives. Following this analysis, NEPA is completed and a decision is made. As with an MRA, following this process should contribute to more

considered and transparent decisions. All decision makers will need to answer the same set of questions and document their responses. However, any systematic thought process or evaluative framework, in the absence of evaluative standards and guidance on which wilderness values should be emphasized, will do little to reduce the subjectivity of decisions. Decisions about whether or not action is more important to the preservation of wilderness character than inaction will continue to be largely dependent on whether one values naturalness or wildness more. Faced with the same situation, different wilderness stewards will answer this question in different ways. Local politics are likely to factor heavily in decisions and the process does little to protect against the cumulative effects of approving one intervention after another.

Some have opined that ethical and moral considerations are key to making decisions (Landres 2010). This is hard to dispute. But whose ethics and morals are paramount and whose are not? Is it more ethical to take responsibility for human threats to natural values and biodiversity and take action to fix past mistakes? Or is it more ethical to be humble and restrained in the face of the likelihood that nature may be better able to heal itself without further human input? Ethics and values inevitably enter into the decision-making process, which is precisely why vague policy leads to decisions that are inconsistent and reflective of the biases (ethics and values) of whoever has the discretion to make decisions.

Implementation

For some issues that wilderness stewards struggle with, policy provides clear guidance and well-developed decision-making processes exist. The struggle in these cases is lack of implementation, which can result from such limitations as inadequate training, inadequate funding, or inadequate commitment from line officers to do the right thing. At the current time, there is little evidence that these are fundamental reasons wilderness stewards struggle with the issue of restoration and intervention. Non-controversial, small-scale interventions, such as restoring campsites, undoubtedly are limited by insufficient training and funding, as well as the low priority generally given to wilderness stewardship. But there is little evidence that the infrequency of large-scale interventions results from barriers related to implementation.

Conclusions

The current situation is characterized by divergent opinion about the appropriateness of intervention, leading to paralysis and, where decisions are made, to inconsistent decisions. Should stewards be guardians or gardeners? Should they emphasize naturalness or wildness? In the opinions of some, wilderness stewards have been too inactive, shirking their duty to protect and manage wilderness “so as to preserve its natural conditions.” Some complain that wilderness policy is naïve (Graber 2003) or that it needs to change, to be more responsive to anthropogenic impacts to native biodiversity (Schoettle et al. 2013). Others fear, particularly as the ramifications of human-caused climate change manifest themselves, that there will be a rush to actively respond to those changes, that we will arrogantly overestimate our ability to fix problems and underestimate ignorance and uncertainty, and that we will lose even more of the wildness of wilderness (Fincher n.d., Zahniser 2014, Cole et al. 2015).

Why are there still inconsistency, paralysis and unresolved divergent opinion, given that this dilemma has been discussed and debated for decades? Does it reflect poor decision-making tools/processes, insufficient training, uncertainty about the likely effectiveness of interventions, lack of funding or other types of institutional support? While all of these may contribute to some degree to the current situation, our fundamental conclusion is that this situation primarily reflects current policy and guidance.

Current policy and guidance regarding decisions about restorative and other interventions in wilderness ecosystems is contradictory in spirit and does little to constrain or guide those decisions. It does not provide explicit guidance to wilderness stewards as they weigh the relative importance of attempting to restore natural qualities of wilderness being disturbed by humans against preservation of the untrammelled qualities of wilderness. Regardless of process (whether the MRA or some new decision-making framework such as that of Hahn and Landres 2014), decisions about the appropriateness of any proposed intervention are primarily dependent on whether degradation of naturalness is considered more or less erosive of wilderness character and values than degradation of the untrammelled quality of wilderness. Since there is no clear, explicit policy that establishes the relative importance of these two wilderness attributes, decisions will be strongly influenced by the value system of whoever is charged with making the decision. Stewards who see wilderness primarily as a reservoir of biological diversity will tend to support intervention while those who see wilderness primarily as a sanctuary of wilderness will tend to not intervene.

Moving Forward

Moving forward, there are two questions to address. Should less contradictory and more specific guidance and policy be developed and, if so, what should that guidance and policy be?

1. Should less contradictory and more specific guidance and policy be developed? The existing situation requires stewards to make decisions on a case-by-case basis, in the context of very broad and general policy that is contradictory and does little to constrain decisions. Although the pervasiveness of intervention should theoretically be determined by the level of threat to naturalness, the lack of clear and specific policy opens the door to divergent interpretations of the appropriateness of intervention. Consequently, for any given level of threat to naturalness, whether intervention occurs or not will be strongly influenced by the personal opinion and ethical worldview of decision makers and those able to politically influence decision makers. The advantages of maintaining the current situation (by not developing more specific guidance and policy) are that (1) there is no need to develop more specific policy (which will inevitably be controversial and time-consuming to develop), (2) it maintains maximum flexibility for decision makers, and (3) it continues the tradition of decentralized decision making. The disadvantage of not developing more specific guidance and policy is that divergent opinions about the appropriateness of intervention will continue, leading to ongoing paralysis and inconsistent decision making. It will also perpetuate a situation in which the contradictory nature of policy and divergent opinion provides no consistent standard for evaluating the appropriateness of stewardship decisions.

The problem with inconsistent decisions lies in their cumulative effect. The benefit of a decision not to intervene can be negated if a subsequent steward decides to intervene. Or perhaps a single intervention might be appropriate while multiple interventions would not. The adverse effects of inconsistent decisions increase as the scale of concern is enlarged from the individual wilderness to the National Wilderness Preservation System. The benefits of an intervention may only be realized if similar interventions are undertaken in neighboring wildernesses. Moreover, the aggregate benefits of a wilderness system can only be maximized if individual stewardship decisions contribute to rather than detract from the value of the entire system.

These disadvantages might be reduced with the decision tool that the agencies are currently working on (Hahn and Landres 2014) and by encouraging monitoring and evaluation of any interventions that are taken. The decision tool and increased monitoring should have the positive effect of increasing the transparency of decisions, their rationale and their outcomes. They should promote confidence in decision making in that an established framework for organizing assumptions and value choices is

available. However, neither of these improvements is likely to change either the nature or consistency of the decisions that are made, because the generality of existing policy allows decision makers to emphasize whichever wilderness values they hold most dear.

By developing more specific guidance and policy, case-by-case decision making would continue but it would be guided by policy that does more to constrain decisions. In this case, whether intervention occurs or not occurs or not should primarily be influenced, both theoretically and in reality, by the magnitude of threat to naturalness and the importance of the attributes being threatened. For any given level of threat to naturalness, intervention decisions should be more consistent across wildernesses. The primary advantage of developing more specific guidance and policy is that individual bias in decision-making is reduced and decisions should be more consistent. The disadvantage is that more specific policy will have to be developed and these specifics will be controversial. Because people have polarized opinions about the relative importance of untrammeled wilderness vs. natural wilderness, any policy decision will make some people unhappy.

With more specific guidance and policy, the utility of a decision making framework, such as that of Hahn and Landres (2014) would increase, as would the value of monitoring and evaluation of interventions.

2. If more specific policy and guidance is developed, what should it be?

At its most basic, more specificity is needed regarding the relative emphasis to be given to the untrammeled and natural qualities of wilderness. In situations where protecting one of these will compromise the other, which should generally have primacy? Or in what situations should one have primacy and in what situations should the other have primacy? Emphasizing the untrammeled will result in less management intervention and a wilderness system in which nature is more autonomous but where ecosystems may be substantially affected by anthropogenic influences such as climate change. Emphasizing the natural will result in more management intervention and a wilderness system in which ecosystems are subject to more human control but where, if interventions are appropriate and successful, conditions might be less affected by anthropogenic influences such as climate change. The compromise between these two desirable wilderness qualities could be expressed in the form of specific criteria for when interventions are and are not appropriate.

It would be most straightforward to apply this guidance and policy to all wilderness lands. The compromise to be made between the untrammeled and natural qualities would be applied equally to all wilderness. The result would be a wilderness system in which all wildernesses will experience some loss of both their untrammeled and their natural qualities.

However, another option would be to develop policy and guidance that emphasizes preserving untrammeled qualities on some wilderness lands and attempting to restore some of the diminished natural qualities on other wilderness lands. In this case, whether intervention occurs or not would reflect whether lands are allocated to untrammeled wilderness or to natural wilderness⁴, as well as by the magnitude of threat to naturalness. The compromise between untrammeled and natural qualities is made by having some highly untrammeled lands and some lands where conditions altered by humans have been restored to a more natural state rather than by having all wilderness lands moderately untrammeled and moderately natural. It is important to note that both categories of wilderness land would be generally consistent with the Wilderness Act. Lands on which natural qualities have primacy

⁴ The terminology of untrammeled vs natural wilderness is problematic. Better terms should be developed. In “untrammeled wilderness,” few if any interventions would be allowed, while interventions would more frequently be allowed in “natural wilderness.”

would still be largely untrammled, providing a profound contrast with areas where man and his works dominate the landscape. Lands on which untrammled qualities have primacy would still be largely natural; the imprint of man's work would be substantially unnoticeable⁵.

The advantage of this approach is that the untrammled and natural qualities of wilderness would be less degraded on some wilderness lands than if these values were compromised in a similar manner across all wilderness lands. The wilderness system would retain diversity, with some highly untrammled and some highly natural wilderness rather than a system of consistently semi-untrammled and semi-natural lands. This type of diversity was originally advocated by the founders of the Wilderness Society who argued that we need separate wilderness designations for lands that emphasize wildness and primitive recreation and lands that protect naturalness and biodiversity (Sutter 2002). It also reflects the opinions of most scientists who have written about how to respond to climate change and the pervasiveness of anthropogenic impact in wilderness (Botkin 1990, Cole 1996, Barnosky 1996, Cole and Yung 2010, Kaye 2012, Belote et al. 2014).

The problem with this approach is that it is a substantial change from current policy and there is nothing in the Wilderness Act to suggest having different categories of wilderness land, with each category giving primacy to different values. There would have to be agreement that it is appropriate and legal to protect both untrammled and natural wilderness at the scale of the entire National Wilderness Preservation System rather than the scale of the individual wilderness. Moreover, considerable effort would have to go into developing guidance regarding criteria (and/or a process) for allocating wilderness lands (either entire wildernesses or portions) to either the natural or the untrammled category. For lands devoted to "naturalness," it would be worthwhile to conceive of those lands as a system-- considering such things as connectivity, representativeness, vulnerability, the statutory purposes for which the area was established etc . (see, for example, Magness et al. 2011). Then guidance would need to be developed regarding how to compare a threat to naturalness to a threat to untrammled values (and decide whether to intervene) for each of these two categories of wilderness.

Recommendations

We recommend that the agencies form a task force to consider the need to develop guidance and policy that is less contradictory and more specific. Such a task force might also consider whether more specific policy would also improve stewardship of other controversial issues.

We also recommend that such a task force reject the current situation and develop more meaningful policy and guidance that helps wilderness stewards make decisions about intervention and restoration when there is conflict between the untrammled and natural qualities of wilderness.

These decisions are too important to be made largely on the basis of individual bias, reflective of one's personal code of ethics. Improved decision making is dependent on developing more specific details about (1) the threshold for considering an intervention significant, (2) how to assess magnitude of threat to naturalness, (3) how to assess the invasiveness of the intervention (the magnitude of threat to untrammled wilderness) and (4) the appropriate balance between protecting the untrammled and natural qualities of wilderness.

⁵ Wilderness lands on which untrammled qualities have primacy would be managed such that they did not modify the purposes, statutory authority and restrictions of the lands and units of the land managing agencies, as discussed in Sec. 4. (a) of The Wilderness Act.

This policy and guidance should be developed after considering the perspectives of a wide range of wilderness users/advocates/stakeholders and society at large. It should recognize the varied meanings of wilderness to different users/advocates/stakeholders and protect the varied wilderness values that they cherish. The stakes are huge. If intervention and attempted restoration of human disturbance is widespread, the future of the National Wilderness Preservation System and the values it protects will be very different from the future values protected by a policy of refraining from intervention and restoration. So it is important for policy and guidance to be developed collaboratively and transparently (Cole 1996, 2003) and endorsed by “the highest officials of each land management agency” (Joly 2013). With clear policy, guidance and definitions in place, the foundation would exist for the agencies to develop improved frameworks and decision tools for evaluating where and when ecological restoration and intervention is appropriate.

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APPENDIX:

AGENCY POLICY AND GUIDANCE ON WILDERNESS INTERVENTION/RESTORATION: A COMPILATION

This appendix is a compilation of much of each agency's policy and guidance regarding restoration and interventions in wilderness. It begins with general policy on restoration and ecosystem management and then has sections specific to particular issues, such as fire and invasive species. Finally, it compiles policy and guidance on which processes to use and how to document decisions about whether and how to intervene.

The agency documents these excerpts were taken from are:

Forest Service (FS): Fs Manual 2300 - Recreation, Wilderness, and Related Resource Management, Chapter 2320 - Wilderness Management

Fish and Wildlife Service (FWS): FWS Manual -Natural and Cultural Resources Management – Part 610, Wilderness Stewardship

National Park Service (NPS): NPS Management Policies 2006; Director's Order 41 – Wilderness Stewardship; White Paper

Bureau of Land Management (BLM): BLM Manual 6340 – Management of Designated Wilderness Areas (Public)

General Management Policy

FS

FS Manual 2323.43a - Watershed Condition Improvement

(See FSM 2522). Use watershed improvements to restore watersheds where deteriorated soil and hydrologic conditions caused by humans or their influences create a serious threat or loss of wilderness values. Watershed condition improvements are also appropriate where natural conditions present a definite hazard to life or property; or where such conditions could cause serious depreciation of important environmental qualities outside of the wilderness. Promote natural healing where such dangers are not imminent or where natural vegetation would return in a reasonable time.

Use indigenous or appropriate naturalized species to reestablish vegetation where there is no reasonable expectation of natural healing.

Use nonmotorized equipment to accomplish improvement objectives. Only imminent threat to important values downstream justifies the use of motorized equipment.

FS Manual 2323.52 - Policy

1. Permit ecological processes to operate naturally.
2. Recognize both climax and successional biotic communities as natural and desirable.

3. Allow, wherever possible, the natural process of healing in handling disturbed communities. Consider structural or vegetative assistance only as a last resort.

4. Only allow vegetation to be cut or sold when necessary for wilderness purposes or on valid mining claims under specified conditions, or when emergency conditions like fire, insect and disease, or protecting public safety make it necessary.

FS Manual 2323.54 - Reforestation

Allow reforestation only if a loss of the wilderness resource, due to human influence, has occurred and there is no reasonable expectation of natural reforestation.

FWS

FWS Manual Part 610 Sec. 2.16 How does the Service conserve wildlife and habitat in wilderness?

A. We conserve fish, wildlife, and plant resources and their habitats (including water resources) in wilderness in a manner consistent with the Administration Act and refuge purpose(s), including Wilderness Act purposes. Fish, wildlife, plants and their habitat are essential and inseparable components of wilderness. On wilderness areas within the Refuge System, we conserve fish, wildlife, and plants by preserving the wilderness environment. Both the Service and State fish and wildlife agencies have authorities and responsibilities for management of fish and wildlife on refuges as described in 43 CFR part 24. We work cooperatively with State fish and wildlife agencies to conserve fish, wildlife, and plant resources and their habitats (including water resources).

B. Major ecosystem processes including wildfire, drought, flooding, windstorms, pest and disease outbreaks, and predator/prey fluctuations may be natural ecological and evolutionary processes.

(1) We will not interfere with these processes or the wilderness ecosystem's response to such natural events unless necessary to accomplish refuge purposes, including Wilderness Act purposes, or in cases where these processes become unnatural. Examples of unnatural conditions are:

- (a) Excess fuel loads from past fire suppression activities,
- (b) Disrupted predator/prey relationships,
- (c) Elimination of native grazers, and
- (d) The spread of alien species.

(2) In such cases, we encourage the restoration and maintenance of biological integrity and wilderness character.

(3) All decisions and actions to modify ecosystems, species population levels, or natural processes must be:

- (a) Required to respond to a human emergency, or
- (b) The minimum requirement for administering the area as wilderness and necessary to accomplish the purposes of the refuge, including Wilderness Act purposes. In addition, such decisions and actions must:
 - (i) Maintain or restore the biological integrity, diversity, or environmental health of the wilderness area; or
 - (ii) Be necessary for the recovery of threatened or endangered species.

C. Hunting and fishing, when compatible, are among the priority general public uses of the Refuge System. We design our wildlife population management strategies to support accomplishing refuge purposes, including Wilderness Act purposes. (See section 2.30 and Refuge System recreation policies in 605 FW 1-7 for further guidance.)

FWS Manual Part 610 Sec. 2.17 May the Service introduce, transplant, or stock fish, wildlife, and plants in wilderness? We will not introduce, transplant, or stock any species into a wilderness area where it is not native (see 601 FW 3). We will not introduce fish into wilderness waters that do not naturally support fish populations. We may continue to manage species traditionally stocked before wilderness designation only if they meet the criteria established in section 2.16. We will determine suitable stocking levels and native species for a given wilderness area in consultation with State fish and wildlife agencies. We will use local genetic strains whenever possible and will not use genetically modified organisms. We will give preference to threatened or endangered species and native species exterminated by humans. We will not use fertilizers or supplemental food to artificially enhance fisheries or other wildlife resources. See 610 FW 5 for some of the additional provisions applicable in Alaska.

NPS

NPS Management Policies 2006, 6.3.7 Natural Resources Management

The principle of non-degradation will be applied to wilderness management, and each wilderness area's condition will be measured and assessed against its own unimpaired standard. Natural processes will be allowed, in so far as possible, to shape and control wilderness ecosystems. Management should seek to sustain natural distribution, numbers, population composition, and interaction of indigenous species. Management intervention should only be undertaken to the extent necessary to correct past mistakes, the impacts of human use, and the influences originating outside of wilderness boundaries.

Management actions, including restoration of extirpated native species, altered natural fire regimes, controlling invasive alien species, endangered species management, and the protection of air and water quality, should be attempted only when the knowledge and tools exist to accomplish clearly articulated goals.

NPS Management Policies 2006, 4.1 General Management Concepts

The Service will not intervene in natural biological or physical processes, except

- when directed by Congress;
- in emergencies in which human life and property are at stake;
- to restore natural ecosystem functioning that has been disrupted by past or ongoing human activities; or
- when a park plan has identified the intervention as necessary to protect other park resources, human health and safety, or facilities.

Any such intervention will be kept to the minimum necessary to achieve the stated management objectives.

NPS Management Policies 2006, 4.1.5 Restoration of Natural Systems

The Service will reestablish natural functions and processes in parks unless otherwise directed by Congress. Landscapes disturbed by natural phenomena, such as landslides, earthquakes, floods, hurricanes, tornadoes, and fires, will be allowed to recover naturally unless manipulation is necessary to

protect other park resources, developments, or employee and public safety. Impacts on natural systems resulting from human disturbances include the introduction of exotic species; the contamination of air, water, and soil; changes to hydrologic patterns and sediment transport; the acceleration of erosion and sedimentation; and the disruption of natural processes. The Service will seek to return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated. The Service will use the best available technology, within available resources, to restore the biological and physical components of these systems, accelerating both their recovery and the recovery of landscape and biological community structure and function. Efforts may include, for example

- removal of exotic species
- removal of contaminants and nonhistoric structures or facilities
- restoration of abandoned mineral lands, abandoned or unauthorized roads, areas overgrazed by domestic animals, or disrupted natural waterways and/or shoreline processes
- restoration of areas disturbed by NPS administrative, management, or development activities (such as hazard tree removal, construction, or sand and gravel extraction) or by public use
- restoration of natural soundscapes
- restoration of native plants and animals
- restoration of natural visibility

NPS Management Policies 2006, 4.4.2.4 Management of Natural Landscapes

Natural landscapes disturbed by natural phenomena, such as landslides, earthquakes, floods, hurricanes, tornadoes, and fires, will be allowed to recover naturally unless manipulation is necessary to (1) mitigate for excessive disturbance caused by past human effects, (2) preserve cultural and historic resources as appropriate based on park planning documents, or (3) protect park developments or the safety of people. Landscape and vegetation conditions altered by human activity may be manipulated where the park management plan provides for restoring the lands to a natural condition. Management activities to restore human-altered landscapes may include, but are not restricted to

- removing constructed features, restoring natural topographic gradients, and revegetating with native park species on acquired inholdings and on sites from which previous development is being removed;
- restoring natural processes and conditions to areas disturbed by human activities such as fire suppression;
- rehabilitating areas disturbed by visitor use or by the removal of hazard trees; and
- maintaining open areas and meadows in situations in which they were formerly maintained by natural processes that now are altered by human activities.

Landscape revegetation efforts will use seeds, cuttings, or transplants representing species and gene pools native to the ecological portion of the park in which the restoration project is occurring. Where a natural area has become so degraded that restoration with gene pools native to the park has proven unsuccessful, improved varieties or closely related native species may be used.

Landscape restoration efforts will use geological materials and soils obtained in accordance with geological and soil resource management policies. Landscape restoration efforts may use, on a temporary basis, appropriate soil fertilizers or other soil amendments so long as that use does not unacceptably alter the physical, chemical, or biological characteristics of the soil and biological community and does not degrade surface or groundwaters.

Biological or physical processes altered in the past by human activities may need to be actively managed to restore them to a natural condition or to maintain the closest approximation of the natural condition in situations in which a truly natural system is no longer attainable. Prescribed burning and the control of ungulates when predators have been extirpated are two examples. The extent and degree of management actions taken to protect or restore park ecosystems or their components will be based on clearly articulated, well-supported management objectives and the best scientific information available.

NPS Management Policies 2006, 4.1.5 Restoration of Natural Systems

The Service will reestablish natural functions and processes in human-disturbed components of natural systems in parks unless otherwise directed by Congress. Landscapes disturbed by natural phenomena, such as landslides, earthquakes, floods, hurricanes, tornadoes, and fires, will be allowed to recover naturally unless manipulation is necessary to protect park developments or visitor safety. Impacts to natural systems resulting from human disturbances include the introduction of exotic species; the contamination of air, water, and soil; changes to hydrologic patterns and sediment transport; the acceleration of erosion and sedimentation; and the disruption of natural processes. The Service will seek to return human-disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated. The Service will use the best available technology, within available resources, to restore the biological and physical components of these systems, accelerating both their recovery and the recovery of landscape and biological community structure and function.

NPS Management Policies 2006, 4.4.2 Management of Native Plants and Animals

Whenever possible, natural processes will be relied upon to maintain native plant and animal species, and to influence natural fluctuations in populations of these species. The Service may intervene to manage individuals or populations of native species only when such intervention will not cause unacceptable impacts to the populations of the species or to other components and processes of the ecosystems that support them.

NPS Management Policies 2006, 4.4.2.2 Restoration of Native Plant and Animal Species

The Service will strive to restore extirpated native plant and animal species to parks whenever [stated criteria] are met.

NPS National Wilderness Steering Group, White Paper #2, What Constitutes Appropriate Conservation and Restoration Activities in Wilderness

In the wilderness community recently some have contrasted “natural” with “wild.” Both Cole (2000) and Landres et al. (2001) find a significant difference between these words, particularly as applied to wilderness, while Turner (1996) argues that “wild” precludes intentional human intervention. These authors emphasize leaving nature alone to manage itself. On the other hand, Graber (1985, 1995, in press) has argued, as did McKibben (1989), that the pervasive and insidious magnitude of human activity has largely rendered the distinction between “wild” and “natural” moot. This is particularly true in many of the small, eastern lands Congress has set aside as designated Wilderness. There is, for example, very little wild about Cumberland Island Wilderness on Cumberland Island National Seashore, which includes roads, motor vehicles, many introduced species, and several key species extirpated. Yet through time, if this were desired, alien species could be removed, natives species reintroduced, a natural fire regime restarted, and human construction removed. Similarly, some other small designated wildernesses, as well as larger ones adjacent to development, suffer substantial deviations from aboriginal wilderness character. They may require urgent intervention and long-term maintenance simply to preserve what remains of their original native biodiversity, and sometimes what remains is quite irreplaceable. To put

it another way, a case can be made that their value as man-aged reserves of biodiversity exceeds their value as “wilderness.”

The appearance (Sec. 2[c]) of wildness is in the eye of the beholder: An ecologist or scientifically educated naturalist sees anthropogenic alteration where someone not so schooled does not, while many conservation actions are quite obvious to the casual observer. The use of “untrammeled” in the Act refers to intentional control or manipulation of the “community of life” (Zahniser 1963, Scott 2001) but ecological consequences ensue regardless of the degree or distance of intention. Wilderness landscapes have always been and will continue to be subject to both natural and anthropogenic changes. The pace of landscape change in the United States and the rest of the world is accelerating. So is human appropriation and alteration of nature. Yet locally, although perhaps only temporarily, those changes can largely be stopped, even reversed, with sufficient knowledge and effort. The disturbances introduced by ecological restoration—the loss of wilderness character—need not represent permanent loss.

A way to evaluate the appropriateness of restoration and other conservation activities in wilderness: The outcomes of conservation activities can be considered to offer varying degrees of benefit to wilderness ecosystems, while the activities themselves impose varying magnitudes and longevities of compromise to wilderness character. Un-avoidably, determining which actions should proceed and which should be avoided will be location specific and subjective. The following classification scheme is intended merely to help structure the analysis. It provides three artificial categories of conservation activities and examines the relative impacts and benefits of each. It is intended only as a guide.

Class I: Short-term wilderness disturbance Long-term wilderness character enhancement

This class of activity entails one-time reversals of anthropogenic changes that, once accomplished, are self-sustaining. Users of wilderness might well encounter restoration activities that would typically result in impacts to wilderness character lasting a season to perhaps several years. Often, these impacts include temporary markers such as flagging, or tags and radio-collars on animals. Some of this, such as dam removal, may require heavy equipment. Upon completion, however, traces of the restoration activity would be extinguished over a short period of time, while the benefits of “re-wilding” and natural-ness to wilderness character would be long-term.

Examples:

- Reintroduction of self-sustaining native species
- Extirpation of invasive alien species
- Restoration of natural fire regimes
- Restoration of natural hydrologic regimes

Class II: Long-duration or recurring entry Benefits and costs to wilderness character

Many ecosystems that include wildernesses suffer anthropogenic disturbances for which we lack the knowledge, the legal authority, or the financial resources to correct permanently at the present time. For example, introduced weedy plants often invade natural areas from adjacent lands, and require regular removal and frequent monitoring. Periodic liming of some eastern streams mitigates acid precipitation and permits continued survival of native fish and amphibians which otherwise would be entirely eliminated from the ecosystem—at least until the source pollution is eliminated. Pyrophytic ecosystems that lie adjacent to developed lands may no longer receive sufficient natural fire ignitions, or those ignitions are no longer socially acceptable; however, periodic managed ignitions may accomplish most of the objectives of maintaining the natural structure and composition of the native biological

community. Small, anthropogenically isolated populations of large mammals, such as mountain sheep, may lack the demographic or genetic size for long-term viability. However, periodic infusions of additional animals can help assure survival. These nature-maintenance activities reflect the sad reality that many designated wildernesses, and other kinds of nature reserves, are simply too small or disconnected to sustain their full suite of ecosystem functions without intervention. The National Park Service manager must ultimately weigh the restoration benefits to the ecosystem against the impacts to other aspects of wilderness character.

Examples:

- Periodic control of persistent introduced species
- Indefinite extent of planned ignitions
- Reintroduced species requiring continuing support
- Mitigation of acidified waters

Class III: Support of laws or NPS policies Don't directly enhance wilderness character

These activities represent substantial impacts on wilderness character. They clearly violate the intent of the Wilderness Act. Some of these, such as control of pests, reflect the incapacity of some landscapes designated as wilderness to function as such either ecologically or politically. On the other hand, some severe interventions, such as the removal of native organisms for restoration elsewhere, illuminate the fundamental and unavoidable connections between many wildernesses and their surrounding more modified landscapes. Ultimately, decisions in this category may require a public review for their resolution.

Examples:

- Habitat modification for endangered species
- Regulation of predator or prey numbers when an area is too small for natural regulation or natural controls have been lost
- Control of native pests or dangerous species to protect life or property outside wilderness.
- Removal of native organisms in support of restoration elsewhere.

None of the activities in any class is necessarily precluded by statute, regulation, or policy. However, when one is considering the activities listed in Class III that invoke Section 4(c) of the Wilderness Act, you must carefully weigh the benefits against the significant impacts on wilderness character, and consider whether the proposed restoration activity is sufficiently beneficial to outweigh those impacts. An excellent and comprehensive discussion of the management and restoration of wilderness ecosystems is provided by Franklin and Aplet (2002).

NPS User Guide: Keeping it Wild in the National Park Service - Natural Resources

Wilderness character is closely tied to many of the daily operations conducted by natural resource management staff. Control of invasive species, accumulated fuels from fire suppression or exclusion, impacts on natural sounds and night skies, protection of paleontological resources, the potential effects of climate change, and visitor experience are among the many concerns of natural resource managers. Actions associated with such concerns could have a variety of effects on wilderness character. Preserving natural resources, the integrity of native ecological systems, and improving visitor experience are all key components of wilderness character, but natural resource managers must also consider effects of any action they take on the qualities of wilderness character. To preserve wilderness character, actions must be determined to be necessary. Any activity (method or tool) taken to

accomplish the action should eliminate or minimize any impact to wilderness character. A good way to make these determinations is through the completion of a minimum requirements analysis.

Preserving the natural quality and the untrammeled quality can often be contradictory; however, the Wilderness Act requires both qualities to be preserved to the greatest extent possible. For example, removing invasive species can improve the natural quality, but simultaneously degrades the untrammeled quality. Staff should engage in discussions about how potential actions may affect both qualities and honestly weigh the benefits and impacts to wilderness character in decision making. In some cases, a short-term sacrifice in the untrammeled quality may be necessary to gain a longer term benefit to the natural quality. While this is often a sound and legitimate argument, managers should also be conscious of the cumulative impacts of many short-term sacrifices to the untrammeled quality.

BLM

BLM Manual 6340: Sec. 1.6 C 15 Restoration and Vegetation Management

a. General principles. Generally, wilderness areas must, at a minimum, be managed to maintain the baseline degree of wilderness character that existed when the area was designated by Congress. When possible, management activities should emphasize enhancement of wilderness character over time. Natural processes should always be favored to restore disturbed vegetation in order to maintain the Untrammeled, Natural, and Undeveloped qualities of wilderness character, as well as outstanding opportunities for Solitude or Primitive and Unconfined Recreation. However, in some cases, restoration management activities may be needed to restore vegetation and to preserve or enhance the area's wilderness character, despite the impacts of such activities on the Untrammeled quality of wilderness character. The need for active restoration and the alternatives available for conducting restoration activities must be analyzed using the MRDG.

b. Use of Minimum Requirements Decision Guide. An analysis using the MRDG must be made in non-urgent situations to determine whether or not any restoration action within a wilderness is warranted. The MRDG must also be used to determine the most appropriate method to use in order to minimize impacts to wilderness qualities. See section Appendix B.

c. Structures. When structures exist in a wilderness and are not eligible for listing in the National Register of Historic Places, the management plan should evaluate whether they must be maintained or can be removed. An example of a structure that may be removed is a range line cabin that is no longer needed.

d. Surface disturbances. When surface disturbance exists, the management plan should evaluate whether the disturbance can be removed or made less noticeable. Common examples are routes that once were used by motor vehicles but have been closed by the wilderness designation. Reclamation of these routes can enhance the area's wilderness qualities. Reclamation can also discourage or prevent illegal motorized and mechanical transport.

e. Unauthorized or illegal activities. Some wilderness areas have evidence of activities that are unauthorized or illegal. Examples are desecration of cultural sites, establishment of dump sites, graffiti, and vandalism of signs and other authorized installations. Reclamation activities designed to reduce or eliminate the evidence of such activities will enhance the wilderness qualities of the area by increasing naturalness.

f. **Vegetation.** Whenever possible, the BLM will rely on natural processes to maintain native vegetation and to influence natural fluctuations in populations within wilderness. Natural disturbance processes, including fire, insect outbreaks, and droughts, are important shapers of the ecosystem. In some cases, vegetation in a wilderness has been altered by past human activities. Fire suppression, livestock grazing, and introduction of invasive species are examples of activities that may have changed the vegetative composition within the wilderness.

Manipulation of vegetation through prescribed fire, chemical application, mechanical treatment, or introduced biological agents, is normally not permitted. Exceptions may include emergencies, actions taken to recover a federally listed threatened or endangered species, control of non-native species, and restoration actions where natural processes alone cannot recover the area from past human intervention. All management activities must be designed to strive towards natural vegetative composition and processes that reflect what would likely have developed with minimal human influence.

i. *Emergencies.* Vegetation may be manipulated when there is no effective alternative for controlling wildfires, insects, or diseases that threaten non-Federal lands. Reseeding or planting of native species may be undertaken following wildfire or other natural disaster if natural seed sources are not adequate to compete with non-native vegetation or substantial unnatural soil loss is expected.

ii. *Restoration for the preservation of wilderness character.* There are three primary types of restoration for preservation of wilderness character:

A. Restoration of site specific disturbances. Restoration of pre-designation human impacts, authorized disturbances, or violations normally includes treatments to restore the appearance of site specific areas and to promote regrowth of native vegetation on the disturbed site.

B. Restoration of native vegetative communities and control of non-native vegetation. Non-native vegetation that interferes with ecosystem function, or illegally cultivated plants (e.g. marijuana), may be controlled using the method or combination of methods known to be effective while causing the least damage to non-target species. Reseeding or planting of native species may be done following weed treatment where natural seeding is not adequate and to prevent non-native vegetation from becoming reestablished.

C. Restoration of broad-scale landscape function. Some landscapes in which wilderness areas are located have undergone intentional and unintentional human-caused transformation during the modern industrialized era. In some cases, these landscapes cannot be returned to a natural state without further intervention as a result of departures from the natural composition, structure, and density of native plant species, with impacts to native animal habitats, soil stability, and watershed function. Management actions may be taken to restore vegetation to characteristic conditions of the ecological zone in which the area is situated, to the extent that they will not cause unacceptable impacts to other components and processes of the ecosystem or to wilderness character as a whole and where:

I. natural successional processes have been disrupted by past human activity and to the extent that intervention is necessary in order to return the ecosystem to a condition where natural process can function; or

II. restoration through natural processes would require lengthy periods of time during which the impacted area would suffer other degradation of wilderness character without intervention

iii. *Required Analysis.* Restoration projects are based on landscape assessments that identify historical range of variability, current condition, restoration targets, and cumulative effects of management. The decision to manipulate an ecosystem must be based upon clearly articulated, well-supported management objectives and the best scientific information available. To adequately address the impacts to wilderness character, this manual requires that, at a minimum, the EA or EIS for any proposed manipulation of vegetation must address the following:

A. a description of the natural vegetative community and processes, based on historical and scientific evidence, that would have existed prior to the effects of industrialized humans,

B. the existing condition and the departure from the natural vegetative community and processes,

C. evidence from existing research/application that the proposed treatment will bring about the desired result, and

D. an evaluation of the likelihood of the natural system to be self-sustaining after the treatment. Treatments should allow for natural processes to resume. Where this is not possible because of conditions outside the wilderness (e.g. a fire regime influenced by adjacent private land development), the contributing conditions and factors must be described. All other projects should be designed to emphasize the role of natural restoration processes.

iv. Restoration treatments should use the least disruptive techniques. Normally, patient, incremental treatments should be favored over aggressive attempts to restore long-term changes all at once.

v. Monitoring programs must be in place prior to treatment and must be sufficient to evaluate responses of key ecosystem components and processes at multiple scales.

vi. Establishing non-native plants within a wilderness is normally not permitted. Exceptions may be made where native species cannot be grown to adequately compete with non-native species, and replacing one non-native with another non-native species will prevent further degradation of wilderness character and ecological function.

vii. Trees, shrubs, or other vegetative products removed as part of a restoration activity ordinarily may not be sold. Stewardship contracts, where the removed products become the property of the contractor, may be permitted as commercial services under Section 4(d)(5) of the Wilderness Act "to the extent necessary for...wilderness purposes." See also section 1.6.C.4 of this manual.

Wilderness Fire Policy

FS

FS Manual 2324.2 – Management of Fire

6. Forest Service managers may ignite a prescribed fire in wilderness to reduce unnatural buildups of fuels only if necessary to meet at least one of the wilderness fire management objectives set forth in FSM 2324.21 and if all of the following conditions are met:

- a. The use of prescribed fire or other fuel treatment measures outside of wilderness is not sufficient to achieve fire management objectives within wilderness.
- b. An interdisciplinary team of resource specialists has evaluated and recommended the proposed use of prescribed fire.
- c. The interested public has been involved appropriately in the decision.
- d. Lightning-caused fires cannot be allowed to burn because they will pose serious threats to life and/or property within wilderness or to life, property, or natural resources outside of wilderness.

7. Do not use prescribed fire in wilderness to benefit wildlife, maintain vegetative types, improve forage production, or enhance other resource values. Although these additional effects may result from a decision to use prescribed fire, use fire in wilderness only to meet wilderness fire management objectives.

8. Do not use management ignited fire to achieve wilderness fire management objectives where lightning-caused fires can achieve them.

FWS

FWS Manual Part 610 Sec. 2.23 May the Service use prescribed fire in wilderness?

A. We may use prescribed fire within a wilderness area only where fire is a natural part of the ecosystem, and only if prescribed fire is the minimum requirement for administering the area as wilderness and is necessary to accomplish the purposes of the refuge, including Wilderness Act purposes. In addition, such decisions and actions must:

- (1) Maintain or restore the biological integrity, diversity, or environmental health of the wilderness area; or
- (2) Be necessary for the recovery of threatened or endangered species.

B. We must include prescribed fire use within wilderness in an approved FMP and develop a fire plan for any prescribed fire. The FMP must be incorporated through reference in the unit's WSP. We should plan prescribed fire to avoid or minimize adverse effects on:

- (1) Safety of visitors and staff;
- (2) Biological integrity and diversity;
- (3) Health of humans, fish, wildlife, plants, and their habitats;
- (4) Visibility; and
- (5) Other air-quality-related values.

NPS

NPS Director's Order 41: Sec. 6.7

In many NPS wilderness areas fires resulting from natural ignitions are considered a natural process that contributes to ecosystem function and is necessary to maintain wilderness in an unimpaired condition. As a result of many factors including past fire management practices within wilderness and the need to control wildfires on adjacent lands, fire may not be adequately functioning as a natural change agent. In those cases, augmenting natural ignitions with prescribed fire or other fuel treatments within wilderness may be necessary to restore or maintain ecological function if that is a goal identified in the park's Wilderness Stewardship Plan or FMP.

To ensure adequate consideration of wilderness resources, a programmatic minimum requirement analysis (MRA) must be completed as part of the development of the park's FMP and companion environmental compliance document. The programmatic MRA must address management strategies for wildfires and fuel treatments in wilderness. The programmatic statement will establish the need for potential fire management actions in wilderness and will provide guidance for implementing initial wildfire responses. The analysis should specify the minimum activities (strategies, methods, and tools) that are generally permitted for managing wildfires, implementing fuels treatments, and conducting post-fire activities. For management of long-duration wildfires an incident specific minimum requirements analysis should be considered to evaluate the methods and tools being applied to manage the event. The analysis should be periodically reviewed throughout the incident to ensure that appropriate strategies, methods and tools are being used to protect wilderness character.

A MRA must also be developed as part of a Burned Area Emergency Response (BAER) plan for actions in wilderness that are proposed to restore, stabilize, or rehabilitate an area following a wildfire.

Project plans for fuels treatments in wilderness must address the minimum requirement. Project plans should refer to the programmatic MRA developed for the FMP that establishes the necessity for such treatments. If the proposed treatment is confirmed to be within the framework of the programmatic MRA, the project plan is not required to revisit that decision. However, each project plan must contain an analysis of the minimum methods and techniques necessary to accomplish the specific action with the least negative impact to wilderness character.

BLM

BLM Manual 6340: Sec. 1.6 C 7 Fire

b. Wildfires.

ii. The management response to a wildfire within a wilderness may vary along a continuum from monitoring to suppression according to objectives outlined in the applicable Resource Management Plan, Wilderness Management Plan, or Fire Management Plan. The management response to a fire can change due to variations in weather, topography, fuels, and resources available. Responses involving prohibited uses described in section 1.6.B.2 of this manual must be authorized by the applicable BLM State Director unless this authority has been delegated to the District or Field Manager.

iii. Stabilization, rehabilitation, and restoration of impacts to wilderness from wildfires should be conducted as part of the fire incident. Where wildfires have been managed for resource benefits, most stabilization, rehabilitation, and restoration activities are expected to be limited to the effects from suppression actions. Any stabilization, rehabilitation, and restoration activities are likely to be more intensive where the effects of the fire were greater than would be expected from the natural fire

regime. Any stabilization, rehabilitation, and restoration should seek to establish, or re-establish, the natural vegetative community.

c. Prescribed fires. These are fires—otherwise known as "planned ignitions" —that are ignited by the BLM. The goal of prescribed fires is to make conditions possible for natural wildfire to return to the wilderness.

i. Prescribed fires can be used in wildernesses only to clearly enhance the land's wilderness values, including restoring natural vegetative communities. Generally, enhancing wilderness values means reestablishing the natural role of wildfire where both the following conditions are met:

A. the natural role of wildfire cannot be returned solely by reliance on wildfire, or, relying on wildfires might create unacceptable risks to life, property, or natural resources outside the wilderness; and

B. the use of wildland fire or other fuel reduction treatments outside of wilderness is not sufficient to reduce the risks from wildfire within the wilderness to life, property, or natural resources outside the wilderness.

ii. Except as necessary to control exotic species or contribute to the survival of threatened or endangered species, or species for which Federal protection has been found to be warranted by the U.S. Fish and Wildlife Service, prescribed fire cannot be used to enhance specific wildlife species, specific vegetative types, or forage production, although secondary effects to these resources may occur. As noted above, however, prescribed fire may be used to restore natural vegetative communities.

d. Fuel treatment. This includes thinning or removing native vegetation, either mechanically or chemically, in advance of, or as a replacement for, wildland fire (either wildfire or prescribed fire). The goal of fuel treatment is to make conditions possible for wildfire to return to the wilderness where past management practices have reduced the historic frequency and intensity of wildfire.

i. Fuel treatment is not allowed in wilderness, except in rare circumstances. Due to the controversial nature of fuel treatments and the complexities of analyzing the effects of these on the totality of wilderness character, when they are to be used as a replacement for wildland fire they may require analysis through an EIS. Fuel treatments *may* be permitted:

A. To remove non-native vegetation (see also section 1.6.C.15); or

B. When prescribed fire without pretreatment in the wilderness will inevitably cause unacceptable risks to life, property, or wilderness character (including cultural resources, as outlined in 1.6.C.5.f); or

C. When any wildland fire will inevitably cause unacceptable risks to life, property, or wilderness character. ii. Because it more closely mimics a natural wildfire event, repeated low-intensity prescribed fires are preferable in most circumstances where fuel treatment is contemplated. This is true even if this increases the time and cost of treatment, or would necessitate burning at a different time of year as long as other impacts to the Natural quality of wilderness character can be sufficiently mitigated.

Wilderness Invasive Species, Insects and Disease Policy

FS

FS Manual 2323.36 - Disease Outbreaks

The Forest Service, in cooperation with State and Federal public health authorities, may make special exceptions to policy and direction where necessary to control disease epidemics or other public health hazards in which wildlife or fish species are carriers. See FSM 2323.04 for approvals.

FS Manual 2324.12 - Policy

1. Do not control insect or plant disease outbreaks unless it is necessary to prevent unacceptable damage to resources on adjacent lands or an unnatural loss to the wilderness resource due to exotic pests.
2. Trees within the wilderness have no commercial value. Do not consider the commercial value of trees in wilderness in evaluations for insect and disease control.

FS Manual 2324.15 - Control Measures

When control of insects or disease is necessary in National Forest wilderness, it shall be carried out by measures that have the least adverse impact on the wilderness resource and are compatible with wilderness management objectives.

Meet the requirements in FSM 2324.04, FSM 2151, FSM 3430, and FSM 1950 in carrying out insect and disease control projects in wilderness. Special care must be taken with the use of chemicals inside wilderness because of possible effects on the total biological complex. Consider other alternatives to chemical use in the environmental analysis.

FWS

FWS Manual Part 610 Sec. 2.19 May the Service control invasive species, pests, and diseases in wilderness?

A. We may control invasive species, pests, or diseases when:

(1) We have demonstrated that they have degraded or there is a high probability they will degrade the biological integrity, diversity, environmental health, or wilderness character of a wilderness area;

(2) They pose a significant threat to the health of humans, and the U.S. Public Health Service (which includes the Centers for Disease Control) has advised us to control them; or

(3) We have demonstrated that they pose a significant threat to the health of fish, wildlife, plants, or their habitats.

B. We will follow an integrated pest management (IPM) approach to prevent, control, or eradicate invasive species, pests, and diseases subject to the criteria in section 2.16 (also see the biological integrity policy at 601 FW 3.16). We will determine appropriate IPM procedures through an MRA and document them in the refuge's WSP. If the approved IPM plan determines that chemical or biological treatments are necessary, we will only use agents that have the least impact on nontarget species and on the wilderness environment in compliance with current Service policy. We may make an exception to introducing species (see section 2.17) for Service-approved, nonnative biological control agents.

NPS

NPS Director's Order 41: Sec. 6.9

Parks should use Integrated Pest Management (IPM) to guide invasive species planning and implementation and develop management plans using IPM that may require NEPA and minimum requirements compliance. Elements include prevention, inventory, prioritization, treatment, monitoring, research, education, and outreach. An inventory and assessment of non-native invasive species should be conducted before any treatment actions are proposed. The objective of treatment within wilderness should be the eradication of the invasive species. If eradication is not feasible, the objective of treatment should be to contain the invasion, preventing spreading.

NPS Management Policies 2006, 4.4.4.2 Removal of Exotic Species Already Present

All exotic plant and animal species that are not maintained to meet an identified park purpose will be managed— up to and including eradication— if (1) control is prudent and feasible, and (2) the exotic species [possesses one or more stated attributes].

BLM

BLM Manual 6340: Sec. 1.6 C 15 Restoration and Vegetation Management

B. Restoration of native vegetative communities and control of non-native vegetation. Non-native vegetation that interferes with ecosystem function, or illegally cultivated plants (e.g. marijuana), may be controlled using the method or combination of methods known to be effective while causing the least damage to non-target species. Reseeding or planting of native species may be done following weed treatment where natural seeding is not adequate and to prevent non-native vegetation from becoming reestablished.

Wilderness Wildlife Policy

FS

FS Manual 2323.32 - Policy

4. Manage wilderness to protect known populations of federally listed threatened or endangered species where necessary for their perpetuation and aid in their recovery in areas of previous habitation. When alternative areas outside of wilderness offer equal or better protection, take actions to recover threatened or endangered species outside of wilderness areas first.

FS Manual 2323.34f - Chemical Treatment

Chemical treatment may be used to prepare waters for reestablishment of indigenous, threatened or endangered, or native species, or to correct undesirable conditions caused by human influence. The Regional Forester approves all proposed uses of chemicals in wilderness (FSM 2150).

FS Manual 2323.35a - Manipulation of Wildlife Habitat

The objective of all projects must be to perpetuate the wilderness resource; projects must be necessary to sustain a primary value of a given wilderness or to perpetuate a federally listed threatened or

endangered species. To qualify for approval by the Chief, habitat manipulation projects must satisfy the following criteria:

1. The condition needing change is a result of abnormal human influence.
2. The project can be accomplished with assurance that there will be no serious or lasting damage to wilderness values.
3. There is reasonable assurance that the project will accomplish the desired objectives.

Test major projects through a pilot study. The pilot study should take place in a comparable area outside of wilderness if possible.

Give first priority to locating habitat improvement projects outside wilderness for the benefit of wildlife that spend only part of the year in wilderness.

FS Manual 2323.33c - Predator Control

Predacious mammals and birds play a critical role in maintaining the integrity of natural ecosystems. Consider the benefits of a predator species in the ecosystem before approving control actions. The Regional Forester may approve predator control programs on a case-by-case basis where control is necessary to protect federally listed threatened or endangered species, to protect public health and safety, or to prevent serious losses of domestic livestock. Focus control methods on offending individuals and under conditions that ensure minimum disturbance to the wilderness resource and visitors. Poison baits or cyanide guns are not acceptable. Poison bait collars may be approved.

The U.S. Fish and Wildlife Service or approved State agencies shall carry out control programs. The Forest Service is responsible for determining the need for control, the methods to be used, and approving all proposed predator damage control programs in wilderness (FSM 2650).

Only approve control projects when strong evidence exists that removing the offending individual(s) will not diminish the wilderness values of the area.

FWS

FWS Manual Part 610 Sec. 1.4 What are the priorities in implementing this policy? We will consider three main priorities in the following order when administering refuge wilderness areas: The Administration Act, the Endangered Species Act, and the Wilderness Act. We initially determine what needs to be accomplished to meet refuge purposes, then ensure that these activities comply with the Endangered Species Act, and then ensure that these activities comply with the Wilderness Act.

FWS Manual Part 610 Sec. 2.20 May the Service control predation in wilderness? Predation is an essential and integral process in the wilderness ecosystem. We will initiate actions intended to alter natural predator/prey relationships only when compelling evidence exists that the proposed action will correct or alleviate identified impacts on native fish, wildlife, plants, or their habitats and would be in compliance with section 2.16. We will direct control at the individual animal(s) causing the problem using the method least likely to adversely impact nontarget species and wilderness visitors. We will not manage predation solely to protect livestock, wilderness visitors, or other users.

NPS

NPS Management Policies 2006, 4.4.2.3 Management of Threatened or Endangered Plants and Animals

The Service will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. The Service will fully meet its obligations under the

NPS Organic Act and the Endangered Species Act to both pro-actively conserve listed species and prevent detrimental effects on these species.

BLM

BLM Manual 6340: Sec. 1.6 C 21 Wildlife

b. General principles.

iii. Fish and wildlife management activities should emphasize the protection of natural processes in a wilderness context. It is expected that nature, not human intervention, will play the dominant role. In some cases, active management of wildlife or habitat will be necessary to preserve the Natural quality of wilderness character, despite the impairing nature of these actions on the Untrammled quality of wilderness character. Management activities will be guided by communication and cooperation with the State wildlife agencies and the principle of doing only the minimum necessary to manage the area as wilderness, as determined by application of the MRDG.

iv. Non-native species may not need to be eradicated if they have become naturalized, but, other than as provided in sub-section 21.c.vi below, no prohibited use can be employed in their maintenance or propagation. All practicable effort will be made to keep non-native species new to a wilderness area from becoming naturalized.

c. Project Implementation.

iv. Threatened and Endangered species. Many wilderness areas provide important habitat for federally listed threatened or endangered wildlife species. The BLM will manage wilderness areas to protect and recover known populations of federally listed threatened or endangered species and to aid in their recovery in previously occupied habitat.

A. To protect or recover threatened, endangered, or candidate species necessary actions, including habitat manipulation and special protection measures, may be implemented in wilderness to a degree greater than for unlisted species. Nevertheless, any wilderness-impairing actions must be necessary for the protection or recovery of the species and it must be demonstrated that the actions cannot be done as effectively outside wilderness. In coordination with the U.S. Fish and Wildlife Service and applicable State wildlife agencies, the BLM will use the MRDG to determine the actions that least impair wilderness character.

B. Threatened and endangered species may be transplanted into previously occupied habitat within wilderness. By policy, all transplants will require approval by the BLM in coordination with the applicable State wildlife agencies through the use of the MRDG and subsequent NEPA analysis. The BLM's NEPA analysis will evaluate the impacts of the activity on wilderness character.

C. When alternative areas outside of wilderness offer equal or better opportunities for habitat improvement for species protection, recovery actions will be taken outside of wilderness first, in cooperation, as applicable, with the U.S. Fish and Wildlife Service and State wildlife agencies,

v. Use of chemicals. Chemical treatment may be necessary to prepare habitat for the reestablishment of native species, to protect or recover federally listed threatened or endangered species, or to correct unnatural conditions resulting from the influence of humans.

A. Chemicals used to kill unwanted species are subject to additional restrictions:

Use only registered pesticides according to label directions and applied only by certified pesticide applicators.

In selecting pesticides, give preference to those that will have the least impact on non-target species and on the wilderness environment.

B. Any use of chemicals in wilderness must be approved by the BLM. Any use prohibited by the Wilderness Act employed in the delivery of chemicals must be approved through the use of the MRDG and subsequent NEPA analysis.

vi. Fish stocking. The BLM should coordinate with state agencies regarding fish stocking within wilderness. Any prohibited use must be approved through the use of the MRDG and associated NEPA analysis. Examples of fish stocking activities that may be appropriate include:

A. Stocking to perpetuate or recover a threatened or endangered species, or to reestablish or maintain a native species adversely affected by human influence.

B. Stocking non-native fish stocked prior to wilderness designation if the species is likely to survive. Otherwise, non-native species of fish must not be stocked and may be removed. Selection of species for stocking will be determined jointly by the BLM and the State agency. Numbers and size of fish and timing of stocking will be determined by the State agency. The State agency will make proposed fish stocking schedules available to the BLM, indicating what species and numbers are planned for each water within a wilderness.

C. Naturally fishless lakes and streams may be considered for stocking only to perpetuate or recover a threatened or endangered species, and only if there is mutual agreement between the State agency and the BLM that the benefits to conservation, as supported by science, outweigh the adverse impacts to wilderness character.

vii. Transplanting wildlife. By policy, all transplants will require approval by the BLM in coordination with the applicable State wildlife agencies through the use of the MRDG and subsequent NEPA analysis. The BLM's NEPA analysis will evaluate the impacts of the activity on wilderness character. Examples of wildlife transplanting activities that may be appropriate include:

A. transplanting to perpetuate or recover a threatened or endangered species.

B. transplanting to restore the population of a native species eliminated or reduced by human influence. Transplants must be made in a manner compatible with preserving the wilderness character of the area.

viii. Wildlife Damage Control. Wildlife damage control in wilderness may be necessary to conserve Federally listed threatened, endangered species, or candidate species, to prevent transmission of diseases or parasites affecting wildlife and humans, or to prevent serious losses of domestic livestock. Refer to MOUs between the Animal and Plant Health Inspection Service (APHIS) and the Federal administering agencies regarding permissible action in wilderness. Proposals that would involve uses generally prohibited under Section 4 (c) of the Wilderness Act will be considered and may be authorized by the Federal administering agency through the MRDG. The BLM should consider the following when reviewing wildlife damage control actions within wilderness areas:

A. Control measures should be implemented by the Animal and Plant Health Inspection Service, the BLM, the State fish and wildlife agency, or other approved State agency, pursuant to cooperative agreements or memoranda of understanding.

B. Control measures should be directed at the individual animals causing the problem.

C. Acceptable control measures include lethal and nonlethal methods. Criteria for choosing a particular method include need, location, environmental conditions, the preservation of wilderness character, and applicable federal and state laws. Only the minimum amount of control necessary to solve the problem should be used.

D. Wildlife may be killed, hunted, or otherwise controlled if necessary to protect federally listed threatened or endangered species, to prevent transmission of diseases or parasites affecting humans, or to prevent transmission of diseases or parasites affecting other wildlife.

E. Wildlife may be killed, hunted, or otherwise controlled if necessary to prevent serious losses of domestic livestock. In such cases, control must be directed only at the individual animals causing the problem.

F. Killing, hunting, or otherwise controlling nonnative species also may be necessary to reduce conflicts with native species. Killing, hunting, or otherwise controlling native species, including those reintroduced, to reduce conflicts with other native species (other than covered under sub-section viii.E, above) is not permitted, unless mutually agreed upon between the State agency and the BLM, and is consistent with preservation of wilderness character.

G. Nonnative, domestic, and feral animals maybe killed, hunted, or otherwise controlled by Federal and State agencies to protect wilderness character.

H. Poisons should be used only where other measures are not practicable, subject to additional restrictions:

I. Use only registered pesticides according to label directions and applied only by certified pesticide applicators.

II. In selecting pesticides, give preference to those that will have the least impact on non-target species and on the wilderness environment.

III. Place temporary warning signs at the entrance to the area where pesticides are being used to warn the public of any dangers to themselves or their pets. Maps that adequately indicate where the pesticides will be placed should be posted at access points, and made available to the public in the local office and through local public media outlets.

Policy Regarding Responding to Climate Change

NPS

NPS Director's Order 41: Sec. 6.6 Climate Change

Climate change will have long-range effects on all aspects of ecosystem function. Wilderness managers and superintendents should collaborate across program areas to develop flexible, sustainable strategies that uphold wilderness values and integrate with park, regional, and national level responses.

These strategies must account for any effects on wilderness character from actions taken or not taken.

Superintendents and wilderness staff should fully participate and be leaders in efforts to increase landscape connectivity, improve ecosystem resilience through the reduction of the influence and negative impact of humans on the ecosystem, engage in interagency management collaboration, consider appropriate scientific research, and create relevant climate change communication products.

NPS User Guide: Keeping it Wild in the National Park Service - Planning for Effects of Climate Change on Wilderness Character

The National Park Service increasingly needs to consider the effects of global climate change on the qualities of wilderness character, the infrastructure that allows public access to parks and wilderness, and on the societal implications of wilderness. Lands designated for protection as wilderness have been set aside to protect valued biological and/or physical attributes in a natural state free from human development, disturbance, and manipulation. Climate change, particularly to the degree that it is human-caused, threatens all the values for which these areas were designated. Climate change will force many difficult decisions about wilderness stewardship because it will fundamentally compromise the degree to which protected areas function as a refuge from the effects of expanding civilization.

Responses to climate change will be highly variable from place to place, depending on the localized effects of change. Some examples include:

Restoration of the natural process of fire in wilderness to reduce the risk of catastrophic fire elevated by past fire suppression practices, the enlarging wildland-urban interface, and accelerated climate change.

Given that climate change will more than likely adversely affect water quality and quantity, proper stewardship of wilderness watersheds—the source of much of the remaining high-quality water—is critical. To ensure that water quality is not impaired, ongoing uses such as recreation and grazing need to be managed and natural disturbance regimes need to be sustained.

Given the challenges species will have in moving in response to climate change, loss of biotic diversity can be minimized by sustaining and/ or restoring undisturbed corridors and elevation gradients among and within wildernesses. It is also important to ensure that critical habitat and populations remain undisturbed.

An adaptive planning framework is the NPS conceptual approach for considering climate change in park planning and management. Considering climate change in park planning and management demands flexibility to accommodate how understanding of climate change and its impacts will evolve over time through observations and scientific projections. The 2010 NPS Climate Change Response Strategy instructs NPS planners to “Incorporate climate change considerations and responses in all levels of NPS

Planning.” The Climate Change Response Program and the Water Resources Division in the Natural Resource Stewardship and Science directorate have developed an intranet site dedicated to climate change planning. Site resources include policy and guidance; climate science information, data and reference materials; and examples of climate change considerations in park planning. The site is available at <http://www1.nrintra.nps.gov/climatechange/planning.cfm>.

During any planning process, there is an opportunity to explore the specific relationship between climate change and the indicators and measures under each monitoring question in *Keeping It Wild* (see Chapter 5). As parks begin to think through adaptation strategies it may be helpful to work through the monitoring questions in conjunction with the following set of trend questions.

What are the trends in actions that control or manipulate the “earth and its community of life” inside wilderness?

What are the trends in terrestrial, aquatic, and atmospheric natural processes inside wilderness?

What are the trends in nonrecreational development inside wilderness?

What are the trends in mechanization inside wilderness?

What are the trends in cultural resources inside wilderness?

What are the trends in outstanding opportunities for solitude inside wilderness?

What are the trends in outstanding opportunities for primitive and unconfined recreation inside wilderness?

As an example, the monitoring question, “What are the trends in terrestrial, aquatic, and atmospheric resources inside wilderness?” could be explored further by considering the following: What effect could climate change have on those resources? What monitoring protocols should be developed that will produce a “trend analysis” for those resources? What resources are most vulnerable to the range of plausible climate futures? Rather than looking at all the resources, consider those fitting a particular indicator and measure that might prove to be a likely candidate for a vital sign, and for which a data source already exists.

A trend question that could be more challenging is: What are the trends in mechanization inside wilderness? As parks become more involved in monitoring for wilderness character, and with the potential for more research requests within wildernesses, will there be a greater need for mechanical equipment? The related indicator is: “Use of motor vehicles, motorized equipment, and mechanical transport.” The measure is: “What is the type and amount (weather stations, use of pumps to check on groundwater, vehicle access to get equipment into areas)?” Parks will need to assess each request to determine if there is a trend toward increased mechanization, as requests for more scientific activities related to climate change are put forward.

Once trend data are available, each question could be expanded to include a second question: “How might those trends vary under different climate change scenarios?” Finally, a key question is: “How do we adapt to these changes in the face of climate change?”

A scenario planning process has been used as a tool to further climate change planning at selected parks and landscapes across the country. The process continues to evolve into a versatile tool that can be

applied at various spatial scales. Potential entry points for wilderness character in scenario planning for parks with wilderness include:

Existing wilderness character indicators and measures can be used to help park staff think about what a specific wilderness area might look like under various climate change scenarios.

Plant and animal species and communities are important indicators. The measures used to determine wilderness character trends will be critical for wilderness character monitoring; they can also be tied directly to the critical monitoring recommended in climate change scenario planning.

If a park does not have existing wilderness character indicators and measures, and is thinking about developing a wilderness stewardship plan or wilderness character monitoring protocols, it would be appropriate to consider scenario planning as a first step. Wilderness character indicators and measures could be tied directly to scenario planning monitoring.

Policy Regarding a Minimum Requirements Analysis

FS

Comment: No specific requirements to do a MRA or follow the MRDG template. However, stewards are encouraged to do so in training.

FWS

Comment: Must do MRA but not required to follow Minimum Requirements Decision Guide (MDRG)

FWS Manual Part 610 Sec. 1.18 How does the Service determine if a proposed refuge management activity is the minimum requirement for administering the area as wilderness and necessary to accomplish the purposes of the refuge, including Wilderness Act purposes? We conduct and document a minimum requirement analysis (MRA) for all proposed refuge management activities that involve a generally prohibited use (also see section 1.19). The MRA clarifies the need for and impacts of a proposed action. We authorize an activity only if we demonstrate that it is necessary to meet the minimum requirement for administering the area as wilderness and necessary to accomplish the purposes of the refuge, including Wilderness Act purposes.

A. We identify and analyze alternative ways to accomplish refuge purposes, including Wilderness Act purposes, in order to determine whether the proposed refuge management activity is necessary and to identify the techniques that will minimize impacts to the wilderness resource. At a minimum, we evaluate the impacts of:

- (1)** An alternative where we take no management action,
- (2)** An alternative allowing no generally prohibited uses, and
- (3)** Alternative(s) to conduct the activities inside the wilderness and outside the wilderness.

B. We consider the full range of wilderness values and character when evaluating the alternatives. These values include the undeveloped and untrammelled natural condition of wilderness,

cultural resources, outstanding opportunities for solitude, the potential for the public to have a primitive and unconfined type of recreational experience, and other components of wilderness character.

C. We consider the direct impacts of the proposed refuge management activity under each of the alternatives. We also consider the indirect impacts associated with the action and the cumulative impacts of the action when it is conducted in conjunction with other existing or planned uses or actions within or adjacent to and affecting the wilderness areas. Under the nondegradation principle, the conditions prevailing in an area at the time of wilderness designation establish a benchmark for assessing the significance of a proposed action's beneficial and adverse impacts on wilderness character.

D. Our refuge management activities preserve wilderness character and only rarely involve generally prohibited uses. The alternative that has the least impact on the area's wilderness character, including intangible aspects of wilderness character, and accomplishes refuges purposes, including wilderness purposes, constitutes the minimum requirement. We do not use cost or convenience as a factor in determining the minimum requirement or minimum tool. We use primitive tools when possible.

1.19 When must the Refuge System conduct a minimum requirement analysis?

A. If the refuge has an approved WSP less than 15 years old and it includes a written MRA for each proposed refuge management activity, we may carry out those activities as described in the plan. The analysis in the WSP must include an estimate of how frequently each activity will take place and the intensity of the activity. If circumstances significantly change or we want to allow the same activity in a significantly different part of the wilderness, we must prepare another MRA.

B. For any refuge management activity not addressed in a current WSP (less than 15 years old), we must amend the WSP to include the activity or prepare an MRA once per year, even for recurring actions.

1.20 Who makes minimum requirement decisions? Refuge managers may make minimum requirement decisions only if they have attended the Carhart Center's national wilderness stewardship course (see section 1.23D). If refuge managers have not attended this training, they must send the MRA to their refuge supervisor for approval. If the supervisor lacks the required training, the supervisor must request review and approval from an individual who has had this training and is equal to or higher than the refuge manager in the organizational hierarchy.

NPS

Comment: Must do MRA but not required to follow MRDG. However, the MRA is supposed to be a two-step process where Step 1 determines if any action is necessary and Step 2 determines what the minimum necessary activity is.

NPS Director's Order 41: Sec. 6.4

Parks must complete a "minimum requirements analysis" (MRA) in order to document the determination of whether a proposed action (project), which involves a prohibited use, is necessary to meet minimum requirements for the administration of the area for the purpose of wilderness. The Wilderness Act in Section 4 (c) identifies the prohibitions (codified at 16 U.S.C. 1133(c)) and Section 2 describes the purpose of wilderness (codified at 16 U.S.C. 1131).

Parks must first determine if the action (project) is necessary for the administration of the wilderness area, to realize the purpose of wilderness. Once the action (project) is determined necessary, parks must next determine the activity (method or tool) to accomplish the action (project) with the least negative impact to wilderness. This MRA should be undertaken using an interdisciplinary approach that includes the project lead, wilderness manager, resource specialists, and superintendent.

NPS Management Policies provide that a MRA must also be applied to all other administrative actions (projects) within wilderness that could potentially affect wilderness character. Also, whenever an environmental assessment or environmental impact statement is prepared for work projects within wilderness, a MRA should be included as part of the document.

Under no circumstances may a MRA be used to allow permanent roads or commercial enterprise within wilderness. The use of motorized equipment and the establishment of management facilities are specifically prohibited when other reasonable alternatives are available.

For newly designated wilderness, parks will prepare a MRA, along with a NHPA Section 106 Determination, to evaluate the retention or removal of administrative facilities, structures, and installations.

Parks in Alaska must consult RM 41 to ensure that their minimum requirement analysis process is consistent with the provisions of ANILCA.

The Associate Director will ensure that additional information, guidance, and detail on applying the MRA are included in RM 41.

NPS Management Policies 2006, 6.3.5 Minimum Requirement

All management decisions affecting wilderness must be consistent with the minimum requirement concept. This concept is a documented process used to determine if administrative actions, projects, or programs undertaken by the Service or its agents and affecting wilderness character, resources, or the visitor experience are necessary, and if so how to minimize impacts. The minimum requirement concept will be applied as a two-step process that determines

- whether the proposed management action is appropriate or necessary for administration of the area as wilderness and does not cause a significant impact to wilderness resources and character, in accordance with the Wilderness Act; and
- the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized.

In accordance with this policy, superintendents will apply the minimum requirement concept in the context of wilderness stewardship planning, as well as to all other administrative practices, proposed special uses, scientific activities, and equipment use in wilderness. The only exception to the minimum requirement policy is for eligible areas that the Service has not proposed for wilderness designation. However, those lands will still be managed to preserve their eligibility.

When determining minimum requirements, the potential disruption of wilderness character and resources will be considered before, and given significantly more weight than, economic efficiency and convenience. If a compromise of wilderness resources or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable.

Although park managers have flexibility in identifying the method used to determine minimum requirement, the method used must clearly weigh the benefits and impacts of the proposal, document

the decision-making process, and be supported by an appropriate environmental compliance document. Parks must develop a process to determine minimum requirement until the plan is finally approved. Parks will complete a minimum requirement analysis on those administrative practices and equipment uses that have the potential to impact wilderness resources or values. The minimum requirement concept cannot be used to rationalize permanent roads or inappropriate or unlawful uses in wilderness.

NPS User Guide: Keeping it Wild in the National Park Service - Minimum Requirements Analysis

Any management action within wilderness has the potential to affect wilderness character, and should thus be evaluated on its basic necessity, and examined for ways to minimize or mediate any adverse effects. A minimum requirements analysis guides compliance with NPS management policies, and helps determine if potential actions by the National Park Service or government agents are the minimum necessary to accomplish a particular objective, and if so, how to minimize any adverse effects. Preserving wilderness character should be the primary consideration of any MRA decision for potential actions in wilderness.

Although park managers have flexibility in how they apply the MRA process, they must clearly weigh and document the positive and negative impacts of proposed actions, using wilderness character as a major criterion. The analysis must honestly evaluate whether or not the action is necessary and if so, what activity is truly the minimum activity (method or tool) necessary to accomplish the action. The best way to meet these requirements is by using an interdisciplinary team to develop and review the minimum requirements analysis so the action is considered from multiple perspectives.

The minimum requirements analysis is a two-step process, and wilderness character should be evaluated during both steps:

Step 1—Determine whether the proposed management action is necessary for administration of the area as wilderness and causes no significant impact to wilderness resources and character, in accordance with the Wilderness Act.

Step 2—Determine the techniques and types of equipment necessary to minimize impacts on wilderness resources and character.

Step 1: Is the Action Necessary?

First identify the problem or situation that prompts a possible need for action; for example, a bridge has been washed out over a major river crossing. Describe proposed actions to address this situation; for example, replace the bridge or refrain from any action. Specific activities, methods, and tools used to address the issue—for example, the decision to use a helicopter to transport bridge materials— should not be identified at this time. This first step is often glossed over, ignored altogether, or used to describe a solution, which should be part of step 2. Step 1 provides the foundation for a minimum requirements analysis and must be taken seriously.

Step 1 involves the use of several filters, but wilderness character will be the only filter discussed here. This filter assesses whether the proposed action is necessary to preserve or improve one or more of the qualities of wilderness character:

Untrammeled—This quality is degraded by modern human activities or actions that control or manipulate the components or processes of ecological systems inside wilderness.

Undeveloped—This quality is degraded by the presence of structures, installations, habitations, and by the use of motor vehicles, motorized equipment, or mechanical transport that increases people's ability to occupy or modify the environment.

Natural—This quality is degraded by intended or unintended effects of modern civilization on the ecological systems inside a wilderness since the area was designated.

Outstanding opportunities for solitude or a primitive and unconfined type of recreation— This quality is degraded by settings that reduce these opportunities, such as visitor encounters, signs of modern civilization, recreation facilities, and management restrictions on visitor behavior.

Other features of value—This quality refers to specific, unique aspects of a wilderness area that contribute to its wilderness character. These may or may not be present in an area, and may be degraded by a variety of specific factors such as deterioration in the condition of a cultural site or loss of an endangered species within the area.

In some cases, not all of the qualities of wilderness character may be relevant to a proposed action, or a proposed action may cause no change to the existing status of wilderness character. For example, replacing an existing trail bridge neither increases nor decreases the number of structures in wilderness, so there would be no significant change to either the undeveloped or the primitive recreation qualities of wilderness character. A proposed action that would preserve or degrade certain qualities of wilderness character is treatment to control nonnative invasive weeds:

Untrammeled—Weed treatment would degrade this quality because the action, even if necessary, is an intentional human-caused manipulation of “the earth and its community of life.”

Undeveloped—Weed treatment does not degrade this quality unless motorized equipment or mechanical transport is used. In that case, if an action is determined to be necessary, assess the impacts of implementing specific alternatives in step 2.

Natural—Weed treatment improves naturalness and helps preserve this quality, although if nontarget native species were adversely affected this would degrade this quality.

Outstanding opportunities for solitude or a primitive and unconfined type of recreation—Weed treatment requires field technicians, the presence of whom may affect opportunities for solitude. The effect on this quality may only be short-term; however, the likelihood and magnitude of an effect will vary among the specific alternatives determined in step 2, if an action is determined to be necessary.

Other features of value—It is likely that weed treatment would have negligible impacts on any significant additional value not already accounted for in the other qualities, unless, for example, there were nonnative species that are now considered an historic cultural resource.

If an action is determined necessary in step 1, after considering all the filters, document the rationale, including how the action supports preservation of wilderness character, and then proceed to step 2. In the weed example above, action may or may not have been determined necessary once all the step 1 filters were considered.

Step 2: Determine the Minimum Activity.

This step involves developing a range of alternatives that describe what specific methods and techniques (often referred to as minimum tool) will be used, when and where the activity will take place, what mitigation measures will be necessary, and the general effects to the wilderness resource and wilderness character.

Identify and describe a full range of feasible alternatives, including, as applicable:

No action

No section 4(c) prohibited uses

Minimal section 4(c) prohibited uses (e.g., a combination of motorized and nonmotorized methods or tools)

Proposed section 4(c) prohibited uses

The level of detail required in the description of alternatives and effects varies by the complexity of the activity (method or tool) necessary to complete an action. A “no action” alternative is included to help confirm whether or not an action in wilderness is necessary, and to facilitate a comprehensive comparison of effects. If an action is necessary, identify all alternatives that were considered and rejected as not being feasible to implement, along with the rationale for dismissing each alternative. Determining that a proposed action is possible to accomplish but would have an unacceptable effect on wilderness character is a valid reason for declaring an alternative infeasible.

Compare the potential effects of implementing each action alternative on wilderness resources and character using several criteria. In addition to effects on wilderness character, these criteria may include maintaining traditional skills, legislated special provisions, economic values, and convenience for each phase of an activity, including design, construction, management, removal, or restoration. NPS management policies state that the potential disruption to wilderness character is to be considered before and given significantly more weight than the other criteria, such as economic benefits and convenience. Wilderness character will be the only criterion discussed here. A “no impact” response would be selected if it was determined that there would be no positive or negative impact to any quality of wilderness character. This, however, would be a rare case in wilderness, with most management actions having an effect on some quality of wilderness character. Criteria should be applied by describing in a detailed narrative the positive and negative impacts of each alternative in terms of the wilderness character qualities:

Untrammeled—Discuss the degree to which the components or processes of ecological systems are intentionally controlled, manipulated, or hindered by each proposed alternative. Typically, actions that affect this quality are those that are broader in scale or impact to ecological systems, such as weed treatment or prescribed fire. In this case, simply state that there is an insignificant effect and, if appropriate, include these effects in a discussion of the Natural quality.

Undeveloped—Wilderness is meant to be a place where “the imprint of man’s work will remain substantially unnoticeable,” and to contrast other areas of “growing mechanization.” Include in the discussion the effects of the use of any motorized equipment, mechanical transport, structures, or installations on maintaining the undeveloped quality of wilderness character.

Natural—Describe the potential for each proposed alternative to protect, degrade, or restore natural conditions (e.g., air, water, soil, wildlife, fish, plants) including endangered, threatened, or rare species, natural biological diversity, and self-regulating ecosystems. Include, where applicable, a discussion of the effects related to protecting natural conditions within the regional landscape from, for example, insects, disease, or nonnative species.

Outstanding opportunities for solitude or a primitive and unconfined type of recreation—Identify how opportunities for visitors to experience solitude or a primitive and unconfined type of recreation will be protected or degraded. Describe the impacts that will be noticeable to the visitor and which could affect the wilderness experience. Include effects on visitors from the use of motorized equipment, mechanical transport, landing of aircraft, structures, or installations.

Other features of value—Address other features and values that have been identified as a part of wilderness character specific to the wilderness by describing the potential effects on these other features of value for each MRA proposed alternative. All wilderness areas may not have this quality of wilderness character.

In some cases, the impact to wilderness character by two different alternatives will be relatively equal. If this occurs, comparison using these other criteria can help decide which of these alternatives is preferable. If a compromise of wilderness resources or character is unavoidable, only those actions that preserve, or improve wilderness character and/or have localized, short-term adverse impacts will be acceptable.

Select the alternative that uses the minimum activity (method or tool) necessary to administer the area as wilderness and that also conforms to all laws and agency policy. Describe the rationale for the selection in terms of the positive or negative impacts to the qualities of wilderness character. The rationale for the selected alternative should demonstrate that the decision is the result of an objective evaluation of the alternatives. It should not be a justification for a predetermined decision, a bias toward a certain alternative, or an alternative or method not related to the preservation of wilderness character.

BLM

Comment: Must do MRA and use MRDG template

BLM Manual 6340: Appendix B. Minimum Requirements Analysis (and the MRDG)

NOTE: The process described in this appendix is not a substitute for NEPA requirements, as set forth in 16 USC §1131 *et seq.*, CEQ regulations at 40 CFR §1500.1 *et seq.*, DOI NEPA regulations at 43 CFR Part 46, and the BLM's NEPA Handbook (Handbook H-1790-1). There are many opportunities to integrate the Minimum Requirements Analysis and NEPA analyses, and a Minimum Requirements Analysis should inform the BLM's NEPA analysis. For example, where the BLM's NEPA analysis relies on information or rationales developed through the Minimum Requirements Analysis, the relevant discussion could be summarized or incorporated by reference in the appropriate NEPA document(s).

To assist in documenting any decisions involving the uses listed in section 1.6.B.2 of this manual, and as noted elsewhere in section 1.6.C of this manual, the BLM will use the Minimum Requirements Decision Guide (MRDG) developed by the Arthur Carhart National Wilderness Training Center. The MRDG is

subject to occasional revision; BLM employees should use the most recent version, which can be found at wilderness.net. All versions, however, are organized around answering two fundamental questions: 1) Is *any* action *necessary* (regardless of the tool or other use employed); and 2) if so, what is the minimum amount of a prohibited use necessary to address the issue at hand. The BLM will also use the MRDG to determine the minimum amount of other activities as noted in this manual that could impair wilderness character but do not involve a prohibited use. The MRDG should not be used at the time of response to an emergency. However, the minimum requirements concept should be incorporated into emergency planning so that the minimum necessary methods and tools can be used to resolve emergencies while preserving wilderness character to the greatest extent practicable. In addition, the MRDG concept could be used in determining the minimum necessary for activities that impair wilderness character other than those prohibited by Section 4(c) (e.g., the “minimum necessary” visitor regulation). The sections below serve as a guide for using the MRDG in wilderness areas managed by the BLM.

A. Background. As outlined in this policy at 1.6.B.3, except where provided for elsewhere in the Wilderness Act or subsequent legislation, and subject to valid existing rights, the following uses can be employed in wilderness only if they meet the “minimum requirements” criterion: temporary roads; use of motor vehicles, motorized equipment, or motorboats; landing of aircraft; use of other forms of mechanical transport; structures; installations. These uses are defined in this policy at B.2. Section 4(c) of the Wilderness Act states that these uses are prohibited “except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area.)” Hence, all the following conditions must be met:

1. “necessary”: essential, indispensable, and inevitable
2. “minimum”: the least possible amount, degree, or quantity
3. “requirement”: something demanded or imposed as an obligation
4. “administration”: the function of the BLM in exercising its land management duties; by extension this includes non-BLM employees officially acting on behalf of the BLM; “administration” includes, as the Act says, “measures required in emergencies involving the health and safety of persons within the area”
 - a. “emergency”: a situation requiring action of immediate and urgent necessity; see Glossary. “Emergencies” do not include placing structures that might be used at some future time, or using other prohibited tools in training for hypothetical future responses
 - b. “health and safety”: soundness of body and freedom from the unacceptable risk of injury; “health and safety” does not include personal convenience or the degree of freedom associated with managed or controlled environments
 - c. “persons”: human beings; “persons” does not include non-human organisms or inanimate objects
 - d. “within the area”: inside the boundary of the designated wilderness
5. “purpose of this Act”: to secure for the American people of present and future generations the benefits of an enduring resource of wilderness through the preservation of an area’s wilderness character

B. Determining if Any Action is Necessary.

1. *Background.* Describe a problem or situation that prompts a possible need for action. Include supporting information (e.g. cause, threat, existing use, etc.) as needed. Do not identify a specific method or tool unless it is necessary to understand the situation. The background description should not justify the use of motorized equipment or mechanical transport or the placement of a structure, facility, or temporary road.

2. *Determination Questions.* There are four questions that need to be answered before determining if any action is necessary.

a. Is action necessary within wilderness? Determine if action can only be taken inside wilderness by identifying and describing any options outside of wilderness and whether the options are possible or impossible. A proposal that requires a prohibited use and can be satisfactorily addressed by taking action *outside* the wilderness must be denied *inside* the wilderness.

b. Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that allows or requires consideration of the Section 4(c) prohibited uses? If there is a valid existing right, or special provision language, consideration of some actions may be required even though they would otherwise be prohibited. Identify any valid existing rights or special provision in wilderness legislation and cite the applicable law and section; be careful to note whether the law says that a specific action “shall” be taken or that an action “may” be taken.

c. Is action necessary to meet the requirements of other laws? Laws that do not directly address wilderness (such as the Endangered Species Act or National Historic Preservation Act) may influence the need for actions in wilderness. Identify and cite applicable provisions of other laws and describe any conflicts between the provisions of other laws and the Wilderness Act or enabling legislation for your area. Apparent conflicts between the Wilderness Act and other legislation may require innovative approaches and not all apparent conflicts are genuine. No law over-rides another law (unless specifically stated in the superseding law). The requirements of all applicable laws must be met.

d. Is action necessary to preserve one or more of the qualities of wilderness character? Taking action in wilderness may be necessary to preserve one or more of the qualities of wilderness character, or the public purposes associated with them. For a detailed discussion of those qualities and purposes, see sections 1.6.A.2 and .3 of this policy.

3. *Step 1 Determination.* In determining whether any action is necessary, fully consider the responses to all four questions, as discussed above. It is possible that more information may be needed to determine if administrative action is needed. In rare instances, it may be useful to continue with Step 2 to evaluate the benefits and effects of alternatives to help determine if any administrative action is necessary.

C. Determining the Minimum Activity.

1. *Describing Alternatives.* For each alternative, describe what methods and techniques will be used, when the activity will take place, where the activity will take place, what mitigation measures are necessary, and the general effects to the wilderness resource and character. The level of detail required in the description of alternatives and effects varies by the complexity of the activity. Note that the alternatives considered in the MRDG analysis may be different from those analyzed under NEPA. (For

instance, in some cases the MRDG may not look at a No Action alternative, required by NEPA.) If so, the MRDG and NEPA documents should indicate and explain the differences.

2. *Range of Alternatives.* Identify and describe a full range of feasible alternatives, including, as applicable:

- Action using originally proposed Section 4(c) prohibited uses
- Action using no Section 4(c) prohibited uses
- Action using minimal Section 4(c) prohibited uses (e.g. a combination of motorized and non-motorized methods or tools)
- A No Action alternative may be included to help confirm that action in wilderness is necessary and to facilitate a comprehensive comparison of effects useful for a subsequent NEPA analysis.
- Actions found in applicable guidance (such as wilderness plans, other BLM policies, or agreements with other agencies) may already exist that pertain to the situation or project under consideration. Pay careful attention to the context and requirements of the policy, plan or agreement; plans developed using a NEPA analysis are decisions that provide stronger guidance than MOUs or agreements developed with less public or interdisciplinary involvement.

Alternatives that are not feasible to implement should be identified along with the reasons for not fully considering them. Valid reasons for deciding that an alternative is not feasible should be limited to actions:

- impossible to accomplish by any means
- possible to accomplish but implementation would cause significantly greater adverse effects to wilderness character, or,
- causing a significant safety risk to workers or the public that cannot be mitigated.

Alternatives should not be eliminated from full consideration simply because implementation would take more time, require greater funding, or because the skills or equipment needed are not readily available on the local unit.

NEPA imposes requirements for analyzing alternatives that may not apply to a particular MRDG analysis. Make sure that alternatives analyzed under NEPA are consistent with section 6.6 of the BLM NEPA Handbook (Handbook H-1790-1) and 40 CFR § 1502.14.

3. *Information Required in the Description of Each Alternative*

a. Include all methods and timing in sufficient detail to reasonably support the effects listed below. Where mitigation is possible, include mitigation measures. In describing the effects of the alternative, break down each alternative into its component actions and describe the effects of each action to each comparison criterion.

b. Describe the positive and negative effects to:

I. *Wilderness Character.* Describe the adverse effects or benefits of each alternative on the preservation of wilderness character in terms of the five qualities listed in Section 1.6.B.2 of this policy. Include any effects on protection or management of historic or pre-historic artifacts, sites, structures, or landscapes in the section describing impacts to the unique quality of wilderness character.

II. Valid Existing Rights and Special Provisions. Explain how the special provisions identified in the Wilderness Act (Sections 4 or 5) or subsequent legislation, are managed to minimize impairment to the wilderness resource and character.

III. Maintaining Traditional Skills. Explain how the alternative helps maintain proficiency in the use of primitive and traditional skills, non-motorized tools, and non-mechanical travel methods.

IV. Economic and Time Constraints. Describe the costs for implementation of the alternative in terms of operations budget, personnel work time needed, timing constraints. While administrative activities should always be accomplished with economic efficiency, neither the cost nor the time required for implementation can be the overriding factors for administrative use of otherwise prohibited activities.

V. Safety of Visitors and Workers. Describe any safety concerns associated with implementing the alternative. Identify which hazards can be mitigated (through providing information to the public or through worker training, the use of protective equipment, or other requirements) and which hazards cannot be mitigated. Identify the degree of risk for each alternative after considering both the rate of occurrence and severity of injuries. Base the determination of the safety risks of implementing an alternative on adequate supporting evidence (i.e. agency accident data, project specific Job Hazard Analysis, agency specific guidelines, or other documentation).

4. *Comparison of Alternatives.* Alternatives are compared with the greatest importance given to the impacts to wilderness character. In some cases, the impacts of two alternatives to the qualities of wilderness character will be equal. Comparison of the other criteria can help decide which of these alternatives is most supportable. Because the safety of wilderness visitors, employees, volunteers, and contractors is a priority in all decisions and actions, you will also want to compare the various alternatives' safety risks that cannot be mitigated through training, use of protective equipment, and implementation of safety procedures. The MRDG Instructions and Worksheets include template tables useful for comparing alternative.

5. *Documenting the Decision.* The decision includes several necessary parts, listed below.

a. Rationale. Explain why the prohibited use authorized (if chosen) is the minimum necessary requirement for the administration of the area as wilderness by briefly describing the benefits or adverse effects to the qualities of wilderness character. The rationale should demonstrate that the decision is clearly a result of objective evaluation of the alternatives and not the result of an inappropriate bias or justification of an alternative or method for non-wilderness reasons. Avoid selecting an alternative based primarily on costs and the amount of time needed for implementation. If your selection is based at least in part on the Safety criterion, be sure to explain the rationale and include or reference supporting analysis or documentation.

b. Monitoring Requirements. Include monitoring or reporting requirements to meet other agency policy or guidelines, include both near-term and long-term impacts to wilderness character that are monitored and reported under Section X of this policy.

c. Approval. Any use of a Section 4(c) prohibition requires approval of the State Director. This can be delegated down to the District or Field Office if the approving official has been through the National or Regional Wilderness Stewardship Training offered by the Arthur Carhart National Wilderness Training Center. In either event, approval of the use of a Section 4(c) prohibition must be coordinated

through the State Office Wilderness Program Lead. In the event that the State Office Lead is vacant, coordination is required through the Washington Office Wilderness Program.

d. Where the BLM's NEPA analysis relies on information or rationales developed through the MRDG analysis, the relevant discussion should be summarized or incorporated by reference in the appropriate NEPA document(s).