

Chapter 6

Let It Be: A Hands-Off Approach to Preserving Wildness in Protected Areas

PETER LANDRES

We should have the wisdom to know when to leave a place alone.

—*Sir Peter Scott*

In an era of rapid global climate change and other pervasive anthropogenic ecological insults, many scientists and managers have few qualms about taking action to mitigate the effects of these insults, including in areas that are protected by law as wilderness, wildlife refuges, or national parks. For example, habitat is manipulated to sustain populations of selected threatened and endangered species, nonindigenous invasive species are removed, and extirpated species are reintroduced. Even with important technical advances in the ecological sciences over the last several decades, ecologists still question the feasibility of managing biodiversity in the face of continued environmental change. For example, Western (2004: 496) wryly notes in an essay on the paradox of managing wildlands that “like the Red Queen running in place, we are destined to manage ever harder to save any semblance of the natural until . . . the unmanaged will be more managed than the managed to preserve the illusion of the natural.”

Is there an alternative to becoming locked into managing what is not fully understood in an environmental context that is rapidly changing? The

purpose of this chapter is to explore the reasoning behind and steps toward implementing the hands-off alternative. This alternative focuses on one of the three meanings of *naturalness* described in Chapter 2: freedom from intentional human control, intervention, and manipulation. This chapter first reviews current understandings about wildness and the autonomy of nature as the context for a hands-off approach. Next, the reason for leaving some areas alone, expressly because of global climate change and other novel ecological changes that are occurring, and the substantial and unique benefits to the land and people from this approach are discussed. Last, limitations and the specific conditions under which such an approach might be most feasible are explored. I conclude that although the hands-off alternative is not feasible in all areas, in some areas it is, and that more fully understanding what is gained and what is lost by such an approach fosters the opportunity to realize all the meanings and benefits of naturalness in the twenty-first century.

Defining Wildness

In his “Walking” essay, Thoreau (1862: 664) wrote, “In wildness is the preservation of the world.” Since then, many terms and phrases have been used to describe “wild” as self-willed, autonomous, unmanipulated, unrestrained, uncontrolled, unbounded, unimpeded, and free. Turner (1996: 112) writes that “a place is wild when its order is created according to its own principles of organization—when it is self-willed land.” Schroeder (1994: 64) suggests that “our responsibility . . . is to respect the autonomy of nature—to care about nonhuman nature for its own sake and grant it at least a measure of freedom to follow its own path.” In *Recognizing the Autonomy of Nature*, Heyd (2005) points out that *autonomy* is based on the root words *autos* and *nomos*, literally meaning “self-rule.” In the context of environmental conservation, the autonomy of nature is generally considered to mean that an area, ecosystem, species, or ecological process follows its own internal drives (see Katz 1997). Hettinger (2005: 90) states that “nature carries on independently of human control or domination” and that nature’s autonomy is respected by “avoiding exerting” human influence over it.

Examining how this concept of autonomy applies to ecological restoration in wilderness, Woods (2005) argues that there are really two distinct embedded concepts: wildness and freedom. Wildness is the lack of

intentional manipulation that allows self-expression, whereas freedom is the lack of external constraints that limit the capacity for this self-expression. In other words, an area is wild when it is not intentionally manipulated, even though its freedom may still be reduced because global climate change is altering temperature and precipitation regimes (the external context).

Woods (2005) further elaborates on the distinction between wildness and naturalness, echoed in the discussion in Chapter 2. This conceptualization of wildness and how it is related to but distinct from freedom and naturalness helps clarify what have been confusing or unfounded management implications (Ridder 2007), such as that “‘hands-on’ management is needed to restore ‘hands-off’ wilderness character” (Noss 1985: 19). For example, spraying herbicides compromises wildness but was considered necessary to protect the indigenous plants in the Frank Church River of No Return Wilderness (Anderson and Wotring 2001). This recent discussion of wildness can also “be seen as a sign of a growing sensitivity towards the meaning of nature, an emerging new ‘wildness ethic’” (Drenthen 2007: 394). Similarly, Willers (1999: 3) concludes, “Reawakening to wildness will carry with it deference to the dense meshwork of process that has been the source of evolution since life on Earth began, and an acknowledgment of the inherent rightness of allowing some vast landscapes to function, with all parts intact, according to their own internal dictates.” As a scientific and moral concept, wildness may therefore help society more fully understand, respect, and value nature’s autonomy.

The Role of Designated Wilderness

As a legal mandate and policy goal, no area is explicitly protected for wildness, although in the United States wilderness designated under the 1964 Wilderness Act (Public Law 88-577) comes closest. In defining *wilderness*, this law states, “A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man.” The word *untrammelled* is rarely used, but Howard Zahniser, the primary author of the Wilderness Act, purposefully used this word as the key element in the definition of *wilderness* (Scott 2002). The intent behind using the word *untrammelled* was to establish a relationship between people and the land that was based on restraint, humility, and respect—a relationship that would foster a sense of interdependence and interconnectedness that people felt with the land (Zahniser 1956). Olson (1976) and many others argue that

the loss of this relationship between people and the land is a root cause for many of the conservation problems seen today.

As Friskics (2008) points out, recent criticism of wilderness misconstrues *untrammelled* to mean pristine, unaffected by indigenous people, or not influenced by exogenous environmental threats. Instead, in the management context, *untrammelled* means that “wilderness is essentially unhindered and free from modern human control or manipulation” (Landres et al. 2008: 7). This idea builds on the simple description by Zahniser (1963: 2) that wilderness managers are “guardians not gardeners.” This implies that to maximize the untrammelled quality in wilderness, managers should refrain from taking actions that manipulate, control, or intervene with the ecological system.

A Hands-Off Approach

Although humility and restraint should be hallmarks for the management of all protected areas, as well as the other approaches that are described in this section, the hands-off approach takes restraint to an extreme. The hands-off approach, in its simplest form, is not taking action that manipulates, controls, or hinders the conditions (e.g., habitat), components (e.g., species), or processes (e.g., fire) of an ecological system. This restraint should be based not on naiveté or wishful thinking that there is not an ecological problem, or on a lack of understanding about the consequences and trade-offs of restraint, but rather on a purposeful and willful holding back to respect nature’s autonomy and to observe and learn from what happens. In contrast to the other chapters in this section that advocate management intervention to sustain elements of historic fidelity, resilience, or ecological integrity, the goal of the hands-off approach is to not intervene even if some of these elements are lost. As Lucas (1973: 151) suggests, in wilderness “the object is not to stop change, nor to recreate conditions as of some arbitrary historical date, nor to strive for favorable change in big game populations or in scenic vistas. The object is to let nature ‘roll the dice’ and accept the results with interest and scientific curiosity.”

The hands-off approach preserves wildness by restraining direct interventions generally recognized as having adverse effects on ecosystems, such as suppressing lightning-ignited fires, introducing nonindigenous fish and ungulates for sport (or any other reason), killing or removing native predators, or damming and diverting water bodies and flows. In addition, and much harder for ecologists and conservationists to accept, the

hands-off approach restrains interventions taken to provide specific ecological benefits, such as using management-ignited prescribed fire to reduce accumulated forest fuels and mimic a natural fire regime, spraying herbicides or introducing biological control agents to eradicate nonindigenous invasive plants, or creating artificial water or food sources to replace those that are no longer accessible because of habitat fragmentation.

Factors Affecting Whether a Hands-Off Approach Is Appropriate

Three intertwined factors affect whether a hands-off approach is appropriate and will be used: legislation, ethics, and knowledge. First, the legislative mandate for an area fundamentally determines whether management intervention is warranted. For example, in areas that are designated for the protection of threatened or endangered species, such as some national wildlife refuges, active management interventions are usually mandatory to support the persistence of such species. In contrast, in designated wilderness and potentially in other protected areas that have similar legal direction, such as Adirondack Park in New York State, the hands-off approach would be considered appropriate. However, some areas are managed under overlapping legislative mandates, such as Cabeza Prieta Wilderness in Arizona, which is managed as wilderness and for the endangered Sonoran pronghorn antelope (*Antilocapra americana sonoriensis*). In such cases the appropriateness of a hands-off approach must be determined by the specifics of the case and area.

Ethics, based on the values of individual managers, scientists, and public stakeholders, may influence the interpretation of uncertain or ambiguous legislation (where not already determined by judicial opinions) and typically has a strong impact on whether the hands-off approach is considered appropriate. Katz (1992) argues that managing “natural entities” and attempting the “technological fix of nature” are basically moral and value-laden decisions. For example, the decision about whether the hands-off approach is ethically appropriate may rest on values-based questions such as the following:

- Should management interventions be used to sustain specific elements of biodiversity or ecological processes in wilderness or similarly protected areas?
- Should precaution dominate and no action be taken unless no harm can be demonstrated from action-based alternatives?

- How does a manager decide whether preserving wildness (hands off) or biodiversity (management intervention) has priority?
- Under what circumstances is it appropriate to set a precedent for interventions that compromise wildness?

The last major factor affecting the use of a hands-off approach is whether sufficient knowledge exists to manage an ecosystem or specific elements within an ecosystem. One reason for restraint in general and the hands-off approach in particular is that in many situations there is insufficient knowledge to manage ecosystems. Any environmental science textbook is replete with examples of attempts to “fix” an ecological problem that went awry because of unforeseen consequences. Global climate change exacerbates this lack of knowledge. In discussing whether there is sufficient knowledge to manage ecosystems, Turner (1996: 124) concludes, “We are not that wise, nor can we be. The issue is not the legitimacy of science in general, nor the legitimacy of a particular scientific discipline, but the appropriate limits to be placed on any scientific discipline in light of limited knowledge. To ignore these limits is to refuse humility.” The increasing rarity of wildness in our increasingly manipulated world argues for greater humility and restraint, for watching change occur—even if this change is not in accord with what managers and scientists think should be happening.

The Benefits of a Hands-Off Approach

Wilderness, national parks, and other areas that are designated by law or administrative policy are generally protected for their social and ecological values. In this section I describe some of the social and ecological benefits of a hands-off approach.

DEEPENING RESPECT FOR NATURE’S AUTONOMY

An important benefit of the hands-off approach is a deepening awareness of and respect for nature’s autonomy. This is a long-term societal value and benefit that is at the heart of the direct interplay between people and their environment (Plumwood 2005). The hands-off approach is a conscious choice to put restraint first, to ensure that people are not in charge, in control, or dominating, to foster awareness of and appreciation for our interconnectedness with what is typically called nature. Rolston (1999), Schroeder (2007), and Keeling (2007) respectively describe the significant

spiritual, psychological, and philosophical benefits to individuals and to the larger society from having areas where people are purposefully not in control. In other words, not intentionally manipulating or controlling offers an antidote to some of the deeper spiritual, psychological, and philosophical problems caused by our increasingly developed and manipulated world. To the extent that the value of this approach is recognized and articulated, our society has the opportunity to move toward a deeper and more enduring relationship with all three meanings of *naturalness* described in Chapter 2.

FOSTERING SCIENTIFIC HUMILITY

A derivative benefit of such restraint is the opportunity for scientists to be placed in a position where they explicitly acknowledge the limitations of their understanding about ecological systems; that is, where they may gain humility. In a recent meta-analysis of ecological surprises, Doak et al. (2008) contend that “the extent and frequency of major ‘surprises’ in ecological systems argue for substantial humility about our predictive abilities” (p. 953). Humility is needed, they say, because scientists are “sometimes surprised because of ignorance, sometimes because of a failure to pay careful attention, and sometimes because [they] have to prioritize which aspects of ecology to include and which to ignore in order to make predictions” (p. 957). They also assert that “most management strategies, sooner or later, will not work as planned . . . sometimes not just less than perfect in achieving some desired outcome, but totally wrong” and that “frequent ecological surprises reinforce the need for management plans that are highly precautionary” (p. 958). As a specific example, in an experimental study to elucidate patterns of plant zonation in Chilean salt marshes, Farina et al. (2009) found that the long-established mechanistic understandings of pattern generation in salt marshes derived from California and New England could not be exclusively used to manage and restore the novel Chilean salt marsh systems.

ACCEPTING EVOLUTIONARY CHANGE

There are likely to be ecological benefits from a hands-off approach, although there are few direct experimental studies to support the ideas explored here. First, this approach might increase the likelihood of evolutionary processes being largely unfettered by modern people. Ashley et al. (2003), Bohn and Amundsen (2004), and Klein et al. (2009) discuss the importance of explicitly considering evolutionary outcomes in conservation

strategies. Genetic frequencies will always change in response to whatever selection pressures are extant in the area, so evolution per se will continue unabated no matter how much modern people intervene. Site-specific and pervasive ecological changes, from global climate change and airborne pollutants to increasing human presence and development, affect selection pressures everywhere and consequently evolutionary outcomes. Western (2004: 496) comments that “the more we change the world, the more we govern evolution.”

At stake are selection pressures and evolutionary outcomes that are intentionally not dominated or controlled by the whims, desires, designs, and even good intentions of modern people. For example, in a study of selection pressures among native and invasive perennial and annual grasses, Leger (2008: 1226) concludes that “while it is tempting to restore degraded areas to higher densities of natives . . . such actions may impede long-term adaptation to new conditions by arresting or reversing the direction of ongoing natural selection in the resident population.” At its core, the hands-off approach strives to protect and sustain the types and intensities of selection pressures that gave rise to the diversity and complexity of life seen today and to allow these forces to operate in ways that people do not intentionally control and could not fathom in the future. Respecting nature’s autonomy is allowing evolutionary change and adaptation to occur, even in response to what are typically considered environmental insults.

SUSTAINING NONFOCAL SPECIES

Another ecological benefit of the hands-off approach is that it may increase the likelihood of protecting a broad range of species that might otherwise be lost when management focuses on select species. For example, Ozaki et al. (2006) found that management plans for the northern goshawk (*Accipiter gentilis*), often cited as an umbrella for other species, failed to protect the diversity of birds, butterflies, carabid beetles, and forest floor plants in Japan that use the same habitat as the goshawk. More generally, in a recent review of ecological restoration goals, Choi et al. (2008: 60) conclude that “restoration goals are determined by us, not by nature. . . . For this reason, the goals tend to be determined by preconceptions or misconceptions that often place more value on certain target species or ecosystems.” By definition, the hands-off approach has no a priori ecological target, focal species, or ecological process. Instead, the intent is to let all species and ecological processes in the area be or change, free from intentional manipulation, and not focus management on any particular component or process.

REDUCING UNINTENDED ADVERSE CONSEQUENCES

Another potential ecological benefit of a hands-off approach is that scientists and managers would not inadvertently cause adverse impacts to ecosystems when trying to help. For example, in a review of the effects of management interventions to improve the resistance and resilience of U.S. northeastern forests in advance of insect infestation and disease, Foster and Orwig (2006: 968) conclude, "Current management regimes aiming to increase long-term forest health and water quality are ongoing 'experiments' lacking controls. In many situations good evidence from true experiments and 'natural experiments' suggests that the best management approach is to do nothing." Similarly, in experiments testing the use of herbicides to reduce the abundance of invasive plants and their impact on native species, Rinella et al. (2009: 155) found that herbicide use made two native plant species "exceedingly rare" over the 16-year study and that the "dominant invader became more abundant in response to the decreases in native-forb abundance."

PROVIDING UNMANIPULATED BENCHMARKS

A hands-off approach increases the likelihood of an area serving as an unmanipulated ecological benchmark, or at least as unmanipulated as may be possible in the context of an increasingly humanized landscape and planet. For example, Van Mantgem et al. (2009) located sixty-six undisturbed old-growth forest stands to examine the causes of tree mortality across the western United States. This may be closest to what Leopold (1941: 3) described as "the base datum of normality, a picture of how healthy land maintains itself as an organism." Such a benchmark does not need to be based on an arbitrary timeframe (such as pre-European settlement) or on whether indigenous people influenced the area. Instead, the area is simply not intentionally manipulated or controlled from the time and state of designation onward.

PRESERVING OPTIONS AND HEDGING RISK

Finally, a hands-off approach preserves options for the future. Given huge uncertainty about the type and intensity of both current and future stressors that will adversely affect ecological systems, especially global climate change, and huge uncertainty about the response of ecological systems to these stressors (Hobbs et al. 2006), the more options for future responses and management the better (Seastedt et al. 2008). The hands-off approach

contributes a unique perspective to the suite of management options and possibilities, thereby keeping as many options open as possible in the coming time of rapid and novel ecological change.

Limitations and Barriers to a Hands-Off Approach

A hands-off approach is still a form of management, and like all management it entails limitations and trade-offs. The most important limitation posed by the hands-off approach is the increased risk to specific elements of biodiversity (Figure 6.1). For example, if decades of fire exclusion have



FIGURE 6.1. Whitebark pine (*Pinus albicaulis*) illustrates the dilemma of deciding whether to use a hands-off approach. It occurs throughout the Pacific Northwest and northern Rocky Mountains, and in certain seasons its seeds form a significant part of the diet of endangered grizzly bears. The pine is severely declining in many parts of its range because of fire exclusion, attack by the nonindigenous whitepine blister rust (*Cronartium ribicola*), and increasing infestations of mountain pine beetle (*Dendroctonus ponderosae*), probably allowed by climate change. Several proactive treatments being proposed to restore pine populations include replanting forests with seed gathered from trees that are naturally resistant to the blister rust. The main thesis of this chapter is that the goal of preserving wildness via a hands-off approach should be considered for some areas, even though it may allow the decline of whitebark pine in these areas. (Photo by John Schwandt, Forest Service)

allowed current fuel loads to build, a naturally ignited fire that is allowed to burn may cause the death of old-growth ponderosa pines (*Pinus ponderosa*), which are of high social and ecological value (Allen et al. 2002). Conversely, in the absence of active efforts to restore the fire regime with the use of management-prescribed fires, some plant and animal species might decline or become locally extinct (Christensen 1988; Agee 2002). Likewise, nonindigenous invasive plants may cause the loss or reduced distribution of indigenous species (Orrock et al. 2008), and aggressive eradication may be the only way to sustain native species (see Anderson and Wotring 2001 for an example in wilderness). Comparing the effects of active management and no management of forests to sustain red-cockaded woodpeckers (*Picoides borealis*), Saenz et al. (2001) found that using prescribed fire and creating artificial nest cavities was necessary for woodpecker persistence and that eight of nine woodpecker groups were lost in hands-off areas over a period of nearly 20 years. Graber (2003: 38) has consistently argued that some wilderness areas “require urgent intervention and long-term maintenance simply to preserve what remains—and often what remains is quite irreplaceable. To put it another way, their value as managed reserves of biodiversity exceeds their value as ‘wilderness.’”

Cultural resources may also be put at greater risk with a hands-off approach. Sydoriak et al. (2001) describe how not taking intensive restoration actions to cut encroaching trees and replant grasses and other ground vegetation inside the Bandelier Wilderness will cause the loss of archaeological remains. Where specific resources, such as threatened or endangered species or cultural and heritage sites, are at risk and protected by legislation, the hands-off approach may not be appropriate.

A potential barrier to implementing the hands-off approach is that it may allow certain species or disturbance processes that pose a risk to life or property to spread outside the protected area. For example, because the boundaries of protected areas are porous, naturally ignited fire that is not suppressed, nonindigenous invasive plants that are not eradicated, or certain species such as bison or wolves that are allowed to thrive could spread outside the area managed under a hands-off approach. In such cases, public or management pressures may be sufficient to preclude implementing a hands-off approach.

Another significant barrier to implementing the hands-off approach is that it goes against the dominant paradigm in most management agencies that doing something is better than nothing and that managing by command and control is appropriate (Holling and Meffe 1996). Scientists may exhibit a similar attitude based on faith in their technical knowledge.

For example, Janzen (1998: 1312) contends that humanity must accept its responsibility for “recognizing and relabeling wildland nature as a garden per se, having nearly all the traits that we have long bestowed on a garden—care, planning, investment, zoning, insurance, fine-tuning, research, and premeditated harvest.” Both managers and scientists may strongly desire to do good and think that today’s rapid anthropogenic change brings a responsibility to stave off the loss of biodiversity. Adding to this belief, both groups may be unwilling to take the risk and liability of not doing something even if the technical knowledge is incomplete or uncertain. Although they are understandable, implementing the hands-off approach will require great conviction to overcome these attitudes.

Implementing a Hands-Off Approach

As part of a diverse suite of management approaches, the hands-off approach would be feasible only in certain areas. Discussing feasibility of the hands-off approach helps develop what Willers (1992: 605) calls “a science of letting things be” and is critical because if this approach remains only a naive ideal, then the societal and ecological benefits of wildness will never be realized. This discussion focuses on the intentional implementation of a hands-off approach, not a de facto hands-off approach that occurs in many remote areas, whether protected or not, because of a lack of staff and funding resources.

A hands-off approach would be least appropriate in areas where active management is needed for the protection and maintenance of species or communities, especially those that are listed as threatened, endangered, or sensitive. In addition, where the practices and traditions of indigenous people are an integral part of the ecological system, the hands-off approach probably would not be appropriate.

The hands-off approach is more feasible in areas that have legal and administrative policy direction that supports the goal of wildness. As already discussed, *nature’s autonomy* and *wildness* are not explicitly used in law or policy for any U.S. agency or protected area. However, all designated wilderness broadly fits the goal of wildness because of the emphasis on untrammelled nature. Furthermore, the mandate of untrammelled nature requires only that the area be free from intentional manipulation, not that the area be free from human influence.

The hands-off approach is also more feasible in an area that is large and isolated. A large area provides the variety of terrain, ecological

processes, disturbances, and resources sufficient to allow persistence of species' metapopulations and to fulfill the dispersal needs of a species (Noon and Dale 2002). Isolation provides buffering from threats that move short or moderate distances, such as many nonindigenous plant and animal species, and from the myriad other effects of fragmentation. Isolation also separates the area from the socioeconomic interests of people because these interests have an effect far beyond the area of personal or commercial property. For example, a naturally ignited fire that occurs inside a protected area may be suppressed because of the concern that it will spread outside and harm people or their property. Likewise, a naturally ignited fire outside a protected area may be suppressed for the same reasons, even though under more natural circumstances this fire might burn into the protected area.

Because isolation from roads or other developments is almost impossible to find in the United States (Watts et al. 2007), relative isolation will have to suffice. Such relative isolation could be achieved by using areas that are embedded in the center or core of a moderate to large area and ensuring that the management goals in the outlying areas are compatible with and provide a buffer to the core area (Landres et al. 1998). However, isolation will not protect any area from regional threats such as air pollution or from the effects of global climate change.

Finally, the hands-off approach would be most feasible as part of an integrated, diverse system of protected areas, each with specific goals that in combination provide sufficient protection and the benefits (both ecological and societal) that come from such broad-scale protection (Lambeck and Hobbs 2002). For example, a national park that is 90 percent designated wilderness could have a core area (depending on its spatial configuration) allocated to wilderness that is managed with a hands-off approach. The wilderness outside this core would be managed more intensively to eradicate or control specific threats, such as nonindigenous invasive plants. And the area outside the wilderness but still within the park would be managed even more intensively to achieve specific management goals and help buffer the inner areas. This model of complementary management goals could also be applied across a landscape. For example, an endangered and endemic species that needs periodic habitat manipulation, such as low-intensity fire, could be protected in one area while another part of this landscape could be devoted to preserving wilderness using a hands-off approach. In twenty-two 1-hectare experimental sites, Franc and Gotmark (2008) found that the number of beetle species increased with a combination of active and hands-off management: Red-listed beetle species declined in active management areas, whereas hands-off areas had more open patches and more dead wood that favored other species. Cole (2001) suggests that a combi-

nation of active management and hands-off approaches may be inevitable in wilderness.

Shall We Accept the Wild?

By willfully not manipulating or intervening in ecological systems, the hands-off approach is a way to foster greater respect and humility toward the autonomy of nature, to “let being be” (Abbey 1984: 43). Global climate change highlights how little managers and scientists understand about ecological systems, and respecting nature’s autonomy and using a hands-off approach is even more important in such a novel world to hedge risk and not cause inadvertent problems. This approach will be difficult to implement given the impulses, the desires, and the burden of responsibility managers and scientists may strongly feel to help protect parks and wilderness in the twenty-first century. To truly protect these areas in an uncertain future, managers and scientists need to face what Turner (1996: 125) describes as a fundamentally moral choice: “Shall we remake nature according to biological theory? Shall we accept the wild?”

BOX 6.1. MANAGING FOR AUTONOMOUS NATURE

- Wildness is the lack of intentional management interventions that allow self-expression of the ecological system in an area.
- Designated wilderness, with its emphasis on untrammelled nature, comes closest to providing legal protection for wildness.
- The hands-off approach takes restraint to an extreme by not taking actions that manipulate, control, or hinder the ecological system in an area.
- The benefits of a hands-off approach may include deepening respect for nature’s autonomy, fostering scientific humility, accepting evolutionary change, sustaining nonfocal species, reducing unintended adverse consequences, providing unmanipulated benchmarks, preserving options, and hedging risk.
- The hands-off approach poses increased risk to specific elements of biodiversity or other resources of high social value that need management interventions to sustain them.
- The hands-off approach would be most feasible in large, isolated areas that are part of a landscape-scale, integrated suite of conservation strategies.

REFERENCES

- Abbey, E. 1984. *Beyond the wall: Essays from the outside*. Henry Holt, New York.
- Agee, J. K. 2002. The fallacy of passive management. *Conservation Biology in Practice* 3:18–25.
- Allen, C. D., M. Savage, D. A. Falk, K. F. Suckling, T. W. Swetnam, T. Schulke, P. B. Stacey, P. Morgan, M. Hoffman, and J. T. Klingel. 2002. Ecological restoration of southwestern ponderosa pine ecosystems: A broad perspective. *Ecological Applications* 12:1418–1433.
- Anderson, B., and K. Wotring. 2001. Invasive plant management along wild rivers: Are we stewards, guardians, or gardeners? *International Journal of Wilderness* 7(1):25–29.
- Ashley, M. V., M. F. Willson, O. R. W. Pergams, D. J. O'Dowd, S. M. Gende, and J. S. Brown. 2003. Evolutionarily enlightened management. *Biological Conservation* 111:115–123.
- Bohn, T., and P. A. Amundsen. 2004. Ecological interactions and evolution: Forgotten parts of biodiversity? *BioScience* 54:804–805.
- Choi, Y. D., V. M. Temperton, E. B. Allen, A. P. Grootjans, M. Halassy, R. J. Hobbs, M. A. Naeth, and K. Torok. 2008. Ecological restoration for future sustainability in a changing environment. *Ecoscience* 15:53–64.
- Christensen, N. L. 1988. Succession and natural disturbance: Paradigms, problems, and preservation of natural ecosystems. Pp. 62–86 in J. K. Agee and D. R. Johnson, eds. *Ecosystem management for parks and wilderness*. University of Washington Press, Seattle.
- Cole, D. N. 2001. Management dilemmas that will shape wilderness in the 21st century. *Journal of Forestry* 99:4–8.
- Doak, D. F., J. A. Estes, B. S. Halpern, U. Jacob, D. R. Lindberg, J. Lovvorn, D. H. Monson, et al. 2008. Understanding and predicting ecological dynamics: Are more surprises inevitable? *Ecology* 89:952–961.
- Drenthen, M. 2007. New wilderness landscapes as moral criticism: A Nietzschean perspective on our contemporary fascination with wildness. *Ethical Perspectives* 14:371–403.
- Farina, J. M., B. R. Silliman, and M. D. Bertness. 2009. Can conservation biologists rely on established community structure rules to manage novel systems? . . . Not in salt marshes. *Ecological Applications* 19:413–422.
- Foster, D. R., and D. A. Orwig. 2006. Preemptive and salvage harvesting of New England forests: When doing nothing is a viable alternative. *Conservation Biology* 20:959–970.
- Franc, N., and F. Gotmark. 2008. Openness in management: Hands-off vs. partial cutting in conservation forests, and the response of beetles. *Biological Conservation* 141:2310–2321.
- Friskics, S. 2008. The twofold myth of pristine wilderness: Misreading the Wilderness Act in terms of purity. *Environmental Ethics* 30:381–399.

- Graber, D. M. 2003. Ecological restoration in wilderness: Natural versus wild in National Park Service wilderness. *The George Wright Forum* 20(3):34–41.
- Hettinger, N. 2005. Respecting nature's autonomy in relationship with humanity. Pp. 86–98 in T. Heyd, ed. *Recognizing the autonomy of nature: Theory and practice*. Columbia University Press, New York.
- Heyd, T., ed. 2005. *Recognizing the autonomy of nature: Theory and practice*. Columbia University Press, New York.
- Hobbs, R. J., S. Arico, J. Aronson, J. S. Baron, P. Bridgewater, V. A. Cramer, P. R. Epstein, et al. 2006. Novel ecosystems: Theoretical and management aspects of the new ecological world order. *Global Ecology and Biogeography* 15:1–7.
- Holling, C. S., and G. K. Meffe. 1996. Command and control and the pathology of natural resource management. *Conservation Biology* 10:328–337.
- Janzen, D. 1998. Gardenification of wildland nature and the human footprint. *Science* 279:1312–1313.
- Katz, E. 1992. The call of the wild: The struggle against human domination and the technological fix of nature. *Environmental Ethics* 14:265–273.
- Katz, E. 1997. *Nature as subject: Human obligation and natural community*. Rowman and Littlefield, Lanham, MD.
- Keeling, P. K. 2007. Beyond the symbolic value of wildness. *International Journal of Wilderness* 13(1):19–23.
- Klein, C., K. Wilson, M. Watts, J. Stein, S. Berry, J. Carwardine, M. S. Smith, B. Mackey, and H. Possingham. 2009. Incorporating ecological and evolutionary process into continental-scale conservation planning. *Ecological Applications* 19:206–217.
- Lambeck, R. J., and R. J. Hobbs. 2002. Landscape and regional planning for conservation: Issues and practicalities. Pp. 360–380 in K. J. Gutzwiller, ed. *Applying landscape ecology in biological conservation*. Springer-Verlag, New York.
- Landres, P., C. Barns, J. G. Dennis, T. Devine, P. Geissler, C. S. McCasland, L. Merigliano, J. Seastrand, and R. Swain. 2008. *Keeping it wild: An interagency strategy to monitor trends in wilderness character across the National Wilderness Preservation System*. General technical report RMRS-GTR-212. USDA Forest Service Rocky Mountain Research Station, Fort Collins, CO.
- Landres, P., S. Marsh, L. Merigliano, D. Ritter, and A. Norman. 1998. Boundary effects on wilderness and other natural areas. Pp. 117–139 in R. L. Knight and P. B. Landres, eds. *Stewardship across boundaries*. Island Press, Washington, DC.
- Leger, E. A. 2008. The adaptive value of remnant native plants in invaded communities: An example from the Great Basin. *Ecological Applications* 18:1226–1235.
- Leopold, A. 1941. Wilderness as a land laboratory. *The Living Wilderness* 6(July):3.
- Lucas, R. C. 1973. Wilderness: A management framework. *Journal of Soil and Water Conservation* 28:150–154.
- Noon, B. R., and V. H. Dale. 2002. Broad-scale ecological science and its

- application. Pp. 34–52 in K. J. Gutzwiller, ed. *Applying landscape ecology in biological conservation*. Springer-Verlag, New York.
- Noss, R. F. 1985. Wilderness recovery and ecological restoration: An example for Florida. *Earth First!* 5(8):18–19.
- Olson, S. F. 1976. *Reflections from the north country*. Knopf, New York.
- Orrock, J. L., M. S. Witter, and O. J. Reichman. 2008. Apparent competition with an exotic plant reduces native plant establishment. *Ecology* 89:1168–1174.
- Ozaki, K., M. Isono, T. Kawahara, S. Iida, T. Kudo, and K. Fukuyama. 2006. A mechanistic approach to evaluation of umbrella species as conservation surrogates. *Conservation Biology* 20:1507–1515.
- Plumwood, V. 2005. Toward a progressive naturalism. Pp. 25–53 in T. Heyd, ed. *Recognizing the autonomy of nature: Theory and practice*. Columbia University Press, New York.
- Ridder, B. 2007. The naturalness versus wildness debate: Ambiguity, inconsistency, and unattainable objectivity. *Restoration Ecology* 15:8–12.
- Rinella, M. J., B. D. Maxwell, P. K. Fay, T. Weaver, and R. L. Sheley. 2009. Control effort exacerbates invasive-species problem. *Ecological Applications* 19:155–162.
- Rolston, H. 1999. Nature, spirit, and landscape management. Pp. 17–24 in B. L. Driver, D. Dustin, T. Baltic, G. Elsner, and G. Peterson, eds. *Nature and the human spirit: Toward an expanded land management ethic*. Venture, State College, PA.
- Sazenz, D., R. N. Conner, D. C. Rudolph, and R. T. Engstrom. 2001. Is a “hands-off” approach appropriate for red-cockaded woodpecker conservation in twenty-first-century landscapes? *Wildlife Society Bulletin* 29:956–966.
- Schroeder, H. W. 1994. Wild metaphors: Nature as machine or person? *The Futurist* March–April:64.
- Schroeder, H. W. 2007. Symbolism, experience, and the value of wilderness. *International Journal of Wilderness* 13(1):13–18.
- Scott, D. W. 2002. “Untrammelled,” “wilderness character,” and the challenges of wilderness preservation. *Wild Earth* 11(3/4):72–79.
- Seastedt, T. R., R. J. Hobbs, and K. N. Suding. 2008. Management of novel ecosystems: Are novel approaches required? *Frontiers in Ecology and the Environment* 6:547–553.
- Sydoriak, C. A., C. D. Allen, and B. F. Jacobs. 2001. Would ecological landscape restoration make the Bandelier Wilderness more or less of a wilderness? *Wild Earth* 10(4):83–90.
- Thoreau, H. D. 1862. Walking. *Atlantic Monthly* 9(56, June):657–674.
- Turner, J. 1996. *The abstract wild*. The University of Arizona Press, Tucson.
- Van Mantgem, P. J., N. L. Stephenson, J. C. Byrne, L. D. Daniels, J. F. Franklin, P. Z. Zule, M. E. Harmon, et al. 2009. Widespread increase of tree mortality rates in the western United States. *Science* 323:521–524.
- Watts, R. D., R. W. Compton, J. H. McCammon, C. L. Rich, S. M. Wright,

- T. Owens, and D. S. Ouren. 2007. Roadless space of the conterminous United States. *Science* 316:736–738.
- Western, D. 2004. Managing the wild: Should stewards be pilots? *Frontiers in Ecology and the Environment* 2:495–496.
- Willers, B. 1992. Toward a science of letting things be. *Conservation Biology* 6:605–607.
- Willers, B., ed. 1999. *Unmanaged landscapes: Voices for untamed nature*. Island Press, Washington, DC.
- Woods, M. 2005. Ecological restoration and the renewal of wildness and freedom. Pp. 170–188 in T. Heyd, ed. *Recognizing the autonomy of nature: Theory and practice*. Columbia University Press, New York.
- Zahniser, H. 1956. The need for wilderness areas. *The Living Wilderness* 59(Winter–Spring):37–43.
- Zahniser, H. 1963. Editorial: Guardians not gardeners. *The Living Wilderness* 83(Spring–Summer):2.