Winter Visitor Experiences in Yellowstone National Park: Visitor Perceptions of the Natural Soundscape and of Interactions with Bison

A Research Proposal

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Forward

This proposal serves two purposes. It is the product of the first phase of research on the project "Winter Visitor Experiences in Yellowstone National Park: The Roles of Natural Soundscapes and Wildlife Interactions" that was initiated in cooperation between managers of Yellowstone National Park and researchers at the University of Montana in the Fall of 2005. Our desired product for the first phase was a refined proposal. The process used to refine the ideas included here included two site visits to Yellowstone in the months of February and March of 2006. During those visits researchers conducted interviews with managers, scientists (both wildlife and soundscape experts), and snowcoach drivers and had informal conversations with winter visitors. Researchers also systematically observed bison encounters and visitor behavior relative to those encounters. Finally, a meeting was organized with the NPS natural sounds program in Fort Collins, Colorado to discuss perspectives on information needs and to ensure that data collected in this process would have applicability to broader NPS soundscape research needs.

The enclosed proposal is the result of these efforts and a thorough review of current literature relative to wildlife encounters and the experience of natural soundscapes. We offer this as the foundation for a second phase of research which targets winter use in Yellowstone National Park. It is our intent for the proposal to be thorough enough to develop an amendment to our existing grant, yet draft enough to allow considerable input by park management to ensure the instruments, procedures and resources will offer the most utility possible from the knowledge constructed.

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Winter Visitor Experiences in Yellowstone National Park: Visitor Perceptions of the Natural Soundscape and of Interactions with Bison

Yellowstone National Park is arguably the most well known national park in the world. Visitation to Yellowstone has exceeded three million annual visitors several times in the past 12 years. On a busy summer day, the 30,000 plus people traveling within the park mostly stay close to roads and attractions. Thus, while the geography of the park includes over two million acres of land (90% of which is recommended as wilderness), visitor management within the park is highly similar to what would be involved in an urban proximate park.

The management of winter use has been of growing concern to the National Park Service since the mid 1980s as the popularity of snowmobiles has grown in American culture (Yochim, 2003). As planning to organize winter access explicitly started in the 1990s, broader interest groups began pressuring park management through lawsuits to prioritize specific resource values such as wildlife habitat, economic development and public access (Sacklin et al. 2000).

Winter use plans have prescribed two general forms of snowmobile management in the past decade: completely eliminating snowmobile access to the park or providing a limited amount of access under a guided management regime. At the heart of this planning has been competition among the basic goals of national park management: protecting park resources in an unimpaired fashion while providing for visitor access and enjoyment. Human – bison interactions and impacts are a physical manifestation of this basic tension: viewing bison is a primary motivation for many winter visitors but visitor behaviors associated with viewing may impact bison behavior raising questions about whether this impairs values visitors and the public at large hold with regard to YNP's bison. Similarly, the agency strives to preserve natural soundscapes in part because of the effect sounds can have on wildlife and because people value natural sounds in the type of wilderness settings many associate with national parks. Thus understanding how visitors perceive human – bison interactions and park soundscapes are important inputs in helping the park managers understanding how winter use impacts important park resources and values.

While each of these resources (bison and the natural soundscape) has been monitored in the park, an understanding of how they are perceived and experienced by visitors remains

incomplete. This proposed study is designed to provide park managers with specific information on visitor perceptions of the experience of the natural soundscape and of human interactions with bison within the range of winter experiences that occur in Yellowstone. This information will assist managers in understanding the affects of current and proposed management actions on visitor experiences while learning how to maximize the impact of those actions on desired outcomes.

Research Topic One: The Experience of the Natural Soundscape

Natural soundscapes are becoming increasingly valued and appreciated as important resources. Natural soundscapes act as a motivation for recreational use and are valued by visitors (Driver et al., 1991; Kariel, 1980). Current research dealing with soundscapes and the visitor experience focus heavily on dose-response relationships dealing with aircraft overflight and levels of visitor annoyance. The current state of research exhibits a lack of knowledge concerning the actual experience of natural soundscapes. Little is known about the process and actual dimensions of the experience of natural sounds in parks. The purpose of this portion of the proposal is to lay out the background and objectives of studying the dynamics of the winter visitor experience of the natural soundscape in Yellowstone National Park. Mapping the dimensions of the soundscape experience now may be used to shape future policy that affects the quality or preservation of natural soundscapes.

National Park Soundscapes as a Resource

The National Park Service Organic Act states that the Park Service will "conserve the scenery, the natural and historical objects and the wild life therein…" The now expired Director's Order #47 (2000) also states that "an important part of the NPS mission is to preserve and/or restore the natural resources of the parks, including the natural soundscapes associated with units of the national park system." Natural sounds are considered to be an intrinsic element of what the Park Service is mandated to conserve.

The 1995 *Report on Effect of Aircraft Overflights on the National Park System*: *Executive Summary Report to Congress* acknowledges that resource conservation is the primary

responsibility of the Park Service, according to the Organic Act as amended by the Redwood National Park Act of 1978.

The 2001 National Park Service "Management Policies" contains sections dealing specifically with the preservation and management of soundscapes. In these policies, the agency reiterates that, as part of its effort to maintain the parks for future generations, when there is a "conflict between conserving resources and values providing for enjoyment of them, conservation is to be predominant" (National Park Service, 2001). The directive again establishes that natural soundscapes are considered a park resource. In regards to external threats to the parks, the directive states that:

> Recognizing that parks are integral parts of larger regional environments, the Service will work cooperatively with others to anticipate, avoid, and resolve potential conflicts; protect park resources and values; provide for visitor enjoyment; and address mutual interests in the quality of life of community residents, including matters such as compatible economic development and resource and environmental protection. (National Park Service, 2001)

The Park Service should also take a leadership role and be proactive when issues arise that may affect a park's resources. In the section regarding restoration of natural systems, restoring natural soundscapes is specifically called for (National Park Service, 2001).

Perhaps most importantly, the NPS Policies state that superintendents will use appropriate management planning to identify the acceptable levels of human-caused sound throughout a park. The Park Service will then take action to deal with inappropriate sounds by preventing or minimizing them. Visitors to the parks will not be allowed to engage in activities that unreasonably interfere with "the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park" (National Park Service, 2001).

Positive and Negative Effects on the Experience of the Natural Soundscape

The vast majority of visitors to national parks feel that an important part of their visit is to enjoy natural quiet and the sounds of nature (Mace, Bell & Loomis, 2004; National Park Service, 1995). In wildland settings, people tend to be very sensitive to even low levels of sound from

human sources. This holds true for both studies conducted in the field and in laboratory settings (Mace, et al., 2004). Noise in parks can also be annoying or intrusive to visitors (Miller, 1999) and can detract from their enjoyment of the experience.

Previous social research on natural soundscapes is composed primarily of dose-response studies which demonstrate negative effects of mechanized sounds on the visitor experience (Fidell et al, 1996). Mace et al. (1999) employed a laboratory design by asking respondents to compare slides of Grand Canyon landscapes coupled with natural sounds and those of aircraft and helicopter overflights. They found consistent negative effects of aircraft sounds on participant assessments of naturalness, preference, beauty, annoyance, tranquility, and solitude.

Other studies have assessed the relationship between the soundscape and recreational conflicts. Vitterso et al. (2004) conducted an experimental study where two groups of skiers responded to a questionnaire about their emotional state and mood. One group was exposed to snowmobile sounds during their ski, while the other group was not. Results showed that the emotional state of skiers who encountered the snowmobile noise was impacted negatively.

Additional research has demonstrated the restorative effects of natural sounds on park visitors (Anderson et al., 1983; Hartig et al, 1991; Kariel, 1980; Ulrich et al., 1991). One experimental study by Hartig et al. (1991) asked participants to engage in activities which cause mental fatigue and then assigned them to treatment groups: reading magazines indoors and listening to music, walking in a clean urban area, and walking in a regional park next to a stream. Individuals who walked in the park exhibited greater improvements in their psychological states than did other groups.

Freimund et al. (2002) investigated visitor tolerance for frequency of hearing motorized transportation. They employed video surveys to assess visitor norms for sounds from aircraft overflight and motorized boats in different settings. Their results show that front country visitors exhibited a higher tolerance than backcountry visitors for such mechanized sounds.

A recent study by Grau (2005) used a multi-sensory approach by incorporating different sounds into a visual crowding model. Survey respondents evaluated slides of Zion National Park representing different levels of visitor density. These images were shown with and without different levels and types of sounds. Participants were exposed to natural as well as man-made sounds such as talking and laughing. The results suggest that sounds are just as, if not more, important than other setting attributes in providing visitor satisfaction.

Newman et al. (2005) recently studied the emotions and thoughts visitors associate with the hearing of particular sounds at Muir Woods National Monument. Participants in different locations within the National Monument were asked to close their eyes and listen to all of the sounds they could hear in that area. Following the listening exercise, participants completed a survey identifying what sounds they heard and rated them on a scale from very pleasant to very annoying. Visitors consistently appreciated natural sounds more than human-caused sounds.

Understanding Visitor Experiences

Studies addressing the dynamics of visitor experiences have done so in different ways; however, no research has been conducted on the actual experience of natural soundscapes. Some researchers studying the dynamics of the wildland experience have assumed that the visitor experience could be understood as goal-directed and have employed an expectancy-valence framework. These studies explored the relationship between environmental settings and resultant desired psychological experiences. These approaches evolved to include Experienced-Based Management (Manfredo, 1992) and Benefits-Based Management (Driver et al., 1999). Visitor satisfaction models are often employed under this approach. As traditionally applied, this approach neither explores visitor meanings of the experience nor how those meanings influence and are influenced by a particular setting. More recently researchers have suggested supplementing the traditional EBM approach with research that focuses on the actual nature and meanings associated with the visitor experience itself rather than on ratings of desired outcomes/goals alone (Duffus and Wipond, 1992; Montag, Patterson, and Freimund, 2005; Patterson, Watson, Williams, and Roggenbuck 1998).

As researchers began to question the adequacy of the expectancy-valence model for understanding wildland experiences, an *in situ* approach was introduced to the study of the visitor experience and the elements that affect it (Hull et al., 1992; Larson and Csikszentmihalyi, 1990; Stewart and Cole, 1999). The *in situ* approach emphasizes that experiences are processes rather than end states. These studies question when the experience should be sampled; for example in expectancy-valence type studies, visitors are sampled after the experience occurs as a global, post-trip assessment, whereas *in situ* research focuses on multiple sampling during the experience. A key goal of *in situ* research is to evaluate visitors' states of mind as close to the moment of actual experience as possible.

Borrie and Roggenbuck (2001, p. 202) have taken this analysis a step further, by describing wilderness experiences as "dynamic, emergent, and multi-phasic". They sampled individual visitors multiple times at the Okefenokee National Wildlife Refuge by giving them beepers during their river trips. The beepers were programmed to go off at random points during the trip. Participants were asked to fill out a questionnaire each time they heard their beeper sound. The results indicate that there are three phases of the wilderness experience with unique characteristics: entry, immersion, and exit phases. Patterson et al. (1998) understands recreation experiences as similarly complex and conducted a qualitative study at Ocala National Forest in Florida finding four coherent dimensions of wildland visitor experiences.

While some soundscape studies have dealt with acceptability of natural and human-caused sounds, Gramman (1999) notes that it is unclear that annoyance or interference of human-caused sounds in the natural soundscape is a useful indicator of experience quality. Little is known about the actual dynamics of the experience of natural soundscapes. There is an absence of research providing empirical documentation of the phases and process of experiencing natural sounds. Further, Gramman (1999) also identifies the need to better understand visitors' perceived need for mechanized sounds (such as automobiles, aircraft, and oversnow vehicles) and to assess how that influences evaluations of the park soundscape. We propose here to address both of these knowledge gaps: mapping the dynamics of the natural soundscape experience as well as garnering information on visitors' perception of the practical need for mechanized noise in the park.

Soundscape Research Questions

After our initial scoping visits to YNP in February, we were able to assess that visitors seem willing and able to discuss their experiences of natural sounds during their visit to the park. Given this and the aforementioned knowledge gaps in soundscape research, we propose to direct our study toward the dynamics and overall sensory experience of the natural soundscape by addressing the following research questions:

Objective 1: To better understand the actual dynamics of the experience of natural sounds

- When and where is it that visitors begin to notice the natural sounds of the park?
- What are the phases of the winter soundscape experience? Are there distinct phases of the experience of the natural soundscape that each exemplify unique characteristics? What exactly are the dynamics of the experience of natural sounds?
- What is unique about the YNP winter experience? What is the role of natural sounds in that unique experience? What is special about the winter soundscape?

Objective 2: To better understand visitor perceptions of the practical need for mechanical sound presence during a park visit

- How do visitors understand the existence of mechanical noise in the YNP winter experience? For example, do they differentiate between types of vehicles or those used by staff rather than visitors? How do human voices factor into the visitor's sense of noise?
- Do they see some/all/no mechanical noise as part of larger societal needs (e.g., need to allow/restrict oversnow vehicle transportation)? What tradeoffs are visitors willing to make between their optimal desired soundscape experience and larger social realities and needs?

Soundscape Procedure

The proposed research (winter of 06-07) will consist of site visits for the purposes of conducting interviews with visitors in several locations within the park. A semi-structured interview guide will be developed in cooperation with park management to reflect the questions just stated in Objectives 1 and 2. The use of interviews will allow for greater depth of understanding to emerge concerning the dynamics of the sensory experience of natural sounds. Providing analysis of a cross-section of visitor responses including snowmobilers, snow coach riders, and cross-country skiers will be an essential aspect of the study design. We anticipate some variation across visitors participating in differing activities which will be important to

account for when mapping out the dimensions of the experience of the park soundscape. The results of this study will address critical gaps in knowledge concerning the role of the natural soundscape in the winter visitor experience which may be used in developing and assessing future park policies.

Interviews will be conducted on approximately 20 days in January, February and possibly early March of 2007. Visitors will be contacted at the Snow Lodge and Visitor Center in the Old Faithful area. It is anticipated that interviews will average 30 minutes in length. Based on previous experience with interview-based research of this type and the nature of the questions being asked (Montag, Patterson, and Freimund, 2005; Patterson, Watson, Williams, and Roggenbuck, 1998; Patterson and Williams, 2001; Pohl, Borrie, and Patterson, 2002) we believe a sample of 40-50 will be large enough to provide significant insight into the questions being asked, but still fall within the researchers' capacity to conduct, analyze and present a detailed analysis. A more detailed explanation of this research approach and sampling logic is included in Appendix A while a copy of the interview guide is included in Appendix B.

Research Topic Two: Visitor Perceptions of Interactions with Bison

Recreational wildlife viewing is a central motivation for many visitors to YNP. A recent study of winter visitors to YNP found that wildlife viewing ranked second in importance as a motivation for visiting YNP behind only enjoying natural scenery (Davenport, Borrie, Freimund, and Manning 2002). The more focused wildlife oriented goal of viewing bison in their natural habitat was found to rank fourth in importance across the sample of visitors. Yet despite the importance of viewing wildlife in general, and bison in a natural setting specifically, this study also found that winter visitors on average were at best neutral toward, and often did not support, various proposed management actions to regulate winter recreation and protect bison herds in the park. Davenport et al. suggested that this lack of support for management actions may in part have reflected visitors' rejection of restrictions that would diminish their experience (indeed 'having fun' was the third most important motivation for the visit). They further noted that some visitors were philosophically opposed to restricting access to the park. However, their research also suggested that these factors alone did not seem to adequately explain visitors' views about the proposed management actions. Visitors also appeared to be influenced by their experienced-

based impressions that bison often seemed to be indifferent to human presence. Other visitors noted that while bison appeared to be agitated at times, overall they felt human-bison encounters had little effect on the bison. Thus, the researchers concluded that while winter visitors were not adamantly opposed to measures to protect bison, many winter visitors appeared hesitant to support restrictions on their own recreation experiences without credible scientific proof that adverse impacts were occurring. Further, in interviews centered around management, some visitors questioned managers' agenda in regard to management strategies that placed restrictions on visitor use. Overall, Davenport et al. (2002, p. 62) concluded that winter visitors' reactions reflected a "complex interaction among the visitor's philosophic orientation toward the park and the logistics of their visit," all of which influenced visitor support for management.

These researchers pointed to a need for establishing an expanded conceptual framework as a basis for understanding and explaining how visitors perceive and assess management of human-bison interactions/conflicts. Further, since the 1998/1999 winter visitor study, there have been several developments. First, more recent "scientific proof" based on monitoring wildlife responses to motorized winter recreation has suggested that "the debate regarding the effects of motorized recreation on wildlife is largely a social issue as opposed to a wildlife management issue" (White, Davis, and Borkowski, 2005). This confirms the impressions of some of the visitors in Davenport et al.'s study (at least at a population stability level). Second, management of winter use within the park has changed. This change may have affected the nature of winter experiences and human-bison interactions, visitor impressions, and the population of winter visitors. In fact, looking at Davenport et al.'s (2002) study results suggests the possibility that the social debate about snowmobile access in the park running concurrently with their research may have influenced some respondents' perceptions and responses. Access was a major issue in the debate and some visitors were strongly opposed to limiting visitor access on philosophical grounds. Third, recent research provides additional insights for exploring how visitors perceive human-wildlife interactions. For these reasons, a follow-up study exploring YNP winter visitors' perceptions of human-bison interactions would be appropriate.

The wildlife oriented phase of this research project will focus on bison since this species is highly visible, a major attraction for winter visitors, and has been of particular concern/focus with respect to potential impacts of winter recreation use. As with the management of other natural resource values, the National Park Service has a dual mission with respect to bison

management. The first is a stewardship role. Originally the notion of stewardship focused primarily on conserving wildlife populations and maintaining their capacity to produce future generations. However, societal changes associated with urbanization, trends toward a greater focus on the cultural and symbolic meanings of wildlife, increased concern for the treatment of animals, and an expanding segment interested in including animals in the moral community (Kearns, 2001; Montag, Patterson and Freimund, 2005; Sutherland and Nash, 1994) have led to a broadening in perspective on the agency's stewardship role among a portion of the public. In addition to species and population conservation, a growing number of visitors now also associate the agency's stewardship role with protection of the welfare and well-being of individual animals and with the protection/proper management of the cultural and symbolic values these animals represent to American society. The second role stemming from the agency's mission is that of a facilitator in which the goal is to provide opportunities for people to benefit from interacting with wildlife in personally meaningful ways. This aspect of the mission is primarily associated with facilitating recreational opportunities. The types of visitor perceptions assessed in the wildlife-related portion of this study will focus on visitor appraisals related to these two dimensions of the National Park Service's mission that stem from the human-bison interactions they experience or witness during their visit to YNP.

Past research on visitor appraisals associated with wildlife viewing experiences fall broadly into two classes: affective appraisals and normative appraisals. Affective appraisals refer to judgments or evaluations visitors attribute to a place, object, or event based on experiences (Russell and Snodgrass, 1987). According to Russell and Snodgrass, these appraisals are viewed as a quality of the place, object, or event being appraised, which distinguish them from other emotional events such as moods or emotional dispositions. Normative appraisals refer to prescriptive judgments about the acceptability of situations encountered. Each of these types of appraisals is discussed in greater detail below.

Affective Appraisals

Two different research traditions exploring affective appraisals have been evident in wildlife viewing research. The first tradition stems from the fields of outdoor recreation and consumer behavior research and represents the earliest tradition of research in wildlife oriented recreation, dating back to the 1970's. This research tradition is most closely linked to the role

NPS managers play in facilitating recreation experiences. Research in this tradition focuses on judgments related to the quality of the experience itself. Satisfaction has generally been viewed as the appropriate surrogate for evaluating quality of visitor experiences (Brown, 1988). Under this model satisfaction judgments are thought to reflect the extent to which outcomes realized from an experience match the outcomes expected and desired by visitors (Oliver and Desarbo, 1988; Williams, 1989). Early satisfaction research focused on appraisals of the overall experience but subsequent research also focused on appraisals of specific aspects of the experience (Graefe and Fedler, 1986) which are important contributors to overall satisfaction. More recently, in the context of zoo visits, Tomas et al. (2002, 2003) explored visitors' appraisal of the quality of service performance.

The concept of "quality of service performance" shares the same theoretical basis as overall satisfaction. However, it differs from satisfaction in that it focuses more narrowly on the attributes provided/controlled/supplied by recreation managers including service and the tangible nature of the opportunity and focuses on the notion of management performance (Tomas et al. 2002). In contrast, overall satisfaction relates to judgments about the experience as a whole. The latter (overall satisfaction) is affected by a number of factors, many of which are less likely to be attributed to management (weather, social interactions with companions, experience level of participants, etc.). Because of the concept's narrower and more management related focus, this research project will emphasize visitor appraisals related to the quality of service performance modeled after the research on zoo viewing experiences by Tomas et al. (2002, 2003).

The second research tradition on affective appraisals in relation to wildlife viewing stems primarily from research on visitors in zoos (Finlay, James, and Maple, 1988; Reade and Waran, 1996). It is distinguished from the satisfaction research tradition described above primarily in terms of what visitors are being asked to appraise. Satisfaction-related appraisals focus more on evaluations of the event (the experience resulting from the visit). This second research tradition adopts a more animal centered focus with respect to visitor appraisals. These animal centered appraisals may be associated with either aspect of the National Park Service's dual mission. For example, from a recreation standpoint bison may be appraised as an object suited (or not) for recreational enjoyment (entertaining vs. boring; active vs. passive; exciting vs. dull, etc.). From a stewardship standpoint, bison encountered also may be appraised as an independent "subject of

life" in terms of how their well-being is appraised (healthy vs. unhealthy, distressed vs. tranquil, happy vs. unhappy, etc.). The visitor interviews by Davenport et al. (2002) suggested that this type of appraisal was an important factor in their views about management (i.e., bison largely seemed indifferent to human presence and this was one of the reasons some visitors were not supportive of management restricting visitor experiences). Also from a stewardship standpoint the bison encountered may be evaluated in light of cultural and symbolic meanings such as those associated with wildness (tame vs. wild, free vs. restricted, dangerous vs. safe, etc.). This study will assess these types of visitor appraisals as well drawing upon prior wildlife viewing literature (Finlay, James, and Maple, 1988; Reade and Waran, 1996) and the more general literature on environmental appraisal in environmental psychology (Russell and Snodgrass, 1987).

Normative Appraisals

Normative research emerged as a prominent research tradition for assessing visitor appraisals in outdoor recreation research in the late 1970's (Vakse et al., 1986). The initial premise underlying normative theory in recreation research was that norms represent standards or rules of behavior that prescribe what is acceptable, that are shared either by society as whole or by identifiable social groups within society, and that are supported by social sanctions within the relevant group when violated (Patterson and Hammitt, 1990). Since its introduction, normative research has been applied to a variety of recreation contexts ranging from standards for visitor encounters, standards for resource conditions, and appraisals of when lethal action is an appropriate management option for addressing wildlife conflicts (Wittmann, Vaske, Manfredo, and Zinn, 1998). The initial interest in, and subsequent prevalence of, normative theory-based research in outdoor recreation stems from the prospect that it could provide a means to help managers make evaluative management decisions (what is or is not acceptable) by identifying socially shared consensus about what is acceptable. This in turn would provide greater legitimacy for managerial decisions involving visitor regulations.

Some of the original premises which prompted the initial interest in normative research have been debated (Patterson and Hammitt, 1990; Roggenbuck, Williams, Bange, and Dean, 1991; Shelby and Vaske, 1991), specifically the notion of whether social consensus exists and how it can be empirically documented, whether the notion norms can be extended to included resource conditions as well as behavior, and whether norms truly exist when there is no realistic

opportunity or likelihood of social sanctions (for example number of encounters). However, regardless of the ultimate answer to these theoretical questions, a normative research tradition remains a valuable means of studying visitor appraisals both in general and this research project in particular.

Like the satisfaction research tradition described above, the normative approach focuses on visitors' appraisals of events (interactions they experience or witness) rather than appraisals of bison themselves. However, the nature of the appraisal normative approaches assess is different from the nature of appraisal assessed in satisfaction research. Satisfaction measures reflect judgments that are preferential in nature (e.g., like/dislike) and are related to the hedonic nature (pleasurableness) of the experience. In contrast, normative appraisals focus on the acceptability or appropriateness of events. Thus they reflect judgments along the lines of what is legitimate or ethical rather than what is pleasurable. With regard to the National Park Service's stewardship role, this latter form of judgment (acceptable, appropriate, legitimate) is a central question. Therefore, this study will include a normative event-oriented measure of acceptability that is separate and distinct from preference/pleasureableness event-oriented measures discussed above.

Factors that May Influence Appraisals

A variety of factors can influence visitor appraisals of the sort described above. Thus, in addition to measuring visitor appraisals of human-bison interactions the study also will measure several factors that may play a prominent role in shaping and influencing visitor appraisals.

One obvious factor is the nature of the interactions between humans and bison that visitors either experience directly or witness. Two of the central measurement questions here are the means of representing the interactions and the unit of analysis. Due to the situation-specific nature of human bison interactions, a means of measuring this factor will have to be developed specifically for this study (as opposed to drawing upon or adapting a measure developed in prior research as described for the visitor appraisals above). Our measure of the nature of interactions will be developed based on our observations during two exploratory visits in the winter of 2006. Where possible the survey-based measure will seek to parallel those measures used by wildlife biologists assessing wildlife responses to motorized winter recreation use in YNP over the last several years (White et al., 2005) to facilitate the complementariness of the two research initiatives.

The other key measurement concern on this factor is the unit of analysis. In this context, unit of analysis refers to the temporal unit (time span) in which visitors are asked to describe/characterize their visit. In this research we would like to capture some sense of visitors' perceptions of the occurrence/prevalence of different types of interactions in order to facilitate comparisons with systematic monitoring conducted as part of the wildlife responses to motorized winter use monitoring. However, global measures associated with the entire trip are not the most appropriate bases for analyzing visitor appraisals. As Stewart and Cole (1999) note, global measures force visitors to lump what are actually numerous individual evaluations into a single overall evaluation. Such an approach is deemed particularly inappropriate when specific situational factors influence the evaluation, as will likely be the case in the present research. Therefore, we will seek to associate visitor appraisals with specific events rather than the trip overall. To accomplish this, for appraisals that require judgments that might vary across situations, we will ask visitors to identify specific human-bison interactions they experienced/witnessed. We will then ask them to characterize an interaction and to respond to the relevant appraisal questions.

A second factor that may influence visitor appraisals of bison and the human-bison interactions they witness are the symbolic meanings/values that visitors hold with respect to wildlife. In this study, symbolic meanings refer to values and beliefs about issues such as the role that animals play in society, animal rights, and the appropriate relationship between humans and wildlife. Measures of these type of symbolic beliefs will be drawn or adapted from existing scales (Bright and Manfredo, 1996; Teele, Dayer, Manfredo, and Bright, 2005). The nature of a visitor's beliefs about the purposes of national parks in general may similarly have an influence on their appraisals of human-bison interactions. Measures of the perceived purposes of parks will be drawn from existing studies at YNP and other wildlife-oriented recreation research (Borrie et al, 2001; 2002; Reade and Waran, 1996).

Finally, visitors' goals and motivations for a particular visit may also have an influence on their appraisals of bison and human bison interactions. There is a long tradition of measuring visitor motivations/goals in both general and wildlife-oriented recreation research (Driver, Tinsley, and Manfredo 1991; Manfredo, Pierce, Vaske, and Whittaker 2002). Similarly, the guide with whom visitors are traveling in Yellowstone (all winter visitors must tour the park with

a commercial guide) may significantly influence their perceptions of the park and its management.

Bison Encounter Research Questions

Objective 3: To better understand visitor appraisals of human-bison interactions associated with mechanized winter use in YNP.

While the soundscape research objectives adopt the more general goal of exploring the nature and dynamics of the experience, the human-bison interaction aspect of the research adopts the more focused goal of exploring how YNP winter visitors appraise human-bison interactions they observe during their visit. The primary goals of this aspect of the research are to explore snowcoach and snowmobile winter use visitors' appraisals of the human-bison interactions they witness during their visits, to analyze situational and visitor characteristics that might influence those appraisals, and to explore visitors' normative judgments about when consequences of winter use for bison are serious enough to warrant management intervention regulating or restricting visitor experiences. More specific research questions to be explored include:

- What is the nature of interactions between humans and bison that winter visitors observe?
- How do visitors appraise those interactions in both affective and normative senses?
- How are affective and normative appraisals related to or associated with the specific recreation visit (e.g., the nature of the wildlife interactions observed, symbolic beliefs about wildlife, and beliefs about the purpose of national parks)?

Visitor Perception of Human-Bison Interactions Research Procedures

To address the questions outlined in Objective 3, a survey will be conducted of visitors to Old Faithful during January-Early March, 2007. Sample times will include one 8-10 day period during January, and three- four day periods during February and early March. Sample periods will be selected to ensure a balance of weekend and week-day periods and distribution across the winter season. Some constraints will be imposed on the sampling window to accommodate interviewer schedules and available housing. We will seek a minimum of 300 completed questionnaires which would require obtaining an average of 20 questionnaires per day on 15

days. Our goal will be to attain 450 completed questionnaires, which would require an average of 30 completed questionnaires on 15 days of sampling. We will plan for 19 days of sampling with the assumption that weather conditions or other unseen events could reduce the effective number of days in the field.

On selected sample days, visitors will be contacted at the Old Faithful Area. Data collectors will approach visitors while they are waiting for the geyser to erupt and ask them to fill out the questionnaire on-site. Data collectors will begin with the first available visitors and move on to the next available visitors as participants finish the questionnaire. Given the use patterns at Old Faithful, we anticipate that most data will be collected between 10:00 AM and 3:00 PM. All visitors over 17 years of age will be eligible to participate. Data collectors will introduce themselves as students from the University of Montana working in cooperation with YNP. They will alert the visitors that participation is voluntary and that visitor anonymity will be protected. The questionnaire should take approximately 13-15 minutes to complete on average.

A draft questionnaire is presented in Appendix C. The instrument is divided into five sections. The instrument begins with some basic questions about the visitor's trip. The second section focuses in on specific encounters with bison that the visitor has had that day. Here the visitor will describe the number of encounters they had and the responses bison had during those encounters. After question seven the visitor will be asked to describe specific encounters that led to positive or negative reactions by the bison. If they identify a negative reaction, the remaining encounter questions (q8-q12) will be dedicated to that incident. If they did not have a negative encounter, the remaining encounter questions (q8-q12) will be directed to the bison encounter that had the most positive influence on their experience. The third section of the questionnaire (q13-q15) addresses the visitors' general perceptions of bison. These questions focus on service quality, symbolic values and normative judgments. The fourth section of the questionnaire addresses the visitor's general perception of the Yellowstone's conditions and purpose. The final section provides demographic background on the participants. Sections 1, 4, 5 are all comparable to previous studies conducted on Yellowstone's winter users previous to the current management regime. While the sampling procedures are different, this will still be insightful in seeing how visitors, their values, and trip characteristics may be changing over time.

Table 1. Proposed schedule for research: exploration of the role of the natural soundscape and wildlife interactions in the context of their importance and dimensionality within the winter experience.

Action	Time period
Data Collection: on site interviews on the experiences of the natural soundscape and questionnaires administered on the role of wildlife	January-March 2007
Data analysis and interpretation	April – June 2007
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Appendix A: Interviews as a Data Collection Method for Research on the Experiences of the Natural Soundscape

Research Design

The purpose of this approach is to obtain an in-depth understanding of visitor experiences of the natural soundscape and to better understand the context within which soundscape policies affect the visitor experience. We will be able to address, for example, how visitors understand their experience of natural sounds, how their experiences are influenced by the various situations in which they occur, what visitor perceptions of the necessity of some mechanical noise in the park are, how visitors are affected by natural sounds, and what the actual experiences of park sounds are on the ground. The goal of this approach is to provide a detailed description of the range of experiences of the natural soundscape, rather than to determine the extent to which different types of experiences are distributed across the visitor population.

All research strategies possess different strengths and limitations. Interviews are neither superior nor inferior to a questionnaire; however each approach does possess unique strengths and limitations. An interview approach to data collection allows for more in-depth and valid description of the experiences of the natural soundscape than questionnaires for several reasons. First, interviews do not impose the kinds of highly limiting and restricted research assumptions (often found in survey research) concerning what information, issues, and meanings are relevant. Second, interviews allow the researcher the opportunity to both clarify responses and probe more deeply for information. Using general lead-in questions, clarification questions, and probes throughout the interview, the researcher allows the respondent to bring to light issues salient to his or her experience while simultaneously ensuring that aspects relevant to the research project are addressed. Interviewing allows the researcher to explore complex phenomenon more meaningfully by going beyond categorical responses and into the terrain of multifaceted descriptions of human experiences. An ideal interview is one where the interviewer leads the respondent to particular themes, but allows them to express the particular meanings relevant to those themes (Kvale, 1983; Patterson and Williams 2001). Interviews as such are perhaps best described at “directed conversations” (Charmaz, 1991:385; Patterson and Williams 2001).

While the depth and richness of data produced from interviews is superior to that produced by survey research, interview data are also subject to certain limitations.

Implementation of the research instrument (the interview itself) and analysis of interview data is more time-consuming and less efficient than survey research. Additionally, the very context sensitivity and richness of the data generated from interviews leads to a reduction in the ability to generalize from individual cases to larger populations. In our case, however, we are interested in exploring the dimensions and complexities of the experiences of the natural soundscape in YNP, something that previous research has not addressed. Providing the range of rich, multi-faceted experiences serves our purpose to a greater degree than collection of data which may be more highly generalizable, but also greatly reduced in complexity and depth.

Given that this study proposes to map out the dimensions of the experiences of natural sounds by describing the range of experiences that currently exist among winter visitors to YNP, an interview approach is the best suited research strategy; human experiences are complex, need to be fundamentally understood in terms of their richness, and are more readily explored in an interview rather than a survey approach. Due to the very fact that data produced from interviews allows us greater depth in exploring the experiences of the natural soundscape, this data will necessarily be more context-sensitive, providing more comprehensive data than a survey approach (Flyvbjerg, 2001). Interviewing will generate knowledge that can account for complexity, multiple dimensions of experiences, and variation in context.

Sampling

Determining the sample size for a study of this nature requires balancing three factors. First, the sample needs to be large enough to capture the range of diversity within the population. Second, the sample needs to be large enough to provide insight into commonalities within the population, to provide insight into differences within the population, and to offer the possibility of seeing patterns that might be associated with the differences in experiences. The third factor deals more with the maximum suitable size of the sample and its explanation requires a brief overview of the nature of the database constructed from the study. The data in this study will consist of tape-recorded and transcribed interviews which we anticipate will each typically be approximately thirty minutes in length. Unlike quantitative data where data are represented and structured in a way that allow computer algorithms to conduct the analysis, or content analyses which entail counting the occurrence of terms or concepts in the interview text, analysis of these interviews will follow a more holistic iterative process during which researchers repeatedly read and code interviews. With this approach to analysis, at some point the amount of data becomes

so cognitively overwhelming that it exceeds the researcher's ability to identify and grasp new patters within and across interviews. Therefore, the sample size should not exceed the researcher's cognitive capacity in this regard. Based on previous experience with this type of research and the nature of the questions being asked (Montag, Freimund, and Patterson, 2000; Patterson, Watson, Williams, and Roggenbuck, 1998; Pohl, Borrie, and Patterson, in press) we believe a sample of approximately 40-50 total interviews will be large enough to provide significant insight into the questions being asked, but still fall within the researchers' capacity to conduct, analyze, and present a detailed analysis.

Our most important criterion is to ensure representation of the major visitor user groups: snowmobilers, snowcoach riders (whose primary purpose in the park is not to ski), and cross-country skiers. A sample of approximately 13-16 interviews for each of these three user groups will allow us to look at characteristics occurring within each user-group as well as characteristics occurring across user-groups. In a further effort to achieve a diversity of respondents we plan four data collection visits to YNP distributed across the winter use season. In addition, we will select respondents based on other identifiable visitor characteristics such as age, sex, group size, and group type (couples, families with small children, friends, etc.).

Data Collection

Interviews will be conducted at and around Snow Lodge and Old Faithful and will rely on an open-ended, in-depth interview process assisted by the use of an interview guide. An interview guide (Patterson et al. 1998, Charmaz 1991, Kvale 1983) identifies themes to be addressed in the interviews. A series of possible lead-in questions for each theme ensures that interviews are systematic and focused enough to cover relevant information while also allowing the responses to be comparable across interviews (Patterson et al. 1998, Charmaz 1991, Kvale 1983). Interviews will be tape recorded and transcribed verbatim. Approaching interviews in this way will provide the flexibility needed to be responsive, to explore emergent information, and to gain clarity as necessary. Upon completion of the semi-structured interview, the respondent will be asked to complete a 10-item questionnaire focused on socio-demographic information. The interview guide and 10-item questionnaire are included in Appendix B.

Data Analysis

Interviews will be analyzed by developing an organizing system using NVivo (qualitative analysis software). The purpose of an organizing system (Patterson et al. 1998, Tesch 1990) is to identify predominant themes that emerge from the interview process, according to which the data can be meaningfully organized, interpreted, and presented. The process of developing an organizing system is the 'analysis', while the final organizing system is the product of the analysis. The development of an organizing system is a systematic process beginning with the identification of meaningful sections of the interviews, followed by the identification of themes, and ending with an analysis of the interrelationships among these themes.

Appendix B: Interview Guide - Experiences of Natural Soundscapes

Visitor Characteristics

1. How often do you visit National Parks?
    A) Yellowstone National Park?
    B) In Winter?
2. How did you enter the park today?
3. What is the primary purpose of your visit today? (skiing, snowmobiling, watching wildlife, snowcoach ride, etc.)

Undirected Broad Experience Questions

1. What attracted you to visit YNP during the winter?
2. Could you describe what your visit was like today?
3. Is there anything that really added to your experience today?
4. Is there anything that detracted from your experience today?

More Directive Sound Questions

1. How important are the sounds of the park to you and your visit?
2. Would you describe what the sounds of the park were today?
3. When do you begin to notice the sounds of the park?
4. Could you describe the experience of noticing the sounds of the park? What is that like?
5. Was there a single sound experience, whether human or natural, that distinctly affected you or that really stands out in your experience today?

Natural Sounds

1. What does YNP sound like in winter?
2. What does a geyser sound like?
3. What is the sound of snow falling?
4. What is important to you about the natural sounds of the park?

Mechanical and Human Sounds

1. Could you describe how the sounds of snowmobiles and snowcoaches affect your visit?
    A) How do you feel about these sounds?
2. Are there any other human-caused sounds that affect your visit?
3. How do you feel about the different types of vehicles (snowmobiles and snowcoaches) used within the park?
4. How necessary do you see the use of snowcoaches and snowmobiles in the park?
5. Are there any circumstances under which you would support restrictions on the use of snowmobiles and snowcoaches?

6. Could you envision a situation where there was too much noise from snowmobiles and/or snowcoaches or visitors in the park?
    A) Could you describe that situation?
    B) In that situation, how would you best like to see the park sounds or visitors managed?
7. What would the park sound like in your ideal winter visit?
    A) Did you have this experience?
    B) Is this type of experience realistic?
8. What would you be willing to trade in exchange for a visit that aligns more closely with your ideal? (Restricted visitor access? Restrict oversnow vehicle transport? In certain locations?)
9. What suggestions would you have for creating a park visit that aligns more closely with your ideal?

In addition to the questions in the interview guide, the following questions about trip characteristics will be asked during the interview to parallel the visitor information collected with the survey in Appendix C.

About Your Trip

1. What type of group were you with on the trip when you were interviewed? (check all that apply).
    - ☐ alone
    - ☐ family
    - ☐ friends
    - ☐ outfitter/guide group
    - ☐ organization or club (name of organization/club)_____

2. Which of the following best describes your primary mode of transportation while you were within Yellowstone National Park? What activities will you engage in during your visit? (check all that apply)

Primary Transportation		Activity
☐	snowmobiling	☐
☐	skiing	☐
☐	snowshoeing	☐
☐	snowcoach touring	☐

☐ other (please specify)_____

3. During your visit to the Yellowstone area, how many days will you recreate within Yellowstone National Park? _____

4. While on your trip to the Yellowstone area, will you also do the following activities in other areas (such as nearby National Forest lands or National Parks)?:

Activity	Number of days
snowmobile	_____
cross-country ski	_____
down-hill ski	_____
snowshoe	_____

About You

5. What is your gender? (check one) ☐ Female ☐ Male

6. What is your age? _____

7. What is the highest level of education you have completed? (check one box)

   - ❒ 8th grade or less
   - ❒ Some high school
   - ❒ High school graduate or GED
   - ❒ Some college, business or trade school
   - ❒ College graduate
   - ❒ Some graduate school
   - ❒ Master's, doctoral or professional degree

8. In which of the following kinds of places did you spend the most time while growing up (to age 18)? (check one box)

   - ❒ On a farm or ranch
   - ❒ Rural or small town [under 1,000 population]
   - ❒ Town [1,000 - 5,000 population]
   - ❒ Small city [5,000 - 50,000 population]
   - ❒ Medium city [50,000 - 1 million population]
   - ❒ Major city or metropolitan area [over 1 million population]

9. In what type of community do you now live? (check one box)

   - ❒ On a farm or ranch
   - ❒ Rural or small town [under 1,000 population]
   - ❒ Town [1,000 - 5,000 population]
   - ❒ Small city [5,000 - 50,000 population]
   - ❒ Medium city [50,000 - 1 million population]
   - ❒ Major city or metropolitan area [over 1 million population]

10. What is your approximate total household income before taxes? (check one box)

☐ Under $ 10,000	☐ $ 60,000 - $ 69,999
☐ $ 10,000 - $ 19,999	☐ $ 70,000 - $ 79,999
☐ $ 20,000 - $ 29,999	☐ $ 80,000 - $ 89,999
☐ $ 30,000 - $ 39,999	☐ $ 90,000 - $ 99,999
☐ $ 40,000 - $ 49,999	☐ $ 100,000 - $199,999
☐ $ 50,000 - $ 59,999	☐ $ 200,000 or more

Appendix C: Bison Encounter Questionnaire

Questions 1-7 will be conducted as an interview. The interviewer will ask the questions and record the answers. Question seven has two parts. First the interviewer will ask the participant to characterize the bison encounters they have had up to that point in the trip by using the list of bison responses in questions seven and checking all that apply. From this data, the interviewer will be able to discern whether the visitor perceived whether bison were altering their behavior due to the encounter. If the visitor identifies one of the last five encounter descriptors the interviewer will ask the visitor to describe in detail an encounter that demonstrated that result. If the visitor did not check one of those descriptors, they will be asked to describe the interaction that had the greatest effect on their experience. While the respondent continues with the survey, the interviewer will ensure a detailed description of the encounter is recorded. Questions 8-12 will be referenced to the encounter described in question seven.

About Your Trip

1. What type of group were you with on the trip when you were interviewed? (check all that apply).

   - ☐ alone
   - ☐ family
   - ☐ friends
   - ☐ outfitter/guide group
   - ☐ organization or club (name of organization/club)_____

2. Which of the following best describes your primary mode of transportation while you were within Yellowstone National Park? What activities will you engage in during your visit? (check all that apply)

Primary Transportation		Activity
☐	snowmobiling	☐
☐	skiing	☐
☐	snowshoeing	☐
☐	snowcoach touring	☐

   ☐ other (please specify)_____

3. During your visit to the Yellowstone area, how many days will you recreate within Yellowstone National Park? _____

4. While on your trip to the Yellowstone area, will you also do the following activities in other areas (such as nearby National Forest lands or National Parks)?:

Activity	Number of days
snowmobile	_____
cross-country ski	_____
down-hill ski	_____
snowshoe	_____

About Bison Encounters

We are interested in visitors' experiences and observations watching bison from oversnow vehicles. Please respond to the following questions about your experiences observing bison.

5. When traveling by snowcoach/snowmobile in the park today, did you see bison?

   Yes ____ No ____

   If yes, on how many different occasions:

   - ❒ 1-3
   - ❒ 4-6
   - ❒ 7-10
   - ❒ >10

6. Which of the following best describes the bison's response to the presence of you and/or the other visitors during the time you watched them? (***check all that apply***).

   - ❒ None, the bison did not seem to notice the humans/oversnow vehicles
   - ❒ The bison appeared to look up or notice, but resumed their activity
   - ❒ The bison appeared alarmed and vigilant
   - ❒ The bison traveled apparently to get further away from the humans/oversnow vehicles, but appeared unhurried
   - ❒ The bison's desired movement was blocked
   - ❒ The bison's movement was hurried by the encounter
   - ❒ The humans put the bison to flight (at some point the bison ran)
   - ❒ The bison were defensive and charged or seemed ready to charge humans/vehicles
   - ❒ Other: _____

If you saw bison only once, please respond to the following questions about that experience.

If respondent indicates that they saw one of the last five responses, please respond to the following questioned based upon the experience in which **the bison _____ (most significant action)**

If the respondent indicates that they saw more than one of the earlier choices, please respond to the following questions based upon ***the interaction that had the greatest effect on your experience.***

What made this experience the one that stands out in your mind?

About Your Bison Encounter

7. Where were the bison when you saw them? (***Please check only one***).
   - ❒ At least some bison were on the road
   - ❒ At least some were near (within 10 ft) but not on the road
   - ❒ At least some bison were >10 ft from road but still within 100 yards
   - ❒ Bison were more distant than 100 yards from the road

9. Which of the following best describes what most of the bison were doing when you first saw them? (***Please check only one***).
   - ❒ Don't remember
   - ❒ Traveling
   - ❒ Feeding/drinking/plowing snow aside to get to forage
   - ❒ Laying down
   - ❒ Interacting w/ each other
   - ❒ Interacting w/ other wildlife
   - ❒ Interacting with people
   - ❒ Other:_____

9. What sorts of responses did you see among humans (including your group and other groups) in relation to the bison? (***Please check all that apply***).

   - ❒ Stop, but remain in/on snowmobile/snowcoach
   - ❒ Dismount snowmobile/exit snowcoach but remain near vehicle
   - ❒ Approach bison to get a better look or better picture
   - ❒ Snowmobiles/snowcoaches weaving through/around bison on road to get past them
   - ❒ A snowmobile/snowcoach hit a bison
   - ❒ Other: _____

10. For each of the word pairs below, please check the box that best represents your impression of the bison during the experience you describe above.

Healthy	☐	☐	☐	☐	☐	☐	☐	Unhealthy
Agitated	☐	☐	☐	☐	☐	☐	☐	Calm
Active	☐	☐	☐	☐	☐	☐	☐	Inactive

11. For each of the word pairs below, please check the box that best represents your impression of the interaction between bison and visitors described above.

Appropriate	☐	☐	☐	☐	☐	☐	☐	Inappropriate
Bad	☐	☐	☐	☐	☐	☐	☐	Good
Well managed	☐	☐	☐	☐	☐	☐	☐	Poorly Managed
Acceptable	☐	☐	☐	☐	☐	☐	☐	Unacceptable

Questions about Overall Experiences

The final questions below apply to your overall experience viewing bison during your trip to the park.

12. Please rate how well the bison viewing experience at YNP rated today on the following features.

	Not at all Important				Extremely Important	Not at all Satisfied				Extremely Satisfaied	Don't Know
Number of bison seen	1	2	3	4	5	1	2	3	4	5	DK
Proximity of bison	1	2	3	4	5	1	2	3	4	5	DK
Opportunity to view bison	1	2	3	4	5	1	2	3	4	5	DK
Contribution of the guide to the bison viewing experience	1	2	3	4	5	1	2	3	4	5	DK
Guide's role in managing the visitor-bison interactions	1	2	3	4	5	1	2	3	4	5	DK
NPS management of visitor-bison interactions	1	2	3	4	5	1	2	3	4	5	DK
Role of NPS in brucellosis control/eradication in YNP bison	1	2	3	4	5	1	2	3	4	5	DK

13. For each of the word pairs below, please check the box that best describes the bison at YNP.

Wild	☐	☐	☐	☐	☐	☐	☐	Tame
Restricted	☐	☐	☐	☐	☐	☐	☐	Free
Dangerous	☐	☐	☐	☐	☐	☐	☐	Safe
Authentic	☐	☐	☐	☐	☐	☐	☐	Artificial
Stressed	☐	☐	☐	☐	☐	☐	☐	Peaceful
Entertaining	☐	☐	☐	☐	☐	☐	☐	Boring
Passive	☐	☐	☐	☐	☐	☐	☐	Active

Beliefs about Bison

14. Below are statements that represent a variety of ways people feel about bison and Yellowstone National Park. Please indicate the extent to which you disagree or agree with each statement. (*Circle one number for each statement.)*

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
Bison are given too much prominence in park planning.	1	2	3	4	5	6	7
Bison should be managed so as to remain wild in YNP.	1	2	3	4	5	6	7
Whether or not I would get to see bison, it is important to me that they exist in YNP.	1	2	3	4	5	6	7
I feel a strong emotional bond to bison.	1	2	3	4	5	6	7
Bison are an important part of American identity.	1	2	3	4	5	6	7
It is important that YNP always have an abundant bison population.	1	2	3	4	5	6	7
Bison are an important part of Native American heritage.	1	2	3	4	5	6	7
Bison have spiritual importance to me	1	2	3	4	5	6	7
It is important to maintain bison populations in YNP so future generations can enjoy them.	1	2	3	4	5	6	7
It is important that bison be respected as wild creatures in YNP.	1	2	3	4	5	6	7
If we did not have bison in YNP, we would lose an important part of our cultural heritage.	1	2	3	4	5	6	7
Visitor access should take priority over the protection of bison.	1	2	3	4	5	6	7
It is important to me to know that there are healthy populations of bison in YNP.	1	2	3	4	5	6	7
Bison deserve protection but snowmobiles/snowcoaches do not seem to bother them.	1	2	3	4	5	6	7

15. For each of the word pairs below, please check the box that best represents your impression of the winter setting at Yellowstone National Park.

Pristine	☐	☐	☐	☐	☐	☐	☐	Polluted
Loud	☐	☐	☐	☐	☐	☐	☐	Quiet
Appropriate	☐	☐	☐	☐	☐	☐	☐	Inappropriate
Acceptable	☐	☐	☐	☐	☐	☐	☐	Unacceptable
Dissatisfying	☐	☐	☐	☐	☐	☐	☐	Enjoyable

Role of Yellowstone National Park

16. We are interested in your opinions about the values of Yellowstone. Please indicate for each of the following, how important they are to the overall value of Yellowstone National Park (1 being strongly disagree, and 8 being strongly agree):

Yellowstone National Park is:	Strongly Disagree							Strongly Agree	Don't Know
a wildlife sanctuary	1	2	3	4	5	6	7	8	DK
a place for education about nature	1	2	3	4	5	6	7	8	DK
a place to develop my skills and abilities	1	2	3	4	5	6	7	8	DK
a protector of threatened and endangered species	1	2	3	4	5	6	7	8	DK
a sacred place	1	2	3	4	5	6	7	8	DK
an economic resource	1	2	3	4	5	6	7	8	DK
a family or individual tradition	1	2	3	4	5	6	7	8	DK
a place everyone should see at least once in their lives	1	2	3	4	5	6	7	8	DK
a place without most types of commercial development	1	2	3	4	5	6	7	8	DK
a display of natural curiosities	1	2	3	4	5	6	7	8	DK
an historical resource	1	2	3	4	5	6	7	8	DK
a symbol of America's identity	1	2	3	4	5	6	7	8	DK
a place for the use and enjoyment of the people	1	2	3	4	5	6	7	8	DK
a social place	1	2	3	4	5	6	7	8	DK
a site to renew your sense of personal well being	1	2	3	4	5	6	7	8	DK
a place of scenic beauty	1	2	3	4	5	6	7	8	DK
a place to be free from society and its regulations	1	2	3	4	5	6	7	8	DK
a reserve of natural resources for future use	1	2	3	4	5	6	7	8	DK
a tourist destination	1	2	3	4	5	6	7	8	DK
a place for scientific research and monitoring	1	2	3	4	5	6	7	8	DK
a place for recreational activities	1	2	3	4	5	6	7	8	DK
a place for wildness	1	2	3	4	5	6	7	8	DK
a place for all living things to exist	1	2	3	4	5	6	7	8	DK
a protected place for fish and wildlife habitat	1	2	3	4	5	6	7	8	DK
a quiet place	1	2	3	4	5	6	7	8	DK
a place to hear natural sounds	1	2	3	4	5	6	7	8	DK
a place free of motorized noise	1	2	3	4	5	6	7	8	DK
a place for natural quiet	1	2	3	4	5	6	7	8	DK

About You

18. What is your gender? (check one) □ Female □ Male

19. What is your age? _____

20. What is the highest level of education you have completed? (check one box)

- ❒ 8th grade or less
- ❒ Some high school
- ❒ High school graduate or GED
- ❒ Some college, business or trade school
- ❒ College graduate
- ❒ Some graduate school
- ❒ Master's, doctoral or professional degree

21. In which of the following kinds of places did you spend the most time while growing up (to age 18)? (check one box)

- ❒ On a farm or ranch
- ❒ Rural or small town [under 1,000 population]
- ❒ Town [1,000 - 5,000 population]
- ❒ Small city [5,000 - 50,000 population]
- ❒ Medium city [50,000 - 1 million population]
- ❒ Major city or metropolitan area [over 1 million population]

22. In what type of community do you now live? (check one box)

- ❒ On a farm or ranch
- ❒ Rural or small town [under 1,000 population]
- ❒ Town [1,000 - 5,000 population]
- ❒ Small city [5,000 - 50,000 population]
- ❒ Medium city [50,000 - 1 million population]
- ❒ Major city or metropolitan area [over 1 million population]

23. What is your approximate total household income before taxes? (check one box)

□ Under $ 10,000	□$ 60,000 - $ 69,999
□ $ 10,000 - $ 19,999	□$ 70,000 - $ 79,999
□ $ 20,000 - $ 29,999	□$ 80,000 - $ 89,999
□ $ 30,000 - $ 39,999	□$ 90,000 - $ 99,999
□ $ 40,000 - $ 49,999	□ $100,000 - $199,999
□ $ 50,000 - $ 59,999	□ $200,000 or more