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Crossing Methodological Boundaries: Assessing Visitor Motivations and Support for Management Actions at Yellowstone National Park Using Quantitative and Qualitative Research Approaches

Winter use of Yellowstone National Park has given rise to a complex of management issues, including rapid growth in recreation demand, environmental impacts of snowmobiling, and a string of litigation against the National Park Service (NPS) designed to both protect park resources and maintain public access (Sacklin et al. 2000). The intertwined character of these problems suggests that none can be resolved independently of the other, that policy must be comprehensive in nature, and that many sources of knowledge may be required to effect their resolution.

Winter use of Yellowstone has grown significantly since snowmobiles were first permitted, up 300% since 1971 to 120,000 visits annually (Sacklin et al. 2000). Of these visits, about 60% are by snowmobilers, 30% by traditional automobile passengers, and 10% by passengers on commercial snowcoaches. By definition, winter use of the park occurs during the time of the year when effects on wildlife could be significant, through disturbance that could draw down scarce energy reserves. While there is considerable scientific and public debate about snowmobiling and its effects on wildlife in particular, snowmobiling provides outstanding recreational experiences and provides an opportunity for

thousands of visitors to appreciate the park in winter. The debate over snowmobiling encompasses both biophysical and social dimensions. How the issue is resolved will carry significant implications for both park resources and park visitors.

Of particular interest at the time of the research described in this paper was the relationship between the movement of bison herds within the park and the grooming of roads for snow machine travel. This issue was heightened to national levels when approximately one third of the bison herd died in the winter of 1996-1997. While some bison starved due to harsh winter conditions, federal and state wildlife officials killed many because they strayed from the park

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and were believed to pose a potential source of brucellosis for surrounding livestock (Sacklin et al. 2000). Grooming roads for snow machine use may provide a network of corridors that enable bison to leave the park.

The purpose of our research was to develop an understanding of (1) winter use and users and (2) visitor attitudes toward park management practices designed to mitigate recreational impacts on bison and other wildlife. The complexity of the Yellowstone policy environment required an understanding of visitor support (or lack thereof) for alternative park management practices, as well as an understanding of why visitors feel the way they do. Therefore, our challenge was to develop a methodological complement that would meet the needs of depth and breadth. For this reason, we chose to develop and apply both quantitative and qualitative research methods.

Understanding Visitor Use and Users

A dominant approach to understanding visitor use and users treats recreation as individual subjective experiences (Tinsley and Tinsley 1986; Mannell and Kleiber 1997; Samdahl and Kleiber 1989). This experiential approach to outdoor recreation was first conceptualized by Driver and associates, and represents a shift from focusing primarily on recreation activities to providing

appropriate conditions for satisfying recreation experiences (Driver and Toucher 1970; Driver 1975; Driver and Brown 1975; Driver 1976; Driver and Bassett 1977; Driver and Brown 1978; Haas et al. 1980; Driver and Rosenthal 1982; Schreyer and Driver 1989). This approach to understanding and managing recreation recognizes that the motivations people seek to satisfy through recreation can be fulfilled by a number recreation activities (Mannell and Iso-Ahola 1987). Two general research approaches have been developed to study visitor use and users from this experiential perspective (Mannell and Iso-Ahola 1987). The first is called "product-based" research and relies primarily on quantitative research methods. The second is called "process-based" and relies primarily on qualitative research methods.

Product-based research. This research approach proposes that by identifying the motivations and experiences visitors seek to fulfill, managers can provide recreation opportunities designed to meet these needs (Manning 1999). The predominant method used to measure these motivations and experiences is through the use of recreation experience preference (REP) scales developed by Driver and associates (Manfredo and Driver 1996). REP scales measure the importance of a range of potential motivations for recreation. These scales have been applied to visitors to

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many different parks and related areas (Manning 1999). This research suggests that a wide diversity of motivations are sought by park visitors, even within a single recreation activity.

While a dominant and productive research approach, product-based research may have limitations (Patterson et al. 1998, Mannell and Iso-Ahola 1987, Schreyer et al. 1984, Williams and Patterson 1996, Virden and Knopf 1989). For example, product-based research may document that a motivation such as "enjoying nature" is important to visitors, but it may not fully explain what it means to "enjoy nature" (Patterson et al. 1998). Moreover, product-based research may measure the degree of support or opposition to a proposed management action, but it may not explain why visitors support or oppose this action.

Process-based research. Other researchers have encouraged a process-based approach to study recreation experiences (Schreyer et al. 1984). This approach focuses on the nature of the recreation experience and emotional states of visitors during recreation. Borrie and Roggenbuck (2001), for example, measured recreation experiences in the Okefenokee Wilderness in Georgia and found these experiences to be dynamic and emergent across the course of the experience. Holbrook and Hirschman (1982, 137) further suggest that an exploration of the

true nature of experience warrants a qualitative research approach focusing on "the purely subjective aspects of consciousness." For example, Arnould and Price (1993) studied whitewater rafting on the Colorado River to record "subjective aspects of consciousness" of river rafters. Because of the inherent complexity of the recreation experience, "the narrative of the experience is central to overall evaluation." Patterson et al. (1998) also utilized a process-based approach in their qualitative study of the nature of wilderness experiences in the Juniper Prairie Wilderness Area, Florida. They examined the meaning of the experience visitors had and how that recreation experience is recollected. According to this study, the experience as a whole is different and more valuable than the sum of its parts.

Product- and process-based research approaches have both strengths and weaknesses. The quantitative nature of product-based approaches allows for the empirical assessment of the degree to which selected motivations contribute to the quality of recreation experiences and the extent to which visitors support or oppose alternative management practices. Process-based research approaches provide insights into the nature of recreation motivations and why visitors might support or oppose alternative management practices. By using a combination of these research approaches, a more

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complete understanding of winter use of Yellowstone might be possible.

Study Methods

Both product-based (quantitative) and process-based (qualitative) research methods were used to understand visitor use and users in Yellowstone, and user attitudes toward alternative management practices designed to reduce the impacts of recreation on bison. The product-based approach employed a mail-back survey of 1,505 visitors who were systematically sampled at the park's four entrances on randomly selected days from January through March 1998 (Borrie et al. 1999). The survey questionnaire included the REP scales described above and a battery of questions designed to measure visitor support for selected management practices. A series of follow-up mailings to non-respondents was conducted, as recommended in Dillman (1978), and yielded 1,064 completed questionnaires for a response rate of 71%.

The process-based approach employed open-ended, in-depth interviews with 93 visitors at six sites within the park (Davenport et al. 2000). Interviews lasted between five and 30 minutes, and each was tape-recorded and transcribed. Two primary issues were addressed in the interviews: the character of the Yellowstone winter visitor experience, and visitor support for proposed

management actions.

Study Findings

A quantitative assessment. Respondents were asked to rate the importance of 40 potential motivations (REP scale items) for visiting Yellowstone. A five-point response scale was used that ranged from 1 ("Very Unimportant") to 5 ("Very Important"). Findings are shown in Table 1. These data strongly suggest the importance of nature, scenery, and wildlife to the quality of the visitor experience. "Enjoy natural scenery" was the highest-rated motivation for visiting Yellowstone, "view wildlife" was the second highest, and "view bison in natural setting" was the fourth highest.

Respondents were also asked the extent to which they agreed or disagreed with a series of eight potential management actions to "better protect the bison herd." A five-point response scale was used that ranged from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Findings are shown in Table 2. These data suggest that visitors are not very supportive of such management actions; most respondents "disagreed" or "strongly disagreed" with most proposed management actions.

How can these findings be reconciled? Most visitors highly value the natural beauty of the park, including its remarkable bison herd. However, most visitors do not support measures designed to protect

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Table 1. Motivations for visiting Yellowstone National Park. 1=vu (very unimportant); 2=u (unimportant); 3=n (neither unimportant or important); 4=i (important); 5=vi (very important). Avg score = average score on the 1-5 response scale.

<i>Motivation</i>	<i>Importance (percent of respondents identifying each level)</i>					<i>Avg score</i>
	<i>1-vu</i>	<i>2-u</i>	<i>3-n</i>	<i>4-i</i>	<i>5-vi</i>	
Enjoy natural scenery	1.1	0.1	1.0	16.4	84.4	4.8
View wildlife	0.7	0.5	1.9	28.8	68.1	4.6
Have fun	1.3	1.4	4.5	44.8	44.0	4.4
View bison in natural setting	2.5	2.5	10.4	39.5	45.1	4.2
Get away from the usual demands of life	2.3	2.7	11.2	38.6	45.2	4.2
Experience the tranquility	2.2	3.4	10.8	41.1	42.4	4.2
Snowmobile or ski in wild/natural setting	6.8	2.5	9.1	31.7	49.9	4.1
Experience new and different things	2.2	2.7	13.3	49.6	32.1	4.1
Do something with family	7.5	3.9	9.4	33.1	46.1	4.1
Have adventure	2.7	3.8	13.3	48.0	32.2	4.0
Learn more about nature	2.2	3.8	15.8	46.5	31.6	4.0
Learn about natural history	2.2	4.1	17.7	45.8	30.1	4.0
See Old Faithful	5.1	5.0	17.4	34.3	38.2	4.0
Experience peace and quiet	5.9	6.3	21.0	36.9	29.9	3.8
Be with people who enjoy same things	5.8	7.8	18.8	37.4	30.2	3.8
Be with members of my own group	7.3	8.8	19.4	30.5	34.1	3.8
Get away from crowds	6.5	9.1	21.1	37.2	26.2	3.7
Do something creative	4.8	8.9	23.9	40.3	22.0	3.7
Experience excitement	5.8	9.2	24.5	40.8	19.7	3.6
Bring my family/group closer together	10.2	8.4	22.3	32.7	26.4	3.6
Experience solitude	8.9	10.5	23.6	35.3	21.8	3.5
Learn more about cultural history	5.0	12.0	30.7	35.9	16.4	3.5
Feel healthier	9.7	9.7	27.7	32.4	20.4	3.4
Be in an area where wolves exist	15.1	10.0	21.9	23.1	29.9	3.4
Help reduce tension	14.7	11.5	25.6	30.9	17.3	3.2
Allow my mind to move at slower pace	14.8	11.2	27.0	30.0	17.0	3.2
Promote greater environmental awareness in own group	14.3	11.5	33.4	22.3	18.5	3.2
Be challenged	11.1	13.9	37.5	26.8	10.7	3.1
Have thrills	13.8	16.0	31.6	25.1	13.5	3.1
Reflect on and clarify personal values	13.5	16.0	34.2	25.6	10.7	3.0
Share what I have learned with others	15.7	16.4	31.9	23.4	12.6	3.0
Keep physically fit	14.5	19.9	34.4	21.9	9.3	2.9
Talk to new and varied people	13.5	22.0	38.0	20.3	6.3	2.8
Rest physically	16.8	20.1	36.7	18.9	7.6	2.8
Feel more self-confident	19.6	17.1	38.5	17.5	7.3	2.8
Be at a place where I can make own decisions	22.9	16.7	36.3	16.0	8.0	2.7
Help others develop skills	23.1	17.6	36.8	15.7	6.9	2.7
Develop skills	19.4	26.2	34.4	16.5	3.4	2.6
Be more productive at work	17.0	19.1	35.8	12.3	5.9	2.5
Escape family temporarily	40.4	23.3	26.3	5.6	4.5	2.1

these animals. Why not? A qualitative assessment provides some insights into this issue.

A qualitative assessment. Like the questionnaires described above, the in-depth interviews suggested the

importance of natural scenery and wildlife to the recreation experience. However, the interviews went further by revealing what it is about natural scenery and wildlife that is so important. We learned that for many

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Table 2. Level of agreement with proposed management actions to protect the bison herd. 1=sd (strongly disagree); 2=d (disagree); 3=n (neither disagree or agree); 4=a (agree); 5=sa (strongly agree). Avg score = average score on the 1-5 response scale.

<i>Proposed management action</i>	<i>Level of agreement (percent of respondents identifying each level)</i>					<i>Avg score</i>
	<i>1=sd</i>	<i>2=d</i>	<i>3=n</i>	<i>4=a</i>	<i>5=sa</i>	
Limit size of groups	15.2	21.0	22.4	20.3	11.0	3.0
Travel only in specific areas	21.3	19.8	18.2	30.8	9.9	2.9
Watch 30-minute video	24.1	27.2	24.4	17.9	6.4	2.6
Wait up to one hour before travel	35.4	35.0	25.6	2.7	1.3	2.0
Travel only at particular time of day	34.1	36.3	17.1	10.0	2.5	2.1
Travel only on particular days of the week	39.0	35.9	16.0	6.8	2.3	2.0
Travel only in shortened season	36.9	31.8	17.6	10.3	3.5	2.1
Obtain a required permit	45.3	27.7	16.7	6.7	3.6	2.0

respondents it was not just seeing wildlife, but seeing an *abundance* and *diversity* of *unique* wildlife *in a natural setting*. For example, Max and Nora had this to say about their experience:

Max: They [the bison] were standing in the hot spring, steam rising. We were right there. It was awesome, beautiful.

Nora: We don't have them in California. And the elk, we don't have elk either, very awesome. It's just a treat because in California we don't have this.

Max: When we're snowmobiling [in California] there's no animals around. It's just really neat seeing the wildlife.

(These names, and all those that follow, were chosen by respondents to uniquely identify their responses, but do not necessarily reflect their real names.)

When asked to describe their visit to Yellowstone, many respondents listed the species of animals they saw. Visitors seem to keep track

of their wildlife observations, similar to avid birdwatchers or other wildlife enthusiasts. The abundance of bison, elk, and waterfowl was noted by a number of visitors interviewed. Stan listed the kinds of wildlife he saw:

We saw more animals. From the littlest to the biggest, a lot of buffalo, a swan, coyotes. The coyotes are funny when you come to a stop. They just look at you, and they wanted to stay and stop and [they] had a buddy, a raven, that looked like they were working that particular stop. We saw a couple of swan, a lot of elk but I was impressed with the buffalo.

For many visitors, however, it is the natural conditions accompanying that opportunity that are most remarkable. The thrill of watching wildlife interact in their natural habitat resounds from many of the respondents stories. Those who observed such interactions felt lucky to have those opportunities in Yellowstone. The following excerpt is an example of one impression a participant had with regard to wildlife and

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natural conditions.

Alice and her boyfriend took a wildlife tour guided by a naturalist into the Lamar Valley, where they got a rare glimpse of wolves feeding on an elk carcass. She described the fierce scene as thrilling and more than surpassing her expectations.

Yesterday we took the wildlife tour guided by a ranger naturalist ... and we saw a whole wolf pack. And we saw them, either they had killed a bull elk or a ranger had shot a bull elk who was injured, but she set up her scope so that we could see the kill site. And then we saw a bald eagle that was munching away on something. And we saw the various wolves as they were coming to take turns. The whole pack, you know, sitting up like a quarter of a mile away and then they take turns coming down ... kind of in priority of their, I suppose their hierarchy. And then we saw a bunch of them, you know, just lolling on their backs, probably with very full bellies, but that was very thrilling. So the park ... I think in the winter has more than fulfilled our expectations. We're really having such a good time here.

Given the apparent importance of nature and wildlife to the park experience, as suggested by both the product- and process-based research approaches, why aren't park visitors more supportive of proposed management actions designed to protect bison? Further findings from the in-depth interviews are suggestive. During the interviews, respondents were asked to discuss why they supported or opposed the potential

management actions included in the mailback questionnaire. Four distinct themes were evident in their comments.

Public access as a role of Yellowstone. Among those who opposed management actions designed to protect bison, some believed that the park's primary role is that of a place for recreation, and people have a right to visit the park. These respondents were against almost any kind of restriction on public access. For example, Wendy (a snowmobiler) recognized the advantage of protecting the bison by restricting visitor access to them, but contended that seeing them is too important. She explained, "No, I think that just from the environmental standpoint it's nice to have all these animals have this nice seclusion, but nobody gets to see them. I wouldn't want to do that to myself or anyone else."

Another visitor on snowmobile, Roberta, saw the value of nature lying in human enjoyment of it. She asked succinctly, "Why have nature, if people can't be around to enjoy it?" Jake also toured Yellowstone on a snowmobile. He was not in favor of any of the management actions designed to protect the bison herd. He stated "It's a people's park and all people ought to be allowed."

Lack of a credible problem. Commonly, visitors who described their close encounters with wildlife remarked at how indifferent bison appeared to be to visitors. Although

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some respondents noted that bison seemed to be agitated, many felt like their encounter had little or no effect on the bison. This was a predominant theme in the data as illustrated by Greg:

I don't really know what the problems with the bison are. They don't seem to mind the snowmobilers. They'll stand right there by the side of the trail and go right by them real slowly. They don't even mind that you're there it seems like. I don't even think that they care if we're out here.

However, many respondents admitted that if they had proof of environmental degradation, they would support restrictions on use.

How will management actions affect the recreation experience? As our product-based survey illustrated, visitors have clear motivations for their visit to Yellowstone. Several respondents to the in-depth interviews contemplated how specific management actions would change their recreation experience. Respondents considered how their experience would be restricted in terms of access, time, and freedom. While these visitors weren't necessarily against wildlife preservation, they were hesitant to support such actions when this might diminish the quality of their own experience. Many visitors said they "like the way the park is now" and were wary of change.

Caren, who snowshoed in Yellowstone, was not aware of any problems with the protection of the

park's resources. Here's what she had to say about limiting visitor group size.

I don't know, because my whole family, there's five in my family, so if we couldn't come as a family, I would not be happy about that. But, I would be for doing something like, course I don't know if cars, see I don't know much about that issue and ... what they would do to protect bison and how that would affect me to comment on it. I think they should cut down on the cars in the summer too. So I would be for some kind of mass transportation in, as opposed to everybody bring their personal vehicles into the park. I don't know how that affects bison though.

Are recommendations based on science or opinion? A few participants stressed the importance of scientific proof and questioned the capability of the park's decision-makers to explore all other management options before restricting visitor use. For example, when Michael was asked about the possibility of shortening the winter visitor use season, he replied:

Before they do that, I think they ought to determine that this is, the common problem. What is the problem with bison wandering out of the Park? Are they carrying that disease and is it safe? To what extent do the bison wandering out of the Park; is their migration affected by the groomed trails? You can count that. You can count the bison and find out where they are, and another question would be are there some simple things you could do, like certain trail

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Figure 1. Winter visitors to Yellowstone value seeing wildlife, but may not support management practices designed to protect bison.

points, where you could keep the bison from getting that trail. I think get some wildlife biologists involved and they can do it.

Valerie, a visitor on snowmobile, also mentioned cattle guards when asked about her support for closing some sections of groomed roads to oversnow vehicles to protect the bison herd. When asked if she would support management change if she had better proof of impacts, she replied:

True. It's easy to take a management action with no clear objective and some

generalization, but the results may not be what you expect. Measure the environment before you take the action. Measure after you take the action to see if it's good. If you see the effects you desired, or you could have the exact opposite.

Eve stressed the importance of good relations between park management and the public. When it was suggested that the Park Service should close some road sections to oversnow vehicles, she said:

I'd be sad about it, but if it was necessary then I'd support that. I just don't want it to become political to the point

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where it's closed for political reasons and not true wildlife management reasons.

Eve demanded scientific proof of degradation. It seems as though she was also skeptical of the Park Service's agenda. Eve was asked if there were particular road sections that she would want to remain open. She answered:

I don't think it would be up to me whatsoever. It would be up to what is truly needed to manage wildlife. It doesn't have anything to do with which ones I would be interested in.

So while Eve didn't perceive a problem with the protection of wildlife, she would support necessary actions if such proof were forthcoming. Furthermore, she thinks that these decisions should be based on science and not on politics or visitor opinion.

Randy, who toured Yellowstone on skis, was asked if he would be supportive of restrictions on the times that visitors could be in the park to protect wildlife. He answered, "I guess I'd have to defer. The answer is yes, deferring that decision to those professionals that are trained in the habitat and how different species react to man."

Sarah, a visitor on snowcoach, said she would support restricting the times visitors could be in Yellowstone in the winter. Here's how she explained this:

Well, because I would trust that they wouldn't do such a drastic thing unless they had good reason to. I certainly

would not want them to just do it because somebody got the idea that it might be nice to give the animals a break. I mean how do they know. But if they can convince the people that they know what the animals need better than the rest of us, then I think they ought to do that. But I'm not sure.... I don't know what the animals need, but maybe somebody else does. If the animals are showing signs of stress, well, they should have a break.

Conclusions

Why does the public visit Yellowstone in winter, and what management actions do these visitors support or oppose? These are vital questions to park managers who are challenged to provide high-quality visitor experiences while maintaining protection of important park resources. Research can help answer these questions through both product-based (quantitative) approaches and process-based (qualitative) approaches. We used both in a complementary fashion to help answer these questions and to rectify study findings.

Initial quantitative research indicated that seeing and experiencing nature and wildlife, especially bison, were central to many park visitors. However, these visitors generally did not support a variety of proposed management actions designed to protect the bison herd, a park resource that had been substantially diminished in recent years.

Follow-up qualitative research helped to clarify these findings in two

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ways. First, visitors value seeing many species of wildlife in their natural setting. Thus, while wildlife is important, the park serves a very different role than a zoo. Natural processes may be at least as important to visitors as the natural objects of those processes.

Second, there are at least four important reasons why visitors may not support proposed management actions designed to protect resources that are important to the quality of the visitor experience. Park managers are challenged to deal with these issues in a way that will not only protect important park resources, but will also convince visitors and other interest groups to support appropriate management actions. Specifically, how can park resources be protected while offering reasonable public access to the park? Can needed park management actions be designed and implemented in ways that minimize their impacts on the quality of the visitor experience? Can proposed

management actions be justified on “scientific” rather than “political” grounds, and are there viable alternatives to restricting visitor access and freedom? To the extent that such questions can be answered successfully, there is likely to be a stronger relationship between visitor motivations and visitor support for proposed park management actions designed to protect resources that serve as the foundation for such motivations. And, ultimately, park management is likely to be more successful and less contentious.

The findings from this study are informed by alternative research approaches, each complementing the strengths and weaknesses of the other. “Crossing boundaries” in methodological approaches can build a more complete understanding park use and users, answering questions of both “what” and “why”, and ultimately informing park management.

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