In Focus: Policy

Climate change policy challenges in the National Park Service

By Susan Johnson and Jeff Mow

THE SHENANDOAH SALAMANDER

(*Plethodon shenandoah*) lives only in a 6 km² (2.3 mi²), high-elevation area in Shenandoah National Park, Virginia (fig. 1). Survival of this federally endangered species depends on unique habitat conditions of this mountaintop island (NPS 2010a). Moisture and temperature changes projected to occur with climate change would adversely impact the already small salamander population (NPS 2010a). Park managers[1] must decide what action, if any, is warranted to "save" the species in the face of climate change.

Abstract

We examine and provide a brief overview of the applicability of NPS management policies to climate change in parks. Climate change impacts to park resources should not be considered "impairment" for purposes of management action; rather managers should focus on preventing impairment from in-park activities and engage in cooperative conservation to address impacts from external sources. To maintain resources in a "natural" condition remains a broad management goal, but it is not possible for managers to shield or protect park resources from climate change impacts. We identify some broad policy questions, and stress the importance of consistency in policy interpretations within the context of climate change and the need for a deliberate approach to stewardship action. Policy interpretations and potential changes, as well as stewardship approaches to address climate change, continue to evolve.

Key words: climate change, impairment, National Park Service, natural condition, policy

Service-wide, new problems such as this will face NPS managers as the rate of climate change accelerates and associated impacts become increasingly evident. In many coastal areas, for example, rising sea level and changes in storm frequencies will challenge managers' ability to maintain infrastructure and park natural and cultural resources. Iconic values and species will not be immune: glaciers, Joshua trees, and giant sequoias are already affected, or are predicted to be affected. How the National Park Service will respond, what response is even possible, and how we should prioritize our duties are questions whose answers must be supported by the best science possible. The answers, however, are ultimately policy questions that must be carefully analyzed in the context of our mission.

NPS Director Jon Jarvis described climate change as "fundamentally the greatest threat to the integrity of our national parks that we have ever experienced" (NPS 2010b). The NPS *Management Policies 2006* (MPs, chapter 4, introduction) recognize that ecosystems are dynamic and subject to continual change (NPS 2006). At the same time, these policies presume a context of relatively stable environmental conditions and somewhat predictable, gradual changes. This allows our paradigms for resource protection, park planning, and natural and cultural resources management to rely on historical conditions and the historical range of natural variability as a frame of reference. However, with climate change continuing to create novel conditions and associated, unprecedented impacts on our resources, the past is no longer a reliable guide for predicting the future. Consequently, current policy may require clarification or "evolution" to guide decision makers and best conserve NPS resources and the national heritage they encompass.

The policy challenge

The NPS *Management Policies 2006* "set the framework and provide direction for all management decisions. This direction may be general or specific; it may prescribe the process through which decisions are made, how an action is to be accomplished, or the results to be achieved" (NPS 2006).

Current management policies direct that decisions use the best available science, carefully considering other pertinent factors and public input, and be transparent via a complete administrative record. Policy does not require what is impossible, economically infeasible, or likely ineffectual.[2] To accommodate site-specific variables, management policies tend to be flexible and broad. They are also practically silent with respect to climate change, mentioning the term "climate change" only twice[3] and providing minimal, if any, guidance for prioritization or triage for park resources affected by climate change.

[1] The park is working with the U.S. Geological Survey, the U.S. Fish and Wildlife Service, the Smithsonian Institution, the University of Virginia, and Towson University on this case.

[2] *MP* section 1.4.3 directs managers to minimize adverse impacts "to the greatest extent practicable."

[3] "Earth's climate has changed throughout history. Although national parks are intended to be naturally evolving places that conserve our natural and cultural heritage for generations to come, accelerated climate change may significantly alter park ecosystems. Thus, parks containing significant natural resources will gather and maintain baseline climatological data for reference" (*MP* 4.7.2). Also, NPS interpreters and educators should take opportunities to explain to visitors and other audiences "the influence of global climate change" on the parks (*MP* 7.5.1).

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Figure 1. The Shenandoah salamander is an endangered species whose high-elevation habitat may become less suitable for population persistence under future climate change. The U.S. Geological Survey, the National Park Service, the Smithsonian Institution, and the University of Virginia are cooperatively developing optimal strategies for protection of the species.

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Lack of specific guidance regarding resource protection in the context of climate change can promote decision paralysis at times that management creativity and innovation are most needed. In addition to the need for innovative solutions, however, we need Service-wide consistency in interpreting the NPS mission and mandates and complying with relevant legal requirements.

A growing body of literature aggregates some traditional conservation approaches in new ways, suggesting management strategies to adapt to climate change. Many authors emphasize strategies to enhance resilience of existing ecosystems, such as reducing stressors, combating invasive species, and preserving biodiversity, all of which fall under current NPS objectives. We expect, however, that climate change will eventually push some areas to new ecosystem states—changing species associations, community structures, habitat types, and ecosystem functions—in which new management challenges prevail.

Furthermore, in responding to climate change by working with state and federal agencies, tribes, and other partners through the U.S. Department of the Interior's Landscape Conservation Cooperatives, we expect that potential landscape-scale response strategies will include new approaches difficult for parks to consider without policy clarification. For success in the future, park managers need guidance on how to manage ecosystem change and transition.

Upholding our mission into the future

Given uncertainties of future climate change impacts, the diverse array of areas within NPS responsibility, and the importance of learning through adaptive management, adaptation strategies applied in parks should be developed and implemented by design rather than haphazardly. Creativity, innovation, and flexibility at the park level must be balanced with thoughtful and coordinated Service-wide consistency, again highlighting the need for more specific policy guidance.

The need to provide additional policy guidance to field areas is accompanied by broader, complex questions regarding agency mission and management goals, interpreted within the context of climate change. For example, as a premier conservation agency:

- How should the National Park Service define management goals in an era of climate change as our ability to foster and conserve "natural conditions" becomes impractical?
- How do we best manage the potential transition of ecosystems and conserve resources for which we are specifically responsible?
- How do we address the inevitable movement or loss of species from park units?
- How can management policies guide park managers in making decisions despite heightened uncertainty?

Upholding our mission likely requires updating interpretations of policy, mandates, and approaches to resource stewardship.[4] As it has on numerous occasions since being established in 1916, the National Park Service must reexamine its

[4] The MPs will be revised at appropriate intervals to … respond to new … understandings of park resources and the factors that affect them (introduction). Director's Orders can clarify or amend current policy to avoid the need to revise *MP*s.

conservation principles, this time against a background of climate change.

NPS climate change response

The NPS Climate Change Response Strategy, developed at the request of the NPS director (2010b), provides an initial road map for our agency and employees to address impacts of climate change. It describes general goals and objectives under four integrated components: *science*, *adaptation*, *mitigation*, and *communication*. The National Park Service will collaborate with partners to identify and monitor climate change effects in parks and to apply accurate and relevant science to management and policy decisions. We will adapt to a changing climate by developing feasible and actionable scenarios and creating flexible frameworks to manage impacts. We will reduce the carbon footprint of NPS activities through energy-efficient and sustainable practices. Finally, through clear, directed communication, the Service will raise employees' and the public's awareness of climate change implications and provide inspiration to address this challenge.

The strategy calls for (but does not supply) an overarching legal and policy framework to ensure the legality, consistency, and appropriateness of management decisions. With establishment of the NPS Climate Change Response Program (CCRP) in FY 2010, legal and policy issues associated with climate change response activities became a focus. The authors of this article lead a Service-wide policy working group that focuses on legal and policy implications of climate change. The group helps frame legal and policy issues, provides initial guidance on specific aspects of climate change adaptation and mitigation, and conducts case study analyses to help develop a framework for management decisions involving climate change.

The Organic Act, the impairment standard, and future natural resource conditions

The mission of the National Park Service in managing parks is familiar:

> to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. (16 U.S.C. sec. 1)

There have been several efforts both within and outside of the Service to consider our mission as stated in the Organic Act (above) and its relevance in the face of climate change. How do we preserve resources in a "natural" and "unimpaired" condition when significant changes are predicted to occur in many landscapes? Amending the Organic Act is not desirable, feasible, or necessary. The Service has historically been afforded significant deference in defining objectives to carry out its mission. Current management policy provisions discuss potential impairment and response actions from *in-park* activities and sources (NPS 2006, sections 1.4.4, 1.4.7.1). Regarding potential impairment from external sources, managers are directed to work cooperatively with others (NPS 2006, sections 1.4.5, 1.6). Managers are not held accountable for external impacts, however, in the same sense as for impacts from in-park activities.

Additionally, climate change does not negate existing NPS policy direction. In fact the context of resource management remains consistent—that is, resource managers realize that we cannot prevent all impacts to resources. However, we can help guide changes in the near term by emphasizing management goals such as resiliency, removal of external stressors, and maintaining biodiversity and disturbance regimes such that ecosystem structures and processes remain as healthy and "natural" as possible. NPS policy already calls for these actions.

Current management policies define "natural condition" as "the condition of resources that would occur in the absence of human domination over the landscape" (NPS 2006, chapter 4). Chapter 4 of the management policies alone has more than 270 references to the term "natural." Extensive literature and ongoing discussion debate the role of naturalness with or without the context of climate change, and we expect the conversation to continue well into the future. "Natural" in *Management Policies 2006*, out of practical and realistic necessity, refers to a broad goal of preserving protected areas free from anthropogenic impacts. The climate change we are currently experiencing is primarily caused by anthropogenic emissions on a global scale (IPCC 2007). Though we can reduce our carbon footprint within our parks, reducing all harmful greenhouse gas emissions and altering the current temperature trajectory are beyond NPS control.

Managers should recognize that while the impacts from climate change are not "natural" in the traditional sense, and past conditions are not an effective guide for desired future conditions, they should be diligent in preserving resources unimpaired from activities over which they have control. Additionally, managers should commit fully to cooperative conservation and civic engagement to understand, mitigate where possible, and adapt to impacts from external forces to the extent practicable. The relationship between climate change and other anthropogenic effects on resources is complex—potentially synergistic—and the ability to isolate the primary cause of a specific impact may be limited or impossible. But the bottom-line message is, managers cannot, and are not expected to, prevent impairment from global climate change.

Figure 2. The island scrub jay is found only on Santa Cruz Island, the largest of the California Channel Islands. This insular species is thought to have been isolated from its closest relative, the western scrub jay, approximately 200,000 years ago. It is the only bird species in the continental United States never to have ranged to the mainland.

Policy does not require what is impossible, economically infeasible, or likely ineffectual.

An example of how our managers must cope with climate change may be found at Channel Islands National Park, where the island scrub jay (*Aphelocoma insularis*) is a species of bird endemic to Santa Cruz Island (fig. 2). Long-term viability of this species—already with a small population size and insular range—is at stake from emerging disease and climate change threats of habitat stress and fires (Morrison et al. Accepted). Park managers wrestle with opportunities to identify and manage threats, apply principles of conservation best practices, and explore possible actions that may be more manipulative and intrusive than what the Service typically undertakes. While no decisions are imminent and many uncertainties still prevail, possible actions include captive propagation, vaccination, instituting biosecurity measures, and establishing a second free-living population on Santa Rosa Island. Such examples, if found to be consistent with evolving resource policy, could become an example of strategic climate change adaptation.

The CCRP Policy Working Group will continue to analyze the case studies at both Channel Islands and Shenandoah national parks, using these case studies and others to help develop a framework for decision making on resource issues involving climate change. The group has a list of other case studies for analysis and invites submission of additional issues and situations that park managers may face as a result of climate change impacts. Please contact the authors if you should have such a case study.

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