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Forum Paper

How Perceptions About Naturalness Affect Science in Yellowstone National Park

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ABSTRACT

This paper describes a history of science and management on the Northern Range of Yellowstone National Park (YNP). In 1983 YNP began to shape public perceptions about management issues. In this case study, YNP shaped public perceptions to cause an unnatural condition (the appearance of the Northern Range was due to the extermination of wolves) to be portrayed as a natural condition (the appearance was due to climate change). Perception shaping can adversely affect the quality of science and influence the role of science in resource management. Perception shaping can have devastating ecologic consequences.

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Introduction

Each year, millions of visitors come to Yellowstone National Park (YNP) to experience the park's natural wonders. There are wonderful things to see including thermal features, herds of elk and bison, and packs of wolves. YNP describes an additional reason to enjoy the park: it is "one of the largest nearly intact temperate ecosystems on Earth" (YNP, 2017a).

There was a time when YNP did not focus on how natural the park was. Why does this matter? As we see in the history described later, perceptions about naturalness have profoundly influenced the accuracy of science in YNP. As we will see, resource management based on accurate science is key to the ecological future of the park.

What is natural?

The relationship between YNP and the word "natural" date back to 1872 when the US Congress established the park. In that legislation, Congress directed the Secretary of Interior to retain the park in its "natural" condition (US Stat., 1872). What is natural? Among the general public there are many opinions, and for some, it is simply the absence of manmade features. But for the modern National Park Service, "natural conditions" are defined to be "those that would occur in the absence of human dominance over the landscape" (NPS, 2006).

The earliest, detailed account of non-Euro-American presence in the future park is found in Osborne Russell's *Journal of a Trapper* (Russell, 1955). In 1835 and 1836, the "sole inhabitants" were a band of

Sheepsteater Shoshone composed of 6 men, 7 women, and 8 - 10 children; the band traveled by foot. There is no evidence that these people had a lasting effect on YNP's ecological conditions. Within a few years, horse-mounted Native Americans began to travel through YNP with increasing frequency. There is no evidence that documents a significant human influence in YNP before 1840. By modern NPS standards, the future park was natural at that time.

Human Influence

When the fur trade collapsed in the late 1830s, the number of trappers in the region declined. The Euro-American population did not increase until the 1860s when prospectors and explorers poured into the region (Haines, 1977). The new arrivals were responsible for two well-documented human influences. In the 1870s, elk (*Cervus elaphus*) were killed for their hides and canine teeth; wolves (*Canis lupus*) were poisoned with strychnine for their pelts. While pre-Euro-American elk numbers are uncertain, by 1877 few were present in western YNP (Norris, 1877).

By modern standards, YNP was losing its naturalness. But in 1877 there was no criterion that defined natural conditions. In the history described below, we see how that criterion came to be.

In 1877, Superintendent Norris persuaded hide hunters to cease their activities and elk began to increase (Norris, 1877, 1880). Wolves were killed for their pelts throughout the 1870s, and by 1880 that killing had "nearly led to their extermination" (Norris, 1881). After YNP superintendents became concerned about the low numbers of big game, wolves and other predators were killed not for pelts, but to protect "good" wildlife like elk from predation.

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In 1886, Superintendent Wear reported, “There is more game in the Park now of every kind than was ever known before” (Wear, 1886). In 1890, Acting Superintendent Boutelle reported, “The number of elk in the Park is something wonderful. In the neighborhood of Soda Butte herds were seen last winter estimated at from 2 000 to 3 000. The whole open country of the Park seems stocked to its capacity for feeding” (Boutelle, 1890). In 1904, Acting Superintendent Pitcher reported, “Owing to the limited winter range for all large game, both within the boundary of the park and in the surrounding country, it is only a question of time when it will become absolutely necessary to provide feed for this game during at least a portion of the winter” (Pitcher, 1904).

At this point it was recognized that a problem existed, but the problem was not attributed to the human influence of wolf extermination. The concept of “naturalness” as defined by modern policy was not in play.

For the next 2 decades, superintendents documented the ups and downs of elk numbers, expressed concern about the availability of forage, and provided supplemental hay during the winter. In 1919, Horace Albright became superintendent and, by 1928, must have been frustrated with the continual problem with elk. In that year, Albright secured funding for a study to be conducted by US Forest Service Biologist William Rush (Albright, 1928). Rush’s study added a new dimension to the mix. He estimated that by 1932, the Northern Range had deteriorated 50% compared with conditions he observed in 1914 (Rush, 1932). With the publication of Rush’s report, concern about elk expanded to include range deterioration, as well as forage availability during the winter.

In January 1929, Albright left YNP to become Director of the NPS. As NPS Director, he received a proposal submitted by George Menendez Wright (assistant park naturalist at Yosemite National Park) to conduct a survey of wildlife in national parks (Emory and Lloyd, 2000). Albright approved the formation of a wildlife survey team consisting of Wright, Ben Thompson, and Joseph Dixon. This team examined NPS wildlife issues on a national scale.

Up to this time, superintendents addressed ecological conditions that were clearly undesirable (e.g., lack of forage) but had no criterion that distinguished good from bad. Within a few years, the wildlife survey team provided that criterion.

Criterion Defining Natural Conditions

In 1933 Wright and his team published *Fauna of the National Parks of the United States: A Preliminary Survey of Faunal Relations in National Parks* (Wright et al., 1933). The report included a comprehensive description of management problems and outlined a series of policy recommendations. The objective of the policies was “to restore and perpetuate the fauna in its pristine state by combating the harmful effects of human influence.” In 1934, NPS Director Cammerer adopted the recommendations of Wright’s team as official NPS policy (Sellars, 2000). The NPS now had a criterion by which to distinguish a natural condition from one that was not: human influence.

Compensating For Human Influence

In 1935 the wildlife survey team published *Fauna of the National Parks of the United States: Wildlife Management in the National Parks* (Wright and Thompson, 1935). Here they addressed the YNP elk issue in detail, finding the range to be in “deplorable condition” when they first saw it in 1929 and deteriorating further by 1933. They were concerned about the overgrazing of grasses, erosion, and the effect of elk on sagebrush (*Artemisia tridentata*), Douglas fir (*Pseudotsuga menziesii*), willow (*Salix* spp.), aspen (*Populus tremuloides*), and Rocky Mountain juniper (*Juniperus scopulorum*) (Fig. 1).

The team attributed the decline in range condition to elk and noted that the wolves that once controlled elk numbers were no longer present in the park. Apparently recognizing that wolf reintroduction was



Figure 1. Juniper in 1932 on the Gardiner River 1.5 miles southeast of Mammoth Hot Springs, YNP. Trees record a history of browsing. This tree documents light browsing when the tree was young, allowing it to grow to tree height. The highlining of the tree documents a subsequent increase in browsing. (Photo by Wildlife Division; in: Wright and Thompson, 1935).

impractical, the team recommended an alternative to compensate for the human-caused absence of the predator: 3 000 elk were to be “taken” each year until the range began to recover. In 1935, rangers killed 223 elk in the park; 2 567 were believed removed from the population by culling, relocation, hunting outside the park, or winter killed (Toll, 1935).

Park rangers continued to compensate for the human-caused extermination of a key predator by killing elk. This would continue for more than 3 decades, although as we see later, the killing of elk was unpopular in some circles.

Politics Intervenes

An elk reduction in the winter of 1961/1962 made the issue extraordinarily controversial. In a 1975 address to NPS superintendents, Dr. Starker Leopold (Professor at the University of California, Berkeley) recounted how predator control had caused the “unusual and abnormal growth of the elk population,” and how after years of ineffective control, Superintendent Garrison “took the bull by the horns and sent his own boys out there and shot 4 500 elk.” This created a “political rhubarb”; pressure was applied to allow hunters to “get in and do the elk shooting”; the pressure involved two governors, four senators, numerous congressmen, and President Kennedy, who then called Secretary of Interior Udall (Leopold, 2013).

Udall convened a committee to study the issue and appointed Leopold as Chairman. Early on, the committee decided that Garrison’s decision was sound but poorly executed. To address the issue, “the board (i.e., the committee) felt that we couldn’t just give back a report on the elk situation in Yellowstone, but rather try and paint a broader picture of what we consider good park management, and then relate the elk situation to this. It was an opportunity, in other words, for us to depict some of

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