

The winter use in yellowstone national park environmental sciences essay



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Case Study: Winter Use in Yellowstone National Park

The National Park Service (NPS) faces many challenges in trying to meet its mission 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" (NPS Organic Act 1916). This dual-purpose mission often makes management decisions complicated and difficult. The 80-year history of decisions about visitor use of Yellowstone National Park (hereafter Yellowstone) during the winter illustrates the difficulty of such management decisions and provides a case study for the use of science in management decisions. The problem addressed by the managers and scientists is the types and amounts of uses that are appropriate for Yellowstone during the winter. The issue of winter use is complicated and shares several of the characteristics of wicked problems. For example, solutions to the winter issue are viewed as either good or bad depending on one's perspective and many solutions are better or worse without being true or false. In addition, how one frames the issue determines the problem's solution (Rittel and Webber 1973). If one views the issue through the lens of resource protection then there is one solution but if one views the issue through visitor enjoyment then there is another solution. In addition, political scientists in the region describe recreation in the Yellowstone region as a wicked problem because it seems intractable and is a hostile and circular issue (Shanahan and McBeth 2010). Many who study national parks describe them as

fiefdoms where the park superintendent has broad authority and the superintendent's nature and background greatly influence management of the park (Yochim 2009). Leaders of individual divisions, such as resources and interpretation, inform park superintendents. In addition, many decisions about park management incorporate visitor preferences, desires of surrounding communities, and political concerns. Politicians weighed in on their preferred management throughout the history of decision making about winter use at Yellowstone. As former Superintendent Suzanne Lewis acknowledged, science is only one factor in decision making and that managers must also consider people's values (Lewis 2007). In addition, decisions are made in the context of the broader Greater Yellowstone Ecosystem. Since 1964, federal land managers have been coordinating management within the region via the Greater Yellowstone Coordinating Committee (GYCC 2013). Although they are not the only consideration, social and physical sciences should play a role in deciding the types and amounts of uses that are appropriate at Yellowstone during the winter. From the physical sciences, research on air quality, water quality, acoustics, and wildlife can help determine if winter activities impair the park's resources. From the social sciences, research into visitor perceptions and visitor desires can help understand if and how park visitors "enjoy" the resources, in alliance with the NPS organic act. However, former Superintendent Suzanne Lewis stated that there tends to be a lack of social science information available to help managers understand their visitors (Lewis 2007). Additionally, research on the economic impacts of winter use can inform decisions. As described below, the role of science in the decision making process at Yellowstone has evolved over the past 80 years.

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Decisions from the 1930s to 1990

Today's controversy over winter use at Yellowstone centers on snowmobiles. However, the first debates about how Yellowstone should be used during the winter concerned automobiles. In the 1930s, politicians and business owners in Cody, Wyoming first suggested that the roads at Yellowstone be plowed year-round, thereby increasing commerce in their city. The park managers and NPS director declined to plow the roads citing funding shortages (Yochim 2009). In 1948, the Cody Club renewed their call for road plowing. Once again, the NPS deemed the request infeasible due to budget constraints and safety concerns (Yochim 1999). Relevant science was not available thus science was not used in these early decisions about winter use at Yellowstone. Instead, the decisions were based on financial considerations. Also in 1948, the first visitors in motorized over-snow vehicles (snowplanes) entered Yellowstone. Visitors in snowcoaches followed in 1955 and on snowmobiles in 1963 (NPS 2013). The limited guidance available to the Yellowstone managers did not address over-snow vehicles and thus the managers decided to let them in to the park. However, some park staff expressed uncertainty about whether this was an appropriate use (Yochim 2009). Once again, science was not available and thus did not inform the management decision regarding winter use. The debate over plowing Yellowstone's roads continued and culminated in Congressional hearings in 1967 (NPS 2013). At the start of the hearing, George Hartzog, Director of the NPS, stated that over-snow vehicles were the most appropriate means for visitors to travel in the park during the winter, unless it could be shown otherwise (Yochim 1999). Subsequently, park staff formalized a policy on winter use and developed a winter management scheme around over-snow

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vehicles (Yochim 2009). The choice over over-snow vehicles rather than plowing the roads considered both the visitor experience of driving through "snow canyons" and the concern that the snow canyons would trap wildlife. However, the concern about wildlife being trapped in the canyons was more about visitor safety (potential accidents) than it was about the wildlife itself (Yochim 1999). Once again, science regarding the impact of winter use on wildlife and other natural resources was not available and thus not considered in the decision making process. As early as 1970, park staff was concerned about the impacts of snowmobiles on plants and wildlife. Although there were some conflicting results in the scientific literature, research mainly done in the Midwest, the consensus was that snowmobiling had the potential to negatively impact wildlife and their habitat (Yochim 1999). Yellowstone Superintendent Jack Anderson directed a park biologist to research the impacts of snowmobiles on wildlife. The biologist reported that elk were habituated to snowmobiles on roads, which prompted Anderson to continue the policy that over-snow vehicles must stay on designated roads. Anderson's decision did not incorporate conflicting information from a Montana State University student because the student's results were not published before Anderson retired as Superintendent in 1975 (Yochim 1999). This is an example of how the mismatched time-scales of scientific research and decision making can present a barrier to the integration of science into decision making. In 1972, President Richard Nixon issued an Executive Order directing park managers to allow off-road vehicles, including over-snow vehicles, only if the vehicles did not "adversely affect the 'natural, aesthetic, or scenic values' of their lands" (Yochim 2009). The Executive Order caused the NPS to review the use of snowmobiles in national parks

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and to close parks to snowmobiles unless the park superintendent specifically opened the park to snowmobiles (Yochim 2009). At Yellowstone, Anderson kept the park open to snowmobiles without explicitly considering the impacts to the environment (Yochim 2009). By not considering the science on the impacts of snowmobiles to wildlife and the environment, Anderson left himself open to criticism. His decision occurred in the broader context of the road plowing debate and on-going mitigation efforts by the park to limit the environmental damage done by snowmobiles (Yochim 2009). Anderson's decision marks a moment where science could have informed decision making but was not considered. Perhaps this reflects an institutional environment that did not value science in the decision making process. As winter visitation increased during the 1970s and 1980s, park managers grew more concerned about the effects of snowmobiles on wildlife and they developed a small research agenda to address their concerns. The research concluded that cross-country skiers and snowshoers had a bigger effect on bison and elk behavior than did snowmobiling (Aune 1981; Cassirer 1992). These results conflicted with the NPS perception that human-powered recreation was more appropriate for national parks than was motorized recreation (Yochim 2009). This conflict of belief with scientific results is a barrier to the use of science in decision making.

Decisions from 1990 to the Present

Although snowmobiles first entered the park in 1963, it was not until 1990 that Yellowstone first issued a winter use plan. The plan formally identified the types and amounts of uses that were appropriate for Yellowstone and contained thresholds for visitor numbers that triggered additional visitor use

management planning (NPS 1990). The 1990 winter use plan was in place for only seven years before it was challenged in court. Since 1998, Yellowstone has been trying to write and implement a Winter Use Plan/Environmental Impact Statement (Yochim 1999). Development of a new winter use plan was part of a settlement in 1997 of a lawsuit contending that Yellowstone's 1990 winter use violated several laws, including the NPS Organic Act, the Endangered Species Act, and the National Environmental Policy Act (Yochim 1999). As part of the lawsuit, the Funds for Animals contended that Yellowstone staff had failed to perform an environmental analysis of the impacts of trail grooming on the environment (Yochim 2009). That is, the National Park Service had not utilized enough science in its decision making. In addition to several lawsuits, politicians from the local level up to the President have weighed in on winter use at Yellowstone (Yochim 2009). The revision of the winter use plan is still ongoing. Over the past 15 years, Yellowstone has produced several winter use plans nearly all of which were challenge in court. The end might be in sight. In April 2013, Yellowstone released the Proposed Rule to Implement the Final Winter Use Plan for public comment with the intention of having a new plan in effect for the upcoming winter (NPS 2013). Amidst the planning, lawsuits and plan revisions, monitoring and applied and use-inspired research were implemented. Early in the 1990s, Yellowstone started monitoring air quality within the park and funded studies of visitors (Yochim 2009). The multi-federal agency Greater Yellowstone Coordinating Committee formed a working group on winter visitor use. Responding to a lack of information on the effects of winter use on wildlife, biologists and managers collaborated on a literature review, not original research, of the topic (Olliff et al. 1999). In the late 1990s, the <https://assignbuster.com/the-winter-use-in-yellowstone-national-park-environmental-sciences-essay/>

National Park Service recognized a service-wide lack of information about natural resources. In response, they created the Natural Resource Challenge to expand science-based management, among other things, and encouraged managers to apply this new information (Natural Resources Challenge Action Plan, 1999). The 2000s saw another increase in use-inspired science and monitoring at Yellowstone. Research topics ranged from physical science topics such as wildlife, air quality, acoustics, and snowpack, to social science topics such as economics and visitor's values (e. g., Borrie et al. 2002; Arnold and Koel 2006; Borkowski et al. 2006; Bishop et al. 2007; Burson 2008; RTI International 2007). In addition, Yellowstone formed a Science Advisory Team to summarize information, highlight key findings, and identify research needs. The Science Advisory Team consists of NPS and U. S. Geological Survey scientists who gathered input from other federal workers engaged in physical and social sciences as well as university, commercial, and non-profit scientists. The Science Advisory Team's work culminated in a scientific assessment report in 2011 to inform winter use planning (NPS 2011).

Although more research was occurring, it was not always incorporated into management decisions. Some of the barriers to the use of science were the mismatch in timing between the science and decision making, confounding results, and errors in the science (Yochim 2009). The timing of the publication of scientific results being out of sync with decision making timeframes continued. An embarrassing error in an air quality monitoring report led to a loss of credibility. In a 1999 report, scientists exaggerated pollution levels when they failed to convert measurements from metric to English units. Not only did the error diminish the credibility of the science but

it also fed into the tendency for stakeholder groups to pick and choose the <https://assignbuster.com/the-winter-use-in-yellowstone-national-park-environmental-sciences-essay/>

science they used to support their positions (Yochim 2009). The combination of confounding results and conflicts between research results and the perceptions of managers and the public also presented a barrier to the use of science. As in prior decades, research on the effects of winter recreation on wildlife produced confounding results where university studies conflicted with park-based research. Additionally, the university research conflicted with what visitors saw at the park. The lack of impact on wildlife populations was difficult for the public to understand when they had firsthand experience people in over-snow vehicles chasing individual animals. The confusion over the impacts on wildlife made it difficult for managers to incorporate the science into decision making (Yochim 2009).

Nature of Research and Relationship between Scientists and Stakeholders

Most of the research related to winter use at Yellowstone falls into the applied research or use-inspired research quadrants (Stokes 1997). Much of the research on air quality and soundscapes fit into the applied research quadrant because it is focused on the applied goals of the park without really seeking a more basic understanding. In contrast, some of the research on wildlife fits within the use-inspired research quadrant. Although clearly driven by applied questions, some of the research on wildlife seeks to expand the basic knowledge on bison or elk and their migrations or reproductively (e. g., Bruggeman et al. 2007). Because much of the research is funded by the NPS, the research can also be considered mission-driven. Much of the research concerning winter use at Yellowstone is " Mode 1" research where the research is largely confined to a single discipline,

adheres to peer-review as quality control, and is organized in a hierarchical fashion (Gibbons et al. 1994). However, the research does share some characteristics with Mode 2 research such as the application of the research providing context and the participation of researchers outside of universities (e. g., NPS scientists; Gibbons et al. 1994). Some of the research on wildlife moves towards Mode 2 and co-production. In co-production, the production of science is iterative, where stakeholders are engaged consistently, the teams are interdisciplinary, and the resulting science is usable (Lemos and Morehouse 2005; Dilling and Lemos 2001). For example, some of the research on bison involved scientists with wildlife biology, landscape ecology, and management background and the university scientists and NPS managers and scientists collaborated throughout the project (Borkowski et al. 2006). The research results helped inform the Yellowstone superintendent (Lewis 2007). Another bison research project started with a workshop with a variety of stakeholders to reach consensus on the basic design of the research. Although park scientists continued to work with university researchers, the project was never funded (Yochim 2009). The funding mechanism used by the NPS encourages research to move towards co-production. The Rocky Mountain Cooperative Ecosystem Studies Unit is a cooperative venture between federal agencies and research institution to provide science to decision makers. The Rocky Mountain Cooperative Ecosystem Studies Unit emphasizes collaboration between the federal agency providing funding and the university undertaking the research. For a research project funded by the NPS to qualify for funding through the Rocky Mountain Cooperative Ecosystem Studies Unit, the NPS must show

substantial involvement in the project (RMCESU 2013). This encourages <https://assignbuster.com/the-winter-use-in-yellowstone-national-park-environmental-sciences-essay/>

interaction between the scientists and the stakeholders (NPS) and moves some of the science towards co-production. In addition to scientific reports and journal articles, research at Yellowstone is shared with managers and the public through the Greater Yellowstone Science Learning Center, a "virtual learning center" (Folts-Zettner et al. 2008). In some ways, the Greater Yellowstone Science Learning Center can be viewed as both a virtual information broker and a virtual loading dock (Dilling 2007). The website is designed to share information with a variety of audiences from managers and decision makers to university scientists to the public. For a wide range of natural resource subjects, the website contains information ranging from one-page syntheses of the state of the knowledge to journal articles and research reports (Folts-Zettner et al. 2008). The website contains several pages related to the research on winter use described herein. Because NPS staff are summarizing information and identifying key findings in the one-page summaries, the Greater Yellowstone Science Learning Center is a type of information broker. However, by attempting to reach so many audiences through a website, the Greater Yellowstone Science Learning Center can also be seen as a loading dock where information is posted with the hope that someone will use it.

Summary

The 80-year history of decisions about visitation of Yellowstone National Park during the winter illustrates some of the difficulties of connecting science with the decision making process. Some of the barriers to the incorporation of science include the lack of site-specific research, a mismatch in the time-scales of science and decision making, confounding results of the science,

and at times a lack of credibility. This dual-purpose mission of the National Park Service to both preserve parks and provide for their enjoyment means that values and other concerns, such as financial constraints, can be more important than science in the decision making process. In describing the decision about winter use of Yellowstone, former Superintendent Suzanne Lewis stated that decision hinged not on science but on the value question of whether or not snowmobiles were an appropriate use in national parks (Lewis 2007). Lewis' statement illustrates that science can inform decision making about national parks but that science is not the only consideration.