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PARK VISITORS AND THE NATURAL SOUNDSCAPE:  
WINTER EXPERIENCE DIMENSIONS IN YELLOWSTONE NATIONAL PARK

By

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for the degree of

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Park Visitors and the Natural Soundscape: Winter Experience Dimensions in Yellowstone National Park

Chairperson: Wayne A. Freimund

The natural soundscape is becoming increasingly recognized as a threatened park resource. A variety of policies, laws, and regulations have rapidly been established that affect the National Park Service mandate and require the agency and individual parks to protect, preserve, and restore natural sounds. National Parks are grappling with how to manage the newly legitimized natural soundscape resource and this research provides some of the first significant knowledge of visitor experiences of park soundscapes and preferences for management policies. The role of the natural soundscape in visitor experiences was explored through both interview and survey data with the primary goal of documenting dimensions of the experiences of natural sounds. Findings from this research highlight that not only do the majority of winter visitors to Yellowstone National Park believe that natural sounds are important to their experience of the park, but that deep meanings and complexity characterize visitor perceptions of the role of the natural soundscape to the overall value of the park and influence perceptions of the role of mechanized sounds in the park. While differences among the three primary user groups (cross-country skiers, snow coach riders, and snowmobilers) do exist, the data reflects a much greater degree of common ground and general agreement on most issues related to the park natural soundscape that were explored in this research.

# Table of Contents

ACKNOWLEDGEMENTS .....	1
CHAPTER 1: INTRODUCTION.....	2
The Importance of Natural Sounds.....	2
The Role of National Parks in Protecting Soundscapes.....	3
Focus of the Research .....	6
CHAPTER 2: FRAMING THE RESEARCH.....	11
National Park Soundscape Policy .....	12
The Role of the Natural Soundscape in Visitor Experiences .....	15
Relationships Between Natural Sounds and Park Values .....	21
Studying Values.....	27
Approach to Studying Visitor Experiences .....	29
How a Multi-Faceted Research Framework Guides this Research .....	32
CHAPTER 3: METHODS .....	33
A Mixed-Method Approach .....	33
Grounded Theory and Hermeneutics .....	35
Selection of Participants and the Interview Process .....	37
Transcription Procedure and Interpretive Analysis .....	41
Selection of Survey Respondents and Survey Analysis.....	45
CHAPTER 4: VISITOR EXPERIENCES OF WINTER PARK SOUNDSCAPES.....	48
General Characteristics of Visitor Population and Perceptions of Natural Sounds.....	49
Natural Sounds as an Aspect of Park Value.....	61
Support for Management Actions.....	67
Importance of the Natural Soundscape and Support for Management Actions .....	74
Brief Summary of Survey Findings .....	77
Characteristics of the Interview Sample.....	78
Detailed Exploration of Visitor Experiences of Natural Sounds.....	81
Detailed Exploration of the Importance of Natural Sounds to Visitors.....	85
Visitor Perspectives on Natural Sounds and the Park Winter Setting .....	89
Detailed Visitor Characterizations of Mechanical Sounds in the Park.....	92
Insights .....	104
CHAPTER 5: IMPLICATIONS AND DISCUSSION.....	108
Reflections on the Research Findings.....	108
Revisiting the Research Framework .....	112
Policy Change and the Visitor Population.....	112
Knowledge of Visitor Perceptions of Natural Sounds .....	113
<i>In Situ</i> Social Science Soundscape Research.....	114
The Value of Mixed Methods.....	115
Opportunities for Dialogue and Participative Planning .....	118
Implications for Management and Policy .....	119
Conclusion.....	126
LITERATURE CITED .....	128
APPENDIX A: INTERVIEW GUIDE .....	134
APPENDIX B: SURVEY .....	136

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## CHAPTER 1: INTRODUCTION

*“Only when one comes to listen, only when one is aware and still, can things be seen and heard. Everyone has a listening-point somewhere. It does not have to be in the north or close to the wilderness, but someplace of quiet where the universe can be contemplated with awe.”*

*~Sigurd Olsen, The Listening Point*

### ***The Importance of Natural Sounds***

Natural sounds have always been an important feature of human experiences with nature. Writers and poets around the world describe the sounds of nature and their value to the human spirit. While natural sounds are not a new element of human experience, how they are understood as a natural resource in society has been undergoing rapid changes in recent years. The natural soundscape is becoming increasingly recognized as an important and threatened natural resource. As societies continue to embed themselves in a context of advanced technology and mechanization, opportunities to experience natural sounds diminish. Some authors have expressed the value of natural sounds in a comparison to endangered species, emphasizing their precious and rare nature, which ought to be protected and preserved (Jensen & Thompson 2004). The continued technological development of society coupled with a lack of management consideration of natural sounds creates the potential for losing the natural soundscape all together (Jensen & Thompson 2004; Pilcher 2006).

## ***The Role of National Parks in Protecting Soundscapes***

The National Park Service (NPS) has traditionally played a key role in the conservation of the natural world by maintaining unimpaired natural conditions in parks and by providing for public enjoyment of these resources (National Park Service Organic Act 1916). Natural sounds have always been a part of the ensemble of natural resources in National Parks, however, in recent years, the National Park Service's dual mandate to both protect and provide public access to park resources has been specifically qualified by a variety of laws, regulations, and policies addressing the natural soundscape. These policies describe the natural soundscape as an explicit element of what the Park Service is mandated to protect. They also provide the framework for further park management activities ranging from monitoring human behaviors adversely affecting a park's natural sounds and restricting and minimizing inappropriate noise, to restoring natural park soundscape conditions (Ambrose & Burson 2004; National Park Service 1995, 2006).

The management and effects of aircraft over flights on natural soundscapes in parks has historically dominated the National Park Service's soundscape management agenda. The National Parks Overflight Act of 1987 directed the National Park Service to study the effects of aircraft over flights and report to Congress on the results. In 1995, *The Report on the Effects of Aircraft Over flights on the National Park System* was submitted to Congress which acknowledged 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. This report detailed deleterious effects of aircraft noise on visitor experiences of natural sounds in National Park settings.



In addition to the National Park Service Organic Act and the Overflight Act, NPS Management Policies and Director's Order #47 have also played key roles in shaping the agency's responsibilities with regard to soundscape management. In 2000, the Director of the NPS, Robert Stanton, saw fit to clarify agency-wide management policies related to soundscape preservation and management by issuing Director's Order (DO) #47. This DO emphasized management policies that required "to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources" (National Park Service 2000). It goes on to further elevate the importance of soundscape protection by stating that "the fundamental principle underlying the establishment of soundscape preservation objectives is the obligation to protect or restore the natural soundscape to the level consistent with park purposes, taking into account other applicable laws" (National Park Service 2000). In cases where natural soundscapes have not been negatively impacted by inappropriate noise, the NPS is mandated to maintain those conditions (National Park Service 2000). Alternatively, when natural soundscapes are found to be impaired by non-natural sounds, the agency is required by DO #47 to mitigate soundscape degradation patterns and "to facilitate and promote progress toward the restoration of the natural soundscape".

As the development of laws and policies governing soundscape management in National Parks continues, individual parks grapple with how to carry out these mandates and incorporate the recreational values of natural soundscapes into their planning. Yellowstone National Park's winter use planning has become a nationally recognized context within which soundscape management goals have come into play. The current temporary winter use plan employs snowmobile use limits, mandatory guided snowmobile visits, and requires snowmobiles in the

park to use the Best Available Technology so as to reduce both mechanized sounds and emissions. In preparation for the creation of a long-term winter use plan for the park, a draft Environmental Impact Statement has recently been issued which inquired into soundscape conditions and the effects of over snow vehicles in the park. The purpose of the draft EIS is to detail potential effects on the integrity of park resources and visitor experiences in light of the development of the park's winter use planning.

The final acoustic monitoring report for this DEIS analyzed current, past, and alternative approaches to managing over snow vehicles and their effects on the natural soundscape. This DEIS assessed several alternatives that affect the number and technological quality of snowmobiles in the park and suggested that increases in use limits would increase the percentage of time audible of over snow vehicles in the park to a maximum of 100% in some cases (National Park Service 2006b). This report concludes with acknowledging the need to incorporate visitor perceptions of alternatives proposed and the integration of social scientific research into the planning process.

## ***Focus of the Research***

Questions surrounding how to manage threatened natural soundscapes in National Parks are rapidly emerging as soundscape policies and issues surrounding them increase in complexity and invoke competing values (recreational, commercial, and environmental interest groups). The National Park Service is under pressure to modify planning frameworks so that they can account for and incorporate critically recognized natural soundscape values. Traditional planning frameworks rely heavily on biophysical characteristics of park settings, but ought to also be informed by less-tangible aspects of visitor experiences such as the role of the natural soundscape in park experiences and to the overall value of the park.

Approaches to natural soundscape management have heretofore privileged bioacoustical data based on frequency and decibel levels as factors in sound level and type acceptability. This tactic assumes that such information will be determinate in making managerial decisions about standards of quality, indicators, and management strategies and activities. The critical flaw in this approach to understanding natural resource management issues lies in the fact that it defines the problem and thus the solution as technical and scientific rather than social, i.e., goal and value determined. Standards of acceptability in National Parks are, in fact, socially and politically prescribed, not scientifically determined. Appropriate soundscape protection and management is a political, not a technical judgment. Knowledge informing soundscape planning must be able to account for visitor perceptions of the role of natural sounds in their experiences, the role natural sounds play in the overall value of the park, and how those complex assessments may drive visitor expectations. It ought to address, to some degree, the deeper meanings and values that contextualize visitor perceptions and then ultimately relate them to support for or opposition to management activities. It ought to stem from an understanding of the existent and

evolving perspectives of various park visitor groups (e.g., visitor primary activity, local residents, repeat visitors, etc.) on the issues at hand. One way of going about such inquiry is to examine visitor primary activity type analyzing patterns in the data to explain variation in visitor perspectives. Another way of exploring this question is to utilize the perceptions of park value as a means of characterizing visitor visions of what a park ought to be. This dissertation explores both variations in visitor primary activity group and subsequent differences in perceptions of park value. Additionally, this research addresses subtler variations, particularly in the interview data, within and across respondent groups. From a political perspective, this information is helpful for building agency capacity to both respond to and pro-actively engage and direct public views on the social value and purpose of the natural soundscape and of National Parks.

This current state of social scientific knowledge presents difficulties for soundscape management as a recognized and legitimized National Park managerial activity. There is an absence of social scientific research documenting our understanding of the visitor experience of the natural soundscape itself. The phenomena of human experiences of natural sounds are not well understood. To date, the research presented in this dissertation is the first to provide in-depth documentation of how visitors characterize their own experience of natural sounds and their perceptions of its importance to the overall value of the park. It is the first research to document the meanings and values that visitors ascribe to their experience of natural sounds and to address the complexity of the soundscape experience as it relates to other experiential attributes or visitor motivations. There was a critical need for exploratory, foundational research to deepen our understanding of the experiences of natural soundscapes. That is the primary focus of my research and the stems from both survey and interview data. The survey data

provides more general characterizations of visitor perceptions of natural sounds and explores the relationship of natural sounds to park values. Some studies have already documented a relationship between the values visitors ascribe to parks and their support for different management alternatives (Borrie and others 2002; Freimund and others 2004). This dissertation was designed to provide greater clarity on the role of the natural soundscape in visitor experiences and potential support for soundscape management actions.

There is a significant knowledge gap between policy mandates regarding natural sounds and implementation strategies on the ground. This limits the agency and individual park capacity to manage the soundscape resource proactively and effectively. Social scientific research can begin to address key knowledge gaps. Without further knowledge of the role of park soundscapes in the visitor experience, management is less capable of making effective decisions in soundscape management whose end is to both protect park resources and to provide for quality visitor experiences. As management clarifies its understanding of the role of the natural soundscape in visitor experiences, there is also a need to connect that information with visitor willingness to support specific managerial strategies.

This problem leads to three primary research questions for this dissertation:

**Research Questions:**

1. How do visitors characterize their experiences of park soundscapes? See questions 8-12 of the interview guide in Appendix A.
2. Do visitors perceive natural sounds to be an important aspect of the park setting and their experiences? If so, how are they important? If not, why not? See questions 13-20 of the interview guide in Appendix A.
3. How do visitors rationalize and evaluate the existence of mechanical noise in park experiences? (How do visitors characterize the relationship between the need for some mechanical sounds in the park and the desire for natural soundscape experiences?) See questions 21-25 of the interview guide in Appendix A.

This dissertation addresses the above questions by looking at visitors' general perceptions of the importance of natural sounds to their experiences and to the overall value of the park. It uses information on these general characteristics to set the broader context for exploring the more in-depth interview data. The interview data allows for a rich and detailed inquiry into the meanings and significance of natural sounds to visitor experiences, the value of those sounds to the park setting, and illuminates the complexity of the management challenge that integrates visitor access and soundscape integrity. Since the interview and survey data assess different aspects of the above research questions, this dissertation uses that diversity of information to flesh out, construct, and validate a foundational conceptual understanding of the role of natural sounds in winter visitor experiences and document the inherent tensions and complexity existent in the soundscape management challenge at Yellowstone National Park. Knowledge from both the survey and interview data informed the analysis and recommendations provided in this dissertation.

## **CHAPTER 2: FRAMING THE RESEARCH**

The information presented in this chapter informs my research questions, the research design, and subsequent analysis and recommendations. To address the questions related to the role of natural sounds in visitor experiences that this dissertation addresses, it was necessary to first have an understanding of the general soundscape policy context for national parks, to understand the current data on human experiences of natural sounds, to acknowledge where natural sounds fit into the park value system, and to appreciate what is complex about the experiences and the management questions related to the natural soundscape. This chapter begins by providing the policy context within which the visitor and soundscape management challenges are situated. While natural sounds are not a new protected area resource, they are newly legitimized as such; and the recent history of policy changes and mandates have set the stage for this new emphasis on the role of natural sounds to both the value of national parks and to the visitor experience itself. This chapter continues by assessing the state-of-knowledge regarding human experiences of natural sounds and describes how this information informed my research approach. Next, a review of research related to national park values is presented which provided both a conceptual approach and survey tools that were adapted in my research on soundscape management. Finally, a discussion and review of the evolution of approaches to studying visitor experiences is chronicled wherein further foundational components of my research framework are delineated.



## ***National Park Soundscape Policy***

The National Park Service Organic Act itself states that the Park Service will “conserve the scenery, the natural and historical objects and the wild life therein.” Natural sounds are considered to be one element of what the Park Service is mandated to conserve. Legislation governing the management of park soundscapes originates with the Grand Canyon Enlargement Act of 1975 which first explicitly identified “natural quiet as a value or resource to be protected from significant adverse effect”. As is the case in the Grand Canyon, management of aircraft over flights have historically been a motivating force in park soundscape management initiatives and have often dominated the research agenda. Consequently, the role of the Federal Aviation Administration, a separate governmental agency with distinctive goals and responsibilities, has played a key role in how parks are able to manage soundscapes.

As a response to the development of mandates highlighting the National Park Service’s responsibility in protecting and managing soundscapes, a new unit of the agency, the National Park Sounds Program, was established in 2000. This unit is charged with coordinating coherent National Park Service responses to Congressional laws, National Park Service Directors Orders and other internal National Park Service policies (National Park Sounds Program 2006). The National Park Sounds Program establishes programmatic guidelines and policies for the entire National Park system. As one of its responsibilities, they are specifically required to work with the Federal Aviation Administration to develop and implement Air Tour Management Plans for each National Park and Monument (Natural Sounds Program 2006).

The current 2006 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 2006). The directive again reinforces the idea that natural soundscapes are considered a park resource, an element of wildlife habitat, and an important part of the visitor experience. Section 8.2.3 on Recreational and Motorized Use states that:

In addition to their natural values, natural sounds, such as waves breaking on the shore, the roar of a river, and the call of a loon, form a valued part of the visitor experience. Conversely, the sounds of motor vehicle traffic, an electric generator, or loud music can greatly diminish the solemnity of a visit to a national memorial, the effectiveness of a park interpretive program, or the ability of a visitor to hear a bird singing its territorial song. Many parks that appear as they did in historical context no longer sound the way they once did (National Park Service 2006).

The 2006 Management Policies direct the Park Service to take a leadership role and be proactive when issues arise that may effect a park’s resources. The Park Service is also charged with “monitor[ing] human activities that generate noise that adversely affects park soundscapes, including noise caused by mechanical or electronic devices” (National Park Service 2006). In the section regarding natural resource management of soundscapes, restoring natural soundscapes is specifically called for (National Park Service 2006). Furthermore, it is emphasized that “the natural ambient sound level— that is, the environment of sound that exists in the absence of human-caused noise— is the baseline condition, and the standard against which current conditions in a soundscape will be measured and evaluated.” (National Park Service 2006).

Perhaps most importantly, the NPS Policies state that superintendents will use appropriate management planning to identify the acceptable levels of non-natural sound

throughout a park. The 2006 Management Policies also require the National Park Service to then take action to deal with inappropriate sounds by preventing or minimizing them. Overall, some notions of soundscape standards are provided in established park policies and should assist parks with soundscape management, but these policies do not dictate specific managerial actions in individual parks.

The writing of the 2006 National Park Service Policies was steeped in controversy with both complaints and applause for the conservation focus it maintains in parks. The new policies do, however, include text acknowledging that while the natural soundscape is important, it may not be realistic or possible to maintain in some parks. In addition, the policies recognize human-caused sounds as an appropriate part of visitor expectations and experiences in some parks (National Park Service 2006).

Laws and regulations provide the foundation and framework for the National Park Service's managerial activities, yet at this time, it is unclear just how some of the new NPS policies will effect soundscape management. Not only is the policy context complex, but the rapid development of soundscape management policies has left the National Park Service in a position to implement new regulations without the guidance of a significant knowledge base provided through scientific research. The policy context was thus, a driver of my dissertation research; it clarified the role that parks play in managing and protecting sounds, yet highlighted the need for relevant social science data to inform managerial decisions. My dissertation will begin to address some of the social scientific knowledge needs of National Park Service related to soundscape management.

## ***The Role of the Natural Soundscape in Visitor Experiences***

Once policies have been established, management typically requires input of various kinds, including social and natural scientific research, to inform agencies in their development of particular managerial strategies and actions. 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 and others 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 and others 2004). Noise in parks can also be annoying or intrusive to visitors (Miller 1999) and can detract from their enjoyment of the experience. Further inquiry into the role of the natural soundscape in the visitor experience provides a critical link between the soundscape policy framework and precise managerial implications. The knowledge from this extant research concerning general trends in visitors broad-scale perceptions of natural sounds and “noise” informed the design of both survey and interview questions related to experiences of natural sounds in Yellowstone National Park.

Previous social science research on natural soundscapes is composed primarily of dose-response studies that demonstrate negative effects of mechanized sounds on the visitor experience (Fidell and others 1996). Mace and others (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 over flights. They found consistent negative effects of aircraft sounds on participant assessments of naturalness, preference, beauty, annoyance, tranquility, and solitude. This prior research has informed the design of my interview and survey questions that relate specifically to visitor experiences of mechanized sounds and vehicles in Yellowstone National Park during the winter use season.

Other studies have assessed the relationship between the soundscape and recreational conflicts. Vitterso and others (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. Given that Vitterso and others (2004) among other recreation researchers have documented conflict between user groups (skiers and snowmobilers), I have explored relationships between those two user groups as well as the other motorized user group, snowcoach riders in my research to see whether these types of conflicts and perceptions of other user groups occur in Yellowstone.

Additional research has demonstrated the restorative effects of experiences in nature (which include natural sounds) on park visitors (Anderson and others 1983; Hartig and others 1991; Kariel 1990; Ulrich and others 1991). One experimental study by Hartig and others (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 the other groups. My research is influenced by this study in that interview questions were used ask visitors to specifically describe their experiences of natural sounds without imposing a framework of such restorative effects. Instead, the interview approach to this question allowed visitors to come forth with their own interpretation of the effects of their experiences of natural sounds, whether restorative or otherwise.

Freimund and others (2002) investigated visitor tolerance for frequency of hearing motorized transportation. They employed video surveys to assess visitor norms for sounds from aircraft over flights and motorized boats in different settings. Their results show that front country visitors exhibited a higher tolerance than backcountry visitors for such mechanized sounds. Given the information from this prior research, my research questions evolved to enquire as to whether cross-country skiers and snowshoers, who are more likely to frequent the back-country of Yellowstone during the winter season also share these same traits.

A recent study by Grau (2005) used a multi-sensory approach 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. Since sounds were shown to play such an important role in visitor satisfaction in the above research, my study builds on that by exploring in more depth visitor perceptions of the role of natural sounds in their experiences.

Newman and others (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. I have taken ideas from this research, but expanded them to allow for greater

description of the experience of natural sounds through an open-ended interview as data source for this study.

Work completed by Staples (1998) has criticized the trend in soundscape research focusing on dose-response studies and levels of visitor annoyance. He argues that such studies have been unable to adequately explain the differences in individual assessments of the soundscape. He further claims that what is needed is greater managerial understanding of how individuals conceptualize, attribute meaning, and understand the soundscape and impacts to it (Pilcher 2006; Staples 1998). This perspective highlights the research and managerial problem related to the fact that visitor appraisals of the soundscape may not correspond with all measurable soundscape impacts; while there may be demonstrable deterioration in the acoustic environment, that does not necessarily mean that parallel visitor evaluation and understanding of their experiences of the soundscape will also be negative (Pilcher 2006). My research has taken Staples' critique to heart and used it to shape the overall design of my study. I have not asked visitors to listen to sounds and rate them; rather I have chosen to capitalize on the semi-structured interview component to allow visitor conceptualizations, meanings, and perceptions of impacts to the natural soundscape to come to light.

Recently researchers have suggested supplementing the traditional behavioral approaches to understanding visitor experiences with research that focuses on the actual nature and meanings associated with the visitor experience itself rather than on ratings of desired outcomes or goals alone (Borrie and Brizell 2000; Duffus and Wipond 1992; Manning 1999; Montag and others 2005; Patterson and others 1998). While my research acknowledges that goals and motivations play a role in visitor experience outcomes, I have specifically included opportunities for visitors

to reveal for themselves the reasons for their visit and the elements of their experience that make them most meaningful, significant, and fulfilling.

As researchers began to question the adequacy of expectancy-valence, goal-directed models for understanding wildland experiences, an *in situ* approach was introduced to the study of the visitor experience and the elements that affect it (Hull and others 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 comprehensive assessment, whereas *in situ* research often focuses on sampling, in some cases multiple times, during the actual experience. A key goal of *in situ* research is to evaluate visitors' states of mind as close to the moments of actual experience as possible. I have employed an *in situ* approach by interviewing visitors during their park visits.

Borrie and Roggenbuck (2001, p. 202) have gone further to describe wilderness experiences as “dynamic, emergent, and multi-phasic”. Such research approaches have demonstrated that the recreation experience is an evolving process that cannot be reduced to setting attributes (Borrie and Brizell 2000; Manning 1999). For managers, this indicates that while setting attributes play a role in providing opportunities, they do not necessarily lead to particular experiences; the recreationists themselves play a role in creating a quality experience as they contribute their emotions, feelings, meanings, and cognitions (Borrie and Brizell 2000). While the survey data in my research provides a general context of visitor experiences of natural sounds, the interview data allowed for analysis of the role that visitors themselves play in the development of their experiences in the park.



For the purposes of this research, the view of visitor experiences as multi-phasic is acknowledged, but it is not the central focus of this study. National Parks can provide opportunities for experiences; their role is not to provide the actual experiences themselves, precisely due to the fact that such experiences do co-dependently arise out of the interaction between biophysical settings and the deeper individual and social perceptions of such settings. Those perceptions of the setting are partly individualistic (e.g., this place is special because it is where I experienced my first kiss) and also influenced by larger-scale socio-political understandings (e.g., this place is a National Park and as such is a special place for contemplating the human relationship with nature). The purposes of the combined interview and survey data in this study is to identify the range of winter soundscape experiences that exist in the park, document how visitors characterize the importance of natural sounds in their experience and to National Parks overall, and finally to provide an account of how visitors perceive motorized sounds in the park and subsequent management preferences. The interview and survey data have been used to explore variations in visitor perceptions within and across user groups, with particular attention to the three primary user groups in the winter visitation season: snowmobilers, snow coach riders, and cross-country skiers.

The multidimensional understanding of visitor experiences has contributed to a desire to more fully understand the values and meanings that individuals associate with their recreation experiences (Borrie and Brizell 2000; Fidell and others 1996; Manning 1999). This view is applicable to the current state of research into the experience of park soundscapes (Fidell and others 1996). These interests have contributed to elevating the value of qualitative studies of visitor experiences into the research arena since an open-ended, but guided interview process may be better suited to illuminate with a high degree of depth and detail, the meanings and the

broader values associated with visitor experiences (Patterson and others 1998; Williams and others 1992). This research engaged a multidimensional approach to understanding visitor experiences, acknowledging complexity and being attentive to variations, nuances, unique responses, and patterns among the visitors interviewed. Interview, rather than survey, data is the best way to collect information from visitors that captures such complexity and meanings. For this reason, among others, it was important to include an interview component in this research.

While some research has addressed positive and negative effects on visitor experiences of natural soundscapes, in many ways, such social scientific research has skipped a step by going straight to a search for indicators of experience quality based largely on studies of attitude, preference, or acceptability. There has not been any research into the more general role of natural sounds in the visitor experience including the dimensions of the experience and the value of the natural soundscape to visitors. This knowledge gap is precisely what my research questions were designed to address.

### ***Relationships Between Natural Sounds and Park Values***

The information on visitor experiences and values will not dictate the larger-scale socio-political processes that determine choices park management must make in planning for and managing the soundscape resource, but it can inform managerial decisions. Disputes over National Park Service management can be understood as questions that fundamentally deal with the value and purpose of National Parks themselves. What kinds of places are National Parks? Why have we established them? What values do National Parks promote? Such disputes are about the identity of societies and arguably more important, about what a society would like to be. They are disagreements about the values that a society embodies and about the values that a

society would like to embody. Ideas about park purposiveness and consequently appropriate activities are the embodiment of certain values, and those two things (purpose and value) are intimately interwoven. In addition to visitor experiences, this research seeks to better understand the relationships between perceived park value and the importance of the natural soundscape.

This research explored how visitors generally perceive the importance of natural sounds to their experiences, the importance of natural sounds to the overall value of the park, and where natural sounds fall on a park values scale previously used by Borrie and others (2002). This information provides some of the context for the more detailed exploration of the role of natural sounds in visitor experiences provided by the interview data. The perception of park value plays a role in shaping understandings of how National Parks ought to be managed. While several studies in recreation have begun to address the role of perceived park value in visitor willingness to support management actions, this dissertation is the first to directly address the relationship of the park soundscape to park value.

Several researchers have highlighted the importance of accounting for values in natural resource management (Borrie & others 2002; Myers & Close 1998; Jakes 1998; Proctor 1998). Decision-making has been described as fundamentally informed and shaped by values and as such has invoked the need for documenting and understanding the values of constituencies in natural resource management (Myers & Close 1998; Jakes 1998). Proctor (1998) elaborates on this point emphasizing that when the diversity and complexity of public values are understood, natural resource agencies are better situated to evaluate their relationships with the public and consequentially are able to build their own capacity to identify loci of consensus and disagreement from which to design effective public engagement and management strategies.

Descriptions of natural resource management issues have increasingly emphasized the important role of values. Researchers have characterized conflicts over environmental management decisions as direct results of disagreement over public values for specific amenities (Borrie & others 2002; Keuntzel & Dennis 1998). It has been suggested that a key challenge for environmental managers is the ability to be responsive, adaptive, and resilient in relation to the diverse and shifting values within different agency constituencies (Bengston 1993; Borrie & others 2002). The importance of understanding values and the role they play in shaping environmental management concerns has been predicted to increase in concert with the more general need for natural resource management agencies to engage the social domain, rather than the historically dominant biophysical domain (Kennedy & others 1998). From a management or agency perspective, one benefit of explicitly engaging in the discussion of values is the possibility of proactively and positively influencing the tractability of management conflicts.

Lawson and Manning (2002) employed a normative approach to wilderness research by evaluating what visitors thought Denali National Park *ought to be managed for* and their willingness to make trade-offs in camping access. Results from this study demonstrate that overnight visitors prefer “(by a margin of three to one) a wilderness setting that emphasizes solitude through relatively restrictive management actions to a more congested wilderness setting with limited management restrictions” (Lawson & Manning 2002, p 309). This means that the majority of overnight visitors value solitude as an important part of their experience at Denali National Park and as such are supportive of camping permit quotas (Lawson & Manning 2002). If the importance of solitude in Denali National Park is an indicator of visitor willingness to accepting managerial restrictions on camping permits, then it is both interesting and useful to

explore how the importance of the natural soundscape relates to visitor willingness to accept restrictions related to winter access at Yellowstone National Park.

Borrie and others (2002) conducted research in Yellowstone National Park that specifically addressed winter visitor perceptions of park value and corresponding support for management actions. They found four key dimensions of perceived park value (natural values, symbolic and historic values, recreation and tourism resource values, and personal growth values) that explained over half of the variance in item responses regarding support for or opposition to management actions. Results showed that statistically significant differences existed between the four park value groups and the levels of support for all nineteen proposed management actions they examined (Borrie & others 2002). Individuals, who characterized the park as primarily natural and historic in value, were highly supportive of protecting park resources and “more likely to be supportive of stricter noise and emission standards and more supportive of establishing alternate use periods to help minimize conflict between user groups” (Borrie & others 2002, p 45). Conversely, individuals who identified recreation and tourism park values were less likely to support management restrictions to the visitor experience. This study concludes with a clear statement that “visitors with different values tend to support different management actions” (Borrie & others 2002, p 46).

In Zion National Park, Freimund and others (2004), utilized the same park value scale to examine its role of visitor access trade-offs. In this study, “visitors were asked to evaluate the acceptability of a range of trail conditions relative to trade-offs in access that would be needed to achieve the level of resource quality along trails that they prefer” (Freimund & others 2004, p 1). This study was designed to mitigate problems resulting from studies that evaluate unconstrained visitor preferences, or preferences for single experiential attributes independent of

their relationship to other attributes, by explicitly asking respondents to include trade-offs in individual access as an element of the decision-making process. The majority of visitors preferred high quality trail conditions and stated that they were willing to accept trade-offs in terms of reduced access in order to achieve such conditions in the park (Freimund & others 2004). Further, when visitor perceptions of park value were included in the analysis, the predictive value of the model increased (Freimund & others 2004). This type of model could be useful for soundscape research if it is adapted to explore relationships between perceived park value and trade-offs between visitor access and natural soundscape integrity

Social-psychological approaches to understanding values have sought to measure broad values of individuals and groups that are understood as more fundamental drivers of the more commonly measured attitudes and behaviors (Borrie & others 2002). Distinct groups of values have been identified as good predictors of specific environmental attitudes and behaviors (Borrie & others 2002; Schwartz 1996; Stern & others 1995). Of particular importance for this research dealing with the natural soundscape is the additional reasoning that attitudes toward emerging and newly legitimized environmental issues (such as the park soundscape as a natural resource) are ensconced in more stable and abiding values (Borrie & others 2002; Stern & others 1995). If this is the case, then it is likely that there may be more stable, enduring values related to Yellowstone National Park and that those are likely to be a means of understanding visitor support for both the integrity of the natural soundscape and potential management policies. The role of values has been used as a tool in this research in hopes of assisting management with better incorporating the soundscape resource into planning.

To date this research is the first to evaluate visitor perceptions of the natural soundscape, their relationship to traditional park values, and visitor willingness to support management

actions that affect and explicitly identify the natural soundscape as a resource and experience attribute. This research is a first step in addressing this knowledge gap as it pertains to winter use planning in Yellowstone National Park.

## *Studying Values*

Few terms are tossed about so casually and freely in popular, normative, and scholarly discourse than that of *values* (Hechter 1993). In popular discourse, parents desire to see their children associate with friends that have appropriate values; politicians invoke the need to restore societal values such as family, education, equality, and hard work; colleges and universities talk of attracting academics with the right kinds of values to join their faculties (Hechter 1993). The normative realm of value discourse is present in democratic political systems which argue that policies are justified by the degree to which they are able to be responsive to the populace's values (Hechter 1993). Further, theories that attempt to explain human behavior assume that actions are embedded in not only the specific external contexts in which individuals exist, but also by individuals' evaluations of alternative outcomes that they consider (Hechter 1993). Values have continually occupied an important role in understanding both these evaluations and their subsequent human behavior; however, there is widespread disagreement on just what values are. In the social sciences, they have been described as "needs, personality types, motivations, goals, utilities, attitudes, interests, and non-existent mental entities" (Kluckhohn 1951; Meglino & Ravlin 1998, p 351; Rokeach & Ball-Rokeach 1989; Williams 1979).

The importance of values as drivers of human attitudes and behavior is not a radically new idea; not only has it been consistently documented in contemporary calls for further studies of human values (Borrie and others 2002; Hetcher and others 1993), but it is also prevalent in some of our most ancient texts in Western civilization (e.g., Plato, Aristotle, Hobbes, among others). The seventeenth century provides a particularly rich era for exploring the popularity of studying the role of human values on behavior and attitude (Gunn 1968). For the purposes of this study, the term *values* is applied to recreation research and the perceptions of park values.



Within recreation research, the term *values* has not always been agreed upon, however many definitional commonalities do exist.

Values have been described as externally imposed understandings of culturally appropriate behavior. Meglino and Ravlin (1998, p 353) suggest this is at least a part of what a value is, as they define a value as an individual's "internalized belief about how he or she should or ought to behave". Values have also been described as originating at the individual and not the social level (Meglino and Ravin 1998). The origin of human values is beyond the scope of this dissertation, however, my view is that human values co-dependently arise as a result of interactions between individual human beings and the larger biophysical and social environment.

Values are not simply cultural impositions that lack foundations and change with the wind. They have been described as relatively stable, personal and social assessments of what constitutes good behaviors. Rokeach (1973) describes values as "enduring belief[s] that a specific mode of conduct is personally or socially preferable" to other modes of conduct. Values are considered more stable and longer-lasting conceptions of the good which consequently influences human behavior (Bengston and others 1999; Brown 1984; Feather 1992; Manning and others 1999). Larue (1998, p 38) explicitly highlights the notion of the good in stating that "the term *values* points to what we value, to what we consider to be of worth or merit".

Values, as indicators of what we hold to be worthy, therefore influence both choice and action (Brown 1984; Manning and others 1999). In this sense, values can be considered motives that drive specific actions that one believes should be performed (Larue 1998). Values can be described as explanations or reasons for choosing between certain objects and specific behaviors (Eccles and others 2002).

For the purposes of this dissertation, values are relatively stable, enduring beliefs that can assist in explaining human choices. This dissertation does not position itself to inquire into the existence of inherent values of objects, but rather, is concerned with understanding human values that are ascribed to objects, namely National Parks and natural sounds. The survey data explores the relationship between value for the natural soundscape and visitor support of management actions. As such, this research assessed how important natural sounds are to visitors and what relationships exist between ascribed value of natural sounds and visitor support or opposition to management actions designed to protect natural soundscape opportunities.

### ***Approach to Studying Visitor Experiences***

Considering the above commitments of my research approach and the goals of my study, I make several assumptions specifically about visitor experiences. I adopted a fundamentally interpretive research paradigm that allows me to acknowledge and integrate both goal-directed approaches to visitor experiences with the need to understand the actual nature and meanings of the experiences themselves.

In particular, I assumed that goals and motivations are one aspect of visitor experiences and that they play a role affecting visitor experiences of parks. However, my research also acknowledged that visitor experiences are complex and multidimensional. Further, I invoked a process-oriented understanding of experiences assuming that experiences are evolving processes that develop and change over time. While our understanding of our own experiences may change over time, for the purposes of my research, I have chosen to adopt an *in situ* sampling approach, interviewing visitors on site and mid-way through their park experience. This decision

reflects the desire to characterize visitor perceptions of their experience as they are occurring on the ground as related to my research goals. Framing my research through this lens means that my data does not reflect any evolution and development that may have occurred as visitors put their park experiences into memory. Significant post-experience reflection and change in experience meaning cannot be documented in this research since it is not longitudinal and does not reflect any data from visitors after they have left the park and returned home.

Given the goals of my research, meanings and values are essential to understanding the nature of visitor experiences. Experiences cannot be simply reduced to setting attributes, however, there does exist an interplay between the two. Further, I acknowledge that diversity of experiences exist, ought to be acknowledged, and contribute to greater understanding of the more general characterization of visitor experiences which is the focus of my research. I am interested in understanding how visitors characterize their own experiences and have analyzed the data to elucidate the role of the natural soundscape in visitor experiences.

My research addressed larger-scale social phenomena, rather than highly idiographic explorations of individual visitor experiences. While it was necessary to first understand each interview as a whole and thus employ an idiographic analysis on each interview, the thrust of my research was placed on documenting the range of themes emerging out of the data relevant to the research questions. In this sense, the research was more focused on nomothetic analyses than idiographic analyses. Analyses of individual interviews was a means to the goal of looking at patterns across individuals, and both within and across primary activity user groups previously recognized in recreation research. The interview and survey portion of this research did, in part, explore differences in characterizations of soundscape experiences articulated by different groups of people (snow coach riders, snowmobilers, and skiers, primarily). Being able to focus

on how user groups previously established in the literature as distinct may or may not experience the natural soundscape differently, value the natural sounds of the park, and characterize the existence of mechanized sounds within the park, allowed me to more closely explore assumptions and documented distinctions present in prior research and establish a deeper baseline understanding of visitor experiences of natural sounds in Yellowstone National Park.

## ***How a Multi-Faceted Research Framework Guides this Research***

In weaving together relevant pieces of background knowledge and theory, my research framework drew on different and necessary conceptual strengths to best address the current state of knowledge and my research questions. To inquire into the particular problem scenario that my dissertation concerns itself with, it was necessary to understand the general policy background, state of policy development, and drivers of those policies to set the context for both the management challenge and the current visitor experience. There was a need to understand the experience of natural sounds in parks and for that I draw heavily on theories utilized and developed out of past recreation research. This is what drives my *in situ* approach to research and has influenced my baseline understanding of how wildland visitor experiences are currently understood and may operate. This research also required an understanding of where experiences of park sounds fit into overall value systems for parks. Prior research has demonstrated a link between park values and perceptions of experience and support for management actions. I incorporated this information as a means of building off extant research and contributing a unique soundscape component to it, thus expanding its scope and utility. Further, to appreciate what is complex about visitor experiences of park soundscapes, I incorporated interview data which is particularly well suited to provide foundational information on visitor soundscape experiences which has thus far been scarcely documented in current research. This dissertation incorporates multiple theories and research approaches which guide my research; specifics of my methods are explicated in the following chapter.

## CHAPTER 3: METHODS

### *A Mixed-Method Approach*

From the conceptual foundations provided above, I have woven together a research framework that is operationalized under the direction of methods described in this chapter. This dissertation is highly exploratory in nature and requires distinct, tailored research methods that correspond with the intentions of the research questions addressing visitor experiences of natural sounds, perceived importance of the natural soundscape, and the value of natural sounds to Yellowstone National Park itself. Little social science has been conducted concerning the experience of natural sounds in park settings until now; and a mixed-method approach yields different types of information that is all foundationally informative to soundscape managers and researchers. The research reported here has two distinct, yet related components. Both components are fundamentally theory-building in purpose. The survey portion provides a means of generally characterizing the visitor population and discussing overall perceptions of natural soundscape experiences in the park, while the interview portion allows for an in-depth account of the range of experiences of natural sounds and their significance.

My study acknowledges individual experiential complexity and the role of values and meaning as drivers of human understandings and actions. The interviews provided the necessary opportunity for exploration of individual and group perceptions of both the experience of the natural soundscape and the types of biophysical setting attributes important in winter visitor experiences of Yellowstone National Park. It also allowed for a rich documentation of differing significance and values that visitors ascribed to natural sounds as a part of their park experience. Interviews provided information that was useful in mapping these elements of the visitor

experience and provided a unique depth for contextualizing visitor preferences, as well as provided foundational knowledge for future soundscape research.

The survey portion of my study also acknowledges the role that values play as drivers of human preferences and behavior. It utilized a park values scale to explore relationships between national park values and visitor perceptions of the importance of natural sounds. The survey instrument provided a means of generally characterizing the role and importance of natural sounds to the park population. The interview data provided an opportunity to explore visitor meanings and values for natural sounds in detail, something that has not yet been done, which is eventually compared to results from the park values scales in the questionnaire. Each component of this study was first analyzed independently and was then analyzed in comparison to the others to allow for the discovery of deeper insights than any single approach was able to provide on its own. What follows in the results chapters of this dissertation is one results section where the survey data was used to generally characterize visitor views related to the natural soundscape and overall park value, while the interview data provided an in-depth look at the specific meanings and values associated with natural and mechanical sounds in the park.

This dissertation acknowledges that visitor experiences can be understood as multi-dimensional and complex. This assumption is present in the interview and the survey components of my research. The survey instrument provided opportunities to explain and contextualize general differences in visitor perceptions of the natural soundscape and park value. The specifics of my interview and survey methods are explicated in more detail in the following sections.

## ***Grounded Theory and Hermeneutics***

Grounded theory and its application to research have been interpreted in several ways. I take the position that grounded theory can be understood fundamentally as methodical hermeneutics. Founded by two sociologists (Glaser & Strauss 1967), the method of grounded theory was developed as an alternative to hyper-rational, top-down theorizing that historically dominates scientific inquiry (Rennie 2007). They legitimized a way of developing theory through a process of induction and inference that is grounded in the data itself. Glaser & Strauss (1967) propose comparative analysis as a means of allowing theory to emerge and develop from the data. Comparative analysis is a description of the process of interpretation that leads to the development of new ideas and theories. Grounded theory is discovery-oriented and theory building. It does not test pre-determined hypotheses, but rather seeks to deepen understanding of the phenomena under study by building theory that arises from analysis and is grounded in the data itself. It is particularly well suited for exploratory studies such as mine.

While grounded theory does not test pre-determined hypothesis, it is nonetheless guided by the general purpose and the conceptual framework of the researcher. As such it does not adopt a view of naïve empiricism or induction often linked to positivistic epistemology which asserts a wholly objectivist account of knowledge. As Laudan (1977, p14) points out, “both historical examples and recent philosophical analysis have made it clear that the world is always perceived through the ‘lenses’ of some conceptual network or other and that such networks and the languages in which they are embedded may, for all we know, provide an ineliminable ‘tint’ to what we perceive”. Inquiry is always a somewhat theory-laden undertaking.

In research, it is not possible to free observation or interpretation from all theoretical influence, nor is it necessarily desirable. Patterson and Williams (2001, p38) describe and



promote the conscious and explicit adoption of a “forestructure of understanding” by a researcher. It can be seen as a benefit which furthers the research goals. The purpose of the forestructure of understanding or the conceptual framework and background knowledge “is to provide an enabling role, not a limiting one; it functions as a guide rather than a boundary to understanding” (Patterson & Williams 2001, p 39). This perspective is consistent with grounded theory as described by Glaser and Strauss (1967, p 3) when they wrote “of course, the researcher does not approach reality as a *tabula rasa*; he must have a perspective that will help him see relevant data and abstract significant categories from his scrutiny of the data.”

Therefore, employment of background knowledge is a tool that helps the researcher to analyze and understand the data. This knowledge sensitizes the researcher to relevant issues and relationships in the data. This notion co-exists with the idea that theories are derived and concepts emerge from the data if a researcher approaches analysis without predetermined categories or hypotheses (Kelle 2005). These two activities are symbiotically related. True inquiry is based on the authentic attempt to learn more, not simply affirm something that one has already concluded in advance of the research process

The development of theory occurs via constant comparison, which invokes the idea of analyzing and understanding parts in terms of wholes and vice versa. Constant comparison is interpretation. This is a continual process that the researcher enters into during analysis which tests ideas and justifies the development of theories. I see grounded theory as interpretive and as such, a methodical hermeneutics. The notion of grounded theory as interpretive is acknowledged by Strauss and Corbin (1998).

Grounded theory as methodical hermeneutics is relevant and is the most appropriate method for my research. The purpose of my study has been to lay the foundational

characterization visitor experiences of natural sounds. Prior to this research, little was known about how visitor characterize such experiences. This interview approach lends itself to discovering and building theory about phenomena. My research was fundamentally exploratory, yet still directed. As a researcher I was not testing pre-determined hypotheses, however, I did enter into the research process with a theoretically informed perspective.

### ***Selection of Participants and the Interview Process***

The method of conducting an interview was fundamentally driven by my research goals to richly characterize and understand visitor experiences of park soundscapes. For guidance in conducting interviews, I referred primarily to Patterson & Williams' (2001) explicit discussion on interviewing methods. I adopted an in-depth, semi-structured interview model.

The role the interviewer plays in influencing the interview is important to take into account (Patterson & Williams 2001). Glaser and Strauss have maintained that the development of grounded theory is related to the perspectives of the researcher who is involved in producing it (Glaser & Strauss 1967; Rennie 2000). This is consistent with interpretive perspectives that highlight the notion that an interviewer and respondent participate in a process of data production. They co-constitute both the data resultant from and by consequent, the subsequent analysis of an interview. I acknowledge that the role of the interviewer "participat[es] in an emergent discourse" (Patterson & Williams 2001, p 42). The interviewer influences the development of the interview by the nature and type of responses, follow-up questions, and manner in which s/he introduces topics (Mishler 1986; Patterson & Williams 2001). The interviewer plays an acknowledged role in the shape and development of the interview and therefore the data that is produced through the process. A good interviewer will be conscious of

this fact, yet try to create an interview environment that allows the respondent to feel comfortable responding to the questions and to produce pertinent data that relates to the research questions under study. A good interviewer should engage in empathic listening which seeks to truly understand the views of the participant. The interviewer should always communicate unwavering and unconditional respect for the respondents' views; they should not judge the respondent or his/her views. An interviewer should provide a comfortable atmosphere and actively cultivate a trusting relationship so as to facilitate honest and accurate responses given during the interview.

The interview is an organically unfolding event. It is dialogic in nature. Rather than take the interview approach that requires the interviewer to ask an entirely structured set of questions to every single participant in exactly the same manner without variation or follow-up questions, the approach I took was to think of an interview as a directed conversation (Charmaz 1991 as cited by Patterson & Williams 2001). The interview should be a conversation where the interviewer facilitates the ability of the respondent to provide information and perspectives pertinent to the research goals. I saw my role as directing respondents to themes important to my research, but not imposing or forcing specific meanings and responses (Patterson 2001; Kvale 1983).

I took a semi-structured approach to interviews that utilized a series of pre-planned open-ended interview questions developed in the form of an interview guide. This guide ensured that I covered all the issues relevant to my research, guarded against wandering off topic, and mitigated the likelihood of awkward pauses and silences that lead to discomfort on the part of both the interviewer and the respondent (Patterson & Williams 2001). Semi-structured interview assisted the respondents by providing a comfortable structure that clues them into what

information is pertinent to the researcher (Patterson & Williams 2001). I made every attempt to be diligent in utilizing this type of interview process so as to provide a systematic and focused approach to interviewing, producing relevant and comparable data (Patterson & Williams 2001).

Conducting interviews of this nature requires integrating structure and flexibility. As a researcher I needed to address the research questions, but I wanted to be careful not to exclude the ability to be flexible and improve an individual interview by asking questions that were relevant to understanding a visitor's experience (Patterson 2001). Follow-up and clarification questions were used as deemed appropriate for the individual interview. Grounded theory as methodical hermeneutics means that research is an emergent, dynamic, and organically evolving process. Attention to negotiating the tensions of structure and flexibility in my interviews also meant that the interview guide was revised and improved throughout the data collection period (Patterson & Williams 2001; Williams and others 1990). Due to this flexibility and the dynamic nature of the interview process, interviews are comparable, but do not contain identical data. The quality of information available through interview data is strength of its use in research, while the limitations on exact comparisons are a weakness of the approach. Please see Appendix A for the complete interview guide.

Prior to conducting interviews in the park, as a means of developing and refining my interviewing skills, I engaged in practice interviews with colleagues and friends before my research began. Through this process, I was able to incorporate their critical feedback and continue to improve my skills. These practice interviews contributed to learning how to be a better interviewer and ultimately, to achieve the goals of my research.

Forty-five interviews ranging in length from fifteen to twenty-five minutes each were conducted at the Old Faithful area of Yellowstone National Park during the 2007-2008 winter

visitation season. Three locations within the Old Faithful area were used to conduct interviews (inside the Snow Lodge, outside near Old Faithful Geysers, and both inside and outside the warming huts near Old Faithful Geysers). Interviews were conducted during the hours of 8:00 am and 8:00 pm during both weekends and weekdays. While forty-five interviews were conducted, some interviews were conducted with couples, resulting in a total of forty-nine individuals being interviewed. My goal was to interview an approximately equal number of visitors from each of the primary visitor activity groups (skiers and snowshoers, snow coach riders, and snowmobilers), so that I would be able to analyze response patterns both within and across these primary user groups. Of the three major user groups in the park, fifteen interviews were conducted with skiers, seventeen with snowmobilers, and seventeen with snow coach riders, yet most respondents interviewed engaged in multiple activities during their visit to the park. Twenty-seven women were interviewed and twenty-two men were interviewed ranging from twenty-one to seventy-four years of age. Respondents stayed from one day to five days in the park and were all visitors to the Old Faithful area.

## ***Transcription Procedure and Interpretive Analysis***

To some extent there may not be a true and solid distinction between conceptualization of a research project, design of study instruments, and analysis. One can consider analysis as a continual process that begins even before one records a first interview. The building of ideas that contribute to a final analysis began to some extent with the germ of a research idea and has continued to evolve.

Once I began the process of conducting interviews I took notes as soon as possible and in most cases immediately after the completion of each interview. I listened to recorded interviews again before transcription and made additional notes. I transcribed fifteen interviews personally and employed a professional transcriptionist to complete the other thirty recorded interviews. Once all of the interviews were transcribed, I listened to all of the interviews a final time while reading the transcriptions to check for quality, errors, or disagreements in meaning potentially driven by choices in punctuation on the transcript.

Once the interview transcripts had been verified, I formally began to analyze each interview and ultimately the entire data set as a whole. I began to develop themes as an expression of understanding and interpreting the data. First I organized, categorized, and looked to understand each individual interview, and then I compared responses within primary user groups and across visitor groups. As I coded the interviews, I analyzed how each interview related to other interviews within and across groups and verified whether similar responses were indicative of the same perspective or if there were explicit or nuanced differences. This was an evolving process that occurred throughout the analysis phase. Patterson & Williams (2001) describe the development of an “organizing system” or conceptual schemata for both individual interviews and the data set as a whole. The goal of my research was to map relationships and

themes within the data set that help us to better understand the phenomena and address my research questions.

The activity of categorizing or coding was a “dynamic and fluid process” (Strauss & Corbin 1998, p 101). It was a continual process that was inspired by asking questions and making comparisons. The purpose was to produce concepts and themes that made sense of the data. It began with understanding parts—both parts of an interview and individual interviews themselves as parts of a whole data set. It required looking at interrelationships, causal factors, and deep meanings. Patterson & Williams (2001), Rennie and others (1988), and Turner (1981), all suggest categorizing progressively from meaning unit to meaning unit as a researcher proceeds through a text. Using this technique, a list of themes or codes developed as the analysis went forward. These codes and their relationships were referred to as each new meaning unit was addressed (Rennie 2000).

Understanding relationships between categories “may be assisted by diagrams, flow charts, narrative schematization, and so on, depending on what works best for the particular analyst” (Rennie 2000, p 485). In my case, I began by coding emergent themes from the interview transcripts and created a narrative schemata for individual interviews and finally for all the interviews as a whole. I coded the interviews by hand, one by one, until relatively few to no new categories were necessary as new interviews were analyzed (Rennie 2000). I focused on meanings and ideas that were relevant to the research goals. I continually took notes and explored questions to more deeply address complexities in the data as I read and reread the interviews during the analysis. My analysis was directed and purposive; it was consistent with addressing my research questions. As codes, categories, and analysis developed, additional note taking and decision-making continued to take place throughout. As I made decisions, I was

attentive to the need to justify my choices and explain my reasoning. I was careful to verify my conclusions with thorough analysis of the data. As analysis progressed, I engaged in constant comparison. I continuously validated, revalidated, questioned, critiqued, and examined relationships between parts of interviews, individual interviews, visitor groups, and the data set as a whole. This was done to deepen and develop greater understanding of the phenomena under study and ensures to the greatest extent possible that I was accurately capturing the range of experience, meanings, and variations existent in the data.

The phenomenological technique of bracketing was also incorporated into the analysis. I made a sincere effort to contain my biases by being self-reflexive and critical throughout the analytic process. Some argue that the ability to do Husserlian bracketing is not possible at all because there are some aspects of an individual's consciousness that are not accessible by self-reflection (Rennie 2000). That assertion is arguable, but nonetheless there are many aspects of individual consciousness that most certainly are accessible to self-reflection and to the extent that they are, I considered it my responsibility as a researcher to engage in such bracketing as authentically, honestly, and self-critically as possible (Ericcson & Simon 1980; Nisbett & Wilson 1977; Rennie 2000).

As the analysis progressed, the activity of categorizing continued through increasing levels of conceptualization and abstraction. While initial categories may have stayed close to the language of the actual interview and have been termed descriptive by Glaser & Strauss (1967), interpretation is nevertheless involved in such descriptive categories (Rennie 2000). As I moved further along in the process of data analysis, my objective was to continue analysis to conceptualize the highest-order categories of increasing abstraction that group and subsume the descriptive categories, providing a meaningful conceptualization and explanation of the



phenomena (Rennie 2000). The idea was to work toward the development of a holistic representation of the phenomena.

Although the process of theory-building and “discovery always contains elements of intuition and creativity, the generation of a hypothesis [or a theory] can be reconstructed as a reasoned and rational affair” (Kelle 2005, p 9). Abductive inference can be considered the logical foundation of theory building. The process of abductive inference has also been called “inference to the best explanation” and “hypothetical inference” (Achinstein 1992; Kelle 2005). In any case, the notion that such “inferences serve to discover hypotheses which explain certain empirical findings” is affirmed in my research and was engaged in during analysis (Kelle 2005, p9). The process of abductive inference began with the data and “proceed[ed] to general statement[s] which explain the observed phenomenon” at which point the “the researcher either has a general rule at his disposal that leads to a possible explanation or the hypothetical inference serves as a means to discover new, hitherto unknown concepts or rules” which they continue to explore and test throughout analysis (Kelle 2005, p 9).

While there was a logical basis for building theory as an explanation and characterization of phenomena, interpretation was also fundamental to the entire process of analysis and increasingly came into play with higher-order conceptualizations (Rennie 2000). During my analysis I engaged in peer-checks with colleagues to further critique the development of my categories and conceptualizations. Due to the fact that interpretation can continue to develop over time and is an on-going process it is difficult to tell when the analysis has been completed, but “it is necessary to force an ending at some point” (Rennie 2000, p 487). What is important is that as a researcher, I felt that I had adequately and rigorously addressed the research questions through my data analysis and provided a meaningful, justifiable, and useful account of the

phenomena. That is when my analysis stopped and when I began to organize my findings in writing this dissertation.

### ***Selection of Survey Respondents and Survey Analysis***

In addition to the interview portion of my research, I also conducted a soundscape survey. While the interview portion of my research explored and richly characterized the importance (or lack thereof) of natural sounds in visitor experiences and the dimensions of this experience, a visitor survey was administered as a means of quantitatively contextualizing the role of natural sounds in visitor experiences. The survey instrument was used to provide general a general context for understanding visitor experiences of natural sounds and to assess perceived value of natural sounds and the value of those sounds to the park itself.

The park values scale was used as a means of characterizing group trends and assessing possible patterns related to ascribed values for the park and the natural soundscape. Borrie and others (2002) have evaluated the role that park values play in evaluations of management actions. They identified natural values, symbolic and historical values, recreation and tourism values, and personal growth and development values as the primary values visitors perceived for Yellowstone National Park (Borrie and others 2002; Freimund and others 2004). Their study found that individuals who ascribed natural values to the park were more likely to support management restrictions of visitor experiences, access, and behavior (Borrie and others 2002; Freimund and others 2004). Please see Appendix B for the park values scale previously used in Yellowstone National Park by Borrie and others (2002) that has been adapted to include a soundscape component. My research utilized this park value scale to evaluate patterns between perceived park values and the natural soundscape.

A total of four hundred thirteen visitors responded to the park values scale which was been modified to include four soundscape variables. Respondents were additionally asked to rate the importance of natural soundscape opportunities to their experience and to the overall value of Yellowstone National Park. Please see Appendix C for the soundscape survey.

Four hundred twenty-seven visitors were approached to complete a survey with four hundred thirteen visitors agreeing to participate in the surveys. Time of day, weather, and visible characteristics of the fourteen visitors who declined participation in the survey were recorded in a non-response chart and analyzed for non-response bias. No patterns explaining non-response were found. Visitors were approached in the same three locations where the interviews were conducted (although interviews and surveys did not go on simultaneously at the same location) in Yellowstone National Park during the 2007-2008 winter use season. Surveys were conducted on twenty days spread across the winter season, eleven of which were weekdays and nine of which were weekend days. The potential respondent universe for the soundscape survey was all visitors, eighteen years of age or older, stopping at Snow Lodge and Old Faithful from 1/02/08 to 3/31/08. Sample periods were selected to ensure a balance of weekend and weekday periods and a distribution across the winter season. Visitor contacts occurred based upon a pre-designed systematic schedule, starting with the first available group during the sample time. The sampled people were adults (eighteen years of age and older), and were chosen using the next birthday method. Based on previous studies and visitor use data, every fifth group was eligible and the “next birthday” method was used to determine individual eligibility within a group. Once the surveyor finished with one group, she moved on to the next eligible group that arrived at the survey site. If a group refuses to be interviewed, the surveyor then contacted the next eligible

group, adhering to the sampling schedule of intercepting every fifth group. Given the use patterns at Old Faithful, the data was collected between 10:00 AM and 3:00 PM.

The data was analyzed using SPSS statistical software to provide basic descriptives and frequencies. Factor analysis was also used to confirm the common value dimensions that underlie the total number of indicators in the scale. Note that the bulk of the park value scale was already utilized by Borrie and others (2002). I analyzed how respondents rated the importance of the new soundscape scale items and I also evaluated how the soundscape items loaded on the other previously established park value dimensions. MANCOVAs were also used to evaluate differences between visitor primary activity user groups and responses to questions related to natural sounds and support for management actions. Gender and education level were used as control variables in the MANCOVA analyses.

The survey data was primarily utilized to provide an overall characterization of the winter visitor population and their perceptions of the importance of the natural soundscape to both their experiences in the park and to the overall value of the park. The interview data was used to richly illustrate and document the range of experiences existent in the park visitor population and illuminate the complexity of visitor perceptions of these issues. Prior to this, there had not been any research assessing the relationship of overall park values and the importance of natural sounds to visitors.

## **CHAPTER 4: VISITOR EXPERIENCES OF WINTER PARK SOUNDSCAPES**

This chapter presents findings from both the interviews and survey conducted at Yellowstone National Park during the 2007-2008 winter visitation season. The findings in this chapter reflect both the survey and the interview data. First, a descriptive analysis of the survey data is presented to frame our general understanding of the role of natural sounds in visitor experiences. This is followed by a synthesized analysis of responses from forty-five interviews which is intended to document the diversity and richness of responses related to visitor characterizations of the experiences of natural sounds, the importance of natural sounds to visitor experiences and to the overall park setting, and finally visitor perceptions of mechanical sounds and vehicles used in the park. When reporting direct quotes from the interviews, I have deliberately selected particularly key quotes which are provided in tables throughout the chapter. Rather than embedding quotations in the results text of this chapter, I have provided them in tables to ease reading. Note that many quotes contain multiple themes. I have selected quotes and associated them with applicable themes to illustrate my arguments. Percentages of total interviews to which a particular theme is directly applicable are listed in the tables of interview data. Throughout this chapter, I have also analyzed the interviews synthetically to account for more abstract categories, quotations containing multiple codes, and to address complexity inherent in the data. For the purposes of the following chapters, the term natural sounds includes natural quiet or silence, although there is specific data attributable to quiet and silence which is explicated below.

## ***General Characteristics of Visitor Population and Perceptions of Natural Sounds***

This section presents data analysis from the survey instrument and is designed to provide an overview and general characterization of the visitor population and their experiences of the natural soundscape in the park. It serves to contextualize the more detailed and in-depth interview data that follows later in this chapter.

Four hundred thirteen visitors to Yellowstone National Park responded to the soundscape survey. Respondents ranged in age from eighteen to eighty-seven years old with the average age being fifty-one years old. Just over half of the respondents (53%) were male and forty-seven percent were female. Close to half (45%) of all visitors participating in the survey visited the park with family. Thirty percent visited with friends; twenty-seven percent visited with an outfitter or guide group; and only six percent visited the park alone. These groups are not mutually exclusive as some visitors may have been in mixed groups or participated in guided activities during a portion of their park visit. Since these categories are not discrete, it is with some degree of caution that we should interpret patterns in the data relative to these categories. Survey respondents spent anywhere from one to ten days in the park with thirty-seven percent spending one day, fourteen percent spending two days, twenty percent spending three days, and fourteen percent spending five days in the park. Eighty-five percent of visitors surveyed spent between one and four days in the park during their visit. Fifty-seven percent of visitors surveyed toured the park in a snow coach; Forty-one percent of visitors snowmobiled in the park, while twenty-six percent of visitors cross-country skied and twenty-five percent went snowshoeing. Again, these categories are not mutually exclusive as many visitors participated in multiple activities while in the park. In fact, fifty-eight percent of respondents participated in multiple

activities within the park during their visit. Thirty-three percent of visitors stated their primary activity in the park was snowmobiling, while sixteen percent cited cross-country skiing, eight percent snowshoeing, thirteen percent snow coach touring, eight percent wildlife viewing, eight percent snowshoeing, and two percent photography. Twenty percent did not cite a primary activity in the park.

**Table 4.1: General Characteristics of the Old Faithful Visitor Population**

<b>N=413</b>	
<b>Age Range</b>	18-87
<b>Mean Age</b>	51
<b>Gender</b>	Male 53% Female 47%
<b>Visitor Group</b>	Alone 6% Family 45% Friends 37% Outfitter/Guide Group 27%
<b>Activities Participated in During Park Visit</b>	Snow coach Touring 57% Snowmobiling 41% Cross-country Skiing 26% Snowshoeing 25%
<b>Participated in Multiple Activities</b>	58%
<b>Primary Activity in Park</b>	Cross Country Skiing 16% Snowshoeing 8% Snowmobiling 33% Snow coach Touring 13% Wildlife Viewing 8% Photography 2% No primary activity cited 20%

The majority of respondents (81%) agreed that Yellowstone National Park is particularly important as “a place for natural quiet” (19% strongly agreed, 62% somewhat agreed). Less than twenty percent of the visitors surveyed were either neutral or in disagreement with the statement (12% were neutral; 4% somewhat disagreed; and 3% strongly disagreed). Examining responses across visitor primary activity in the park (Table 4.3), the data shows differences in the level of agreement that Yellowstone is particularly important as “a place for natural quiet”. Cross-country skiers and snowshoers actually indicated that they agreed to a lesser degree that being “a place for natural quiet” was important to the overall value of the park. When MANCOVAs were employed to test for significant differences in responses between visitor primary activity types, there were no statistically significant differences in the mean responses between primary activity users. The research indicates slight differences in level of agreement that Yellowstone is important as “a place for natural quiet”, but overall there is general agreement among all primary activity user groups that this quality is important to the value of the park.

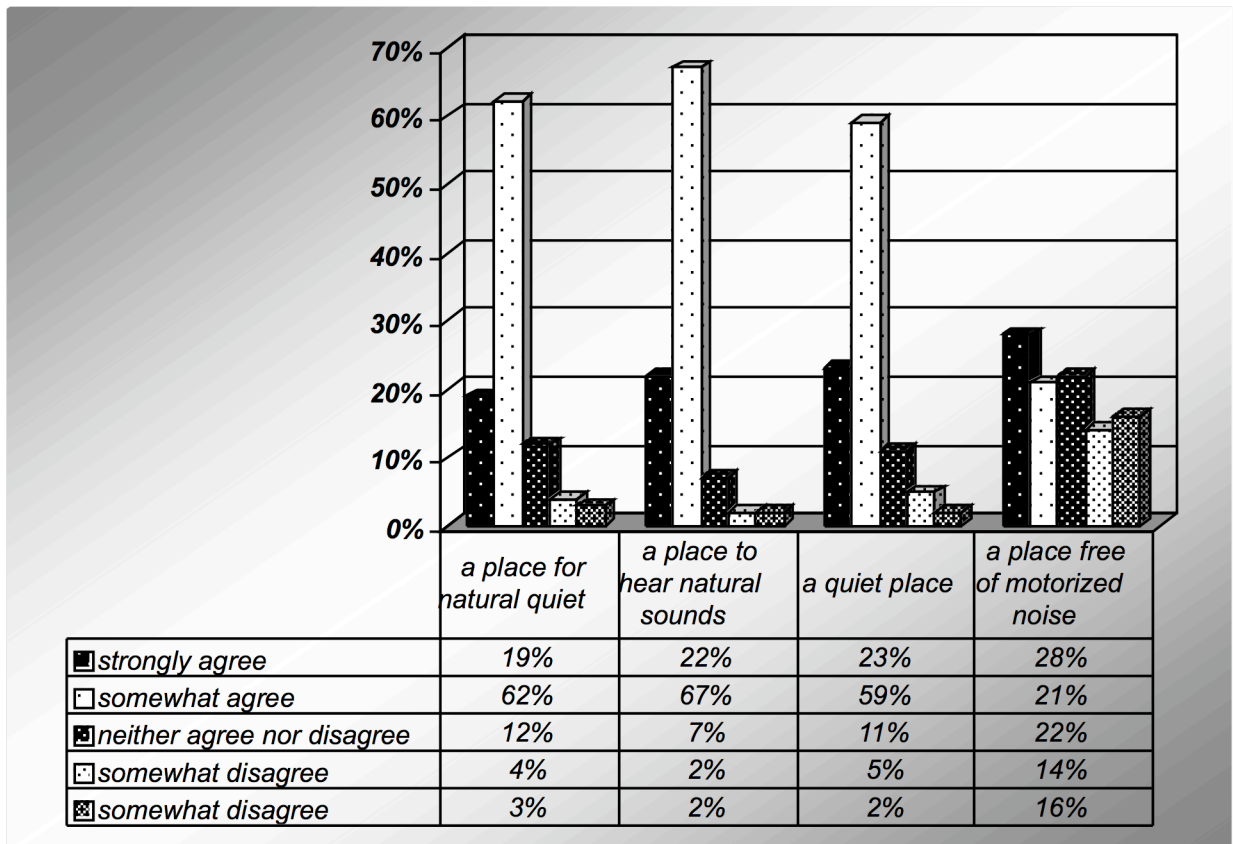
Ninety percent of visitors responding to the survey agreed that the park was particularly important as “a place to hear natural sounds” (22% strongly agreed, 67% somewhat agreed). Only eleven percent of visitors surveyed were either neutral or in disagreement with the claim (7% were neutral; 2% somewhat disagreed; and 2% strongly disagreed). Analysis across primary activity type shows that the snowmobile group is more evenly distributed across the five response categories. MANCOVAs did not find statistically significant differences between subject effects related to this sound variable and visitor primary activity types. What is interesting to note, however, are the differences in response distribution which do show different response patterns for the snowmobile group.



Eighty two percent of visitors surveyed stated that YNP was particularly valuable as “a quiet place” (23% strongly agreed, 58% somewhat agreed, 11% neutral, 5% somewhat disagreed, 2% strongly disagreed). Between eighty and ninety percent of visitors stated that natural sounds play a particularly important role in the overall value of YNP. Response patterns across visitor primary activity type on this variable again show slight differences in the distribution of responses. In particular, the data shows that cross-country skiers and snowshoers are more likely to agree that being a quiet place is important to the overall value of the park. The snowmobile group actually has the largest percentage of responses strongly agreeing that the park is valuable as a quiet place, but is also more likely than other primary activity groups to be neutral on this question. MANCOVAs again were not statistically significant on this question.

Interestingly, just less than half of the visitors surveyed (49%) stated that YNP was particularly valuable as “a place free from motorized noise” (28% strongly agreed, 21% somewhat agreed, 22% neutral, 14% somewhat disagreed, 16% strongly disagreed). Respondents were much more divided on this latter question, which may indicate recognition of the reality and necessity of some existent motorized sounds in the park. This perspective is supported and described in more detail later when presenting the interview results. Looking at the responses across visitor primary activity type, the data shows that the snowmobile group and the photography group are more likely to disagree with the claim that being a place free from motorized noise is important to the overall value of Yellowstone. MANCOVA did reveal that between subject effects on this question were significant at the .01 level ( $p = .008$ ). The effect of primary activity type, however, on level of agreement on this variable explains only eight percent of the variance.

**Graph 4.1: Importance of Natural Sounds to Yellowstone National**



*Question wording: Please indicate for each of the following, how much you agree or disagree that they are important to the overall value of Yellowstone National Park.*

**Table 4.2: Importance of Natural Sounds to Value of YNP by Visitor Primary Activity**

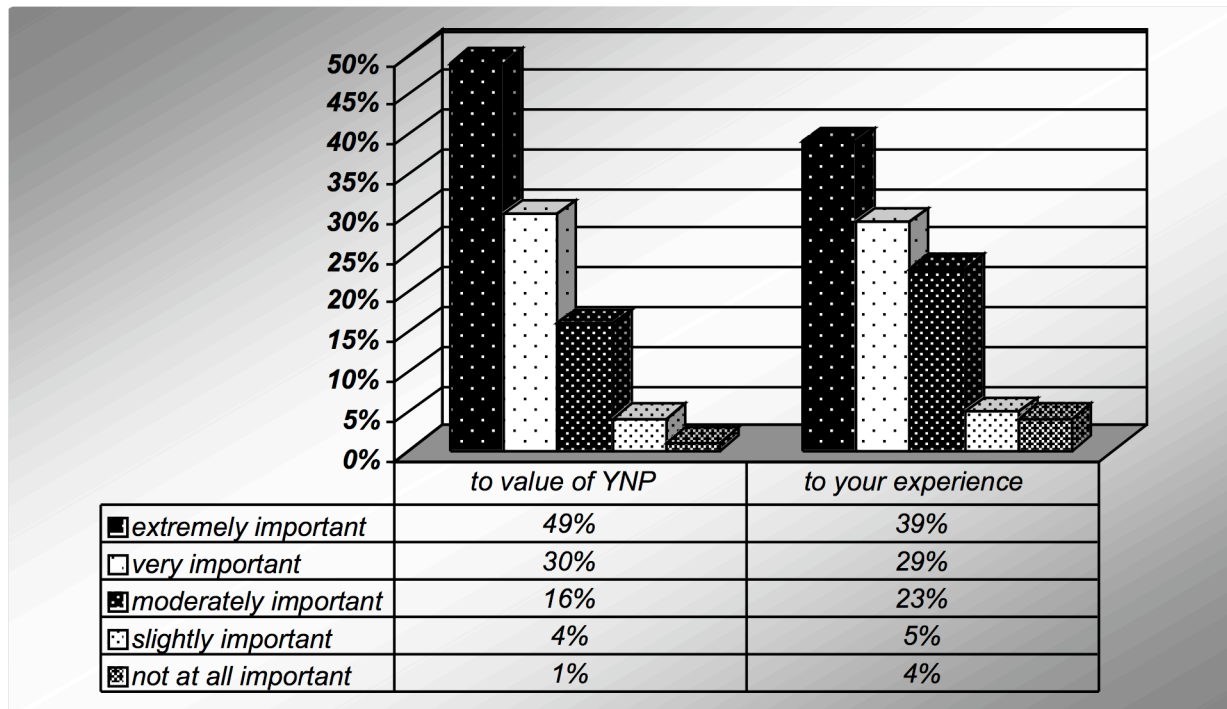
	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree	N
A place for natural quiet						
Cross-Country Skiing	13%	78%	8%	0%	2%	63
Snowshoeing	3%	84%	3%	7%	3%	31
Snowmobiling	26%	47%	17%	6%	4%	133
Photography	20%	60%	20%	0%	0%	10
Wildlife Viewing	12%	67%	6%	9%	5%	33
Snow coach Touring	23%	62%	14%	2%	0%	52
A place to hear natural sounds						
Cross-Country Skiing	16%	78%	3%	2%	2%	63
Snowshoeing	23%	68%	0%	3%	7%	31
Snowmobiling	29%	57%	11%	0%	4%	133
Photography	10%	70%	0%	20%	0%	10
Wildlife Viewing	19%	72%	3%	3%	3%	32
Snow coach Touring	19%	76%	6%	0%	0%	53
A quiet place						
Cross-Country Skiing	13%	78%	3%	3%	2%	61
Snowshoeing	13%	71%	3%	10%	3%	31
Snowmobiling	24%	46%	19%	7%	5%	132
Photography	20%	60%	0%	20%	0%	10
Wildlife Viewing	28%	56%	9%	3%	3%	32
Snow coach Touring	26%	60%	11%	2%	0%	53
A place free of motorized noise						
Cross-Country Skiing	16%	53%	16%	7%	8%	61
Snowshoeing	17%	43%	20%	13%	7%	30
Snowmobiling	20%	9%	26%	18%	27%	133
Photography	10%	20%	20%	30%	20%	10
Wildlife Viewing	38%	25%	22%	6%	9%	32
Snow coach Touring	19%	28%	26%	15%	11%	53

Almost all (99%) visitors stated that the opportunities to experience natural sounds were important to the overall value of the park (49% extremely important, 30% very important, 16% moderately important, 4% slightly important). Only one percent of visitors surveyed stated that the opportunity to experience natural sounds were “not at all important” to the overall value of the park. Analysis across primary activity type shows that the degree of importance of opportunities to experience natural sounds to the overall value of the park was higher among cross country skiers and snowshoers and less important in degree to snowmobilers, wildlife viewers, and snow coach riders. There were statistically significant differences across primary activity type through MANCOVAs at the .01 level ( $p = .001$ ). Primary activity type explained nine percent of the variance in response to this question (partial Eta squared = .090). As such, the

finding suggests that there are many other factors that influence respondents primary activity type.

Ninety six percent of visitors stated that opportunities to experience natural sounds were important to their experience on the day surveyed in the park (39% extremely important, 29% very important, 23% moderately important, 5% slightly important). A minority of visitors (4%) stated that opportunities to experience natural sounds were “not at all important” to their experience of the park on the day surveyed. It was generally more important for skiers and snowshoers to have the opportunity to experience natural sounds than for other user groups. Between subject effects exist as revealed through MANCOVA and were statistically significant at the .01 level ( $p=.001$ ). Twelve percent of the variance (partial Eta squared = .119) on this question was explained by primary activity type.

**Graph 4.2: Importance of Opportunity to Experience Natural Sounds**



**Table 4.3: Importance of Opportunity to Experience Natural Sounds by Visitor Primary Activity**

	Extremely Important	Very Important	Moderately Important	Slightly Important	Not at all Important	N
<b>Please rate how important the opportunity to experience natural sounds is to the overall value of YNP</b>						
Cross-Country Skiing	70%	25%	5%	0%	0%	63
Snowshoeing	73%	20%	3%	3%	0%	30
Snowmobiling	31%	35%	27%	5%	2%	135
Photography	20%	60%	20%	0%	0%	10
Wildlife Viewing	52%	27%	15%	6%	0%	33
Snow coach Touring	46%	37%	10%	8%	0%	52
<b>Please rate how important it is to your experience today to have the opportunity to experience natural sounds in YNP</b>						
Cross-Country Skiing	60%	29%	11%	0%	0%	63
Snowshoeing	67%	20%	10%	3%	0%	30
Snowmobiling	22%	29%	34%	7%	8%	136
Photography	30%	40%	20%	10%	0%	10
Wildlife Viewing	33%	30%	30%	3%	3%	33
Snow coach Touring	40%	35%	17%	6%	2%	52

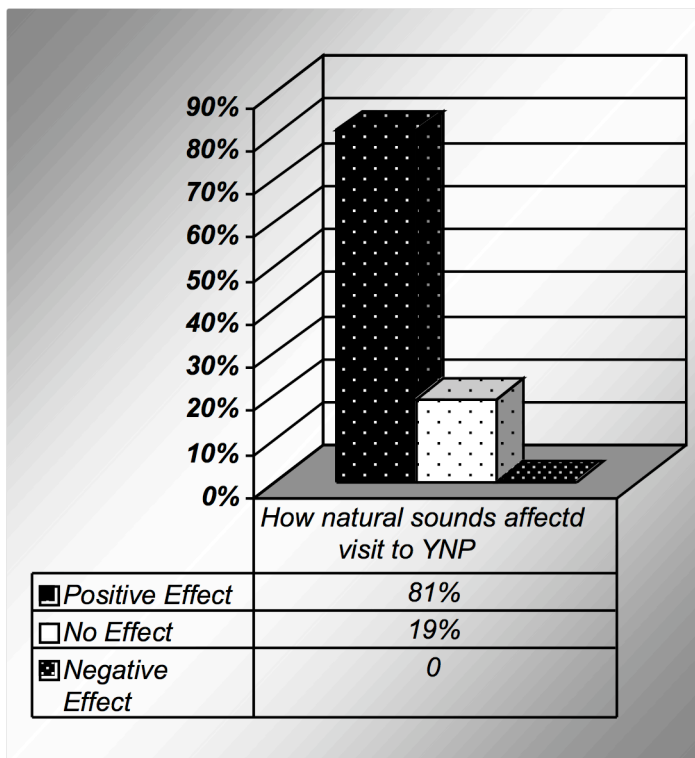
In terms of visitors’ actual experience of natural sounds during their visit to Yellowstone National Park, the majority (81%) of visitors surveyed stated that natural sounds had a positive effect on their visit. The remaining nineteen percent of visitors stated that natural sounds had no effect on their visit to the park. No visitors stated that natural sounds had a negative effect on their visit to the park. Analyzing responses across visitor primary activity, the data again shows patterns that skiers and snowshoers are more likely to describe the affects of natural sounds as having a positive effect on their experience compared to all other groups. Snowmobilers were the most likely to state that natural sounds had no effect on their visit. MANCOVA was used and demonstrated statistically significant ( $p=.012$ ) differences at the .05 error level in responses between visitor primary activity types on this question. Seven percent of the variance was explained by these between subject effects (partial Eta squared = .072).

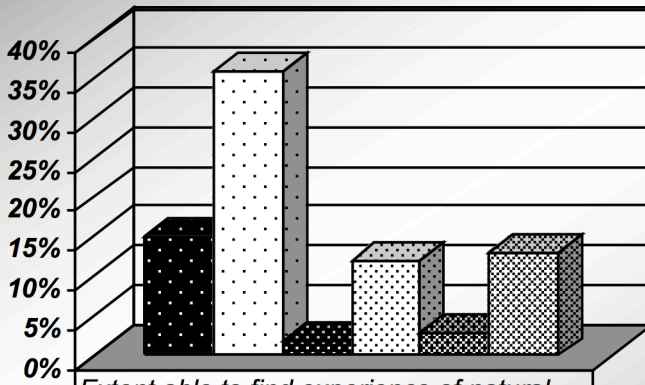
When visitors were asked to state the extent they were able to find the experience of natural sounds that they were looking for in Yellowstone National Park, the majority (71%) were

able to find it half of the time or more (15% all of the time, 36% more than half of the time, 20% about half of the time). Only three percent of visitors were unable to find the experience of natural sounds they were looking for. A minority of visitors surveyed (13%) stated they were not looking for any experience of natural sounds. While only fifteen percent of visitors were able to find the experience they were looking for of natural sounds all of the time while in the park, satisfaction with the experience of the park's natural sounds remained high. Eighty-three percent of visitors were satisfied with their experience of the park's natural sounds. This indicates an awareness of some degree of trade-offs inherent in desiring a pristine soundscape environment and the realities of some development and technological presence within the park. This perspective is further supported from the interview data which is described in later sections. Overall satisfaction of the park was high, with one hundred percent of visitors stating that they were either very satisfied (87%) or somewhat satisfied (13%). Looking at responses across visitor primary activity in the park, compared to snowmobilers, cross-country skiers and snowshoers had more difficulty finding the experience of natural sounds that they were looking for. There was no statistically significant difference of between subject effects through MANCOVA, however, between primary activity types on this question. As with many other questions, the issue is more a question of degree, rather than large-scale oppositional views even between the most divergent groups on this question, snowmobilers and snowshoers. In terms of visitor satisfaction with their experiences of the park's natural sounds, snowmobilers, photographers, and snow coach riders were more likely to be neutral on this question, but overall the data shows that most visitors in all groups were satisfied with their experience of the park's natural sounds. Regarding satisfaction, there was no statistically significant difference of between subject effects through MANCOVA. However, between primary activity types on this

question, as with many other questions there are not large-scale oppositional views even between the most divergent groups on this question, but varying degrees of support. In terms of visitor overall satisfaction with the park experience, the data shows that snowmobilers and photographers were more likely to state they were “somewhat satisfied” rather than “very satisfied”. In comparison to other primary activity type user groups, there is a difference in the degree of satisfaction, but again not patterns that indicate oppositional views between user groups on the question of overall satisfaction with the park experience.

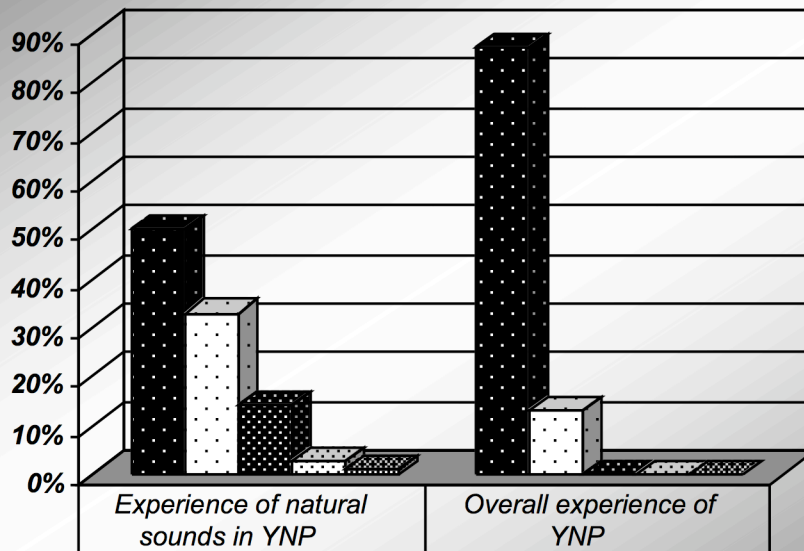
**Graph 4.3: Natural Sounds and Satisfaction**





Extent able to find experience of natural sounds you were looking for

■ All of the time	15%
□ More than half of the time	36%
▣ About half of the time	2%
▤ Less than half of the time	12%
▥ Unable to find experience I was looking for	3%
▦ Not looking for experience of natural sounds	13%



■ Very satisfied	50%	87%
□ Somewhat satisfied	33%	13%
▣ Neither	14%	0%
▤ Somewhat dissatisfied	3%	0%
▥ Very dissatisfied	1%	0%



**Table 4.4: Natural Sounds and Satisfaction by Visitor Primary Activity**

	Please rate how natural sounds affected your visit to Yellowstone NP			
	They had a positive effect	They had no effect	They had a negative effect	N
Cross-Country Skiing	98%	2%	0%	63
Snowshoeing	97%	3%	0%	30
Snowmobiling	68%	32%	0%	136
Photography	80%	20%	0%	10
Wildlife Viewing	85%	15%	0%	33
Snow coach Touring	85%	15%	0%	52

	To what extent were you able to find the experience of natural sounds that you were looking for in YNP						
	All of the time	More than half of the time	About half of the time	Less than half of the time	Unable to find the experience I was looking for	Not looking for any experience of natural sounds	N
Cross-Country Skiing	6%	17%	55%	16%	6%	0%	64
Snowshoeing	3%	10%	27%	37%	23%	0%	30
Snowmobiling	22%	39%	22%	17%	15%	2%	133
Photography	20%	0%	40%	20%	20%	0%	10
Wildlife Viewing	12%	15%	33%	21%	15%	3%	33
Snow coach Touring	10%	6%	39%	27%	14%	6%	52

	Very Satisfied	Somewhat Satisfied	Neither	Somewhat dissatisfied	Very dissatisfied	N
	<b>How satisfied are you with your experience of the park's natural sounds</b>					
Cross-Country Skiing	48%	44%	3%	5%	0%	63
Snowshoeing	43%	46%	7%	4%	0%	28
Snowmobiling	54%	22%	22%	2%	1%	134
Photography	30%	50%	20%	0%	0%	10
Wildlife Viewing	47%	44%	9%	0%	0%	32
Snow coach Touring	62%	19%	14%	4%	2%	52
<b>How satisfied are you with your overall experience of YNP</b>						
Cross-Country Skiing	86%	14%	0%	0%	0%	64
Snowshoeing	64%	36%	0%	0%	0%	28
Snowmobiling	91%	7%	1%	1%	0%	135
Photography	60%	40%	0%	0%	0%	10
Wildlife Viewing	88%	12%	0%	0%	0%	32
Snow coach Touring	89%	11%	0%	0%	0%	52

## *Natural Sounds as an Aspect of Park Value*

In addition to the data which relate to general visitor perceptions of the role of natural sounds in their park experience, my research also employed a park value scale originally utilized by Borrie and others (2002). Borrie and others (2002) constructed a 24-item scale of park values. Through factor analysis, their research demonstrated 4 dimensions of the park values scale defined as natural values, symbolic and historic values, recreation and tourism resource values, and personal growth and development values. My research took this scale and added four soundscape variables.

Responses to the 28-item park value scale (including the 4 soundscape variables) were analyzed through factor analysis using first a principal components analysis and then a varimax rotation to explore changes and consistency in potential scalar dimensions. The Cronbach's alpha reliability for the scale was robust at .927 for the 28-item scale indicating strong internal consistency.<sup>1</sup> Using a principal component analysis, the scale appears unidimensional. One dimension explains thirty-seven percent of the variance with a high Eigen value of 10.2. While there are several more components with an Eigen value around or slightly greater than one, the drop in variance explained from component one to component two is dramatic. While component one explains thirty-seven percent of the variance, component two explains six percent. Beyond the first component, my research shows other components explain less than ten percent and in some cases, less than five percent of the variance. When examining the scree plot, a unidimensional scale is evident as the elbow is distinctly marked on the second component creating a dramatic drop from component one to component two. It is possible that

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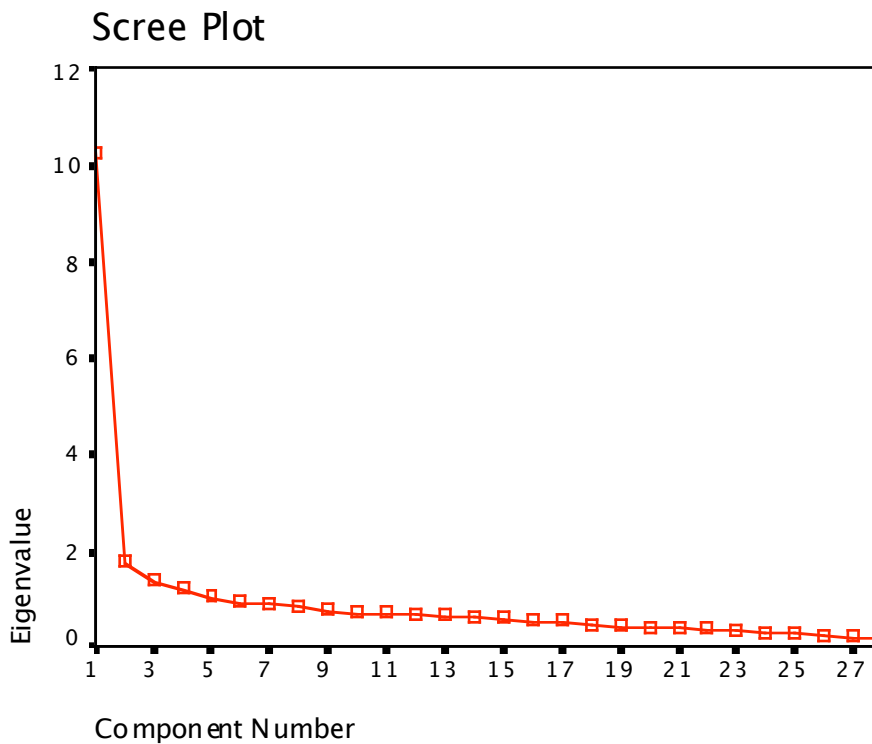
<sup>1</sup> I looked at eliminating several variables in multiple combinations to test whether the alpha reliability would be increased if potentially superfluous variables were excluded, but the alpha reliability did not increase with any of the options that I attempted

the other components using the Eigen value criterion may be legitimate dimensions of the scale, but in analyzing them, a conceptual foundation for this claim was not found. In this case, my research shows only one component explaining at least twenty percent of the variance while the other components explain less than ten percent and in some cases, less than five percent of the variance.

**Table 4.5: Principal Component Analysis**

Component	Eigen Values	% of Variance
1	10.3	36.7%
2	1.8	6.4%
3	1.4	5%
4	1.2	4.4%
5	1.1	3.8%

**Figure 4: Scree Plot**



Further evidence of unidimensionality of the park values scale includes the KMO and Bartlett's Test of Sphericity which provide information on whether the data is consistent. A high KMO of .6 or greater is desirable and indicates a robustly consistent scale. In this case, the park values scale (including the sounds variables) as a unidimensional scale has an alpha reliability of .93, indicating internal consistency in the data.. Bartlett's Test of Sphericity was significant at the .000 level. From a strict statistical point of view, there is not a high degree of evidence for characterizing this scale as other than unidimensional. These results indicate that natural sounds are an aspect of traditional park values documented in extant research.

**Table 4.6: Rotated Component Matrix Factor Loadings on Four Factors Extracted**

*Yellowstone National park is particularly important as:*

<b>Variable</b>	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>	<b>Factor 4</b>
A wildlife sanctuary	.83			
A place of scenic beauty	.83			
A place for education about nature	.80			
A protected place for fish and wildlife habitat	.74			
A place for wildness	.74			
A display of natural curiosities	.72			
An historical resource	.72			
A protector of threatened and endangered species	.70			
A place to hear natural sounds	.67			
A symbol of America's identity	.67			
A place for all living things to exist	.66			
A place everyone should see at least once in their lives	.60			
A place for scientific research and monitoring	.58			
A place for the use and enjoyment of the people	.57			
A place without most types of commercial development	.53			
A place for natural quiet	.52			
A quiet place	.49			
A place for recreational activities	.48			.44
A site to renew your sense of personal well-being		.61		
A place to develop my skills and abilities		.64		
A social place		.68		
A reserve of natural resources for future use			.59	
A place to be free from society and its regulations			.44	
A tourist destination			.40	
A place free of motorized noise				.76
A sacred place				.47

Given the data collected for my research, the results cannot justify an account of the park value scale as anything but unidimensional at this point. The four factors that were extracted do not hold together from a conceptual point of view and thus are not justifiable from an analytic perspective. Looking back at the unrotated principal component analysis and the scree plot (Figure 4), this scale is robust in terms of reliability and taps into park value. If we examine again the rotated factor matrix, there is no justification for interpretive validation of the extracted factors. Not only do the extracted factors not match those of prior research, but also each factor does not hang together with internal conceptual consistency. For these reasons, considering the park value scale a unidimensional scale is warranted.

When analyzing the four soundscape variables on their own, the four item scale has an alpha reliability of .67 demonstrating moderate internal consistency. One component had an Eigen value greater than 1 and explains fifty-one percent of the variance. However, a second component with an Eigen value below 1 (.87) explains twenty-two percent of the variance, indicating that this scale could be multidimensional, with two dimensions explaining seventy three percent of the total variance. Therefore, varimax rotation was employed and two factors were extracted. What the data shows is that the variable “a place free from motorized noise” loads high as the exclusive variable on the second scalar dimension. This distinction between the first three sound variables (a place to hear natural sounds, a quiet place, and a place for natural quiet) and the fourth variable, “a place free from motorized noise” indicates some of the complexity that is revealed through the interview data regarding visitor perceptions of the role of natural sounds in the park.

It is one thing to believe that the park is a haven for natural sounds and thus provides opportunities to experience both natural quiet and natural sounds. When one begins to ask

specifically about the existence of mechanical sounds, however, the question becomes more complex. Just because a national park is a place that generally should protect the integrity of the natural soundscape and provide predominantly unimpeded opportunities for experiencing natural sounds, does not mean that the park is a place absent of motorized sounds. It is also quite possible that when one is keyed in to the question of the role of motorized sounds in the park, that one naturally thinks of the issue of transportation and accessing the park during the winter season. In this sense, clearly a park may not be “a place free of motorized noise”, but may well be “a quiet place” “...to hear natural sounds”. One must also be careful not to put these into complete either/or categories; just because someone may believe the park is a quiet place does not mean they think it should be quiet one hundred percent of the time.

**Table 4.7: Rotated Component Matrix for Soundscape Variables Only**

<b>Variable</b>	<b>Factor 1</b>	<b>Factor 2</b>
<b>Percentage of Variance Explained</b>	51	22
A place to hear natural sounds	.84	
A quiet place	.78	
A place for natural quiet	.73	
A place free of motorized noise		.97

*Alpha reliability = .67*

## *Support for Management Actions*

In order to assess any existent trends in support for various management actions that protect the integrity of the natural soundscape through policies that affect visitor access, the survey instrument asked respondents to rate their support or opposition for seven management actions. Descriptives and cross-tabs were used to evaluate responses to the seven management scenarios and then further analyzed to evaluate if there were differences in responses between user groups. Variations in responses were present across primary activity type, with the most distinct differences appearing in the snowmobile user group. Interestingly, however, the differences across user groups with the snowmobile group included, were not as dramatic as anticipated, and in some cases, almost nonexistent. In most cases, the differences were more a question of degree of support or opposition, rather than clear position differences between user groups. These variations are elaborated on in this section.

The majority of visitors surveyed (93%) supported continuing to require the best available technology for over snow vehicles in the park. Examining the responses across visitor stated primary activity type, the data shows that while there are not tremendous differences across activity type, there does tend to be stronger support from visitors who self-identified as snowshoers or cross-country skiers than in the other user groups which do or are likely to include a form of motorized transportation within the park. Yet even in the snowmobiling group, eighty six percent of visitors surveyed supported using best available technology.



**Table 4.8: Support for Potential Management Actions**

Management Action	Strongly Support	Somewhat Support	Neither Support nor Oppose	Somewhat Oppose	Strongly Oppose
<b>Continue to Require Best Available Technology</b>	80%	13%	4%	2%	3%
<b>Continue to require guided tours for snowmobiles and snowcoaches</b>	71%	15%	5%	5%	5%
<b>Continue to limit total number of snowmobiles and snowcoaches entering the park per day</b>	72%	13%	4%	6%	5%
<b>Continue to limit snowmobile group sizes to a maximum of 11 with 1 guide</b>	68%	15%	9%	3%	5%
<b>Close roads to all over snow vehicles</b>	6%	5%	11%	21%	57%
<b>Close roads to snowmobiles and allow snow coach tours</b>	15%	11%	14%	17%	42%
<b>Plow all roads and allow automobile access to YNP (no over snow vehicles)</b>	7%	6%	7%	9%	71%

Question wording: *We are interested in your willingness to support the following management actions to protect opportunities to experience natural sounds. Please indicate for each of the following management actions the extent to which you support or oppose them.*

**Table 4.9: Support for Management Actions by Visitor Primary Activity in Park**

Primary Activity	Strongly Support	Somewhat Support	Neither Support nor Oppose	Somewhat Oppose	Strongly Oppose	N
<b>Continue to Require Best Available Technology</b>						
Cross-Country Skiing	95%	3%	0%	0%	2%	64
Snowshoeing	97%	3%	0%	0%	0%	30
Snowmobiling	67%	19%	7%	5%	3%	132
Photography	70%	10%	10%	0%	10%	10
Wildlife Viewing	85%	9%	3%	0%	3%	33
Snow coach Touring	78%	16%	6%	0%	0%	51
<b>Continue to require guided tours for snowmobiles and snowcoaches</b>						
Cross-Country Skiing	86%	9%	3%	0%	2%	64
Snowshoeing	90%	7%	0%	3%	0%	30
Snowmobiling	52%	22%	8%	9%	9%	132
Photography	80%	0%	0%	10%	10%	10
Wildlife Viewing	64%	12%	9%	9%	6%	33
Snow coach Touring	75%	20%	2%	0%	4%	51
<b>Continue to limit total number of snowmobiles and snowcoaches entering the park per day</b>						
Cross-Country Skiing	91%	3%	3%	2%	2%	64
Snowshoeing	93%	3%	3%	0%	0%	30
Snowmobiling	48%	26%	6%	14%	7%	132
Photography	70%	0%	10%	10%	10%	10
Wildlife Viewing	76%	6%	3%	9%	6%	33
Snow coach Touring	78%	14%	2%	0%	6%	50
<b>Continue to limit snowmobile group sizes to a maximum of 11 with 1 guide</b>						
Cross-Country Skiing	87%	5%	6%	0%	2%	63
Snowshoeing	86%	7%	7%	0%	0%	29
Snowmobiling	49%	23%	16%	6%	7%	132
Photography	70%	10%	0%	10%	10%	10
Wildlife Viewing	64%	15%	9%	6%	6%	33
Snow coach Touring	70%	16%	6%	0%	8%	50
<b>Close roads to all over snow vehicles</b>						
Cross-Country Skiing	8%	13%	8%	26%	44%	61
Snowshoeing	3%	7%	20%	30%	40%	30
Snowmobiling	8%	3%	12%	19%	58%	131
Photography	0%	0%	20%	20%	60%	10
Wildlife Viewing	0%	6%	3%	24%	67%	33
Snow coach Touring	6%	2%	12%	16%	64%	50

	Strongly Support	Somewhat Support	Neither Support nor Oppose	Somewhat Oppose	Strongly Oppose	N
<b>Close roads to snowmobiles and allow snow coach tours</b>						
Cross-Country Skiing	27%	25%	13%	19%	17%	64
Snowshoeing	40%	7%	17%	20%	17%	30
Snowmobiling	5%	3%	13%	14%	65%	131
Photography	30%	0%	10%	10%	50%	10
Wildlife Viewing	15%	18%	21%	15%	30%	33
Snow coach Touring	14%	6%	20%	20%	40%	50
<b>Plow all roads and allow automobile access to YNP (no over snow vehicles)</b>						
Cross-Country Skiing	9%	3%	3%	5%	80%	64
Snowshoeing	3%	0%	3%	7%	87%	30
Snowmobiling	11%	5%	15%	13%	57%	131
Photography	0%	20%	10%	0%	70%	10
Wildlife Viewing	3%	15%	0%	9%	73%	33
Snow coach Touring	6%	6%	6%	8%	74%	50

Eighty-six percent of visitors supported continuing to require guided tours for snowmobiles and snow coaches. While half of the user groups (cross-country skiing, snowshoeing, and snow coach touring) supported this management policy with an overwhelming majority of ninety-five percent or higher, the remaining three user groups did reveal a lower degree of support. Most dramatic of the remaining three user groups was the snowmobile group, of which seventy four percent supported guided tours. This percentage, however, still represents a high degree of support from snowmobilers. In looking at the distribution of responses across the five categories (strongly oppose to strongly support), the trend is in less strongly supporting the policy, but overall still supporting the management action. This trend is different than one in which one user group disagrees and holds oppositional views to other user groups. In this case, my research shows that all visitors are generally in agreement on the policy, but there are differences in the strength of support for it, with snowmobilers being more likely to “somewhat support” rather than “strongly support” the guide requirement policy.

Eighty-five percent of all visitors support continuing to limit the total number of snowmobiles and snow coaches in the park per day. Skiers, snowshoers, and snow coach riders overwhelmingly supported this policy (skiers 94%, snowshoers 96%, snow coach riders 92%). While the photography group actually had the lowest overall percentage of support (70%) for this policy, the data continued to show differences in intensity of support in the snowmobile group. Snowmobilers strongly supported the policy by forty-eight percent and somewhat supported it by twenty-six percent, bringing the total support in this group to seventy-four percent which is still a strong majority.

Eighty-three percent of total visitors supported continuing to limit snowmobile group sizes to a maximum of eleven with one guide. The strongest supporters of this policy were skiers and snowshoers with eighty-seven percent of skiers and eighty-six percent of snowshoers strongly supportive of the snowmobile group size limits. Overall support from the skiers and snowshoers was even higher when including those who somewhat supported the policy bringing the numbers up to ninety-two percent of skiers and ninety three percent of snowshoers supportive of the policy. As with prior variables, the distribution of responses within the snowmobiler group was notable; seventy-two percent of snowmobilers supported the group size limits with forty-nine percent strongly supportive and twenty-three somewhat supportive. The snowmobiler group did exhibit the lowest level of overall support for this policy, but again, the majority of snowmobilers did, nonetheless, support the policy. The snowmobile group had the highest percentage of responses in the “neither support nor oppose” category for this variable as well with sixteen percent of snowmobilers neutral on the group size policy. While the distribution is distinct in the snowmobile group, the difference is one of degree of support rather than

opposition to the policy. Only thirteen percent of snowmobilers opposed the group size policy, a figure that is actually lower than the photography group of which twenty percent were opposed.

A high percentage (78%) of total visitors oppose closing roads to over snow vehicles. Skiers and snowshoers were generally less strongly opposed than motorized user groups, but the differences were again those of degree of opposition rather than complete differences of position toward the policy. Snowmobilers in this case actually had slightly more moderate opposition to this policy than the photography, wildlife viewing, and snow coach touring groups.

In response to closing roads to snowmobiles, yet allowing snow coach tours fifty nine percent of total visitors opposed this policy. Twenty six percent supported this policy and fourteen percent were neutral. Examining the user groups on this management question, there are several response trends. First, fifty two percent of skiers support closing roads to snowmobilers, yet keeping them open to snow coaches. The distribution of responses across the skier category is, however, much more evenly distributed indicating less consistency in perspectives related to this management question within this group. Forty seven percent of the snowshoers support the policy as well. Conversely, seventy nine percent of snowmobilers oppose this policy with sixty five percent of snowmobilers strongly opposed. This should not be any surprise from a research perspective since this policy would entirely eliminate the possibility of the snowmobile user group's existence in Yellowstone National Park. Because of the distributions of responses within and across user groups on this management scenario, it may indicate its controversial nature. Some interview data presented later in this chapter corroborates the notion that while some visitors may oppose snowmobiles specifically, many visitors may feel uncomfortable eliminating one form of motorized transportation (snowmobiles) while

maintaining another (snow coaches). For many, this may be a less justifiable position and at the very least, more controversial than other potential management policies.

Eighty percent of total visitors opposed the idea of plowing all roads and allowing automobile access, thus eliminating over snow vehicles in the park. As with some prior management questions, the degree of opposition to this policy was distinct for some user groups. Skiers and snowshoers were more strongly opposed to plowing roads and eliminating over snow vehicles (skiers 80% strongly opposed, snowshoers 87% strongly opposed). This could be due to a fear that plowing roads would encourage higher amounts of visitation and thus increase the total number of vehicles in the park. Follow-up research could be helpful to elucidate the drivers of support or opposition to this policy. Snowmobilers were more evenly distributed in their responses on this variable and less strongly opposed to the policy than all other user groups. Fifty-seven percent of snowmobilers were strongly opposed to plowing roads and eliminating over snow vehicles; thirteen percent were somewhat opposed, fifteen percent were neutral, five percent were somewhat supportive, and eleven percent were strongly supportive. Again, the majority of snowmobilers (70%) opposed this policy, but not to the degree of visitors in other user groups.

## ***Importance of the Natural Soundscape and Support for Management Actions***

Prior recreation research has shown relationships between ascribed park value and corresponding support for management actions. My research followed on that line of inquiry by exploring how the stated importance of the natural soundscape correlated with support for various management actions designed to protect natural soundscape conditions. These management actions also affect visitor access in some ways as well.

Analysis of bivariate correlations show that several positively correlated relationships of statistical significance exist between variables where visitor stated importance of natural sounds and variables related to support for specific management actions that protect natural sounds, yet also restrict visitor access. When looking at the variable “Yellowstone National Park is particularly important as a place to hear natural sounds” the data shows that no statistically significant relationships exist among the seven management actions.

While many sound value variables correlate positively and significantly at the .001 or .005 error level to support for management actions that both protect the natural soundscape and limit visitor access, there are no correlations that exhibit moderate or robust correlations. Several correlations do, however, explain twenty-seven to forty-one percent of the variance in these relationships.

**Table 4.10: Correlations Between Natural Sound Importance and Support for Management Actions**

		YNP important as a place free from motorized noise	YNP important as a place to hear natural sounds	YNP important as a place for natural quiet	YNP important as a quiet place	Natural sounds importance to personal experience of YNP	Importance of opportunity to experience natural sounds to value of YNP
Continue to require best available technology	Pearson Correlation	.290**	.025	.129*	.150**	.311**	.277**
	Significance	.000	.618	.010	.003	.000	.000
	N	389	392	393	389	397	396
Continue to require guided tours	Pearson Correlation	.268**	.038	.138*	.106*	.355**	.378**
	Significance	.000	.457	.006	.036	.000	.000
	N	390	393	393	390	398	397
Continue to limit the total number of oversnow vehicles in park per day	Pearson Correlation	.268**	.050	.163*	.190**	.413**	.381**
	Significance	.000	.327	.001	.000	.000	.000
	N	389	392	392	389	397	396
Continue to limit snowmobile group sizes to a max of 11 with 1 guide	Pearson Correlation	.284**	.024	.165*	.172**	.336**	.289**
	Significance	.000	.638	.001	.001	.000	.000
	N	387	390	390	387	395	394
Close roads to all vehicles	Pearson Correlation	.090	-.065	.066	.051	.240**	.218**
	Significance	.077	.202	.195	.323	.000	.000
	N	384	387	387	384	392	391
Close roads to snowmobiles, but allow snowcoach access	Pearson Correlation	.277**	-.033	.095	.107*	.339**	.323**
	Significance	.000	.514	.060	.035	.000	.000
	N	386	389	389	386	394	393
Plow all roads, allow automobile access (no oversnow vehicles)	Pearson Correlation	-.013	.009	.123*	.048	-.064	-.083
	Significance	.805	.852	.015	.351	.206	.101
	N	387	390	390	387	395	394

\*\* correlation is significant at the .001 error level

\* correlation is significant at the .005 error level



There are, however, a few interesting inversely correlated relationships between several variables. First when comparing the relationship between “Yellowstone National Park as a particularly important place to hear natural sounds” to two management actions (close roads to all vehicles and close roads to snowmobiles, but allow snowcoach access), the data shows inverse relationships. This is practically significant as we also note that other sound variables (YNP as a place free from motorized noise, natural sounds as important to personal experience of the park, and natural sounds as important to overall value of YNP) also correlate inversely on the management variable to plow all roads and allow automobile access. These inverse relationships allude to the complexity of the management dilemma and visitor preference. While many visitors may value Yellowstone National Park natural soundscape experiences and opportunities, there is a general lack of support for closing roads to oversnow vehicles, even amongst those visitors who may highly value the natural soundscape.

While some variables were positively and significantly correlated, there was not a clear and consistent relationship between natural sound value or importance and support for management actions in the survey. This likely speaks to the fact that the management question is highly complex and that management actions include multiple aspects that affect visitors. In other words, no management action listed in the survey was discrete in the sense that it only positively affects the soundscape. Management actions affected both visitor access and the natural soundscape. They tap into other issues of complexity such as personal freedom to enjoy the park on a vehicle of your choice, enjoyment of the oversnowvehicle experience of touring the park, as well as the desire for opportunities to experience natural sounds, just to name a few issues that likely come into play and are documented later with the interview data sections.

## ***Brief Summary of Survey Findings***

Natural sounds are important to the vast majority of visitors and most visitors express overall satisfaction with their soundscape experience at the park. Analysis of the relationship between the park values scale and the natural sound variables shows that natural sounds are nested within a multitude of park values and add slight strength to the previously utilized park value scale. Generally, all visitors tend to support policies that will protect the current opportunities to experience natural sounds. While some tensions and differences exist among visitor primary activity groups and most often among snowshoers/cross-country skiers and snowmobilers, the findings support a tremendous amount of common ground among all visitor primary activity groups. User groups such as snowmobilers and cross-country skiers which have previously been thought to hold conflicting views on the nature of the park experience, the values of the park, and preferences for management actions, are shown in this research to have much more in common on all fronts. Differences among primary activity groups are more often related to questions of degree than distinct oppositional categories. While snowmobilers are more likely not to claim natural sound experiences as an important element of their personal experience in the park, they nonetheless generally agree with other primary activity groups that natural sounds are both valuable to the park and that natural sound experience opportunities should be protected and considered in park management decision-making. Relationships between natural soundscape value and support for management actions indicate that while some positive and inversely correlated relationships exist, these issues are more highly complex and likely tap into a multitude of concerns and values that visitors have which is attested to in analysis of the interview data.

### *Characteristics of the Interview Sample*

In addition to the survey responses, forty five interviews were conducted during the Yellowstone National Park 2007-2008 winter season to gain a more detailed understanding of visitor experiences of the natural sounds of the park and to document the significance of those experiences. Some interviews were conducted with couples, resulting in a total of forty nine individuals interviewed. Of the three major user groups in the park, fifteen interviews were conducted with visitors who identified their primary activity within the park as skiers/snowshoers, seventeen with snowmobilers, and seventeen with snow coach riders, yet most respondents (38 out of 49) interviewed engaged in multiple activities during their visit to the park. Twenty seven women were interviewed and twenty two men were interviewed ranging from twenty one to seventy four years of age. Respondents stayed from one day to five days in the park and were all visitors to the Old Faithful area. Just over half (29 out of 49) of visitors interviewed were repeat visitors to Yellowstone National Park in winter. Five interviewees were from the local area (Montana or Wyoming); three interviewees were foreign nationals, and forty one interviewees were visiting the park from various other U.S. states.

Unless explicitly noted in the analysis, the perspectives expressed and illustrated with quotes were not limited to one or two individuals interviewed. They represent patterns within the data and are indicative of shared views expressed by multiple individuals interviewed. As a researcher, I had expected to find highly diverse and divergent views on experiences of natural soundscapes, the value of natural sounds to the park, and perceptions of the existence of mechanical sounds in the park. What the data showed, however, was that there were many more areas of convergence of beliefs than previously anticipated and documented in prior research both within and across primary activity groups. In cases where alternative viewpoints were

expressed, I have presented this data as exceptions to the general patterns found in the data and thus presented where those views diverge from the overall results of the interview research. Again, one of the key findings from the interview research validates and expands upon the survey data; while diversity of viewpoints do exist among visitor primary activity groups, there is much more similarity and convergence of perspectives both within and across user groups than previously demonstrated and assumed in extant research.

While some visitors had difficulty expressing their views on natural sounds due to either natural sounds simply not being a key element of their experience or simply not being particularly expressive individuals, the majority of visitors were able to describe how natural sounds were or were not relevant to their experience, the value of natural sounds to the park, and their perspectives on the existence of mechanized sounds in the park. Where many visitors treaded more lightly in their responses or with less certainty were in response to questions related to how park management ought to reconcile the conflicting demands to provide both motorized access to the park and to provide opportunities to experience natural sounds. This may be related to the fact that many visitors, even those who are familiar with the park, repeat visitors, and engaged with current policy changes in the park, did not tend to have thought about the complex inverse relationship between protecting the integrity of the park soundscape and providing motorized access to experience the park in winter. Local visitors and repeat visitors did tend to have more background information on the history and changes to park winter management policy and, perhaps due to that, were frequently more articulate and confident expressing their views on current park policy.

In almost all cases, however, visitors were eager to engage the complexity in the management challenge and began to think of the management dilemma in new ways as the

interview developed. When asked to step back and consider more of the multiple experiential elements that visitors desired in the park, the soundscape/mechanized access management question became instantly more complex. This was immediately recognized by almost all visitors interviewed; a few visitors interviewed were simply less articulate or less interested in the soundscape issues. In some cases, visitors tended to come to a resolution or partial solution for which they felt comfortable expressing support or opposition, but in other cases, it was clear that some visitors were only starting to work through the complex realities of the park management situation and had not completely reconciled the two conflicting demands, usually resulting in a more or less generic desire to balance the two demands. While repeat visitors to the park certainly had more knowledge of the history of park management and policy changes, in every case, they were also the most unhesitatingly supportive of the current management policies which is likely due to their confidence in being able to compare experiences with current and past management policy.

### ***Detailed Exploration of Visitor Experiences of Natural Sounds***

The interview data contains highly articulate and deeply meaningful descriptions given by the majority of respondents when characterizing their experiences and the meaning of those experiences of natural sounds. Several visitors described a deep sense of *presence* or *being* as a result of their experience of natural sounds in the park. The experience of both the natural sounds of the park and the unique quiet of Yellowstone were described as assisting in centering visitors, allowing them to focus and connect with the present moment (T4.10James, T4.10Kim, and T4.10David). The experience of natural sounds invoking a sense of presence was a theme that recurred in several interviews and attested to a deep psychological experience entered into through the experience of natural sounds in the park.

**Table 4.11**

**Interview Excerpts: Visitor Characterizations of the Experience of Natural Sounds**

T4.11James	SK-R	<i>[Presence 44%* ]</i> “The more you pay attention to the sounds of the park, the more you know where you are; it’s calming and centering. You tune in and focus on where you are, what you’re looking at, you know? You can hear every little sound because it’s so quiet and being able to hear those sounds and that silence, I feel really connected to the present moment. There are no distractions and my mind is clear and totally connected to right where I am and what I’m doing. That’s really powerful.”
T4.11Kim	SK-F	“The sounds of the park...when I really started to notice them it was like I was transported to this very stable place in myself. Your mind is clear and the quiet puts you in really solid mental state. It’s hard to describe really. I felt completely involved in everything I was seeing and doing. I felt more attentive to what I was doing and where I was. There weren’t any distractions, nothing pulling my mind to other thoughts. There is a lot of clarity, no hesitation or worry, in those moments when I think about it now.
T4.11David	SM-F	“I’ve never heard [the sound of the geysers] before. It was so powerful and such a strong sound. It really made you pay attention to where you were and to everything you were doing. And the quiet is really striking. You can hear everything, every crunch of snow, your breath, and I felt totally tuned in to everything around me.”
T4.11Amy	SK-R-L	<i>[Deep Connection to Nature 62%]</i> “Listening to the sounds of the park, the quiet, the wind blowing, the crunch of the snow, the sounds are part of being right there in the elements, connected to the wilderness. It’s like you’re hearing the pulse of the earth, the heartbeat of nature, the purity and power of the natural world.”
T4.11Lou	SC-F	“The sounds are so pure and pristine. The sounds of nature and the quiet here are just part of the wild beauty of Yellowstone. Hearing those sounds is like getting back to nature, a kind of reunion with the natural world.”
T4.11Lisa	SM-F	“The quiet and just the other sounds that you hear--wind, geysers, birds, whatever, and it being winter so it’s is so quiet. I feel like it’s such a wild place, so remote. I think that hearing the sounds of the park, for me, sparked a kind of renewed relationship with the wilderness, with nature. It’s not the whole thing, of course, but hearing the quiet was so special. It plays a part in feeling like you’re really experiencing nature.”
T4.11Mark	SC-R	<i>[Restorative 55% ]</i> “Hearing the sounds, the silence, and the sounds of nature, you feel like you’re home, in a safe place, where you just know you’re okay and supposed to be. The sounds of the park are so pure and comforting like that. You feel at peace when you hear the sounds of nature”
T4.11Mary	SM-F	“When I start to notice the sounds of the park, it’s really relaxing and calming. After a while you start to feel refreshed and renewed in a way. Your mind feels clearer and just refreshed.”
T4.11Allison	SK-R-L	<i>[Spiritual 10%]</i> “When you’re out there and you hear the sounds of nature, whether it’s the quiet or the geysers or whatever, you’re hearing God’s sounds, holy sounds. It’s really profound.”
T4.11Craig	SM-F	“You know, when you get to hear the sounds of nature here, whether it’s the wind or the water bubbling from the geysers or just the quietness of it all, you know you’re in a special place. It’s actually quite personal, but it can really be a sort of spiritual thing for me and the sounds are a part of that. I can’t separate the sounds out of that kind of experience that I’ve had here.”
T4.11Ryan	SK-R	<i>[Valuable Contrast to Civilization 36%]</i> “The sounds here [Yellowstone National Park] makes you realize how different this place is from other places outside the park. We need to have places apart from the constant drone of urban noise. You need that peace and that reminder of what the world is like away from civilization.

\* Percentage out of all interviews

T4.11Mary	SC-F	“We were actually talking about this earlier. I’m really grateful that we do have a protected place, because if we want to hear noises, we want to have more of those “civilization comforts” like being able to have, use snowmobiles without restriction or this or that, go to one of the cities around, because they’re there and then you can do that. But I really think it’s important to have a place that’s not like that civilization, that city life. I mean, it’s, it is the most important thing, it’s the wilderness experience and places like Yellowstone are the only places where we even have a chance to experience it. So it’s really important to me that the sounds of the wilderness be protected in the park. There should be a lot of places in the park where it sounds natural—no machines, you know?”
T4.11Tiffany	SM-F	<b>[Reminder of How to Listen 32%*]</b> “What you get to hear in the park, it sets a new baseline and makes you aware of all the noise in your daily life. It reminds you of what’s important, just the act of listening, something that folks don’t do anymore. I don’t even think I knew what quiet was until I came here. It reminds me that I should really listen more to the world around me, even when I get home.”
T4.11Jordan	SK-F	“Listening to things that you get to hear here in the park—just the normal sounds of nature, it’s just not something people do much anymore and it’s a real shame. People need to be reminded of the importance of just listening and hearing the world around them. That’s definitely something I’m taking back with me from this visit. It’s one of the things I like about spending times outdoors.”

Key:

*SC = Snow coach Rider*      *R = Repeat Winter Visitor*      *L: Local Resident*  
*SK = Skier/Snowshoer*      *F = First Time Winter Visitor*  
*SM = Snowmobiler*

While some respondents described a sense of being centered and connected to the present moment, the experience of being deeply connected to nature was also explicitly described by many visitors in each of the three primary user groups. Visitors connected the natural sounds of the park with the experience of the natural world (T4.11Amy, T4.11Lou, and T4.11 Lisa). For some, experiencing the natural sounds of the park was a powerful way of communing with the nature. Visitors connected hearing the natural sounds of the park with a visceral experience, where sounds were gateways into experiencing the primordial or ancient character of the park. Visitors also described natural sounds as having a restorative effect on them. Characterizing the experiences of natural sounds as something that induced calm and peace was a common theme (T4.11Mark, T4.11Mary). Some visitors distinctly described hearing the sounds of the park in

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\* Percentage out of all interviews



spiritual terms characterizing natural sounds as “God’s sounds” or “holy sounds” (T4.14Allison, T4.11Craig). Natural sounds in this sense were considered sacred both in terms of their inherent quality and as an aspect of experiencing them.

Several visitors interviewed also noted the experience of natural sounds as a valuable explicit contrast to civilization. The value of having places like Yellowstone in which to experience natural sounds, away from one’s common urban lifestyle was a common theme in the interviews (T4.11Mary, T4.11Ryan). Visitors noted the importance of hearing natural sounds in the park frequently as one’s only opportunity to experience those sounds or in some cases, a salient reminder of what the sounds of nature are as contrasted to development outside the park. Responses of this nature tended to more commonly come from visitors who were not local residents, lived in urban areas, and likely stem from the fact that local residents may be less associated with highly urban environments and thus do not instinctively contrast them to the park. Connecting the unique opportunity to hear the natural sounds of Yellowstone with the value of the park and the quality of the park experience was typical of many respondents across all user groups.

Further, for some, the experience of natural sounds was a call or a reminder of the importance of listening in one’s daily life. Some respondents described experiencing the sounds of the park as setting a new “baseline” to which one could compare how they listen and what they listen to in their lives outside of the park (T4.11Tiffany, T4.11Jordan). These visitors were more likely to be residents of non-local urban areas and described hearing the sounds of the park as distinctly different from their typical urban lives, providing a unique contrast and recognition of the urban sounds in which modern lives are typically embedded. Further, listening to the sounds of the park provided an opportunity for them to evaluate how well and how frequently

they listen to the world around them in their daily lives. This process of frequently recognizing that the very act of listening was something they did not engage in as frequently or as diligently as they did while in the park served as a platform for reflection and instilled a desire to bring some of their more attentive park listening back into their regular urban lives. In this case, while the park sounds serve as a clear contrast to the sounds of visitors' daily lives, they also provided an opportunity to incorporate some of the value of listening and attentiveness to natural sounds back into one's life upon return from the park.

### ***Detailed Exploration of the Importance of Natural Sounds to Visitors***

The previous section documented specific meanings and characterizations of visitor experiences of natural sounds in Yellowstone. This section looks at the extent to which visitors considered natural sounds to be important to their overall experience. Interestingly, in many of the interviews, respondents noted quiet as one of their primary reasons for visiting Yellowstone National Park in the winter season. These perspectives tended to originate from repeat visitors to the park who had expectations from prior experience in the park or participating in winter recreational activities in the area. In every case, this description came up before any questions particularly related to natural sounds arose on the part of the interviewer. In fact, responses containing reference to quiet or silence were common responses to the question, "Why did you decide to come to Yellowstone in the winter?" or "What attracted you to visit Yellowstone in the winter?". Hearing the natural sounds and the quiet of Yellowstone was a motivation for visiting the park for several visitors (T4.12Allison, T4.12Joelle). While many visitors articulated quickly and early in the interview that the natural sounds and the unique quiet of the park were a motivation for their visit, others noted that it was an unanticipated, yet significant aspect of their

experience (T4.12Marlene, T4.12Tiffany). In every case this unanticipated, yet significant experience of natural sounds was described by visitors experiencing the park for the first time. These differences among repeat visitors who are familiar with Yellowstone in the winter contrasted to those who were visiting Yellowstone or any wilderness area for the first time. Regardless, both types of visitors noted that hearing the natural sounds of the park was an essential component of their overall positive experience of the park and in some cases constituted the motivation for their visit.

There were not strong response patterns across visitor primary activity type (snowmobilers, snow coach riders, skiers) on the general significance of natural sounds to park experiences. Visitors belonging to each primary activity type commonly described the experience of natural sounds as important to their visit, yet one distinction that supports the survey data is the fact that skiers were generally better able, as a group, to articulate their descriptions of natural sound experiences in the park. Nonetheless, many snow coach riders and snowmobilers interviewed were also quite articulate on this issue. This is a question of the degree of significance or importance of natural sounds to visitor experiences. While there are differences in views described throughout this section, the general patterns were that all skiers believed natural sounds were important to their experience, with snow coach riders following as a close second. The majority of snowmobilers interviewed also believed natural sounds to be important to their experience, but there was a greater likelihood of a snowmobiler stating that natural sounds were not important to them personally than someone of another primary activity group.

**Table 4.12****Interview Excerpts: Importance of Natural Sounds to Visitor Experiences**

T4.12Allison	SK-R-L	<b>[Motivation for Visit 68%]</b> “Being able to hear the natural sounds, and especially the quiet in the park, is one of the main reasons I came here in winter.”
T4.12Joelle	SM-R	“Oh, knowing that the park is going to be quiet is one is a huge reason that I like to come here. I really love the way the park sounds in winter. It’s pretty quiet out there on the trails and you really can hear every little thing. I love that.”
T4.12Marlene	SC-F	<b>[Unanticipated, but Significant 34%]</b> “You know, to be honest, I didn’t really think too much about the park sounds before I came here, but it’s funny we’re talking about it because I noticed the sounds right away. The powerful geysers and hearing such crisp sounds as you walk around, it was actually really important to me. I couldn’t imagine having a real experience of the park without having heard those sounds of nature here.”
T4.12Tiffany	SM-F	“If you had asked me two days ago before I actually got here, I would have said, “no” because I really didn’t even think about sounds when I was planning my trip here. Now that I’ve been here for a couple of days, though, all of the sounds of the park are really important and definitely had a positive impact on my experience here. In some ways, there aren’t really very many sounds, but the sounds you do here are really striking and add to the character of the park. I can’t imagine talking about my time here in the park now without at least mentioning what it was like to sometimes hear no sounds at all and then at other times here the water being pushed up from the center of the earth. It’s pretty wild.”
T4.12Craig	SM-F	<b>[Inseparable Part of Experience 8%]</b> “I don’t think I can really answer how important the sounds were to my experience. It doesn’t make sense to think of sounds as a separate thing; it’s part of the whole package of being here. That said, if I didn’t have the opportunity to hear those natural sounds, I think my time in the park wouldn’t be as special.”
T4.12Jack	SC-R-L	“Hearing the sounds of the park is just part of what it’s like to be here. Unless you’re inside, it’s just what the park is. It’s really hard for me to talk about just the role of the sounds in my experience here. The sounds are part of the whole natural experience of the park.”
T4.12Melissa	SC-F	<b>[Separable from Experience, but Valuable 15%]</b> “That [natural sounds] doesn’t affect me personally. I came here to see the wildlife, to photograph wildlife. But I still want the park to have natural sounds, to be a natural place. I think the sounds are part of the wildlife habitat and so if there was too much noise from vehicles, it would affect them [the wildlife], and then it would ultimately affect my experience.”
T4.12Ethan	SM-R	“The sounds... they’re not really a big thing for me. It’s mostly quiet here anyway. When I think of my time here in the park, I think about the land, the incredible amount of snow, the buffalo, and the geysers...but of course I want the park to protect the sounds that do exist here and even the quiet, because they are a part of the whole environment, the natural environment here. I’m sure if there was too much outside noise here, then it would affect the animals here too. You know, they probably wouldn’t be so easy to see.”
T4.12Ronald	SC-F	<b>[Not Important to Experience 6%]</b> “I don’t think hearing the sounds of the park are really important to me. It didn’t affect my experience at the park. I came here to see the park, not hear it.”

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Percentage out of all interviews

T4.12Emma	SM-F	“The sounds? No, not really. I’ve never even thought about it and I don’t think I could say they’re an important part of why I’m here. I don’t think of natural sounds when I think of my visit here.”
T4.12April	SM-R	“Um, no. What sounds do you mean? There aren’t really any sounds here. I mean, when you’re on the snowmobile you can’t hear anything anyway. The fun of it is more in seeing the park. So, no sounds really weren’t a big thing for me. If anything it was kind of loud riding on the snowmobile the whole day.”

While some visitors were able to talk comfortably about the role that natural sounds played in their overall experience, some visitors noted how difficult it was to talk specifically about natural sounds, given that they were an inseparable part of their overall park experience (T4.12Craig, T4.12Jack). This validates the notion of park experiences being complex and multi-faceted and underscores the need for park managers and researchers to acknowledge and capture experiences in the most holistic way possible.

In contrast, however, other visitors interviewed noted that natural sounds were not an important part of their personal experience of the park, but were clear to comment that the sounds themselves are valuable to the park overall regardless of how it impacted them personally on this visit (T4.12Melissa, T4.12Ethan). Several visitors also noted the role that natural sounds play as part of the wildlife habitat and expressed the importance of protecting the natural sounds as part of that habitat (T4.12Melissa, T4.12Ethan). Only a few visitors interviewed did not consider natural sounds to be an important part of their experience (T4.12Ronald, T4.12Emma, T4.12April). These visitors noted their motivation for visiting the park such as wildlife photography or simply “seeing the park” rather than an aspect of the park experience that related to hearing natural sounds. For this contingency of visitors, natural sounds were simply not considered an important element of their overall experience in the park. They were all either snowmobilers or snow coach riders. However, what became clear throughout the interviews,

even with the contingent of visitors who did not consider natural sounds to be a valuable part of their personal experience of the park, was that every visitor interviewed attested to the value of natural sounds as a part of the overall value of Yellowstone as a whole. In other words, regardless of whether natural sounds were an important aspect of a visitor's personal experience in the park, every visitor interviewed indicated that natural sounds were important to the overall value of Yellowstone and should be protected. The next section describes visitor characterizations of the importance of natural sounds to the park as a whole.

### ***Visitor Perspectives on Natural Sounds and the Park Winter Setting***

Natural sounds were considered essential to the character of Yellowstone in all forty-five interviews conducted. Visitors described natural sounds as a key characteristic of the park in the winter, a unique characteristic of Yellowstone in the winter, and described a hypothetical loss of these sounds in the park as a loss of the essence of the park (T4.13Stacie, T4.13Rick). In particular, one visitor specifically noted that the purpose of Yellowstone as a special place that should be protected from too many technological sounds, particularly during the winter season (T4.13Erin). The winter setting was frequently described as particularly unique as a place to experience a season of rest and peace and also as a haven for silence that is unique to the park setting (T4.13Erin, T4.13Joesph, T4.13Lisa).

**Table 4.13****Interview Excerpts: Importance of Natural Sounds to the Park Setting**

T4.13Stacie	SM-R	<b>[Essential to Park Character 100%]</b> “If you lost the natural sounds, then you’d lose what makes this place special.”
T4.13Rick	SC-R	“When you stop and hear those sounds, then you start to really feel what it’s like to be in this park. You pay attention to the place, to what this place is. You start to understand this park and what makes it such an incredible place. There’s no place like it. There’s no place you can hear the sounds of nature like you can here whether it’s the bison pushing the snow, your skis swooshing through the snow, or the gurgling of the geysers. There’s just nothing like it, and the sounds are definitely a big part of that.”
T4.13Erin	SK-F	“You know, winter is really special here. Nature needs time to rest and winter is that time. The park shouldn’t be a place overrun with technological sounds,”
T4.13Joseph	SC-R-L	<b>[Winter Silence as Unique to Park Setting 88%]</b> “It wouldn’t be Yellowstone in the winter without the sounds, and especially without the quiet.”
T4.13Lisa	SM-F	“The sounds of the park are one of the things that make it so unique. For me, the quiet, the unbelievable quiet is one of the really amazing things about it.”
T4.13Jason	SC-F	<b>[Silent/Natural Sound Contrast as Distinctive 48%]</b> “One of the nice things about winter in the park are the contrasts. The contrasts of quiet and other sounds are more vivid in the park. And the more people are exposed to sounds, the less sensitive they are to any sound. In other words, the more you live in a city with constant noise, the less sensitive you are to sounds in general. So when you get out here in the park and it’s snowing and it’s very, very, quiet, then it’s like a new level of sensitivity to everything. So you appreciate sounds that you would never hear in the city. I mean, you wouldn’t even hear some of the things that we have heard. And the sounds are so distinct, so clear, so noticeable because there’s so much quiet in the background.”
T4.13Kim	SK-F	“It’s unbelievable how quiet it is here sometimes. It’s so quiet you can hear every little thing. It makes every sound so crisp and noticeable. When I was snowshoeing the crunch of the snow seemed so loud, you kind of tried to snowshoe quieter because it really was such a contrast to the natural silence of the park.”
T4.13Miriam	SC-F	<b>[Yellowstone as a Guardian of Natural Sounds 100%]</b> “Here you have the chance to hear this incredible wilderness, the quiet, the wind, the ruggedness, and it’s so important that that the chance to hear the natural sounds are protected for present and future generations. You know, if we lose the things that make this place so special, such a unique environment, then we lose that forever.”
T4.13Craig	SM-F	“The sounds are definitely part of the special character of the park. Winter really is a quiet time, it’s a season of rest and it’s nice to know that we have places like Yellowstone where you can still go and hear what nature sounds like without all of our normal high tech, modern aspects to it. We need to have protected places like our parks so that as technology advances—and it will, we all know that, that our kids and generations to come will have a chance to know what it was like here in a more natural state before all of that progress. Don’t get me wrong, I have my iPod and cell phone and I’m not going to go give up my house back home or anything, but I do think it’s important that we have these kinds of havens where we can see and hear nature.”

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Percentage out of all interviews

The particular role of quiet in the park during winter was noted by several visitors as providing a critical contrast allowing visitors to hear the natural sounds more distinctly, which was seen as a unique feature of the park (T4.13Jason, T4.13Kim). Both natural and mechanized sounds were described as more vivid, clear, and pure due to the backdrop of silence against which all park sounds are heard. Finally, the interviews revealed an overwhelming sense of Yellowstone as a guardian of natural sounds, a place specifically set aside to protect the overall environment, to which the sounds are an essential component (T4.13Miriam, T4.13Craig). The fragility and rareness of the natural soundscape were frequently cited as valuable elements of Yellowstone meriting protection so that current and future generations of visitors could have the opportunity to experience such sounds. There was not a single interview in which natural sounds were not considered to be of essential value to the park overall. For every visitor interviewed, natural sounds were considered to be a unique and valuable aspect of Yellowstone National Park and a hypothetical loss of such natural sound opportunities was considered a loss of part of the essence of the park itself.



### ***Detailed Visitor Characterizations of Mechanical Sounds in the Park***

This section documents the portion of the interviews that focused on visitor perceptions of mechanical sounds and vehicles in the park. While there was a range of perspectives on the existence of mechanical sounds and vehicles in the park, all but a couple of respondents supported the use of snowmobiles and snow coaches in the park with parameters for best available technology, guided groups, and limited group sizes. The variations on these themes will be explained in this section as well as the perspectives from the visitors interviewed who expressed disapproval of any snowmobile use in the park. The majority of visitors interviewed held moderate views related to their desires for both access and preservation of the natural soundscape, however the level to which individuals had actually processed the conflict inherent in these demands and the subsequent desired reconciliation between the two was less clear. Indeed, many visitors interviewed tended to be working through the reconciling conflicting demands and potential trade-offs as they moved through the interview. This lack of having fully addressed the complexity surrounding the question of how to navigate multiple and conflicting demands for both access and preservation of natural sound integrity, indicated an absence of this inherent complexity in the public discourse surrounding management of the park. Ultimately, few visitors articulated a full reconciliation of these conflicting demands to the extent of considering scenarios where natural soundscape opportunities would actually be compromised. In other words, visitors tended to simplify the inherent tension between motorized access and natural soundscape integrity commonly deferring to the status quo while expressing uncertainty on specific preferred management actions that affect both access and the natural soundscape. These points will be elucidated throughout this section.

All but one visitor (T4.14Kelly) interviewed expressed an understanding and acceptance of mechanical sounds in the developed areas of the park. A distinction between front country and backcountry zones was thus applicable to the natural soundscape in the park. Visitors described how they both expect and accept the fact that there will be motorized sounds near the Old Faithful area, roads, and other developed areas within the park (T4.14Mike, T4.14Miriam). At the same time, visitors also described the importance of ensuring opportunities guarded from such motorized sounds, when exploring the park whether it is on foot, on skis, on snowmobile, or during snow coach touring. Almost all snowmobilers and snow coach riders expressed the importance of enjoying the natural sounds of the park when the vehicles were stopped, although they did acknowledge that while they were riding, natural sounds were simply not a part of their experience; they accepted that some portions of their time in the park would not allow for natural soundscape experiences as part of the trade-off in choosing that mode of transport. What was important to these visitors was that when they did turn off the vehicles or walk around near their vehicles, that the natural soundscape would be there to be experienced.

**Table 4.14**

**Interview Excerpts: Visitor Perceptions of Mechanical Sounds & Vehicles in Park**

T4.14Mike	SK-F	<i>[Acceptance of Mechanical Sounds in Developed Areas of Park 98%*]</i> “Well everyone has to get in here, and I know that when I’m near the lodge and there are more people, that I’m going to hear the sounds of vehicles or whatever. I accept that. When I’m out skiing though, especially if I’m away from the road, I expect it to be quiet, to not hear any vehicles or other noises. Then I want to be in the park, to hear it, to see it, to experience it.”
T4.14Miriam	SC-F	“Of course there are going to be the sounds of vehicles in some places in the park. You know there’s going to be noise near the lodge since that’s where everybody is staying and where the restaurant and shop is. That’s obvious and necessary. We all need to ride in here so we can visit. No one would get to see the park at all if you had to hike in here on skis 20 miles in the winter—and you couldn’t survive, so obviously we need to have vehicles and the sounds that go with them at the lodge and on the roads. Of course, no one comes here to hear the sounds of the snow coach or whatever, and I’ve found the park to be really quiet once you’re away from the lodge.”
T4.14Kim	SK-F	<i>[Importance of Access Options 90%]</i> “I like that you can ride a snowmobile or a snow coach, that you have the choice. It’s important for people to have their options when they come here. I’m glad there are snowmobiles here, but they need to be controlled like everything else, so that the park stays nice.”
T4.14James	SK-R	“It’s great that they’ve made changes and that now everyone has the choice to snowmobile, ski or do whatever they want while they’re here. Before the snowmobiles were out of control. It was really bad because other folks, like me and my family, couldn’t even ski to a trail because just being on one of the roads was so dangerous with all the crazy snowmobilers. But I want snowmobiles to be allowed in here because the park should be a place where there are options for experiencing it. I know that everyone doesn’t come here to ski and that’s okay. They should have a way to see the park too.”
T4.14Peter	SK-R	<i>[Environmental Responsibility of NPS 72%]</i> “I’m so glad that the vehicles are using better technology, that they’re quieter. I know we’re going to have some noise from them, but to the extent that we can limit that and require better vehicles, that’s so much better. I’m really happy that the park is showing leadership on that. I’d love to see vehicles with no emissions that are totally silent. I would even pay more for that. I hope the park keeps on pushing for ways to tour the park that are good for the environment.”
T4.14Sean	SC-R	“It’s great that the park is requiring quieter vehicles. I wish they would keep doing that and continue to raise the standards. This is a place where we should be practicing environmental stewardship and how we interact with the environment, even during a park visit is an opportunity for the park to teach people about good practices and behavior. I totally support the park in taking a stand and requiring visitors to be environmentally friendly. I’d like to see even more of that.”

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\* Percentage out of all interviews

T4.14Lynn	SK-F	<b>[Integrate Access &amp; Preservation 98%*]</b> “We need to have the vehicles in the park. The park is for people and that’s the way we get in to appreciate it. But the park also needs to be preserved so that we can really enjoy what a special place it is when we’re here. I would want the park to do something different with the vehicles if there was a negative affect on the park, on the environment. Thinking about the sounds again, it would be really annoying if you heard the vehicles all the time, but you don’t.”
T4.14Brian	SM-R	“We all need to get in here and those are the machines we use to do it, so you can’t stop that, but it’s good that you don’t hear it all the time otherwise the park would be ruined. I know that snowmobiles make noise, and the other vehicles, but you don’t come to Yellowstone to hear snowmobiles.”
T4.14Alex	SK-R	“To be honest, I don’t really like snowmobiles. I don’t really like the sound and the smell when I’m in the park. But at the same time, I think they have a right to be here. I respect that some people want to see the park that way and they should have that opportunity. As long as there are still places where people who want to enjoy the peacefulness of the park can do that, then I don’t have a problem. I had a great time here and I don’t hear or them that much when I’m out.
T4.14Doug	SC-F	<b>[Advocacy/Environmental Role of Access 46%]</b> “I think it’s really important that people have the opportunity to come here and using a vehicle is necessary for that. You have to get people in here so that they can appreciate it. People need to experience this place, so that it will continue to exist for ages to come, you know? You need to do it in a way that still keeps the park in good condition, though. I think it’s good to have the guides to both control the vehicles and to teach people about the park.”
T4.14James	SK-R	“One thing I notice is that there aren’t very many young people here. Most people are my age, maybe 50 and up and when I was younger I remember things being different, seeing a range of ages out there on the trails. I wish more people were out there on the trails skiing and getting out away from the lodge, but at the very least, we need to get people in here, even on snowmobiles or just doing the tours so they know how important and special it is. If people don’t come to the park, they’ll never know and then where will the park be in 50 or 100 years? It’s absolutely essential and that’s another reason we have to have motorized access, but controlled, here in the park.”
T4.14Janet	SM-R-L	<b>[Unreconciled Access &amp; Preservation 52%]</b> “The main reason I come to the park in the winter is because it’s quiet, calm, and there aren’t many people...The whole snowmobile thing is ridiculous. They should allow more snowmobiles and groom more roads for them. There’s no problem. The snowmobiles are fine; it’s the park that has the problem...The snowmobiles belong in the park and we should be able to use it, but they have to be controlled. Yeah, they have to be guided. They need to be controlled. That’s the only way. You can’t let them in without a guide. People don’t follow rules. And because they need to be babysat, they need to have a limit on the number of people who go with a guide; otherwise, people will trail off and start doing their own thing. So they have to be controlled, definitely.”

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Percentage of all interviews

T4.14Liam	SM-R	<b>[Natural Sounds Not As Important as Access 2%*]</b> “Getting in here to see the park is more important than worrying about the sounds from the snowmobiles and snow coaches. This park is our park and we need to be able to get in here, otherwise why do we even have it, you know? So I don’t like the idea that someone would be turned away. I don’t even know if that happens, but I hope not. I didn’t have a problem reserving a sled. But, to the extent that we can use 4-strokes, with better technology, that’s a good thing and having the snowmobiles guided is a must too. So as long as you have them guided and using the 4-strokes, then it’s fine. In fact, I’d like to see more snowmobiles in here, especially if they were the quiet ones.”
T4.14Susan	SC-F	“You know, the motorized sounds don’t bother me. I guess I just don’t listen that much to that kind of stuff. My personal feeling is if you’re going to take the snowmobiles and everything else away from the park, then you should take it all away, and everybody should snowshoe in or something. You know, nothing motorized”
T4.14Kelly	SC-F	<b>[Disapprove of All Snowmobile Access 2%]</b> “Snowmobiles are not a recreational activity. They’re not here to really be in the park. The activity is more about being on a snowmobile than being in the park. I think they’re totally unacceptable. It’s not what the park is for. They’re zipping around. They disturb me and what I’m doing in the park. Trying to take a photo and then all these snowmobiles whiz by; it totally takes you out of the moment. They should be banned.”
T4.14Sean	SC-R	<b>[Approve of Guided Access Because of Affect on Natural Soundscape 22%]</b> “It’s important that [the snowmobiles] are in groups because then you don’t hear the noise from them all the time. They’re not all over the place all of the time. There are plenty of chances to hear the quiet, to hear the animals, to just listen and be still. The guided groups really help to make that possible.”
T4.14James	SK-R	“One thing I notice is how now that snowmobiles are guided in groups, you don’t hear them all the time. A group will pass by and then it’s quiet again for a while. It’s so much better now. I understand that snowmobilers want to be here too, but it’s nice that the park figured out a way, with the guides, to respect people who aren’t here to snowmobile. You can hear the sounds of the park now before and after the groups pass you. Before, it was like a racetrack all the time. It was ridiculous. This is not Disneyland. It’s a National Park and it should look and sound like one. Things are good now, though.”
T4.14Talia	SC-F	<b>[Enjoy the Sound of Snowmobiles 2%]</b> “I like to hear the snowmobiles. They roar through and contrast with the quiet when you’re out there, and then they disappear and it’s so quiet again. It’s great. It would be very annoying if you heard them all the time, but to hear them sometimes really provides a stark contrast to the naturalness of the park. It’s like hearing the urban human world against the backdrop of the quiet wilderness. It’s impressive. If you heard it all the time, though, it wouldn’t be right. That’s not what you should hear in a park.”

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Percentage of all interviews

T4.14Vincent	SM-R	<p><b><i>[Snowmobiling as Direct Experience 4%]</i></b> “I like to snowmobile more than ride the snow coach because I can really get out there in the park, be away from everything, and be right there out there in the park. The wind on my face, the ice under my feet, the animals all around. I feel like I can really experience the park that way, better than in an enclosed snow coach, where I feel confined like I’m in a pod watching the park go by. I don’t like the snow coaches; you have to be with all these other people; you can’t really be in the park except when you’re out of the snow coach. It’s too confining. I came to the park to really be out there, feel it, see it, hear it. You know. On a snowmobile, I can do that.”</p>
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Percentage of all interviews

Some respondents were particularly supportive of multiple transport options in the park, supporting both snowmobile and snow coach access. They indicated that having options and the freedom to choose your mode of transport and primary activity in the park was a valuable part of the park experience (T4.14Kim, T4.14James). Some visitors described and supported the environmental leadership role of the park and how that manifests itself with the regulations for best available technology, guides, and group tours. Visitors described their support and belief in the importance of the park taking leadership on providing and requiring the most environmentally friendly transportation options (T4.14Peter, T4.14Sean). Indeed, one visitor (T4.14Peter) even specifically mentioned their willingness to pay greater entry or transportation fees in support of quieter, less polluting vehicles for both snow coaches and snowmobiles. Visitors who expressed these views on environmental responsibility frequently described their hope for the park to continue to require environmentally friendly vehicles and continually improve the technology required for entry. While the patterns again, were not highly distinct, skiers were most likely to talk about environmental responsibility; snow coach riders followed; and finally snowmobilers were the least likely to express comments on the environmental leadership element of the park policy. These are shades of difference in responses, not clear cut distinctions that strongly characterize differences among primary activity groups.

All but one visitor interviewed expressed moderate views on motorized sounds and vehicles used within the park. Specifically, most respondents described a very practical need to integrate motorized access options with the preservation of natural sound opportunities (T4.14Lynn, T4.14Brian). Several visitors, while making their way through the tension inherent between access and natural soundscape integrity, emphasized the educational and advocacy role that the park must fulfill by providing motorized access to the park in winter (T4.14Doug,

T4.14James). These visitors were quick to express the value that comes from visiting the park, the educational role that the park can play in an individual's life, and therefore, the responsibility that the park has for providing opportunities to experience the park during the winter. These respondents tend to be tapping into the relationship between park experience or appreciation and the development of a political constituency for the park.

During the course of several interviews, it became evident that many respondents had unreconciled and unexplored views about the desire for both access and preservation (T4.14Janet) that they began to work through during the interview. This, in part, reflects little prior time addressing the inherent complexities of the management question. While the park represents freedom and wilderness on one hand, and those are deeply valued and frequent drivers of visitation to the park, on the other hand, motorized access does infringe on that natural character of the park. For a few, frequently local visitors and in all cases repeat visitors to the park, knowledge of the historical changes in winter park regulations had left an impression, frequently oversimplified in the beginning of the interview where visitors would argue vehemently for the freedom to access the park on whatever vehicle they choose without any restrictions, particularly on snowmobiles. However, as respondents moved through the interview, and perhaps came to trust that the interviewer's purpose was not to build an argument against snowmobiles, but to understand how visitors would like to see these conflicting demands negotiated, the respondents tended to feel more comfortable with the notion of access restrictions, at least those currently in effect in the park. As the interview progressed, those who had started their conversation with the interviewer arguing for more motorized access, began to also articulate their support for restrictions like guides and group size limits. The sensitivity of winter access for some was apparent in only one of the interviews (T4.14Janet), however, of



particular significance was this respondent's desire for the park to protect the natural soundscape as management simultaneously allowed the greatest level of access possible. Even for someone with a general distaste for regulations on visitor access of public lands, the tension between access and soundscape preservation was quite salient and like the more moderate majority of respondents, most visitors had not fully worked out just how these two demands should be reconciled, for themselves or for park management.

There tended to be a tendency to oversimplify the management question, characterizing it in terms of one demand or value for the park: access and all that may represent (freedom, advocacy, inspiration, etc.) or preservation of the integrity of the park. Once respondents moved through their thoughts on the necessary trade-offs inherent in access and preservation, in all but one case, they tended to come around to some idea of balance or integration. The specifics of how those two should be balanced, however, were frequently unclear. All but one visitor indicated their general support for the current regulations, approving of total vehicle entry limits, group size limits, best available technology requirements, and guides. However, the very fact that many visitors could not fully articulate just what specific management actions they would like to see, or at what point access would begin to infringe too much on the natural soundscape validates the idea that this question is both complex and very fuzzy, that these are in fact social judgments that to some extent can be monitored, tested, and evaluated, but that require deliberative discourse to elucidate the full complexity of the management challenge and to reinforce public trust in agency decision-making.

While most visitors described a practical need to integrate access and preserve the integrity of the natural soundscape without having to give up either one, one visitor expressed the view that access was more important to them than preserving the natural soundscape

(T4.14Liam). Yet even this individual, specifically mentioned their support of the park requiring best available technology and doing what was possible to protect the soundscape while also providing access. For these individuals, they were not willing to give up access; however, they were still concerned with protecting the park by using the best available technology. For this visitor the idea of access limits in terms of the number of visitors allowed in the park is unacceptable, but other types of restrictions such as group size, guides, and best available technology are desired (T4.14Liam). While the few individuals who did express the importance of access slightly more strongly than that of preservation of natural sounds, one notable characteristic of these visitors was that they fundamentally share the same views as the majority of visitors interviewed. Overall, all visitors interviewed, want both access and preservation; they expect the park to show leadership in designing options that are environmentally friendly so that visitors can enjoy a high quality park experience. The specifics of what individuals may be willing to trade-off may vary slightly, but overall the desire to maintain access and environmental integrity were both strong.

While some respondents viewed the motorized vehicles of snow coaches and snowmobiles as acceptable and welcome in the park under regulated use, a smaller contingent may exist that is entirely opposed to snowmobile use in the park. One visitor interviewed consider snowmobiling a recreational activity in itself, and one that is opposed to what they saw as the purpose of the park, to experience a natural setting without disruption from snowmobiles (T4.14Kelly). This visitor would prefer to see snowmobiles banned from the park and motorized access allowed exclusively through snow coach, a mode of transport which they deemed a less intrusive access option. One person interviewed, who supported regulated snowmobile and snow coach access, expressed concern of the inequity of such a position, stating that if the park were to

ban snowmobiles, then they should ban all motorized access (T4.14Susan). This position indicated a desire for a clear and equitable logic for restricting motorized access, and that the type of vehicle would not be sufficient criteria for excluding a set of vehicles from the park. This was not the desired position of the respondent, who supported motorized access to the park, but rather it provided a window in to the desire for equitable applications of park regulation as they pertain to motorized vehicles. These two responses, desire to ban snowmobiles and concern over a policy of inequity that would ban snowmobiles were only expressed by these two individuals mentioned above and do not reflect the overall direction of the research findings.

With respect to the specific relationship that motorized vehicles and the current regulations have on the natural soundscape, a few respondents described the benefits and thus their approval for the group size limit and guiding regulations. In these cases, visitors were supportive of guided group requirements specifically because they provided windows of quiet or opportunities to experience natural sounds during a visit to the park (T4.14Sean, T4.14James). While snowmobile groups do move through, they move through as one unit leaving opportunities to experience natural sounds behind them. Natural sound integrity and opportunity were provided for due to the acoustical spaces created between the passing guided groups. While these pulses of motorized sounds were not desirable, they were acceptable and rationalized so as to provide the opportunity to access and appreciate the park. The benefit of the pulses of sound due to snowmobile groups is the fact that the moments in between passing snowmobile groups were opportunities to experience the natural soundscape.

There was also one description of enjoying the sounds of snowmobiles, particularly as they contrasted with the natural soundscape and provided an opportunity to experience a rush related to the powerful sounds of motorized vehicles in the park (T4.14Talia). This visitor was

quick to explain, however, that hearing motorized sounds all of the time in the park would be detrimental to their experience. Some motorized sounds, from this perspective, are acceptable and even enjoyable in the park, their contrast providing an opportunity to reflect on the urban/wilderness interface. Nonetheless, even for this visitor, if the opportunities to experience the natural soundscape were eliminated or substantially degraded, their experience of the park would not be as positive and would impact the overall value of the park itself. The purpose of the park as a haven of the natural environment included the natural soundscape. Expressing enjoyment in hearing the sounds of over snow vehicles was only documented in this individual case and does not represent a pattern of responses found in the data. In fact, in this interview, it is the only time the perspective arose. The vast majority of visitors saw motorized sounds as necessary, not desirable in the park, yet acceptable to allow for experiences of the park during the winter season.

While the interviews document a range of perspectives related to the mechanical sounds and vehicles used within the park, it is notable that for most visitors interviewed, a keen understanding of the need to integrate motorized access and protect the natural soundscape pervaded. Time and time again during the interviews, respondents would refer to the purpose of the park as a place to experience a unique natural environment and associate natural sounds as a part of that environment. Visitors generally believed the park should protect the natural soundscape to the greatest extent possible, without sacrificing opportunities to experience it. Overall, visitors supported the current park regulations and if anything, would like to see the park taking on greater environmental leadership by requiring better technology for motorized access that continues to be guided. A couple of visitors interviewed were clear on their perspectives that they did not support snowmobiles as a legitimate means of transportation in the

park and saw this mode of transportation in direct conflict to the value of the park. These visitors did, however, support snow coach access. This view of snowmobiles as inherently oppositional to park values and an experience of the natural character of the park, was quite interestingly contrasted to a perspective on snowmobiling from those who engaged in it at the park. For some who participated in it, snowmobiling was a means of having a direct experience of the park, while riding in a snow coach was described as a mediated, confining experience where the park was less accessible from an experiential standpoint (T4.14Vincent). The freedom of being on a snowmobile in contact with the elements was described as more authentic, direct, and full experience of nature in the park.

### ***Insights***

This research demonstrates the different types of information gleaned from a survey versus an interview. It shows how survey and interview data can be complementary, addressing different informational needs. The survey provided a general overview of the visitor population, while the interviews were able to tap into the deeper significances of natural sounds, documented the inherent complexity of the management challenge, and provided insight into visitor perceptions of the conflicting demands of motorized access and natural soundscape protection. The survey data demonstrate large-scale trends in visitor support or opposition for management actions, yet also indicate many subtleties, rather than clear conflicts, associated with those responses across user groups. These patterns were present in both the interview and survey data and thus in this instance, the two research approaches validated each other. Generally, the survey data provided a basis for acknowledging more fundamental similarities in perceptions of the experience of natural sounds, their value and importance, and perspectives on management

policy designed to protect natural soundscape experience opportunities. The interview data provided more detail and significance related to this common ground, thus validating and further adding value to the survey findings. Comparisons between extant research by Borrie and others (2002) and interviews with repeat visitors and locals also provide insight into the power of policy to shape visitor views and cultivate a constituency that upholds agency values.

This research shows that an overwhelming majority of visitors value the natural soundscape as an essential element of the park. For most visitors, hearing natural sounds is a valued element of their experience of the park. Natural sounds were also shown to be a part of the overall value of the park regardless of the specific role natural sounds played in the visitor experience. The significance of natural sounds to visitors ranged from deep meanings such as experiences of “presence” to spiritual experiences for visitors. Skiers tended to be more articulate and keyed into the importance of natural sounds in their experiences, but this was a difference of degree, not diametrical opposition to snow coach riders and snowmobilers. Indeed, some of the most articulate interviews were with snowmobilers expressing their view on the importance of natural sounds in the park. The common ground between primary activity groups was found to be much greater than prior research had established.

Further, the data revealed that having the opportunity to experience natural sounds was a motivation for some visits to the park. The data also shows that for a smaller portion of visitors, natural sounds are not important to their personal experiences of the park. Finally, the unique natural sounds of Yellowstone National Park in winter were documented; silence, in particular, was shown to be valuable as both an experience itself and as a backdrop to experience other natural sounds of the park.

In terms of motorized sounds and vehicles in the park during the winter season, this research documents how visitor perceptions of motorized sounds are multi-faceted and complex. While managers may be currently grappling with questions of appropriate soundscape management, visitors too, struggle with the appropriate integration of motorized access and preservation of the natural soundscape. Nonetheless, most visitors expressed satisfaction with and support for the way that the park is currently being managed and approved of current restrictions on motorized access. Nonetheless, it was unclear how well most visitors had worked through the complexity of the management dilemma in the face of real decisions the agency must make to protect natural sounds while also providing park access to the public in the winter. Motorized users, including snowmobilers, interviewed were supportive of guided groups and group size limits. It also became clear that there were not strong, distinct patterns among visitors who snowmobiled or skied and their views on the value of natural sounds and restrictions on motorized vehicle access. The very notion of distinct categories like “snowmobiler” or “skier” may no longer accurately and completely reflect winter visitor perceptions of their own identity or be salient indicators of their perceptions. Many winter visitors are engaging in multiple activities that allow them opportunities to explore the park in a variety of ways. Importantly, one snowmobiler described their enjoyment of that mode of transport being a result of the fact that it provided a means of more directly experiencing the park. This was a perspective that contrasted with traditional categorical views on user groups that impose stereotypes of snowmobilers as renegade visitors who do not seek a direct experience of nature in the park. At the very least, this research documents a stark contrast of opinion and likely misunderstanding and inaccurate typification of user groups. It also likely reflects the residue of historical change in motorized access and the corresponding controversy

surrounding winter use in Yellowstone National Park. Most winter visitors today generally espouse a more moderate view of the relationship between access and preservation which is documented in the visitor interviews. One snow coach rider interviewed, however, held fast to a no compromise position that snowmobiles are inappropriate vehicles in the park. My research suggests it may be a minority view, but further research is required to confirm this suggestion.

Management challenges may also initially be poorly understood by visitors or at times, reduced in complexity. However, once addressed in discussion, visitors are keen to engage the questions and frequently acknowledge this complexity and begin to work through their lack of clarity on the exact management action preferred. Through such dialogic engagement, visitors began to arrive at moderate positions that integrated the two demands and started to acknowledge the management question on more holistic terms. It is important to note that many visitors interviewed had not necessarily thought about the management challenges related to motorized access and the natural soundscape before participating in an interview. This indicated an absence of visitors in a truly deliberative arena addressing the complexity of these issues in the public discourse. Visitors clearly have rich, multi-faceted understandings of their experience of the park, the significance of those experiences, the significance of the park itself, and look to the National Park Service to take a leadership role in providing the most environmentally friendly ways of visiting and enjoying the park.



## CHAPTER 5: IMPLICATIONS AND DISCUSSION

### *Reflections on the Research Findings*

Soundscape management is an important issue to winter visitors to Yellowstone National Park. While different groups of people interviewed and surveyed do vary in their perspectives on the importance of natural sounds to their personal experience of the park, the value of natural sounds to the park setting, and the perception of mechanical sounds in the park, the differences are most often questions of degree of agreement, rather than deeply conflicting views or oppositional positions.

These findings contrast with extant research, particularly that completed by Borrie and others (2002) during the 1999 winter visitation season in Yellowstone National Park. The difference in research findings corresponds to a change in visitor management policy which has various implications on the role and relationship between the visitor constituency, their values and beliefs, and park policy. In particular, comparing these research findings raises questions about what park policy communicates to visitors and the impact such strategies have on the visiting public. There is a correlation between visitor perceptions and the change in management policies which currently regulate to a greater degree than before motorized visitor access to the park in the winter season. We know that current visitors exhibit slightly different value patterns than past visitors and that the current winter visitor population is more consistent in their agreement on major issues related to the research conducted. Clearly people may change over time, but it is also possible that park policies have cultivated and attracted a different kind of visitor compared to past years. The type and delivery of information that visitors now receive through the guided experiences required for entering the park likely play a large role in how

visitors develop and confirm their understanding of park goals and values. These research results have tremendous implications for agency-public communication strategies, but were not the primary focus of this dissertation.

When it was possible and valid, this dissertation identified patterns related to specific groups of people such as primary activity group types, local residents, and repeat visitors. The data largely supported more common ground between all groups, but in some cases there were clear patterns and differences. For example, snowmobilers were less likely than other groups, especially skiers, to claim that experiencing natural sounds was an important aspect of their visit to the park. Yet more generally, all groups and all individuals interviewed attested to the importance of natural sounds to the overall value of the park regardless of the specific affect on personal experience. Most visitors among all groups supported the current visitor management policy that includes group size limits on snowmobiles, requires guides, and limits total number of motorized vehicles in the park per day. However, snowmobilers were more likely to oppose restrictions in the survey results. The interviews provided all groups and individuals interviewed the opportunity to talk in more depth about the value of natural sounds to their experience, to the park, and to how they reconciled and understood the existence of mechanized sounds in the park. From these interviews, the significances and diversity of experiences became more apparent. Skiers were more likely to easily articulate the meanings and importance of natural sounds to their personal experience. Yet, many snowmobilers too provided rich, detailed descriptions of both their experience of natural sounds and their importance to their personal experience, and to the value of the park. Further, we know that a range of meanings exist among the visitor population related to the significance of natural sounds, yet in most cases these meanings are coherently related. Visitor groups, whether categorized as skiers, snowmobilers, snow coach

riders, photographers, locals, or first-time visitors are not monolithic, yet in some cases patterns and similarities existed within groups which this dissertation sought to capture. As in all research, there are exceptions to general research findings. For example, one snow coach rider (T4.20Talia) described her enjoyment of the sound of snowmobiles in the park, whereas most other interviewees indicated that mechanical sounds were something that they accepted in the park due to the need for access, but would prefer not to hear during their visit. There is always variation in any population and the Yellowstone National Park 2007-2008 winter visitor population interviewed and surveyed for this research is no exception to that rule.

This research took place in Yellowstone National Park, a specific place, at a specific time, the winter 2007-2008 visitation season. The research context is specific and the data is undeniably relevant to and influenced by this context. For example, winter is a season with unique soundscape attributes and Yellowstone National Park, specifically has unique winter soundscape characteristics. Quiet and silence, for example, was one description that arose during many interviews when visitors discussed what the park sounded like in winter. However, while this research is grounded in a particular place and should be understood from within that context, it also taps into larger-scale socio-ecological phenomena which can inform social scientific theories related to the human experience of natural sounds in national parks. Natural sounds were shown to be a solid element of the traditional park values scale. Indeed natural sound variables increased the alpha reliability and thus internal consistency of the scale.

National Park natural soundscapes have become a recently legitimized and evolving park resource. Policy changes have mandated the National Park Service to protect, preserve, and restore natural or historical soundscape conditions. In response to this change the National Park

Service created the Natural Sounds Program to address soundscape management questions and assist in the development of soundscape management plans in all national parks.

Yellowstone National Park has held center stage as multiple interest groups, visitors, and policy makers around the nation have taken interest in the winter visitor plan which, in part, distinctly relates to effects to and the integrity of the natural soundscape and the visitor experience thereof. To date, even taking my research into account, there is still much to learn about visitor experiences and perceptions of park soundscapes and how those views can help inform soundscape management. This research adds a high degree of quality and specific detail to visitor perceptions of natural park soundscapes which can be used as a foundational jumping off point for future comparisons between results from other parks across the country. Future research can compare common, absent, or conflicting themes from this research as this field of social science soundscape research develops. From there we can begin to confirm what elements of the park soundscape experience tend to be common across all national parks or where differences and nuances lie. In sum, the research findings from this dissertation should be understood as connected to both the specific Yellowstone National Park winter season and to the larger context of U.S. National Park soundscape management, planning, and policy making.

## ***Revisiting the Research Framework***

Earlier in this dissertation the research framework guiding this inquiry was described. It was built from various sources and traditions in order to best address the research questions and information required for this dissertation. In this section, elements of the research framework are revisited in a description of how this research benefited and was shaped from their use. The significance of this dissertation research is highlighted throughout this section.

## **Policy Change and the Visitor Population**

The need for national park soundscape management and thus to understand visitor experiences of natural sounds has been driven by policy changes. By acknowledging the critical role policy has played in the development of soundscape management strategies and in heightening both agency and public awareness was not only true in and of itself, but also led to looking at how visitors perceived potential management solutions that protect the integrity of the natural soundscape. The policy context also provided a specific lens through which to consider possible changes in the visitor population over time which is documented through the comparisons made in this dissertation with the Borrie and others (2002) study. For example, we now know that changes in the visitor population have occurred and that they are coincident with policy changes that affect both visitor access and natural soundscape integrity. The role that policy can play in shaping the visitor constituency of a park grew out of such findings from this dissertation.

## **Knowledge of Visitor Perceptions of Natural Sounds**

The policy context also set the stage for the need to understand visitor experiences of the natural soundscape. These recent policy changes overlay themselves on the National Park Service's dual mandate to both preserve and protect the integrity of the park environment and to provide for quality visitor experiences thereof. Without knowledge of just what visitor perceptions of and experiences are of natural soundscapes, particularly those in national parks, there is no social basis for making management decisions related to the natural soundscape. This dissertation combined both survey and interview approaches to more fully understanding visitor experiences of natural sounds. There had been minimal interview research completed (Pilcher 2006) on this subject and very limited survey research conducted prior to this dissertation. Pilcher (2006) briefly reported how visitors at Muir Woods National Monument tended to negatively describe the experience of non-natural sounds and generally characterized natural sounds as pleasant and relaxing. The information in this dissertation affirmed her work, yet added deeper descriptions of visitor perceptions and values of natural sounds.. For example, the interview analysis in this dissertation brought to light a range of views and deep meanings that visitors associate with their experience of natural sounds. This research affirmed the generally positive visitor assessment of natural sounds present in the existent literature, but brought forth additional interview elements that deepen our understanding of the value and the experiences of natural sounds in National Parks. Both a context specific description of unique wintertime Yellowstone National Park sounds were documented as well as more abstract and generalizable theory on the value of natural sounds. This dissertation brought forth the knowledge that visitors often associate deep meanings ranging from a sense of presence, to spiritual of their experiences of natural soundscapes. This research affirmed and broadened the literature, that as in Muir

Woods and in Zion National Parks, the vast majority of visitors value natural sounds as an essential element of the character and value of Yellowstone National Park. It did so by adding value to that literature and incorporating the multi-dimensional and complex elements of experiences that have been brought forth by Borrie and Brizell (2000), Duffus and Wipond (1992), Manning (1999), Montag and others (2005), and Patterson and others (1998) to complement and critique a tendency in the literature to reduce experiences as exclusively goal-directed. In particular, this research documented that visitors can have unanticipated experiences such as those stemming from natural sounds that were not necessarily planned, yet once experienced, were recognized by visitors as a key element of the overall experience of skiing, snowmobiling, snow coach touring, or wildlife viewing.

### ***In Situ* Social Science Soundscape Research**

The very fact that some visitors articulated the unanticipated positive experiences of natural sounds during their park visit gives credence to the value of taking an *in situ* research approach toward visitor experiences. Contacting visitors during their park visit provided an opportunity for visitors to express their perceptions without time delay and distance. While visitor perceptions of their experiences do likely change over time and are not static, the value of documenting visitor experiences as they were occurring is that the knowledge stemming from this research is grounded in those at-the-park moments; the information from this research reflects visitors actual perceptions while in the park.

Knowing that visitors generally found natural sounds pleasant or restorative in experimental settings (Grau 2006, Pilcher 2006) was limited, and this dissertation built upon that

information and took it one step further. By both interviewing and surveying visitors in the actual park setting, the *in situ* approach allowed this dissertation to access the on-going and in-the-moment thought processes of visitors while they were experiencing the park. This proved invaluable for it provided an opportunity for visitors already conscious of their soundscape experiences to articulate and document them, and also allowed visitors who had not previously thought about natural sounds an opportunity to reflect on them and provide feedback. Through the interviews, this research, for example, provided information on the specific and uniquely valuable sounds of Yellowstone National Park in the winter, something that has never been done before. We now know that quiet plays a role in the Yellowstone National Park soundscape experiences both as a feature in and of itself and as a backdrop and enhancement for other natural sound contrasts such as wind, water, birds, and crunching snow.

### **The Value of Mixed Methods**

The mixture of interview and survey data provided valuable insight related to visitor experiences of natural sounds. The survey helped to contextualize visitor soundscape perceptions and values, but in a fairly general way. We learned that there was much greater overlap of views between groups (snowmobilers, snow coach riders, skiers) that in prior research had been shown to hold conflicting views and values (Borrie and others 2002). The surveys also allowed us to look at patterns in visitor willingness to support or oppose different management policies related to soundscape management in a more exact way than the interview approach allowed. The interviews, on the other hand, provided a richness and opportunity to explore the soundscape significance and management dilemma in much more depth than would have ever been possible though a survey alone, especially given the state of knowledge on soundscapes



when this research was designed. For example, visitors discussed experiencing a sense of presence, a deep connection with nature, and even the experience of snowmobiling perceived as a more direct experience of the park than other modes of travel within the park. Having two types of data, allowed this dissertation to explore different aspects of the soundscape questions and to confirm or raise further questions related to independent results obtained. For example, in both the survey and the interview results, a high degree of common ground across all visitor groups was present, yet the complexity of the management dilemma and visitor confidence in suggesting management alternatives was only revealed through the interviews. Skiers did have a tendency in both data sets to privilege the natural soundscape and attested to a greater degree to its importance in their experiences, yet some snowmobilers interviewed also described the importance of experiencing natural sounds using similar arguments for its importance.

By exploring visitor values, this dissertation was the first to demonstrate how natural sounds are a part of the typical suite of values visitors hold for National Parks. The question of values became more complex since it compared itself to Borrie and others (2002) research where more striking dimensions may have existed in the winter 1999 park season. This research indicated more unidimensionality in visitor values, rather than multidimensionality described by Borrie and others (2002). This change in values could then be linked to the policy changes as described above. In this way, this research built quite strongly upon prior research adding value to previous work in a longitudinal sense, yet revealing a notable change in winter visitor values at Yellowstone National Park. This had not been done before.

My approach to investigating visitor experiences, particularly those documented in the interviews, through an interpretive paradigm led me to consider both unique perspectives, patterns within groups, make comparisons between groups, and to consider the data set as a

whole. While I had anticipated finding strong patterns among the visitor primary activity types as had been documented through survey research in the past, what I found was less consistent with extant research. It became clear that while there was variation and some unique perspectives within the segment of the visitor population that I interviewed, what was striking were the broader commonalities between individuals, within groups, and within the data set as a whole. For example, almost all visitors interviewed held very moderate views on the existence of mechanical sounds in the park, with most specifically noting the need to integrate the preservation and access demands in the park. While more snowmobilers stated that the experience of natural sounds was not particularly important to them personally during their visit, they were all quick to clarify that they still wanted the park to protect those opportunities because natural sounds were valuable to the park overall. These are critical perspectives that had never before come to light in what is still a nascent area of research on visitor experiences of natural soundscapes.

## **Opportunities for Dialogue and Participative Planning**

Since so much common ground was articulated in the research findings, there are tremendous opportunities for the agency to work with visitors toward consensus positions on appropriate and legitimate soundscape management policies and management strategies. We have known for many years that the park population is highly educated and eager to engage in discourse on the National Parks. Yellowstone is already engaged in this dialogue through the required guided winter visitation experiences. Support for the potential for continued and diligent engagement in this dialogic and communicative strategy is an additional contribution from this research. The National Park Service and future research would be wise to consider focusing attention through both individual parks and the Natural Sounds Program on additional communicative strategies and agency-visitor feedback scenarios; if done it is likely to inform park management, allow park management to stay in touch with evolutions and changes among the visitor population, and open up avenues of communication that provide continuous and direct feedback to management and to visitors that offer higher degrees of complexity and explanation to shine through; this is the type of dialogic engagement that builds trust and strong relationships between government agencies and their constituencies.

## *Implications for Management and Policy*

While most visitors recognize natural sounds as a valuable part of Yellowstone National Park, to ensure that perspective continues and grows within the visitor population, it would be beneficial to have increased and improved interpretive programs that further sensitize visitors to the park's unique winter sounds, the role that natural sounds play as a part of wildlife habitat, and overall reinforcement of the notion that natural sounds are an essential characteristic of the park. The role of guides should be revisited in Yellowstone National Park and in other parks to look at effective alternatives for increasing communication to the visitor population and to maximize possibilities for dialogic exchange on controversial and complex topics such as soundscape management.

Visitors in this study were generally eager to support the park in providing environmental leadership. Management would be wise to take an even greater lead in continuing to improve lower-impact motorized transportation options, requiring better technology that reduces noise and emissions in coming years. This research provides evidence that the visitor population would support such policies—possibly even if fees were increased. This is also an area that could benefit from further research to evaluate statistical generalizability of visitor support for such actions. Further, any management actions that do reflect environmental leadership on the part of the park should be communicated to visitors both before and during a typical park visit to reinforce and explain the relationship between management policy and park goals. When visitors understand the reasons for agency choices and how those actions relate directly to supporting the shared agency-visitor goals and purposes for the park, then visitors may be more likely to support the management action and trust the park agency itself.

Overall visitors are quite satisfied with the park soundscape and current management policies. However, discussions with visitors suggest that interview data can provide an opportunity for greater visitor input and collaboration with the park on management and planning issues. In particular, the visitor constituency would benefit from a more explicit and complete discussion of the complexities related to soundscape management. The role and overall legitimacy of public land agencies, like the National Park Service, is an evolving social concern. Governmental legitimacy and public trust in land management agencies may be revived and reinforced by taking an alternative view that values the role of public discourse. By shifting from an emphasis on an agency as a simple director and implementer of management actions, a technocratic expert in decision-making, to a more progressive concept of one where agencies facilitate the creation and collaboration of community and citizen dialogue, there is great opportunity for agencies to regain their decision-making legitimacy and serve the public interest most effectively. Agency participation in and cultivation of collaborative public discourse may be one way of most fully integrating visitor constituencies into decision-making processes. Social science can play a key role in the development of such participative planning and management interactions. The most successful use of this tool, however, requires that the visitor constituency be engaged prior to highly contested and established controversies on management actions fully develop. Visitors ought to be involved in discussions of management alternatives with regard to all of their intricacies and various trade-offs to improve both information for the agency regarding visitor perspectives, but also as a means of allowing visitors the opportunity to work through and understand the management challenges in the most holistic manner possible. This type of engagement with the visitor constituency is likely to build greater trust, respect, and support for land management agencies and their subsequent decisions.

Further, this research is demonstrative of the potential impact of management policy on visitor constituency value development and support for agency initiatives. It is likely no coincidence that differences exist in ascribed park value from the Borrie and others (2002) study and my research. This change of values among the park visitor population is likely reflective of a different type of visitor in the park and is likely linked to the change in management policy which encouraged a different kind of visitor by setting different expectations for a park winter visit. Policy, and particularly, the articulation of the rationale for and affects of policy to the visitor population (which now occurs largely through guides during the winter visitation season) is a powerful shaping force to engage proactively. The role of guides should not be underestimated, preliminary results from additional research conducted during the 2007-2008 winter visitation season on guide perceptions of policy effectiveness and the educational role of guides corroborates this notion (Freimund and others, forthcoming). Additional interview data, in particular, would be helpful to verify and document visitor perceptions of their experience with guides during winter visits to Yellowstone National Park.

The findings from this research also have larger agency policy implications that relate to the recently created National Park Sounds Program. As the National Park Service Natural Sounds Program moves forward in developing, implementing, and monitoring soundscape management plans for U.S. National Parks, the need to engage the visitor constituency in this planning process is paramount. Not only do findings presented in this research illustrate the complexity of visitor experiences of natural sounds and the unique soundscape character and value of an individual park, but it also presents a clear linkage between policy design, implementation, communication to the public, and corresponding visitor support. Not only will information from visitors assist the Natural Sounds Program with optimal management

alternatives to ensure the highest quality visitor experience, but further the agency has a civic responsibility to engage the visitor constituency in both explaining and exploring current and prospective soundscape management policies. My research indicates that visitors are much less likely to care about decibel levels or frequencies—a fundamentally technocratic, natural scientific approach to both study and describe the situation. Conversely, a more meaningful discourse for engaging the public is one that is explicit, explanatory, and social and politically direct. In other words, utilizing a discourse of values and consequences of management policy on the agency's ability to reflect and uphold values is much more likely to be in tune with visitors' understandings of their relationship to natural sounds and the National Park Service itself. Discourse of this nature is not only helpful, but also necessary to remain relevant and in touch with the visitor population. The visitor constituency, in this regard, is the agency's biggest asset and the more quickly it learns to engage this constituency in a meaningful discourse, the more quickly it can both influence character and harness its power and support.

Consequently, the current search for indicators and standards as embodied by the research of Pilcher (2006) and the trend in management policy that privileges bioacoustical monitoring both in Yellowstone National Park and in the National Park Sounds Program may have some merit, but will be hollow without the deeper nuances and complexities that interview and mixed-method research can provide to policy makers and park managers. Just because we know that visitors find certain sounds pleasant and annoying, does not provide the information necessary to evaluate what is meaningful and valuable about those sounds and how visitors are willing to negotiate conflicting demands. In the case of Yellowstone for example, for both mechanized transport and opportunities to experience natural sounds are desired; these conflicting demands are sometimes only beginning to be understood by the visiting public and

while abstract solutions may be easy to articulate, the specific managerial solutions may not always be as obvious or well-understood. The agency can capitalize on this, however, by exploring the meaning and alternative management scenarios with visitors by working through the complexities of the management challenge together.

. The National Park Service and the Natural Sounds Program acknowledges on a conceptual level that each park contains a unique soundscape, but the visitor perspective has only been engaged on this topic in a very limited fashion. While this dissertation begins to address these complexities on both a broad national level and individual park level, much more information is required to produce the best management plans. Once a park has a sense of the range of soundscape experiences and associated meanings that exist in a given park, research and management should look to build on that by filling in information on what scenarios visitors would be willing to support and why. Providing visitors an opportunity to comment in a meaningful way on their perceptions of their soundscape experiences, the value of that experience, the role that those sounds have to the overall value of the park, and preferred management alternatives will build trust and create a space for tremendous opportunity for the agency to pro-actively shape and harness political support for policy and management actions. Yellowstone is a unique park in that guided trips are required during the winter visitation season. Guides in this case have been a positive vehicle through which the park can communicate its message and receive direct and continual feedback from visitors. The very nature of the guide experience is frequently dialogic and inviting, but does not exist in every park. Thinking creatively of how to manage learning about the visitor constituency through formal researchers, guides, public forums, or adaptable interpretive programs should be a key element in the design and monitoring of soundscape management plans for every park.



## ***Implications for Future Research***

Given the current limited state of both biophysical and social scientific data related to park soundscapes, there are great needs and knowledge gaps that remain. This section will focus primarily on social scientific research needs, yet will touch on some opportunities to combine biophysical and social scientific data for future research.

Generally, continual social science monitoring of visitor experiences of natural sounds will be a critical element in the development of viable and robust soundscape management plans. While bioacoustical monitoring should continue, monitoring of visitor experiences will provide needed information on visitor perceptions, significances of natural sounds, and willingness to support management options. This type of continual research could be supported by the National Parks Natural Sounds Program, for example.

Future research focusing on the development and testing of a natural soundscape significance scale from this interview data may be helpful. If such a scale were applied in upcoming winter seasons, this would provide insight into the statistical generalizability of the information gleaned from the interviews. This would help to evaluate overall trends in the visitor population without losing all of the complex information that this research provided through the interview data. In terms of management actions, if specific options are under consideration, further use of interview research is recommended to explore visitor perceptions and potential support for management actions. Interviews exploring visitor perceptions of specific managerial alternatives can account for greater complexity and provides greater explanatory power of complex challenges and conflicting demands. Research undertaken in this

way is a method for improving and increasing participation of the visitor constituency in agency decision-making.

Useful follow-up analysis from this research might include reviewing extant research conducted in Yellowstone during the winter and evaluating any changes in the visitor population related to frequency of first time visitors, comparison of visitor perceptions of guides and their overall role and impact on visitor perceptions of their experience and of park policy, and comparing the results from my research with the recently conducted study of guide perceptions of the impact of current access policies on the visitor population and integrity of the park resource, and evaluating any changes in National Forest recreational visitation in the Yellowstone area.

More interview data should also be collected during the summer season in Yellowstone National Park to allow for a comparison of visitor perceptions of the role and significance of natural sounds to park experiences and to the park as a whole during different visitation seasons. It would be useful to compare differences in perception of the overall role of natural sounds in visitor experiences depending on visitation season as well as inquire in to specific meanings of such experiences that may change with seasonality. Additionally, natural quiet has been shown to be a particularly unique feature of Yellowstone National Park in winter. There is a need to conduct research in other parks to assess unique natural soundscape characteristics of individual parks while also accounting for seasonal variation. Research approaches that use interview data and deal with visitor perceptions of their guided experience in the park would also be useful to better understand the role guides have on carrying the park discourse directly to the public during their visit. Guides, in this sense, may play an important role as vehicles for cultivating an appropriate and strong visitor constituency for agency policy and management decisions.

Biophysical monitoring should be continued and used as a method of comparing changes in both soundscape quality and corresponding visitor perceptions of the role of the soundscape in both experiences and to the park overall. It would be particularly interesting to look at bioacoustical monitoring in the park from 1998 and the Borrie and others (2002) research and compare that to winter 2007-2008 bioacoustical data and the data presented in this dissertation to see what changes may have occurred in both bioacoustical and social scientific data.

## ***Conclusion***

Protection of and interest in natural soundscapes has become an issue of increasing importance in U.S. park management. The National Park Service now has the federally mandated responsibility to properly manage park soundscapes and to protect natural sounds. One needed complement to the rapid development of national soundscape management policies is increased social scientific knowledge that addresses visitor experiences, values ascribed to natural sounds, and preferences for management alternatives. One of the National Park Service's duties is to manage for high quality visitor experiences and enjoyment of parks while simultaneously protecting and preserving park soundscapes. Management decisions ought best be developed and grounded in knowledge concerning just how visitors characterize their experiences of park soundscapes. This fundamental documentation process done in Yellowstone National Park benefited from both interview and survey data providing a generalized backdrop of information as well as more detailed data analysis from the interviews. It is my hope that the knowledge stemming from this research will contribute to an increased capacity on the part of

the agency to manage relationships with their visitor constituency and the evolving demands for park access and natural soundscape experiences.

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## APPENDIX A: INTERVIEW GUIDE

### Visitor Characteristics

1. How often do you visit National Parks?
  - A) How often have you visited Yellowstone National Park?
  - B) How often have you visited in winter?
2. How did you enter the park today? (mode of transport)
3. What is the primary purpose of your visit today? (skiing, snowmobiling, watching wildlife, snow coach ride, etc.)

### Undirected Broad Experience Questions

4. What attracted you to visit Yellowstone during the winter?
5. Could you describe what your visit was like today?
6. Is there anything that really added to your experience today? Please explain.
7. Is there anything that detracted from your experience today? Please explain.

### More Directive Sound Questions

Intro: The questions I've just asked you dealt with your general experience with National Parks and in Yellowstone. The following questions I want to ask you are more specific to issues of sounds within Yellowstone.

8. How important are the sounds of the park to you during your visit?
9. Would you describe what the sounds of the park were today?
10. When did you begin to notice the sounds of the park?
11. Could you describe the experience of noticing the sounds of the park? What is that like?
12. 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

13. Are there certain times during your park experience when natural sounds are important for your experience? (e.g., first entering the park, when out of a vehicle, in the backcountry, on a hiking trail, at Old Faithful, etc.) Why?
14. What does Yellowstone sound like in winter?
15. What does a geyser sound like?
16. Are there other distinctive natural sounds that are important to you here in Yellowstone?
17. How important do you think natural sounds are to enjoying your national park experience?
18. What is important to you about the natural sounds of the park?

19. If your ability to hear natural sounds were diminished, would it detract from, add to, or have no effect on your experience of Yellowstone?
  - If “add to,” could you explain your answer?
  - If “detract from,” could you explain your answer?
  - If “no effect,” could you explain your answer?
20. Do you feel that the National Park Service should preserve and protect natural sounds and restore natural sound conditions?
  - If yes, can you explain your answer?
  - If no, can you explain your answer?

#### Mechanical and Human Sounds

21. Are there any human-caused sounds that have positively affected your visit? Explain
22. Are there any human-caused sounds that have negatively affected your visit? Explain.
23. How do you feel about sounds caused by the different types of vehicles used within the park?
  - More generally, how do you feel about the different types of vehicles used within the park?
24. Are there certain places in the park where you feel the sounds of motorized vehicles are acceptable? Explain.
25. Are there any places in the park where you feel the sounds of motorized vehicles are not acceptable? Explain.

#### Ideal Winter Visit

26. What would the park sound like in your ideal winter visit?
  - A) Did you have this experience? Why or why not?
  - B) Is this type of experience realistic? Why or why not?
27. What suggestions would you have for creating a park visit that aligns more closely with your ideal?
28. Would you support or oppose a management policy that restricts motorized visitor access in order to ensure that YNP provides opportunities to experience natural sounds? Explain

## APPENDIX B: SURVEY

### 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. During your visit to the Yellowstone area, how many days will you recreate within Yellowstone National Park? \_\_\_\_\_

3. Will you engage in the following activities during your visit to Yellowstone National Park? (please circle yes or no for each activity)

- |                         |     |    |
|-------------------------|-----|----|
| a. snowmobiling         | YES | NO |
| b. cross-country skiing | YES | NO |
| c. snowshoeing          | YES | NO |
| d. snow coach touring   | YES | NO |

4. Which of the following best describes your primary activity while in Yellowstone national Park?

- cross-country skiing
- snowshoeing
- snowmobiling
- other: \_\_\_\_\_

**5. While on your trip to the Yellowstone area, please state the number of days you will also do the following activities in other areas (such as nearby National Forest lands or National Parks)? If none, please put “0” (zero):**

<u>Activity</u>	<u>Number of days</u>
snowmobile	_____
cross-country ski	_____
down-hill ski	_____
snowshoe	_____

**Role of Yellowstone National Park**

**6. We are interested in your opinions about the value of Yellowstone. Please indicate for each of the following, how much you agree or disagree that they are important to the overall value of Yellowstone National Park (1 being strongly disagree, and 5 being strongly agree):**

Yellowstone National Park is particularly important as:	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree	Don't Know
a wildlife sanctuary	1	2	3	4	5	DK
a place for education about nature	1	2	3	4	5	DK
a place to develop my skills and abilities	1	2	3	4	5	DK
a place for natural quiet	1	2	3	4	5	DK
a protector of threatened and endangered species	1	2	3	4	5	DK
a sacred place	1	2	3	4	5	DK
an economic resource	1	2	3	4	5	DK
a family or individual tradition	1	2	3	4	5	DK
a place free of motorized noise	1	2	3	4	5	DK
a place everyone should see at least once in their lives	1	2	3	4	5	DK
a place without most types of commercial development	1	2	3	4	5	DK
a display of natural curiosities	1	2	3	4	5	DK
an historical resource	1	2	3	4	5	DK
a symbol of America's identity	1	2	3	4	5	DK
a place for the use and enjoyment of the people	1	2	3	4	5	DK
a social place	1	2	3	4	5	DK
a site to renew your sense of personal well-being	1	2	3	4	5	DK
a place of scenic beauty	1	2	3	4	5	DK
a place to be free from society and its regulations	1	2	3	4	5	DK
a reserve of natural resources for future use	1	2	3	4	5	DK
a place to hear natural sounds	1	2	3	4	5	DK
a tourist destination	1	2	3	4	5	DK
a place for scientific research and monitoring	1	2	3	4	5	DK
a place for recreational activities	1	2	3	4	5	DK
a place for wildness	1	2	3	4	5	DK
a place for all living things to exist	1	2	3	4	5	DK
a quiet place	1	2	3	4	5	DK
a protected place for fish and wildlife habitat	1	2	3	4	5	DK

## Natural Sounds and Your Experience of Yellowstone National Park

***Natural sounds* include natural quiet and all sounds that occur in the park and are produced by animals, weather, and other natural park features.**

**7. Please rate how important the opportunity to experience natural sounds in Yellowstone National Park is to the overall value of the park:**

- Extremely Important
- Very Important
- Moderately Important
- Slightly Important
- Not at all important

**8. Please rate how important it is to your experience today to have the opportunity to experience natural sounds in Yellowstone National Park:**

- Extremely Important
- Very Important
- Moderately Important
- Slightly Important
- Not at all important

**9. Please rate how natural sounds affected your visit to Yellowstone National Park:**

- They had a positive effect
- They had no effect
- They had a negative effect

**10. To what extent were you able to find the experience of natural sounds that you were looking for in Yellowstone National Park? (Check one only.)**

- All of the time
- More than half of the time
- About half of the time
- Less than half of the time
- I was unable to find the experience of natural sounds I was looking for.
- I was not looking for any experience of natural sounds.



**11. How satisfied are you with your experience of the park's natural sounds?**

- Very satisfied
- Somewhat satisfied
- Neither
- Somewhat dissatisfied
- Very dissatisfied

**12. How satisfied are you with your overall experience of Yellowstone National Park?**

- Very satisfied
- Somewhat satisfied
- Neither
- Somewhat dissatisfied
- Very dissatisfied

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

	Very	Somewhat	Neither	Somewhat	Very	
Pristine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Polluted
Loud	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Quiet
Appropriate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inappropriate
Acceptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unacceptable
Dissatisfying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Satisfying

**Support for Potential Management Actions**

**14. We are interested in your willingness to support the following *management actions to protect opportunities to experience natural sounds*. Please indicate for each of the following management actions the extent to which you support or oppose them.**

Management Action:	Strongly Oppose	Somewhat Oppose	Neither Support nor Oppose	Somewhat Support	Strongly Support
Continue to require the best available technology (cleanest and quietest) for all snowmobiles entering the park	1	2	3	4	5
Continue to require all snowmobiles and snow coaches entering the park to be part of guided tours	1	2	3	4	5
Continue to limit the total number of snowmobiles and snow coaches entering the park per day	1	2	3	4	5
Continue to limit snowmobile group sizes to a maximum of 11 with 1 guide	1	2	3	4	5
Close roads to all over snow vehicles (snow coaches and snowmobiles)	1	2	3	4	5
Close roads to snowmobiles, and allow snow coach tours	1	2	3	4	5
Plow all roads and allow automobile access to YNP in winter (no over snow vehicles)	1	2	3	4	5

**About You**

**15. What is your gender?** (check one)  Female     Male

**16. What is your age?** \_\_\_\_\_

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

- 8<sup>th</sup> 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

**18. 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]

**19. 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]

**20. Do you live in the United States? (Check one box and fill in the appropriate blank.)**

- Yes (What is your zip code? \_\_\_\_\_)
- No (What country do you live in? \_\_\_\_\_)