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From non-static vignettes to unprecedented change: The U.S. National Park System, climate impacts and animal dispersal

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ABSTRACT

US Federal land management agencies and the public are currently facing a challenge unlike any other in history: climate change. In the case of the US National Park Service (NPS), agency action to cope with the problem began in earnest in January 2009. The objective of this review is to provide an assessment of NPS policy statements, plans and on-ground activity for the purpose of reducing the future biological impacts of climate change on US National Park System biota. I looked at Presidential initiatives, Secretarial orders, and agency planning documents, policy statements, reports, and Web sites. I also reviewed the scientific literature. Based on my work experience with the agency, I also illustrate how values influenced NPS natural resources policy evolution. One critical piece of the initiatives toolbox is not being given adequate emphasis: land use planning. Without effective land use planning, some terrestrial park biota will find it difficult or impossible to move to higher latitude and cooler habitat in response to changes in atmospheric temperature and moisture. One technical problem is predicting where to provide corridors and of what dimensions, or preferably a more permeable regional landscape, so certain species can navigate around or through developed land. In many cases, the choices remaining are few since much adjacent natural land is so developed as to be realistically beyond reclamation. The implications of not planning for landscape permeability is that many terrestrial, non-volant park species will likely vanish in a developed, human-dominated mortality sink. Unfortunately, land use planning is a politically volatile topic that federal agencies avoid. American society nevertheless will be forced to deal with the inevitable tension between private land rights and the need to allow protected area biota to move.

1. Introduction

As of April 2013, the U.S. National Park System contained 401 units encompassing 34.16 million ha of land-32.4 million ha of federal land and 1.62 million ha of private and other ownership land. The units range in size from 0.4 ha to 5.26 million ha. Almost two-thirds of the acreage resides in Alaska. There are 20 different designations or titles, with 59 units called national parks. Other titles include national historic sites (78), national monuments (78), national historical parks (46), national memorials (29), national recreation areas (18), and national preserves (18). Yellowstone National Park, created in 1872, was the first national park in the world.

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See National Park Service (2009) for more details about the U.S. National Park System.

Federal agencies now need to adjust their land management guidance to address climate change (Kostyack et al., 2011). Three key U.S. land management agencies, the National Park Service (NPS), the US Fish and Wildlife Service (USFWS) and the US Forest Service (USFS), have already begun this task (Defenders of Wildlife, 2010). The following review and analysis focuses only on NPS efforts. My objective is to assess ongoing NPS initiatives for climate change and, as possible, offer advice on how to better plan for the biological impacts facing many terrestrial mammals in units of the US National Park System.

2. Methods

I reviewed all National Park System pertinent documents that dealt with mitigating the effects of climate change that were produced during the Obama administration (since January 20, 2009). For example, an Obama administration Presidential initiative report, Secretary of the Interior orders, some other Department or bureau reports (USFWS and USFS), and NPS materials like policy statements, strategies, plans, memos, and Web sites. I read dozens of scientific papers that dealt with habitat corridors. My own work experience with NPS helped in knowing what to look for and where. That background was also valuable in outlining key values and ideas central to the evolution of NPS natural resources policy. One NPS newsletter admonished ''encouraging open dialogue'' about planning for climate change (National Park Service, 2012a). This paper is a contribution stemming from that invitation. Before jumping into this task in Section 5, some historical background information on NPS natural resources policy should be useful.

3. Defining and interpreting policy

3.1. *Defining policy*

The NPS recognizes land management *goals*, such as being *natural* or *unimpaired*, as one aspect of ''policy.'' They are both legislative mandates. But the NPS definition of policy is very broad. ''Policy sets the framework and provides 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'' (National Park Service, 2006, p. 4). Therefore, in NPS jargon, management policy includes such overarching *goals* but also encompasses *guidelines* to achieve those goals (e.g., controlled burning is encouraged as feasible) and even includes some program administrative procedures. Guidelines are not legally binding. However, if such guidelines restate law or regulations, as occurs in places in the NPS policy handbook, they are binding on agencies and the public.

NPS policy can be generated from diverse sources (e.g., agency field personnel, conservation organizations, academics, and the Congress). It can be technical (e.g., mixing gene pools) or less technical (e.g., encouraging cooperative regional planning). In some natural resources management literature, the terms policy and goals mean different things (see Wagner et al., 1995). Sometimes NPS and other organizations may use the following terms interchangeably: policy, goal, objective, mission, and purpose.

3.2. *Concept of natural*

The concept of ''natural'' has been central to NPS policy since 1872. Some people think natural and unimpaired mean the same thing (Sellars, 1997/2009), but the term *natural* has elicited the most controversy. The Yellowstone Act mandated that the Service would be responsible for issuing regulations for the ''preservation, from injury or spoliation, of all timber, mineral deposits, natural curiosities, or wonders, within the park, and their retention in a *natural* (emphasis added) condition'' (16 U.S.C. 21–22). The idea has dominated NPS culture and values ever since (Pritchard, 1999). However, 142 years after America's first national park was created, NPS is still grappling with the word *natural*. The most recent policy handbook says that national parks will protect ''components and processes in their natural condition'' but then explains ''The term 'natural condition' is used here to describe the condition of resources that would occur in the absence of human dominance of the landscape'' (National Park Service, 2006, p. 36).

''Any methodological or policy judgment about the naturalness of some ecological process or event is, in part, a categorical value judgment, a value judgment that some 'natural' thing is good'' (Shrader-Frechette and McCoy, 1993, p. 104). However, the idea of ''naturalness'' has crept into the thinking of scientists and sometimes they are unaware it is value laden. ''We are unable to define 'natural' in a way free of categorical values. We are unable to define it in a way recognized by hypothetico-deductivists as a part of science. Yet, it is part of science'' (Shrader-Frechette and McCoy, 1993, p. 103). A group of authors consisting of current and former NPS scientists or natural resource specialists concluded ''it is increasingly clear that naturalness is no longer the umbrella under which all protected areas comfortably sit'' (Cole et al., 2008, p. 40). Some argue that ecological integrity would be a better standard (Huff, 1997; Woodley, 2010). In lieu of natural, Parks Canada adopted ecological integrity in the 1988 amendments to their 1930 national parks legislation (Parks Canada Agency, 2000).

3.3. *Natural regulation*

''Management is defined as any activity directed toward achieving or maintaining a given condition of plant and/or animal populations and/or habitats in accordance with the conservation plan for the area'' (Bourliére, 1962, p. 364). This definition implies that management is action toward meeting some goal. As Wagner (2006, p. 333) argued, management ''is a means, not an end.''

However, many protected areas are not well managed (Harrison, 2011). Can intervention cause more ecological integrity or show fewer impacts from human influence? Absolutely. As Chase (1986, p. 382) argued, ''What our national