Chapter 8

Historical Fidelity: Maintaining Legacy and Connection to Heritage

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> History is the witness that testifies to the passing of time; it illumines reality, vitalizes memory, provides guidance in daily life and brings us tidings of antiquity.
>
> —*Cicero*

> Telling the future by looking at the past . . . is like driving a car by looking in the rearview mirror.
>
> —*Herb Brody*

As the story goes, the idea of national parks in the United States emerged one evening in 1870 around a campfire at the junction of the Firehole and Gibbon rivers in Yellowstone National Park (Sellars 1997). Toward the end of an exploratory survey of the region, members of the Washburne–Doane expedition, awed by the spectacles and scenery they had observed, agreed that it would be a travesty if these wonders were despoiled by development and commercialization. Rather, they asserted, the place should be protected and preserved as a public park so all Americans, present and future, could observe the same waterfalls, canyons, geysers, and wildlife and experience the same wild landscapes they had. Within a few years, Yellowstone National Park was created.

This creation myth, cloaked in seemingly altruistic intentions, has often been questioned; utilitarian motives and business interests also played a significant role in the establishment of national parks (Sellars 1997). But there is no doubt that preserving these places much as they are, so their wonders could be experienced by future generations, was a central motivation for the establishment of parks and wilderness areas. John Muir used similar arguments in the Sierra Nevada, as did early proponents of wilderness designation, such as Aldo Leopold and Bob Marshall. This sentiment ultimately was translated into the core mission of the National Park Service, as expressed in its Organic Act of 1916, to conserve scenery, natural and historic objects, and wildlife, leaving them "unimpaired for the enjoyment of future generations."

Originally, humanistic goals such as nostalgia, monumentalism, and the protection of romantic landscapes (Vale 1988) were more fundamental reasons for park and wilderness designation than the ecological goals that have received increasing attention since at least the mid-twentieth century. The park and wilderness movements were largely about passing a legacy of natural and cultural heritage to succeeding generations. Preserving natural conditions in protected areas was widely conceived to be the means for ensuring that future conditions would be faithful to those of the past. Therefore, naturalness often has been equated with the degree to which current conditions are true to the past. As noted in Chapter 2, historical fidelity is one of three primary meanings of naturalness, along with lack of human effect and freedom from intentional human control.

Since the mid-twentieth century, maintaining historical fidelity also has become an important strategy for ecosystem sustainability. Where ecosystems have been degraded, restoration of past conditions is a common objective of interventions designed to conserve biodiversity. As with each management objective discussed in the second part of this book, the pursuit of historical fidelity has promise but also presents challenges. As noted in earlier chapters, the dynamism of ecosystems and the pervasiveness of anthropogenic change make management for historical fidelity more challenging than originally envisioned. Constant change means that maintaining historical fidelity will become increasingly difficult over time. Even more important, if the future is characterized by rapid climate change and no-analog conditions, restoration of past conditions may not be a sustainable option (Harris et al. 2006). Maintaining a high degree of historical fidelity would increasingly be at odds with protecting certain aspects of biodiversity and increasing resilience in protected area ecosystems.

In this chapter, as our opposing epigraphs suggest, we attempt to navigate a narrow divide, both celebrating the value of historical fidelity and expressing concern about its inappropriate use. We define historical fidelity and describe why it is an important management emphasis in protected areas. We explore challenges to its application, particularly ecosystem dynamics, uncertainty about past and future conditions, and the implications of global climate change. We describe how to manage for historical fidelity and articulate ways historical information should and should not be used. We conclude by advocating a balance between the opportunities and challenges of this approach.

Defining Historical Fidelity

The primary definition of the word *fidelity* is "faithfulness to or accuracy in the reproduction of something." We speak of the fidelity of a sound recording when it is a faithful and accurate reproduction of the original performance. So *historical fidelity* implies being true to the past. When protected area managers intervene in ecosystem processes, one of a number of outcomes they might seek is an ecosystem with a high degree of historical fidelity. Such interventions can appropriately be called restorations because they involve restoring conditions to approximations of the past, thereby maintaining legacy, heritage, and authenticity—the historicity of a place (Higgs 2003).

It is common to describe ecosystems in terms of their composition, structure, and function. As Aplet and Keeton (1999) articulate, composition consists of the physical, chemical, and biological objects that make up the ecosystem, including the individual species and their abundances. Structure is the vertical and horizontal distribution of these objects in space, as in the vertical layers of vegetation in a forest or the size and distribution of vegetation patches of differing age. Function consists of the processes that affect ecosystems and through which structure and composition interact. These include both internal processes, such as nutrient cycling and predation, and external processes, many of which are thought of as disturbances, such as fire and flooding.

An ecosystem with high historical fidelity ought to be compositionally, structurally, and functionally similar to past ecosystems found at that place. Each of these ecosystem attributes is important. In comparison to ecological integrity and resilience, composition and structure are more central to historical fidelity. We are not arguing that process is not important. But it is the composition and structure of an ecosystem that typically convey the fidelity of a restoration and give humans an important sense of connection to the past. Moreover, historic fidelity often emphasizes the species that were historically most abundant, iconic, or charismatic, not necessarily the keystone species, the species that are least redundant, or the species most critical to ecosystem function.

When considering historical fidelity as an objective, it is important to view fidelity in a relative rather than absolute sense. Producing a replica of a Stradivarius violin, one of the most highly prized professional musical instruments, is a matter of degree. One approach is to mimic as closely as possible the structure of the instrument by using the same woods, glues, and finishes. Another is to match the feel and sound of the instrument, which may or may not be the same as mimicking the structure of the original. That an artisan may go to great lengths to create a reproduction using similar woods but opt for a slightly different formulation of finish does not mean the work is unfaithful; it means instead that the work approached but did not meet the most rigorous standards for fidelity.

The same is true with ecosystems. Although *historical fidelity* implies an accurate reproduction of the past, no restoration at the spatial scales relevant to protected area ecosystems can be exact. Instead, restorations should be approximations, the precision of which is likely to be variable. What is important is that the natural heritage that comes from the past is carried forward to the present and on into the future. Having said that, there is certainly some point at which the tie to the past is so faint that little fidelity remains.

Reasons for Pursuing Historical Fidelity

There are many reasons for ensuring that the outcomes of ecosystem interventions have some degree of historical fidelity. Some reasons relate to the humanistic goals that were arguably the initial reasons parks and wilderness areas were set aside. Others relate to ecological goals that have emerged more recently and, in at least some places, gained precedence. One of the reasons to sustain past conditions—a reason so obvious as to be almost tautological—is that preservation of park and wilderness ecosystems, their elements and processes, is itself a fundamental goal of management. Certainly no management goal is more fundamental at Joshua Tree National Park or Sequoia National Park, for example, than preservation of the Joshua trees (*Yucca brevifolia*) and giant sequoias (*Sequoiadendron giganteum*) for which the parks were established. But beyond the icons, the lesser species of flora, the fauna, the abiotic environment, and the processes that link and sustain them are all of import. They are interlinked and interdependent. An emphasis on historical fidelity is a means of keeping all the parts of well-functioning ecosystems.

Cultural Reasons to Maintain or Restore Historical Fidelity

There are many significant cultural reasons for attending to history in order to understand ecosystems, and these qualities amplify the ecological value of historical knowledge. We propose that these reasons fall into three categories: nostalgia, place, and time depth. Nostalgia is a bittersweet longing for the past (Higgs 2003). Such longing is never unvarnished in the sense that the past is conclusively better. Memory selectively recalls the qualities that were favorable and pushes the negative aside. Scratch the surface and you will see that returning to one's fond childhood experiences, for example, might be underlain by family conflict that appears only later. As much as anything, this represents a quest for simpler lives in less hurried times. The naiveté in such longing is what lends nostalgia a superficial connotation.

When it comes to nostalgia for ecosystems, the appeal of past systems is that they provide models of nature that are more consistent with affection for wildness: standing on the Great Plains in the 1860s watching a horizon-to-horizon herd of bison, seeing the sky darken with flights of the now-extinct passenger pigeon, walking down the final slope to the Pacific Ocean in northern California through untrammeled old-growth forests. These and other unattainable experiences animate the desire to intervene in ways that create approximations of the conditions.

Place is a second reason why historical fidelity is important. A sense of place is created through the telling of stories, whether lyrical or scientific. Through stories, personal and collective meaning is attached to particular locations. At an individual level, one can feel this connection through the patterns of daily activities—a special trail along which one walks or the location of a series of long-term ecological experiments. At a collective level, people vest certain locations with deep significance. National parks are such places. They are remarkable in their own right, but they are given grace through activities and stories, and over time they become more than just features; they emerge as places. The fabled geysers of Yellowstone are perhaps most significant in this respect. As icons of wilderness, the geysers have become cultural reference points. Surely as they are ecological and geophysical features, so too are they now cultural ones.

Places acquire significance because of their connection to the past, as when one returns to the places of childhood to reinforce family memories or recollect events that helped shape personal identity. A sense of place does not require direct personal connection to a particular location. As Higgs (2003: 152) suggests, "Once we understand that place matters, in other words that we have found within our own lives the qualities that make a place, it is easier to regard these qualities in other places." The act of intervening in ecosystems is motivated in part by the desire to create connections that nurture a sense of place, and the conservation and preservation of ecosystems are similarly motivated by a desire to maintain places.

Finally, ecosystems perceived to have remained the same for long periods of time, which have not experienced recent disruption or human simplification, have time depth. An old-growth forest, for example, or an untilled grassland ecosystem possesses a rarity born of profound historical continuity, providing humans with an opportunity to glimpse a past that seems otherwise mysterious and unknowable. Climate change threatens such continuity by pushing ecosystems outside the range of historical conditions. If new conditions develop slowly, it may be possible to incorporate such gradual change into our collective idea of continuity and rarity. However, should the species assembly fundamentally change, and quickly, then our appreciation of these ecosystems may diminish.

Together, nostalgia, place, and time depth constitute historicity, or the condition of being historical (Higgs 2003). Historicity is important because people are joined to ecosystems through emotional connections, cultural ties, and moral values. A final human value of pursuing historical fidelity is the constraint that comes from gathering information and considering the past. The pressure of rapid environmental change generates swift responses. Operating at a vast scale under tight timelines, interventions will need some resistance. One means for providing necessary constraint is the exercise of gathering historical information. The practice of understanding the trajectories of an ecosystem increases respect for the complexity of ecosystems and allows a pause before we dig in.

Ecological Reasons to Maintain or Restore Historical Fidelity

Maintaining historical fidelity may also be important to the protection of critical ecological values. A fundamental premise of conservation biology is that over evolutionary time periods organisms have adapted to landscape conditions and disturbance events of the past. This suggests that the potential for survival of these organisms will be reduced if future environmental conditions deviate too much from those of the past. Consequently, restoration of past conditions has often been advanced as a means of ensuring sustainability. For example, Manley et al. (1995: xiii) assert that "restoring and maintaining landscape conditions within distributions that organisms have adapted to over evolutionary time is the management approach most likely to produce sustainable ecosystems." According to this theory, then, managing for historical fidelity is a strategy for protecting biotic diversity and the resilience of protected area ecosystems. This has led managers to restore the structure of forested ecosystems, where the absence of fire converted park-like forests to dense tangles of undergrowth (Figure 8.1).

The scientific basis for these assumptions comes from various fields, particularly from disturbance ecology. Karr and Freemark (1985) argue

FIGURE 8.1. Fire and other interventions can be used to restore the widely spaced, open-grown structure of pine forests that were common before the era of fire suppression. This forest near Miquel Meadow in Yosemite National Park was prescribed burned in 1976 to restore historic conditions and reburned by wildfire in 1996. (Photo taken in 2002 by Jan van Wagtendonk)

that ensuring that disturbance regimes continue to operate as they have in the past is crucial to the preservation of genetic, population, and assemblage dynamics. Numerous studies have documented loss of species and adverse ecosystem changes in places where "natural" disturbance regimes and habitats have been substantially altered (Swanson et al. 1994). Landres et al. (1999: 1180) observe that "contemporary anthropogenic change may diminish the viability of many species adapted to past or historical conditions and processes," that "approximating historical conditions provides a coarse-filter management strategy that is likely to sustain the viability of diverse species, even those for which we know little about," and that "because of limited understanding about ecosystems, approximating past conditions offers one of the best means for predicting and reducing impacts to present-day ecosystems."

Recently, however, for reasons explored in Chapters 3 and 4, many of these assumptions and premises have been questioned (Millar and Brubaker 2006). Although we remain convinced that there is a place for historical fidelity in protected area stewardship, it is important to understand the implications of doing so—to consider the ecological appropriateness and feasibility of managing for historical fidelity.

Challenges to Managing for Historical Fidelity

One concern often voiced about historical fidelity is that recreating the past ignores the inherent dynamism of ecosystems. The assumption, originally held by many ecologists and still held by many laypersons, that nature is stable, static, and in balance has been replaced over the past half century by a view of nature in flux (Pickett et al. 1992). Protected area policies and perspectives on historical fidelity are slowly evolving in response to this shift.

When the influential Leopold report (1963), reviewing management policies of the National Park Service, recommended that the goal of interventions should be to recreate "the ecologic scene as viewed by the first European visitors," it caused confusion. The report seemingly called for maintenance of static conditions, freezing environmental conditions at a previous stage. When asked to clarify his intentions, however, Leopold stated that it was critically important to allow the free play of dynamic ecosystem processes (Rydell 1998). Today, National Park Service Management Policies (NPS 2006: 4.1) recognize that "natural change" is an "integral part of the functioning of natural ecosystems" and that "natural processes and species are evolving, and the Service will allow this evolution to continue."

The concept of historical range of variability was developed to recognize the importance of disturbance and to account for and accommodate the inherent dynamics of ecosystems (Egan and Howell 2001). Although it is sometimes used as a metric and used prescriptively, we are most comfortable using the concept of historical range of variability as a descriptor of both the magnitude of variability in ecosystem properties over time and the historical bounds to those properties. The idea is that ecosystems have always changed over time, responding to disturbance, but always within limits. A dynamic view of recreating the past demands that management allow for change in response to disturbance while ensuring that conditions are not pushed beyond the bounds defined by the historical range of variability. In a Rocky Mountain forest, for example, certain changes in species, abundances, and densities would be acceptable; other shifts would not be. As Pickett et al. (1992: 82) conclude, "nature has functional, historical, and evolutionary limits. Nature has a range of ways to be, but there is a limit to those ways, and therefore human changes must be within those limits."

A related idea is that we can more appropriately incorporate ecosystem dynamism into restoration by understanding and restoring ecological trajectories. When degradation occurs, ecosystem conditions change, which in turn alters the present and future trajectories of the system. Rather than recreate the specific conditions that were present at a particular time, an alternative management goal might be to intervene so that trajectories become more consistent with those of the past. This bears some similarities to what Millar et al. (2007) call realignment.

Although some concerns about historical fidelity can be alleviated if we adopt a relative rather than absolute perspective on the term, advance the concept of historical range of variability, and restore ecological trajectories rather than specific conditions, other concerns cannot. Problems with the feasibility of managing for historical fidelity remain. Given the specter of global change, maintaining and restoring historical fidelity will increasingly be a Sisyphean task. Restorations are likely to entail substantial ongoing management intervention to keep ecosystems from adjusting to the new conditions of the future. Costs may be prohibitive. Ecosystems will continue to be assaulted by such stressors as invasive species and pollution and may have lost key natural disturbance processes or even keystone species. As noted in the next section, data needed to understand past ecosystems may be missing or misleading.

Of at least as much concern is that, as explored in Chapter 4, the directional nature of climate change suggests that the abiotic conditions of the future may have no analog. If so, efforts to sustain historical fidelity might reduce the sustainability and resilience of ecosystems, jeopardizing the values managers seek to protect and preserve. All this suggests that although historical fidelity is an important protected area value, managing to maintain or restore past conditions will not be possible everywhere. Moreover, even where it is possible to maintain historical fidelity, doing so will often not be desirable or appropriate.

Using Historical Data in Ecological Restorations

Historical information about past ecosystems is important to ecological restoration, regardless of the degree of historical fidelity that is desired. Data on past conditions and processes reveal the key underpinnings of ecological systems, suggest appropriate trajectories, and provide insight into important ecosystem drivers. They provide one of several important sources of information that can be used to develop an understanding of reference conditions (White and Walker 1997). Among other things, reference conditions are used, with varying degrees of precision, to set restoration goals and targets, providing guidance for interventions and measures of success. It is for this latter purpose that concerns have been raised about using historical data too prescriptively and precisely, particularly given the implications of rapid climate change (Landres et al. 1999; Millar and Woolfenden 1999).

A wide variety of approaches to collecting, interpreting, and applying historical ecological data exist. Egan and Howell (2001: 15) differentiate between "culturally-derived evidence, such as documents, maps, photographs, oral history and Native American land management practices" and "biological (earth-relic) records, including standing woodlots, tree rings, pollen, packrat middens, opal phytoliths, animal remains, and records of changes in soil and hydrology." Given these diverse sources of information, Egan and Howell (2001: 14) recommend that practitioners use a "multiscale, multisource, cross-referential historical analysis that is compared to contemporary data to set reference conditions" and remain open to new information and flexible regarding use of data.

Problems with Historical Data

Two problems with historical data are incompleteness of information about the past and the time and space scale dependence of reference information (Egan and Howell 2001). Incomplete information is problematic for many reasons, particularly because it can lead to interventions that restore a high degree of historical fidelity for ecosystem attributes for which there is substantial historical data but low fidelity for other attributes. The fact that historical data on the structure of tree species and characteristics of fire processes are more abundant than historical data on understory vegetation characteristics and nutrient cycling processes may partially explain why stand structure and fire have received more attention in restoration than other attributes. One should not assume that precise replication of certain ecosystem attributes, such as stand structure or fire frequency, will result in restorations with a high degree of overall fidelity.

As White and Walker (1997: 338) note, "all reference information is inherently time- and space-based." Any characterization of historical range of variability will be valid only for a selected time period and geographic extent (Landres et al. 1999). Narrowing the period of time and the spatial scale to be considered adds precision but introduces other concerns. Resultant conclusions will vary greatly depending on the narrow period of time considered relevant, a decision that often is highly arbitrary. At the other extreme, if very large temporal and spatial scales are used, the range of variation is so great that almost any condition is within appropriate bounds.

Appropriate Use of Historical Data

To address these problems, it is helpful to use as many sources of information as possible and not be overly precise in the use of historical data (Millar and Woolfenden 1999). In other words, it is helpful to use historical data more as descriptive information that provides insight into possibilities and limitations rather than as prescriptive targets or articulations of what ought to be. Although such admonitions work for interventions that are not seeking a high degree of historical fidelity, they are less useful where a high degree of fidelity is desired. In such situations, more useful cautions might be that such interventions are likely to entail perpetual manipulation and that high historical fidelity probably comes at some cost to ecological integrity and resilience.

Despite admonitions about the prescriptive use of historical data, the reality of global change elevates the importance of historical data as a means of informing management response to change. As Swetnam et al. (1999: 1201) observe, knowing history is important "because it informs us about what is possible within the context of certain locations and times, and it places current conditions into this context," as well as providing information "about the potential causes of change and the historical pathways that brought ecosystems to their current condition." Historical data provide information about past conditions, their variability, and how ecological systems have responded to change. A good example is recent work documenting how small mammals have responded to a century of climate change across a 3,000-meter elevation gradient in Yosemite National Park. Moritz et al. (2008) report that half of twenty-eight species monitored showed substantial upward changes in elevation limits. Ranges typically expanded upward for low-elevation species and contracted upward for high-elevation species, although individual species responded idiosyncratically. The research identified several species of concern but concluded that species diversity has changed little, thanks to effective protection of a large-scale elevational gradient.

Historical data are critical in understanding drivers and mechanistic controls of ecosystem processes. For example, such data can resolve divergent interpretations regarding whether fire regimes are driven by seasonal to decadal climatic variations or by local ecological phenomena, such as patterns of vegetation and fuel. A paleoecological perspective indicates that both are important controls of fire regimes (Gavin et al. 2007). Historical data contribute to a better understanding of feedbacks between changes in land cover and regional climate and to improvement of ecological models (Willard and Cronin 2007). Such data can contribute to resolution of stewardship issues such as biological invasions by providing a longer-term perspective on the distinction between what is native and what is not (Willis and Birks 2006). Finally, they can provide insights into thorny questions regarding ecological thresholds, points beyond which management intervention is needed to avoid abrupt, perhaps catastrophic changes in ecosystem quality.

Incorporating Historical Fidelity as a Goal in Ecological Interventions

Arguably the original goal of protected area stewardship, maintenance of historical fidelity remains an important goal today, despite challenges posed by ecosystem dynamism and the pace of directional climatic and other environmental changes. These challenges suggest the need to view historical fidelity in a relative rather than absolute sense, seldom attempting a precise restoration of past conditions. They also suggest the need to emphasize historical fidelity more in certain situations than in others.

Maintaining a high degree of historical fidelity is akin to paddling upstream into the strong current of climate change. In the context of fire restoration, Limerick (2008: 45–46) expresses this challenge as follows:

> Wildland fire presents a prime opportunity to recalibrate the setting on humility and confidence. What are our actual powers? Where does confidence cross into hubris? And if humility needed more to recommend it, global climate change presents precisely that recommendation. Even as we explore the prospect of restoring natural fire to the West's forests, a changing climate makes it impossible to recapture the circumstances of the past, leaving the concept of restoration floating free of an identifiable baseline, an original state to recapture and recreate. If there is anything left to the notion of the forests as a great laboratory, then climate change has made them a laboratory where someone keeps fiddling with the thermostat.

As will be discussed further in Chapter 9, maintaining historical fidelity may require substantial resources and ongoing effort and may reduce ecosystem resilience. Consequently, attempts to emphasize historical fidelity are most likely to be successful where the geographic size of the proposed intervention is small. A historically accurate restoration of a single campsite, for example, is more likely to be successful than restoration of thousands of hectares of piñon–juniper woodland. However, even for small-scale restorations, much of the apparent fidelity may be an illusion if landscape linkages and context are missing where degraded lands surround the restoration. Interventions that emphasize historical fidelity are also more likely to be successful where the objects being restored are less sensitive to change or have been less strongly influenced by directional change. Finally, the importance of emphasizing historical fidelity increases as the rarity and value of the objects of restoration increase. For example, historical fidelity is likely to be more of an emphasis where Joshua tree woodlands and sequoia forests have been degraded than in adjacent communities of less iconic value. Such remnant ecosystems are so redolent with cultural values that heroic interventions will probably be used to maintain historical processes or trajectories.

One example of an intervention that emphasizes historical fidelity is the restoration of 25 hectares of giant sequoia–mixed conifer forest in the Giant Forest Grove of Sequoia National Park. Visitor facilities, including a gas station, a market, hundreds of cabins, campgrounds, and a sewage treatment plant have been removed (Demetry 1998). Because these developments created gaps in the forest, restoration planners decided to use fire-caused gaps as a model for desired restoration outcomes. Specifically, they attempted to restore forest composition and structure such that they mimicked the effects of fire 10 years later. Scientists collected data on the current characteristics of fire-caused gaps in giant sequoia–mixed conifer forest, particularly the horizontal and vertical distribution of woody plant species (Demetry 1998). Based on these data, a prescription was developed for each development-caused gap. Prescriptions specified species composition, density, and spatial patterns within the range of variability found in fire-caused gaps. Treatments varying in intensity were experimentally applied to identify the minimal level of intervention needed to approximate the reference conditions (Demetry 1998). As a coda to this example, illustrative of how perspectives on historical fidelity have changed in the face of climate change, some proponents of this restoration effort now wonder whether it would have been better to use lower-elevation species rather than the species that lived there in the past (Nate Stephenson, personal communication, 2009).

Historical Fidelity and Other Stewardship Goals

We began this chapter celebrating historical fidelity as one of the most traditionally important purposes and values for parks and protected areas. We countered this notion by exploring potential problems with maintaining historical fidelity. We noted that historical fidelity has traditionally been promoted as a strategy for ecosystem sustainability but then voiced concern that, in the face of climate change, restoration of past conditions might lead to loss of resilience. These seemingly contradictory passages might leave the reader wondering where we stand on historical fidelity. We believe that historical fidelity is an important management goal in some places and that adverse outcomes are likely if history is ignored. However, given the pace of global change, interventions that seek a high degree of historical fidelity should be more the exception than the rule in parks and wilderness.

A central thesis of this book is that a diversity of management goals and strategies, including autonomous nature, historical fidelity, ecological integrity, and resilience, must be applied in different parts of individual protected areas and across a protected area system. Planned diversity will optimize the aggregate value of parks and wilderness. It will spread risk and hedge bets in the context of uncertainty and novel stressors, most notably climate change. Thus, we imagine that some interventions will emphasize historical fidelity, as is the case in the example from Sequoia National Park.

Diversity could be enhanced further if we manage some places such that historical fidelity, ecological integrity, resilience, and perhaps even autonomous nature are compromised to equal degrees. That is, the desired outcome in these places would be a modest degree of each management emphasis. Perhaps certain elements of past ecosystems would be sustained while others would be abandoned, if doing so was deemed to enhance long-term resilience. Complementarity with other approaches might also be furthered by the use of historical fidelity to constrain the other stewardship approaches explored in this book as well as to increase their success. For example, historical data are likely to provide insights about ecosystem function that make efforts to promote ecological integrity more successful, and interventions to promote resilience are likely to be more appropriate if they are built around elements that are as true to history as possible.

BOX 8.1. MANAGING FOR HISTORICAL FIDELITY

- Restoring historical fidelity to ecosystems degraded by anthropogenic change is one of several goals or management emphases for ecosystem interventions.
- An emphasis on historical fidelity implies a faithful restoration of past conditions. Although historical processes are important, fidelity to past composition and structure is essential (and thus differentiates this approach somewhat from ecological integrity and resilience).
- Historical fidelity is critical to certain humanistic park and wilderness purposes, particularly nostalgic connections to place and the past, and can contribute to the conservation of biotic diversity.
- Attempts to maintain past conditions are constrained by both the inherent dynamism of ecosystems and the pace of recent directional climatic change.
- Historical ecological data are better treated as being informative rather than prescriptive.
- Historical fidelity should be viewed as relative rather than absolute. Higher degrees of fidelity are appropriate where interventions are small, rare and valued objects of preservation are at risk, and the magnitude of unavoidable directional change is small.
- In addition to being a goal in its own, a concern for historical fidelity can constrain the specific actions taken to promote ecological integrity and resilience (e.g., by giving preference to historic rather than novel elements of biodiversity).

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