ASSESSING THE EFFECTIVENESS OF LIVE MUSIC INTERPRETIVE PROGRAMMING

A Thesis in
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by
Austin Barrett

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The thesis of Austin Barrett was reviewed and approved* by the following:

Andrew Mowen
Associate Professor and Professor-in-Charge of the Honors Program in Recreation, Park and Tourism Management
Thesis Advisor

Deborah Kerstetter
Professor and Professor-in-Charge of Graduate Studies in Recreation, Park, and Tourism Management

George Vahoviak
Program Director, Shaver’s Creek Environmental Center and Affiliate Faculty in Recreation, Park, and Tourism Management

*Signatures are on file in the Graduate School
ABSTRACT

Many scholars have documented a growing disconnect between people and the natural world. If these trends continue, the future efficacy of conservation efforts will be uncertain. Environmental interpretation is one way to help people develop deeper connections to the natural world. Through programming, park visitors can develop a powerful sense of stewardship that will serve to protect these important places into the future. The techniques that interpreters use to present their programs play a critical role in providing these powerful interpretive opportunities.

In an effort to connect more people to natural resources, there is a need to incorporate more creative techniques such as live music into interpretive programming.

This study took place at Glacier National Park in northwest Montana and addressed the effectiveness of live music as an interpretive technique. Utilizing an experimental design, I attempted to understand if there was a difference in interpretive outcomes between the treatment group (participants who experienced a music program) and the control group (participants who experienced a non-music program). The program studied was a 20-minute Ranger talk focusing on the effects of climate change on Glacier National Park resources. Content-wise, these two programs were identical with the only programmatic difference being that, in the music program, a song was sung and, in the non-music program, a poetic rendition of the lyrics was given. A post-test survey was administered to visitors after experiencing either the music or non-music program. To control for variability between the two programs, I was also the National Park Service ranger presenting the programs. The survey instrument probed for emotional, intellectual, and stewardship response measures, which were adopted from previous interpretive effectiveness studies. At the conclusion of the data collection process (Summer 2012), 197 surveys were collected (25% response rate) from 28 programs (13 music, 15 non-music). With this dataset, a number of statistical analyses were undertaken. Descriptive statistics on the visitor demographic, motivations, and interpretive outcome frequencies were run. Factor analysis was
conducted on the individual interpretive outcome items to create four distinct dependent variable measures. Then, due to the skewness of the data, non-parametric Mann-Whitney U Tests were utilized to understand if there were statistically significant differences between the two groups.

Results indicate that there were no significant differences between the two program formats (live-music and non-music) in regards to emotional response, provocation/stewardship response, knowledge gain, and climate change technique effectiveness response. The initial hypotheses that all four response indicators would be higher amongst the live-music respondents were not supported.

Explanations for the lack of difference between the two programs include: the lack of substantial difference between the music and non-music programs, the dramatic location of the study setting (Glacier National Park), a largely homogenous convenience sample, the utilization of an unverified survey instrument, and the exclusively-qualitative methodology.

Even though the study results do not support the original hypotheses, that live-music based programs result in higher interpretive responses than non-music programs, this project may lay the groundwork for future inquiry into studying the use of music (or other non-traditional approaches) as an effective interpretive technique.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF FIGURES</th>
<th>vii</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>viii</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>ix</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>x</td>
</tr>
</tbody>
</table>

Chapter 1 Introduction ......................................................... 1

  Purpose of Study ................................................................. 4
  Study Applications ............................................................... 5
  Definitions ....................................................................... 5
  Study Limitations ............................................................... 6

Chapter 2 Literature Review .................................................. 8

  Introduction ................................................................................. 8
  The Foundation of Interpretation ............................................ 8
  Further Defining Interpretation ............................................. 10
  Brief History of Interpretation ............................................. 12
  The Interpretive Equation and Relevant Techniques ................ 13
    Questioning ............................................................................ 14
    Activities ................................................................................ 15
    Demonstrations ....................................................................... 15
    Slide and Multimedia Presentations ..................................... 15
    Performing Arts ................................................................. 15
  Music and the Human Experience ........................................... 16
  The Application of Music in Environmental Interpretation .......... 19
  Conclusion .................................................................................. 24

Chapter 3 Methods ................................................................. 25

  Introduction ................................................................................. 25
  Study Setting ............................................................................. 25
  Study Design ............................................................................... 26
  Data Collection ........................................................................... 28
  Instrumentation ......................................................................... 30
    Emotional Response .................................................................. 31
    Intellectual Response ......................................................... 31
    Stewardship Response ........................................................... 32
    Effectiveness of Interpretation in Conveying Climate Change Subject Matter .......... 33
  Data Analysis .............................................................................. 34

Chapter 4 Results ........................................................................ 36

  Introduction ................................................................................. 36
  Response Rates and Descriptive Results .................................... 37
Scale Development and Descriptive Data on the Scales .......................................................... 42
Bivariate Relationships ........................................................................................................... 44
Research Question 1 .............................................................................................................. 44
Research Question 2 .............................................................................................................. 45
Research Question 3 .............................................................................................................. 46
Research Question 4 .............................................................................................................. 46

Chapter 5 Discussion .............................................................................................................. 47

Introduction ............................................................................................................................ 47
Discussion of the Descriptive Results ...................................................................................... 47
Comparisons of the Two Different Program Formats .............................................................. 50
Limitations of the Study and Recommendations for Future Research .................................. 50
The Lack of Difference Between the Two Programs ............................................................... 51
Study Location ........................................................................................................................ 52
Self-Selected Convenience Sample ......................................................................................... 52
Survey Instrument .................................................................................................................. 54
Quantitative vs. Qualitative Methodology .............................................................................. 55
Conclusions .............................................................................................................................. 56

References ............................................................................................................................... 58

Appendix A Description of Interpretive Program ................................................................. 65
Appendix B Survey Instrument ............................................................................................... 71
Appendix C Survey Collection Script .................................................................................... 73
Appendix D National Park Service Research and Collections Permit .................................. 74
LIST OF FIGURES

Figure 1: Static Group Comparison Design................................................................. 27

Figure 2: Interpretive Effectiveness Technique Domains and Representative Items. .......... 34
LIST OF TABLES

Table 1: Survey Response Rate. ..................................................................................................................37
Table 2: Description of the Sample ............................................................................................................38
Table 3: Data for Interpretive Response Indicator Items .................................................................40-41
Table 4: True/False Response Frequencies and Percentages ..........................................................42
Table 5: Factor Analysis ..........................................................................................................................43
Table 6: Descriptive Statistics on the Scales ..........................................................................................44
Table 7: Comparison of Interpretive Outcomes Between Program Formats ....................................45
DEDICATION

This thesis is dedicated to my father and friend, Tom Barrett. Dad, you’ve always been a student. Your love for learning and discussing ideas that really matter has in part made me who I am today. For as long as I can remember, conversations at the family dinner table centered on world events, advances in science and technology, or the powerful ideas espoused in one of the books someone was currently reading.

As I grew older, our conversations grew more animated. Coming home from college meant going out to lunch with you to talk about, what else, but ideas. Everyone who knows us, knows that we share a special connection. Many people claim that I’m “the spitting image of my father.” Well, in so many ways that’s true. And I’m proud of it. If I am reflection of you, then I don’t want anything to ever muddy that water.
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Chapter 1

Introduction

Much has been written about the need for humans to maintain a bond and connection with the natural world (Leopold, 1949; Wilson, 1986). However, there has been a pronounced shift away from or disconnect with nature, particularly among youth (Louv, 2005; Pergams & Zaradic, 2006, 2008). For example, environmental literacy, defined as a basic understanding of environmental concepts, has been shown to be strikingly poor amongst the American population (National Environmental Education & Training Foundation, 2005). A recent study suggests that this fundamental shift away from the outdoors has been associated with an increased time spent playing video games, watching TV, and surfing the Internet (Pergams & Zaradic, 2006, 2008). Finally, as many environmental problems are becoming more pronounced, most notably the reality of human-induced climate change (Solomon, 2007), it is imperative that strategies be developed to re-connect humans with the natural world and awaken their understanding and comprehension of current environmental problems.

One approach to inspire a deeper connection to natural resources is through educational programming. In particular, environmental interpretation has the potential to play a significant role in connecting humans to nature, eco-systems, and creating awareness and comprehension of environmental problems such as climate change. Environmental interpretation is a mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource (National Association for Interpretation, 2008). The foundation of interpretation involves encouraging visitors to think about what a resource means to them on a personal level (Tilden, 1957).

Interpretation seeks to evoke both emotional and intellectual responses to the environment and through these responses, to promote stewardship behaviors to address complex
today’s environmental problems. Emotional responses to interpretive programs are felt deep within the visitor (Ham & Weiler, 2006). Intellectual responses to interpretive programs refer to how a visitor might think, believe or know about a resource (Ham & Weiler, 2006). Encouraging emotional and intellectual responses within park visitors is the primary goal for interpretive program development and presentation (Interpretive Development Program, 2003; National Association for Interpretation, 2008). Stewardship responses are action-oriented and correspond to environmentally conscious behaviors that a park visitor might participate in as a result of attending an interpretive program (Ham & Weiler, 2006). In the context of parks and natural areas, front-line interpreters have developed and presented programs to the public that seek to facilitate or evoke emotional and intellectual connections with nature.

Making the resource relevant to a broad audience is an important component of interpretive programming (Larsen, 2005). Interpretation generally encourages creative methods for communicating the significance of park resources to visitors. Some of these techniques include participatory activities, storytelling, demonstrations, questioning, and multimedia presentations (Brochu, 2008). In *Handles: A Compendium of Interpretive Techniques to Help Visitors Grasp Resource Meanings*, National Park Service interpretation scholar Peggy Scherbaum (2006) provides a comprehensive list of techniques interpreters can utilize to facilitate emotional and intellectual connections. This list is considered to be the authority on interpretive techniques regardless of the setting in which they are used. Additionally, in their recent literature review of interpretive research studies, Skibins et al (2012) “identified best practices and examined the empirical evidence linking them to visitor outcomes” (p. 1). This study contributed to the literature by linking 17 commonly regarded best practices and techniques from interpretive textbooks to six evaluated outcomes from the interpretive research literature. From this literature, it is clear that environmental interpretation is not a new strategy, and has been a staple of parks,
forests, and open space programming for decades. Indeed, the study and practice of environmental interpretation has evolved in its diversity and sophistication.

The use of live music within interpretive programs and curricula is a relatively new and promising strategy to better connect park visitors to nature and to convey an understanding of environmental problems. Several authors have suggested that music could have beneficial application in environmental studies because it “offers an inherent connection between humans and the natural world” (Turner & Freedmen, 2004, p.6). From the bouncing lines of a robin, the low moans of a whale, or the fluting tones of a waterfall, music can be heard all around us in the never-ending symphony of nature (Dossey, 2003; Gray et al. 2001; Rothenberg, 2001). Considering these inherent ties, live musical performances have great potential as an interpretive approach.

Both authors and trainers of interpretation recognize the power of music as a compliment to other interpretive methods (Brochu, 2008; Ham, 1992; Ward & Wilkinson, 2006). For example, Ham (1992) explains the effectiveness of using music in conjunction with illustrated programs as a way to elicit strong emotional connections. Ward and Wilkinson (2006) detailed how music can be a useful informal visitor contact method of enticing visitors to attend and participate in interpretive programs. Finally, many interpretive professionals have anecdotally detailed the effectiveness of using music within their own programs at interpretive workshops hosted by the National Association for Interpretation (Brown, 2007; Cahill, Mair, & Cahill, 2002; Cecchini & Marchand 2002; Deutsch, Carpenter, & Herd, 2007; Elbich, 2006; Hempsey & Barnes, 2006; Mallery & Brown, 2005; Morris, Davis, & Paglierani, 2009; Parker, Ruhnke, & Wollenhaupt, 2006; Werling, 2004).

While some has been written about the use of music in interpretive programs (Brochu, 2008; Ham, 1992; Ward & Wilkinson, 2006) and the potential positives and negatives of
entertainment-oriented interpretation, (Knapp & Benton, 2005; Larsen, 2001; Saxe, 2009), little research has been conducted on how music-based interpretive programming impacts interpretive outcomes. What has been researched shows that the arts in general are underrepresented in interpretive training, education, and certification (Lackey, 2008). With the chief aim of interpretation being the provocation of personal connections to resources, the arts (specifically live music) clearly have great potential in impacting the visitor experience (Ham, 2009).

Whether musical interpretation actually delivers on its promise, is unknown. Few studies have examined the effectiveness of musical programming and no study has compared musical interpretation against other types of interpretive delivery systems. For music to be established as a legitimate interpretive approach, evidence is needed concerning the impact of music on eliciting intellectual, emotional, and stewardship outcomes as well as its impact on creating an awareness and understanding of complex, and sometimes controversial, environmental problems such as climate change. To address these gaps, the purpose of this study is to compare the effectiveness of programs with live musical elements against programs without live musical elements with regards to intellectual, emotional, and stewardship outcomes.

**Purpose of the Study**

The following research questions were addressed to achieve the study purpose:

1. Do interpretive programs with live musical elements result in higher intellectual responses (knowledge gain) compared to interpretive programs without live musical elements?
2. Do interpretive programs with live musical elements result in higher emotional responses compared to interpretive programs without live musical elements?
3. Do interpretive programs with live musical elements result in higher stewardship responses compared to interpretive programs without live musical elements?

4. Are interpretive programs with live musical elements, as they pertain to climate change, perceived as more approachable (or less confrontational) compared to interpretive programs without live musical elements?

**Study Applications**

The results to this study could inform park managers and interpretive professionals about the effectiveness of live music within interpretive programming. If the argument that live music in interpretive programming is more effective in evoking emotional, intellectual, and stewardship responses than non-musical programs, the use of live music would be justified as an effective interpretive technique and might be used more frequently in interpretive programming. Second, due to the controversial nature of the program selected (human-induced climate change), this study informs the growing literature about communicating this sensitive, but important phenomenon to the general public (Earth to Sky, 2009; Interpretive Development Program, 2013; National Park Service, 2011). Finally, this study could spur research to examine the impacts of less traditional methods of interpretive programming on the visitor experience.

**Definitions**

1. *Environmental Interpretation:* “A mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource” (National Association for Interpretation, 2008).
2. **Live Musical Interpretation**: Interpretive programming that utilizes performance music (i.e., elements of rhythm, melody, and harmony) to elicit emotional and intellectual connections between the audience members and the resource.

3. **Emotional Outcomes**: “What visitors might feel as a result of interpretation. (e.g., appreciation…satisfaction…[or] attitude about something” (Ham & Weiler, 2006, p. vii).

4. **Intellectual Outcomes**: “What visitors might think, know or believe as a result of interpretation” (Ham & Weiler, 2006, p. vii).

5. **Stewardship Outcomes**: “What visitors might do or be motivated to do as a result of interpretation” (Ham & Weiler, 2006, p. vii). These behavioral motivation levels will be directly tied to environmental stewardship concepts.

6. **Climate Change**: “A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (United Nations Climate Change Convention, 2012).

7. **Approachability**: The ease in which the topic of human-induced climate change was accepted by park visitors.

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**Study Limitations**

Limitations of this study include the inability to randomly select or assign participants to experimental groups. All the study participants were self-selected and came from a single population: visitors at Glacier National Park who attend a “Goodbye to Glaciers” program at the Logan Pass Visitor Center. This specific sample makes it difficult to generalize to the wider population of interpretive program attendees.
Another potential limitation was that the researcher collecting data was also the Ranger presenting the interpretive programs. To address this limitation, the researcher hired an assistant from the Glacier Natural History Association to oversee the survey administration and collection. The researcher had no part of the actual data collection process. These steps were taken in an attempt to discourage biased answers that may have arisen from visitors’ knowledge that the Ranger presenting the programs is also the researcher collecting data and to follow proper Governmental procedures.

Finally, Glacier National Park is an iconic place that is recognized on the international level. It is recognized as a UNESCO World Heritage Site, a Biosphere Reserve, and holds the distinction of being the first ever International Peace Park. Therefore, a major limitation to this study was the ability to generalize results to other interpretive contexts across the United States and internationally. Study results might only be delimited to other symbolic national parks on the same level of importance.
Chapter 2

Literature Review

Introduction

In order to understand the effectiveness of live-musical elements in interpretive programming, a review of the relevant literature was conducted. In this literature review, I identify why music is a promising technique in interpretation, and why I hypothesize that programs containing live-musical elements will be more effective than programs not containing live-musical elements in regards to emotional, intellectual, and stewardship outcomes. The literature reviewed here will provide insight into three primary areas:

1. The Foundation of Interpretation
2. Music and the Human Experience
3. The Application of Music in Interpretive Programming

The Foundation of Interpretation

The definition of interpretation has evolved over time. In 1957, influential writer, reporter, and journalist Freeman Tilden published his seminal work, *Interpreting Our Heritage* (Tilden, 1957). Written at the request of the National Park Service, this text was one of the first inquiries into the purpose and principles of effective interpretation. Within the book, Tilden defined interpretation as “an educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information” (Tilden, 1957, p. 8). Tilden also included his landmark six-principles of interpretation that have established the foundation for interpretive programming and research:
1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.

2. Information, as such, is not Interpretation. Interpretation is revelation based upon information. But they are entirely different things. However all interpretation includes information.

3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable.

4. The chief aim of Interpretation is not instruction, but provocation.

5. Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase.

6. Interpretation addressed to children (say up to the age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program.

As Tilden stated, “the purpose of Interpretation is to stimulate the reader or hearer…to gain an understanding of the greater truths that lie behind statements of fact…to search out meanings for himself” (p. 59). In his analysis of interpretation, Tilden consistently harkened to the principle that learning is more about provocation than education. Through provocation, visitors begin to think independently and develop their own meanings and connections to a resource (Ham, 2009). With deep thought, strong meanings begin to arise.

Today, it has become even clearer that interpretation is about more than the dictation of facts and figures; it includes aspects of personalized meaning. Two contemporary definitions of interpretation are now given. The National Association of Interpretation (2008) defines interpretation as a “mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource”. Similarly, the Interpretive Development Program (2009), the training program for interpreters
within the National Park Service, defines interpretation as “facilitating an intellectual and emotional connection between the interests of the visitor and the meanings of the resource”.

From meaning and personal understanding of a resource, a unique appreciation begins to form. Because appreciation is only a small step away from protection, interpretation can be viewed as a conservation strategy. As the old adage that finds itself at the center of interpretation goes, “through interpretation understanding; through understanding, appreciation; through appreciation, protection” (Tilden, 1957, p. 65). It is clear that when exposed to a high-quality interpretive experience, visitors could potentially become allies in the overall mission of protecting and serving our park resources (Ham, 2009). A deep connection with a place has been shown to inspire a sense of stewardship within the visitor (Mitchell, Force, Carroll, & McLaughlin, 1993). In fact, LaPage (2002) claims that interpretive experiences inspire the Eureka process to begin; whereas impression, reflection, saturation, and validation allow strong understandings to arise within a person. As a “facilitator of Eureka moments,” an interpreter enables visitors to develop their own meanings and connections to sites of environmental and cultural importance (LaPage, 2002).

**Further Defining Interpretation**

There is a need for interpretation to be directed towards a holistic visitor experience and to provide the opportunity for people to make personalized connections with a resource (Tilden, 1957). In this respect, interpretation is slightly different from Environmental Education (EE). According to the North American Association of Environmental Education (NAAEE), EE teaches children and adults how to learn about and investigate their environment, and to make intelligent, informed decisions about how they can take care of it (NAAEE, 2011). The goals of environmental education are to promote knowledge and awareness of the environment so that
students will become stewards of the natural world. Therefore, environmental interpretation (EI) can be seen as a part of the broader field of environmental education (EE). But, even though the goals of EE and EI are similar, environmental interpretation utilizes a different approach than environmental education to illicit intellectual, emotional, and stewardship connections.

According to Cable and Cadden (2006) interpretation and environmental education share a common lineage, but the main difference between the two lies in the setting where the learning takes place. Environmental education is commonly experienced in a formal setting where attendance and attention is required. Additionally, EE is often directed by specific learning objectives, curriculum goals, or state education standards. Interpretation on the other hand is viewed as a free-choice activity where attendance is 100% voluntary and visitors are not required to be actively engaged (Cable & Cadden, 2006). In this context, interpretation and environmental education can be viewed as two separate entities that stem from a common background.

To further understand what interpretation is, I will now rely on the comprehensive text on interpretation entitled, *Personal Communication*, written by former Associate Director of the National Association for Interpretation (NAI), Lisa Brochu (2008). Brochu first describes what interpretation isn’t. Interpretation is not interpretorture (or interpretedata). Interpretorture occurs when an interpreter unloads facts, figures, and minutia on visitors. Instead of connecting to a larger picture, this technique does little more than bore and annoy the visitor. Facts and figures are useful to help substantiate points, but when used as the basis of a program, they discourage visitors from making deep emotional and intellectual connections.

Another form of misguided interpretation is “interpreganda.” Interpreganda “ignores multiple points of view, skews/oversimplifies facts towards a foregone conclusion, and discourages dialogue from the audience” (Brochu, 2008, p. 17). This is the interpretive equivalent of propaganda. Here, an interpreter has an agenda or viewpoint that he/she wants to instill upon
the audience. When the purpose of interpretation is to allow visitors to make their own connections with a resource, this attempt at indoctrination represents the opposite of what interpretation is supposed to accomplish. Visitors can often see through this “soapbox approach” to interpretation, and will lose respect for the interpreter as well as the agency (Brochu, 2008).

**Brief History of Interpretation**

The roots of interpretation have a unique and interesting history. In the context of contemporary natural and historical/cultural resource interpretation, a few luminaries are most responsible for the development of the field. John Muir is widely regarded as the most famous advocate for the natural world in American history. Muir spent his life exploring, writing about, and leading groups of followers through the American West. Muir founded the Sierra Club, wrote prolifically on nature, and was instrumental in the establishment of many National Parks. As a naturalist, he would lead fellow nature-enthusiasts (often including powerful American-icons including the likes of Theodore Roosevelt, Ralph Waldo Emerson, and George Bird Grinnell) on extended trips into the wilderness. On those trips, Muir would communicate the meanings of the natural world so that his guests could better understand and appreciate the profound beauty of nature (in Brochu, 2008).

Enos Mills met John Muir at the age of 19. After taking a camping trip with Muir in the Yosemite region, Mills returned to his home in Colorado and vowed to observe his Rocky Mountains in the same way that Muir viewed the Sierras. Mills became a naturalist and an authority on the American Rockies. As a “nature guide,” Mills led hundreds of groups to the top of Longs Peak, encouraging them to see the natural world as a resource to be treasured. Mills wrote 16 books and numerous articles about his experiences while nature guiding and was actually the first person to identify himself as an interpreter of the natural world when he wrote,
“The aim is to illuminate and reveal the alluring world outdoors by introducing determining influences and the respondent tendencies. A nature guide is an interpreter of geology, botany, zoology, and natural history” (as cited in Brochu, 2008, pp. 12-13). Mills’ legacy as an interpreter and conservationist was confirmed with the creation of Rocky Mountain National Park (Brochu, 2008).

Moving beyond the aforementioned legacy of Freeman Tilden and on to the present, the interpretive field has benefitted from countless researchers and educators, most notably: Joseph Cornell, Steve Van Metre, Sam Ham, Bill Lewis, Grant Sharpe, Ted Cable, Larry Beck, and Dave Larsen. Through study and practice, the interpretive process continues to be refined and adapted to better serve the public. One way the interpretive field is moving forward is through a strong professional association: The National Association for Interpretation (NAI). Forming in 1988 with the merger of the Association of Interpretive Naturalists (AIN) and the Western Interpreters Association (WIA), NAI has become the national voice for interpretive profession. With nearly 5,000 members and 20,000 certified interpreters, NAI provides professional development opportunities including workshops, conferences, and certifications. NAI offers five different certifications to ensure the continued quality of interpretive professionals. In addition, NAI provides a number of written resources including two professional magazines (Legacy and The Interpreter) along with the field’s research journal; The Journal of Interpretation Research (Brochu, 2008).

The Interpretive Equation and Relevant Techniques:

The National Park Service use the following formula to describe the interpretive planning process:
NPS Interpretive Equation:

\[(Ka + Kr) \times AT = IO\]

Ka refers to knowing the audience. To deliver a successful interpretive program, interpreters need to have a basic idea of who they are presenting to. Useful information about the audience includes where they’re from, a general idea of what they’re interested in learning, their age, and more. Kr refers to interpreters’ knowledge of the resource being interpreted. To give a program, interpreters have to have a rich well of knowledge about the subject they will be presenting on. From an ethical standpoint, interpreters have a duty to be well versed on their subject so they can avoid misinforming their audience (Brochu, 2008).

After Ka and Kr have been added together, they should be multiplied by appropriate interpretive techniques (AT). Interpretive techniques are essentially the way that a program is presented. As stated previously, interpretation is a “communication process,” therefore these delivery techniques are critical in fulfilling the definition of interpretation. Following are five examples of interpretive techniques (Brochu, 2008).

**Questioning**

The questioning process encourages visitors to be actively engaged in a presentation. As new material is introduced, questioning can help visitors process what they are experiencing. Interpreters should ask questions that make connections or comparisons between resources (Brochu, 2008).
Activities

Activities are usually game-like, encouraging active participation among many participants and age groups, all-the-while helping people understand concepts. Although activities have great potential for contributing to an interpretive program, they can also take away from the theme of the program. Before using an activity, it is imperative to ensure that it contributes to the theme in a positive way (Brochu, 2008).

Demonstrations

Demonstrations can be an effective technique for presenting an interpretive program. Demonstrating a concept is often much easier and more effective than trying to explain it (Brochu, 2008).

Slide and Multimedia Presentations

In today’s electronic society, it is clear that using multimedia is an effective technique for presenting an interpretive program. Even though this is a powerful and relevant technique, it is often misused. The multimedia portion of a presentation is meant to compliment the message, not be the message (Brochu, 2008).

Performing Arts

Interpretation is an inherently creative process. Therefore, the use of the performing arts as an interpretive technique should come as no surprise. The arts are a universal language that most all visitors can relate to on some level. The art mediums most commonly utilized in
interpretive programming are music, dance, and poetry (Brochu, 2008). This study focuses on one form of the performing arts: the effectiveness of live music as an interpretive technique.

Coming back to the NPS Interpretive Equation, the final outcome is the interpretive opportunity (IO). The goal of effective interpretation is to provide the audience with an experience that encourages them to think about park resources in their own way. Good interpretation provides opportunities for the visitors to make their own intellectual and emotional connections (Brochu, 2008).

In a recent enlightening study entitled “The State of Interpretation in Academia,” researcher Brenda Lackey (2008) surveyed 45 different faculty about their course offerings in the interpretive field. She found that only 18% of interpretive courses offer any kind of instruction of the arts in interpretation. Additionally, Lackey found that the primary concern of interpretation scholars at these universities was the shrinking budget for funding of interpretive research projects. Through additional study, it is hoped that the discipline will become more defined, with standards being set to train and produce qualified professionals. Lackey concluded with the assertion that interpretation needs to receive greater attention in academia.

Music and the Human Experience

To understand how music can be used in interpretive programming to impact interpretive outcomes, there is a need to briefly review the literature on how music plays a dynamic role in the human experience.

Music has been an integral part of the human experience since the dawn of our species. Archeological digs have unearthed prehistoric flutes that date back 53,000 years (Gray et al., 2001). Moving forward to recorded history, the Ancient Greeks believed that music was handed
down by the Gods, and therefore played a prominent role in public and private life. Furthermore, to the Greeks, music was believed to have a near mythical power over people’s thoughts and behavior (Stamou, 2002). So powerful was the allure of music, Plato believed “the unity of melody, poetry, and dance, is important, because rhythm and harmony penetrate deeply into the inmost soul and exercise strong influence upon it” (in Stamou, 2002, p. 5). Seeking to understand the power of music, the Greeks considered musical study to be a study of universal truth (Turner & Freedmen, 2004).

Though music has been organized (composed) in many different forms throughout the world, certain qualities about music have proven to be universal. Through a combination of melody and harmony, music has the power to evoke emotion, regardless of culture (Gray et al., 2001). Additionally, music has an emotional effect on people, regardless of age or developmental state. It has been found that both children and adults have similar and powerful responses to music (Paul, 2009). Additionally, Paul (2008a,b) found that a group of fourth graders of varying developmental states (normal, gifted, and special needs) reported similar levels of reactions and responses to music.

According to author Phillip Ball (2008), there are two schools of thought regarding why music carries such a profound emotional weight within humans. First, the compositional characteristics of a piece of music are thought to determine humans’ emotional reaction. These characteristics include the choice of key (major or minor), tempo, time signature, and other musical elements. The second school of thought is that music occurs on a temporal scale, where musical cues instigate a tension-release response within the listener. In listening to a piece of music, a listener develops expectations that are either satisfied or unresolved by the progression of the piece throughout time (Ball, 2008). As Ball concludes, and critical to this study, many of these emotional responses to music are achieved to a fuller extent when music is performed live.
This is because the performer has the ability to manipulate the musical/emotional cues to which the audience responds (Ball, 2008).

Scientists have attempted to identify a physiological explanation for why music carries such emotional power. A recent study has shown that when a listener experiences a positive emotional response to a piece of music, the reward centers of the brain are activated; mainly the thalamus and other mid-brain structures. Additionally, the study showed that when a song is found to be pleasing, the fear and anxiety portion of the brain, the amygdala, is inhibited (Fick & Shilts, 2006).

Not only does music have the power to influence emotion and mood, music possesses incredible potential for treating a wide variety of maladies. The field of music therapy has grown out of the belief that music treatment can yield positive medical outcomes (Hughes, 2003). In one study, a group of 20 Alzheimer patients were exposed to music therapy sessions five days a week for four weeks. During those sessions, the patients sang, played, and improvised on a variety of instruments. Involvement in music making was a critical component in the therapy sessions. Throughout the course of the studies, marked behavioral changes were noted, including better levels of calm and an overall higher quality of life (Dossey, 2003). More telling were the follow-up results conducted at four and six-week intervals after the therapy ended. From blood samples, scientists saw that melatonin levels had steadily increased. Melatonin is directly connected to the pineal gland, which is often considered the “seat of the soul” where the basis of emotion is housed. Through increased melatonin levels, music has been shown to be a catalyst for a higher quality of life and deep emotional experiences (Dossey, 2003).

Music clearly plays an important role within the human experience. Based on the literature reviewed, it can be determined that music has the power to influence strong emotional connections. From these findings, this study hypothesizes that the use of live-music in
interpretive programming will impact emotional, intellectual and stewardship outcomes in park visitors and do so at higher levels than non-music interpretive programming. To better understand how music can inspire this type of connection within a natural setting, music must be examined in relation to environmental interpretation.

**The Application of Music in Environmental Interpretation**

There is very little in the scientific literature that addresses music and its application to environmental interpretation. Some authors have suggested that music has many beneficial applications in connecting people to natural spaces because it “offers an inherent connection between humans and the natural world” (Turner & Freedmen, 2004, p. 6) but data-based research into this connection is non-existent. From a practical-application perspective, much more has been written that solidifies the effectiveness of music as an interpretive technique. In this section both of these perspectives will be explored.

Music has been defined as agreeable sound, and is found everywhere in nature (Turner & Freedmen, 2004). One-author states: “Music heard in nature or made out of nature is any series of sounds that can be appreciated for their depth, beauty and artistry” (Rothenberg, 2001). From the bouncing lines of a robin, the low moans of a whale, or the fluting tones of a waterfall, music can be heard all around us in the never-ending symphony of nature (Dossey, 2003; Gray et al, 2001; Rothenberg, 2001). Nature sounds, such as the singing of whales and birds have been shown to be strikingly similar in form and composition to the music created by humans. Songs from various birds have been plotted on a spectrogram and then compared to notations of many famous musical passages. It is clear that compositionally, humans and the natural world share musical commonalities (Gray et al, 2001). Given this basic connection between the natural world
and the music therein, music could have profound application within environmental interpretation.

Not only does the sound of music have dynamic potential to impact visitors’ experiences through musical interpretative programming, lyrics of songs carry their own power to forge deep emotional and intellectual connections between visitors and park resources. The words of songs have been effective in teaching environmental concepts (Ramsey, 2002; Turner & Freedmen, 2004). In one study, music was used to teach the environmental and cultural consequences that resulted from the Dust Bowl of the 1930s and the collapse of the northern cod fishery industry. Drawing on lyrics of specific songs about the two crises, the author described how integrating music into environmental education lesson plans allowed students to develop a deeper understanding and connection with the subject matter (Ramsey, 2002).

Additionally, when elements of pop-culture (specifically music) are used in education, the subject matter becomes more approachable and relevant to the audience (Lenton, 2002; Morgan, 2001). This is especially important in reaching an audience, and generation, that is more “tuned-in” to screen media and popular culture than ever before (Louv, 2005).

The use of entertainment as an interpretive technique is becoming more popular in interpretation (Saxe, 2009). For example, living heritage presentations are scripted theatrical programs presented by costumed interpreters to communicate the meanings of a resource in an entertaining way, and within a specific historical context. Saxe contends that when visiting parks and historical sites, the public has developed an expectation of entertainment. It is the responsibility of managers to meet this demand with a supply of entertaining interpretive programming.

Conversely, National Park Service interpretation authority, David Larsen, claims that “interpretainment” should be used cautiously. He argues while interpretainment yields “a
pleasant visitor experience,” it fails to meaningfully allow visitors to connect with resources. Interpretainment is more about an entertainment experience than a connective experience (Larsen, 2002, p. 18). Interpretainment has been cited to “stereotype multiple points of view, arrange facts around a punch line, and not believe that the audience is truly interested in learning about the resource.” This type of treatment of a resource and the audiences’ interest in learning about it is the philosophical down-fall of interpretainment (Brochu, 2008). Although, Knapp and Benton (2005) found that “novel recollections,” or unusual interpretive methods contributed to recall of concepts covered in the program after two years had elapsed.

Interpretation has been described as an art that incorporates many different forms of artistic expression (see Tilden’s third principle) (Beck & Cable, 2005; Tilden, 1957). LaPage (2002) agrees and suggests that there is potential for artists (including musicians) to benefit greatly from personal connections and meanings brought on by an interpretive experience. In turn, LaPage notes that the artistic products of these connections could “potentially yield [sic] important new insights for the interpreter and administrator” (LaPage, 2002, p. 28).

In his seminal textbook, *Environmental interpretation: A practical guide for people with big ideas*, author Sam Ham (1992) acknowledges the power that music can have within an environmental interpretation program. Ham describes how music can be used in illustrated programs to complement images being shown through a visual medium, such as illustrated programs or films. Ham offers guidelines about how to responsibly use music so that it compliments the narration of the interpretive theme. In addition, Ward and Wilkinson (2006) claim that music attracts the attention of visitors and can provide an ideal situation to interpret a resource. Despite these brief sections from the instructional texts of interpretation, research scholarship has shown to be inadequate in addressing the power of live-music within environmental interpretive programming to impact emotional, intellectual, and stewardship outcomes.
From a practical standpoint, a number of practitioners have written about how music has been a valuable tool within interpretive programming at their respective sites. While reviewing the NAI National Workshop sourcebooks from 2002-2010, I have identified many ways that interpretation has been applied in the field. In total, 17 entries were identified that addressed this issue. What follows is a brief literature review of selected sourcebook entries based on a term-paper that I compiled on the subject during the spring of 2012 (Barrett, 2012a).

Cahill and associates (2002) believe that campfire singing needs to be resurrected within the interpretive profession because “group singing around the campfire evokes a fellowship that echoes back to ancient times” (Cahill, Mair, & Cahill, 2002, p. 3). To build competence, they recommend every interpreter add the skills of pitch, rhythm, confidence, and enthusiasm to their interpretive arsenal. Cecchini and Marchand (2002) agree with Cahill et al. and encourage interpreters to become more confident in incorporating music into their programs for four reasons including: physical/mental health, different types of learning styles, engaging more of the brain, and singing is a part of the human heritage (Cecchini & Marchand 2002).

Wahl (2002) details how music has been used at Isle Royale National Park and San Juan National Historical Park to capture “the emotions and experiences of modern visitors” in a way that no other form of interpretation can (p.11). Like Cahill et al. (2002) and Cecchini and Marchand (2002), Ferreira (2004) encourages interpreters to incorporate live-music into their programs through preparation, enthusiasm, confidence, and control. Werling (2004) encourages interpreters to use music to tell the story of local places and contends that through the use of music, these stories “provide kinesthetic opportunities to engage our heritage” (p. 98).

Mallery and Brown (2005) argue that using music in programs can make them more impactful and learning more fun. They state that music “has the ability to supplement program goals and objectives and bring responses, emotion, participation, and revelation as few other
forms can” (Mallery & Brown, 2005, p.14). Elbich (2006) speaks about how music is used at Independence National Historic Site to great effect. With emotional and intellectual connections as the final goal, Elbich believes that “music should naturally present itself as an invaluable tool” (p.10).

At another NPS unit, New Orleans Jazz National Historical Park, Hempsey and Barnes (2006) indicated that music is used to interpret the often-difficult topic of slavery and the African American experience. Music is used as a way to communicate “the whole story” (p.12). Similarly, Parker, Ruhnke, and Wollenhaupt (2006) described how a live-music festival was put on at Chickasaw National Recreation Area to tell the story of the park through original compositions. This festival was received with great success in front of an audience of over 500 people. From this experience, Parker and associates state that “when we discover the meanings of park resources with music, we have the possibility for strong emotional and intellectual connections with the interpreted resource” (p. 16).

Foster Brown, an interpreter nationally known for using music within interpretive programs voices his support of using music in any kind of interpretive program possible. Brown (2007) advocates putting poetry into simple melodies to make a good interpretive program even better.

In a unique presentation, Deutsch, Carpenter, and Herd (2007) detailed the “Inspirations from the Forest” exhibition put on in partnership with the Smithsonian Institution, the USDA Forest Service, and the National Endowment of the Arts. This exhibit detailed how creativity can be drawn from our country’s natural areas. In regards to music, the presenters stated that “Musicians…sing about their love for the land, believing that once people make the connection to the natural environment, they will be motivated to protect it” (Deutsch, Carpenter, & Herd, 2007, p. 28).

Morris, Dayids, and Paglierani (2009) discuss how music can be used to address climate change. Specifically, the presenters are interested in conveying hope in the face of the doom-and-
gloom reality of climate change. They contend that the debate over whether climate-change is occurring is over, and now the focus must be on how to educate the public on the issue. Morris et al. contend that music is an effective technique to encourage “climate literacy” with a “light-hearted and not-so-threatening emphasis” (p. 36).

Finally, as a follow-up to this examination of the practical applications of music found within NAI National Workshop presentations, I interviewed five professional interpreters about how they utilize music within their programs (Barrett, 2012b). Findings from these interviews once again reinforced the exciting potential for the use of music within a variety of different interpretive settings.

Conclusion

In this literature review the researcher linked three related concepts together for the purposes of exploring the potential effectiveness of live-music within interpretive programming. From the research, it is clear that interpretation’s mission is to foster emotional and intellectual connections between the resource and the visitor. Additionally, research has established that music is a dynamic force within the human experience. Finally, even though the use of music in interpretive programming has not been studied to a satisfactory extent, it is widely acknowledged that music has great potential for application in interpretive programming.

With respect to the purpose of this study, it appears as though there is a dearth of empirical documentation on the merits of live-music in interpretive programming and how this form of delivery is related to important interpretive outcomes. Hence, it is clear that this study is needed to better understand the application of live-musical elements within interpretive programming.
Chapter 3

Methods

Introduction

This chapter provides details on the methodological approaches used to address the research questions including, the study setting, the study design, data collection procedures, measurement and instrumentation, and statistical analyses.

Study Setting

This study took place at Glacier National Park in Northwestern Montana along the Rocky Mountain Range. Glacier covers over one million acres of diverse and pristine ecosystems. Rising to the crest of the Continental Divide, Glacier National Park is a World Heritage Site, a Biosphere Reserve, and the world’s first International Peace Park. Glacier is considered one of the “crown jewels” of the National Park Service system and is perhaps one of the most iconic National Parks in the United States. Every year, nearly two million visitors explore this glacially carved landscape abundant with some of the most recognizable and rare species in North America. Glacier National Park offers a wide variety of outdoor recreation opportunities and environmental interpretation programming.

The evaluative focus of this study centered on the 15-minute “Goodbye to Glaciers” interpretive program offered at this park. The “Goodbye to Glaciers” program is presented at the Logan Pass Visitor Center located at the Continental Divide at the apex of the 50 mile Going-to-the-Sun Road. This impressive road bisects the entire width of the park and connects the Lake McDonald and St. Mary valleys. With its dramatic views and legendary appeal, the Going to the Sun Road is one of the highlights for nearly all Glacier visitors. Situated at the top of the Going to the Sun Road is the Logan Pass Visitor Center. Completed in 1964, the Visitor Center is
located in an alpine meadow among glacially carved peaks. When the road is open (usually between June and early October, depending on snow conditions) visitation at the Logan Pass Visitor Center is very heavy not only due to its dramatic scenery, but also because it serves as the trailhead for both the Hidden Lake and Highline trails. With limited parking spots and consistent traffic from the Going to the Sun Road, Logan Pass usually experiences a high-concentration of visitors within a relatively confined space.

Looking to capitalize on its popularity and use, the Division of Interpretation began presenting the “Goodbye to Glaciers” talk at Logan Pass six times a day on the hour from 11am – 4 pm. This short interpretive program addresses the effects of global climate change on Glacier’s ecology and highlights the National Park Service’s stance that the current warming trends are largely human-induced. Given outside of the Visitor Center, rangers present their theme-based interpretive programs to audiences ranging from small numbers of individuals (1-5) to large groups often exceeding thirty people. Due to the consistent audience and the potentially controversial nature of the subject matter, the “Goodbye to Glaciers” program has become a major focus of Glacier’s Division of Interpretation and Partnerships (M. Wagner, personal communication, June 2, 2011).

**Study Design**

The design of this study was based on the evaluative interpretation research conducted by Henker and Brown (2011) who used a static group comparison approach to test the effects of interpretive approaches upon program outcomes. Using their study as a methodological framework, this study also employed a static group comparison approach to examine and compare the effects of a live musical interpretative program (treatment group) against an interpretive program that did not include live musical elements (control group). Participation in the study was self-selected, but visitors were assigned to either a live-music or non-music
The static group comparison method employs only post-test group comparisons and conclusions are drawn from the differences between the two distinct groups with regard to the dependent variables (e.g., intellectual response, emotional response, stewardship response, and the perceived overall effectiveness of climate change messaging). Figure 1 provides an illustration of the static group comparison design used in this research.

| N1: | X ----------------- O | Treatment Group |
| N2: | Y ----------------- O | Control or Comparison Group |

O = Observation (Post-Test)

X = Live Musical Interpretive Program

Y = Non-Live Musical Interpretive Program

Figure 1. Static Group Comparison Design

Efforts were made to ensure that the programs given to the treatment and control groups were identical, with the exception of the use of live musical elements. This study had unique control over the content and presentation of the programs because the Ranger presenting the programs was also the primary investigator and author of this study. The program with live musical elements (treatment variable) included one song entitled “I am a Glacier,” that the Ranger/researcher performed by singing and playing the guitar. The interpretive program without live musical elements (control variable) presented a poetic reading of identical lyrics to cover the
same content that was presented in the song. A description of the program, including the lyrics to 
the song is provided in Appendix A.

**Data Collection**

Data for this study was collected at the park’s “Goodbye to Glaciers” program. At the 
conclusion of 28 different programs, visitors were asked to voluntarily complete a survey to 
gauge the interpretive outcomes associated with each program. Over the course of the summer 
2012, I presented and collected interpretive evaluations for 28 separate programs. In total, 13 
live-music programs and 15 non-music programs were delivered. The programs were given on a 
day-to-day rotational basis. For example, I gave live-musical interpretive programs on day one 
and then gave non-musical interpretive programs on day two. Using this approach, I avoided a 
breach of expectations visitors might have developed throughout the course of a day. To 
illustrate, if a visitor experienced a musical program in the morning and told another visitor about 
it, that second visitor would expect a music-based program, too. If the second visitor’s 
expectations are not met by the presentation of a non-musical program, it could potentially skew 
the survey results. In total, 197 surveys were collected including 102 for live-music and 95 for 
non-music programs.

To control for variation in responses to the post-test, the two programs were the same in 
every way, except for the live-musical element. This controlled for as many variables as possible. 
The musical program included one song that illustrated the overall theme that Glacier National 
Park is being negatively impacted by human-induced climatic change, but that there are steps that 
can be taken to combat this trend. The song is entitled “I am a Glacier.” This song personifies a 
glacier and describes its unique role in shaping the GNP landscape, how it is receding due to 
rising temperatures, and how humans can help in the solution to the climate change problem. The 
non-musical program covered the exact same material as the music-based program, with the only
difference being that I poetically recited the words of “I am a Glacier” utilizing the popular storytelling interpretive technique.

Due to the fact that I presented the programs and was the primary researcher conducting the study, efforts were made to minimize bias in the delivery and evaluation procedures used. As an employee of the National Park Service and a ranger at Glacier National Park, there was a duty to present high-quality interpretive programs regardless of the program format. Furthermore, supervisors routinely audit interpretive programs to ensure their quality. Before either program was presented, a supervisor observed and commented on the programs to document consistency in content and delivery between the two programs. With this in mind, the duty is to present quality programs and there was not any attempt to skew the results of the study by tampering with the quality of the two programs being presented.

Specific consideration was also given to the manner in which the post-test surveys were administered. This was due to the fact that I presented the program and was also the researcher collecting the data. So that this study did not require Office of Management and Budget (OMB) approval, specific procedures were followed to ensure that there was adequate separation between the research project and the National Park Service (for a copy of the research permit, see Appendix D). To ensure the separation, an assistant was in charge of the actual survey collection. This assistant was an employee of the Glacier Natural History Association (GNHA) who was working at the GNHA-operated Logan Pass Bookstore. The GNHA is a 501c3 non-profit agency that, according to their mission statement, works to “advance stewardship of our natural and cultural heritage through education and interpretation.” As a uniformed ranger, I could not assist in the actual data collection process per OMB regulations. The assistant followed a pre-approved script (see Appendix C) that emphasized that the results from the survey would be used for a Master’s Thesis project. Thus, the assistant solicited participation immediately after the interpretive program concluded and distributed clipboards to willing participants. These clipboards contained a survey, a pen, and a compensatory stamped postcard of Mount Clements
(a prominent mountain at Logan Pass). Upon participation in the survey project, the participant returned the clipboard, survey, and pen to the GNHA research assistant and kept the stamped postcard as compensation.

**Instrumentation**

Descriptive information about participant demographics, prior program experience, and motivations for attending the programs were obtained in order to compare the treatment and control groups. Seven motivation items were adopted from Henker and Brown (2011) and expanded upon. For each item, participants were asked to indicate the extent to which they agreed on a five-point Likert scale where a 1 represented “strongly disagree” and a 5 represented “strongly agree.” These items included: “to learn more about Glacier National Park,” “To learn more about glaciers,” “To learn more about climate change,” “To have fun,” “To share an educational experience with family and friends,” “Because I have previously enjoyed similar ranger programs,” and “For no reason.” Previous attendance to a Ranger-led program was measured by circling either yes or no. Gender was measured by circling male or female. Age was measured by a fill in the blank space followed by the words “years of age.”

The type of program (live music vs. non-music) represented the independent variables against which interpretive outcomes were compared. Four main interpretive outcomes served as the dependent variables in this study: intellectual response, emotional response, stewardship response, and response to climate change interpretive techniques. The scale used to assess response to these various outcomes (See Appendix B) was adopted from Henker and Brown’s (2011) study, which assessed the emotional, intellectual, and stewardship responses of visitors to interpretive programs. These three types of responses (or outcomes) have been identified as critical areas for evaluating interpretative programs (Ham & Weiler, 2006; Skibins et al., 2012). Three of these dependent constructs/measures were adopted from the work of Henker and Brown (2011) whose measures were derived from Ham and Weiler’s (2006) *Interpretation Evaluation*
This toolkit includes questions that are used to evaluate emotional (affective), intellectual (cognitive), and stewardship (behavioral) outcomes of park visitors after experiencing an interpretive program. Additionally, I added one new emotional indicator (“awe”) and two new climate change items to the survey instrument to assess visitor response to climate change interpretation.

Each of the four domains assessed in this study included specific indicators or variables. The number of indicators within each domain varied and a more detailed discussion of these dependent measures, including the underlying variables for each construct are now discussed.

**Emotional Response**

Emotional indicators are defined as: “What visitors might feel as a result of interpretation. (e.g. appreciation…satisfaction…[or] attitude about something)” (Ham & Weiler, 2006, p. vii). These indicators included enjoyment, smiles, personal relevance, emotional response to theme, and awe of Glacier’s natural resources. To measure emotional response, a series of 5 items were incorporated into the survey instrument. These indicators included emotional response items such as, “I enjoyed the program I saw,” “I smiled or laughed at least once during the program,” “something I heard or saw reminded me of something in my own life,” “I feel deeply about the impacts of human-induced climate change on Glacier National Park’s resources,” and “I am awed by the glacial features of Glacier National Park.” For each item, participants were asked to indicate the extent to which they agreed on a five-point Likert scale where a 1 represented “strongly disagree” and a 5 represented “strongly agree.” A complete summary of these emotional response items is found in Figure 2.

**Intellectual Response**

Intellectual indicators are defined as “what visitors might think, know or believe as a result of interpretation” (Ham & Weiler, 2006, p. vii). These indicators included interest,
curiosity, and a general knowledge score based on information covered in the program. To assess intellectual or cognitive outcomes, two separate constructs were used. To measure intellectual response, two items were incorporated into the survey instrument. These indicators included intellectual response items such as, “The information was interesting to me,” and “I am curious to learn more about an idea I heard.” For each item, participants were asked to indicate the extent to which they agreed on a five-point Likert scale where a 1 represented “strongly disagree” and a 5 represented “strongly agree.” A complete summary of these intellectual response items is found in Figure 2.

Second, a general knowledge score was derived from participants’ answers to questions drawn from the content of the program. These included five true/false questions. Knowledge assessment of the park resource and climate change questions are as follows: “A glacier is a moving mass of ice and snow,” “The glaciers at Glacier National Park are melting at such a rate that the last glacier is projected to be de-classified in 100 years,” “The greenhouse gas effect is the process that is most responsible for the current warming trends,” “The accumulation and melting of a glacier is directly tied to temperature change,” and “Glaciers carve sharp V-shaped valleys, such as McDonald Creek Valley and St. Mary Valley.” The true/false test scores were calculated as a percentage of correct answers and set aside as a separate intellectual response indicator measuring knowledge retention of the program’s content (See the survey instrument in Appendix B).

**Stewardship Response**

Stewardship indicators are defined as “What visitors might do or be motivated to do as a result of interpretation” (Ham & Weiler, 2006 p. vii). These behavioral motivation levels are directly tied to environmental stewardship concepts and are a key part of the provocation
outcomes that interpretive programs seek to instill in participants. Stewardship indicators include being glad that the park is protected, desire to help, intent to change behavior, and intent to tell others. To measure stewardship response, a series of 4 items were incorporated into the survey instrument. These indicators included stewardship response items such as, “Attending this program made me glad that Glacier National Park is protected,” “I want to help protect Glacier National Park,” “I will change my behavior because of something I heard,” and “I will tell a friend or family member something I learned from this program.” For each item, participants were asked to indicate the extent to which they agreed on a five-point Likert scale where a 1 represented “strongly disagree” and a 5 represented “strongly agree.” A complete summary of these stewardship items is found in Figure 2.

**Effectiveness of Interpretation in Conveying Climate Change Subject Matter**

Climate change has been described as the primary ecological danger facing our planet (Solomon, 2007; United Nations Climate Change Convention, 2012). The effectiveness of interpretation in conveying climate change subject matter was measured through the use of two items. These items addressed visitors’ beliefs on the approachability (non-confrontational nature) of the program and their impressions on the overall effectiveness of the program in communicating the theme of climate change impacts on Glacier National Park. Climate change interpretive technique effectiveness indicators included the following items: “Overall, I believe that the techniques used by the Ranger made the topic of human-induced climate change non-confrontational,” and “Overall, I believe that the techniques used by the Ranger were effective in communicating the effects of human-induced climate change on Glacier National Park.” For both items, participants were asked to indicate the extent to which they agreed on a five-point Likert scale where a 1 represented “strongly disagree” and a 5 represented “strongly agree.” A complete summary of these climate change interpretive technique effectiveness items is found in Figure 2.
Data Analysis

Measures of dispersion and central tendency including means, standard deviations, frequencies, and percentages were used to describe the sample and the response to the individual items in the questionnaire as well as the four dependent indices (e.g., emotional response, stewardship response, intellectual response, and climate change technique effectiveness). Factor analysis was conducted to group the individual interpretive outcome items according to whose
variances best corresponded to each other. The face validity of the domains, and the items therein, was applied when cross-loadings occurred. From these new groups, scales were created that became the interpretive outcome dependent variables. Single items were not analyzed individually (like Henker and Brown 2011) due to the strength in which the items grouped together as a result of factor analysis.

Non-parametric Mann-Whitney U tests were used to compare music and non-music program responses. Mann-Whitney U tests were utilized because the data was not normally distributed and skewed towards the higher end. Henker and Brown (2011) encountered the same situation and utilized Mann-Whitney U tests also. Mann Whitney U analysis is one of the most common non-parametric tests and is used to assess whether one sample of independent observations has larger values than another set of independent observations by comparing the distributions of the ranks of the scores.

The data utilized in this study was collected during the summer of 2012 between the months of June and August. Data was entered and analyzed in the fall of 2012 and the spring of 2013 with IBM PASW Version 18 statistical package.
Chapter 4

Results

Introduction

Results regarding the effectiveness of live music as an interpretive technique are presented in this chapter. Results are presented in several different ways. Response rates, descriptive results, and scale development are first provided to give the reader an understanding of the respondents and their overall response to interpretive effectiveness constructs considered in this study. Then, bivariate relationships are presented to provide comparative evidence concerning the degree of difference between interpretive programs with musical elements and those without music.

The first section details the number of programs given (both music and non-music), the number of surveys completed, the audience size of the programs, and the acceptance rate of visitors who completed the survey. Additionally, basic demographic characteristics are presented to better describe the study sample. Finally, frequencies, means, and standard deviations are given for the interpretive response items on the survey. These will be expressed in both numbers and percentages.

The second section outlines the process of scale development. Factor analysis revealed that the individual interpretive response items did not fit into expected domains as previously utilized by Henker and Brown (2011). Moreover, the inclusion of new climate change effectiveness items were added in this study and considered as a separate effectiveness domain. In this study, the data informed the creation of three new scales that became the dependent variables. Individual item factors and scale reliability are presented along with descriptive data on the newly created dimensions.
The final section conveys bivariate relationships that address research questions one through four. Descriptive data includes means and standard deviations, while non-parametric Mann Whitney U tests were run to analyze differences between responses to the live-music and non-music programs.

**Response Rates and Descriptive Results**

In the summer 2012, 28 “Goodbye to Glaciers” interpretive programs were given; 13 utilized the live-music format and 15 utilized the non-music format. A total of 102 surveys were collected from the 340 individuals who attended the live-music programs, and 95 surveys were collected from the 436 individuals who attended the non-music programs. This yielded a 30% acceptance rate for music programs, a 21.79% acceptance rate for non-music programs, and an overall acceptance rate of 25.39% (Table 1.)

<table>
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<th>Program Type</th>
<th>Programs Given</th>
<th>Surveys Collected</th>
<th>Audience Size</th>
<th>Response Rate</th>
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<td>Non-Music</td>
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</tbody>
</table>
Basic demographic statistics are provided in Table 2. Overall there were more female participants than male with 119 females (60.4%) and 78 males (39.6%). The average age of respondents was 45 years. To report respondents’ ages, specific categories were adopted from the US Census (i.e. under 18, 18 to 24, 25 to 44, 45 to 64, 65 and older) (US Census Bureau, 2012). The age of the respondents is skewed towards the older end of the spectrum with over half (52.8%) of the respondents being 45 years of age or older. To assess experience levels with Glacier National Park programming, visitors were asked if they had previously attended a Ranger Program at that park. Just over three fourths (75.6%) of the respondents had not previously attended a ranger program at Glacier National Park on that specific trip, whereas 24.4% had. (Table 2.)

Table 2. Description of the Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>78</td>
<td>39.6</td>
</tr>
<tr>
<td>Female</td>
<td>119</td>
<td>60.4</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 18</td>
<td>10</td>
<td>5.1</td>
</tr>
<tr>
<td>18 to 24</td>
<td>21</td>
<td>10.7</td>
</tr>
<tr>
<td>25 to 44</td>
<td>62</td>
<td>31.5</td>
</tr>
<tr>
<td>45 to 64</td>
<td>76</td>
<td>38.6</td>
</tr>
<tr>
<td>65 and older</td>
<td>28</td>
<td>14.2</td>
</tr>
<tr>
<td>Total</td>
<td>197</td>
<td>Mean = 45.17</td>
</tr>
</tbody>
</table>

*Previously Attended a Ranger Program at this Park*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>48</td>
<td>24.4</td>
</tr>
<tr>
<td>No</td>
<td>149</td>
<td>75.6</td>
</tr>
</tbody>
</table>
Response to the individual items focusing on interpretive program effectiveness are provided in Table 3. All items were evaluated favorably with the majority strongly agreeing with the individual interpretive outcome items. Intent to Change Behavior (e.g., I want to help protect Glacier National Park) was the lowest rated item at 3.91 (SD = .623) while Awe (e.g., I am awed by the glacial features of Glacier National park) was the highest rated item at 4.84 (SD = .467).

The results from the five true/false questions which measured knowledge outcomes are provided in Table 4. As illustrated in the table, respondents did fairly well answering these content-based questions. In three of the questions (i.e., “A glacier is a moving mass of ice,” “The greenhouse gas effect is the process that is most responsible for the current warming trends,” and “The accumulation and melting of a glacier is directly tied to temperature change”) respondents answered correctly at least 94.4% of the time. In the two other questions, respondents were not as consistently correct (i.e., “The last glaciers at Glacier National Park are melting at such a rate that the last glacier is projected to be declassified in 100 years,” & “Glaciers carve sharp V-shaped valleys, such as McDonald Creek Valley and St. Mary Valley”) (Table 4).
Table 3. Data for Interpretive Response Indicator Items

<table>
<thead>
<tr>
<th>Interpretive Response Indicators</th>
<th>N (%)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Item Mean</th>
<th>Item SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enjoyment</strong> - &quot;I enjoyed the program I saw.&quot;</td>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (.5)</td>
<td>2 (1.0)</td>
<td>3 (1.5)</td>
<td>67 (34)</td>
<td>123 (62.4)</td>
<td>4.58</td>
<td>.632</td>
</tr>
<tr>
<td><strong>Smiles</strong> - &quot;I smiled or laughed at least once during the program.&quot;</td>
<td></td>
<td>2 (1)</td>
<td>1 (.5)</td>
<td>7 (3.6)</td>
<td>47 (23.9)</td>
<td>137 (69.5)</td>
<td>4.63</td>
<td>.680</td>
</tr>
<tr>
<td>&quot;Something I heard or saw in the program reminded me of something in my own life.&quot;</td>
<td></td>
<td>2 (1)</td>
<td>5 (2.5)</td>
<td>42 (21.3)</td>
<td>74 (37.6)</td>
<td>74 (37.6)</td>
<td>4.08</td>
<td>.883</td>
</tr>
<tr>
<td><strong>Awe</strong> - &quot;I am awed by the glacial features of Glacier National Park.&quot;</td>
<td></td>
<td>1 (.5)</td>
<td>0 (0)</td>
<td>2 (1)</td>
<td>23 (11.7)</td>
<td>168 (85.3)</td>
<td>4.84</td>
<td>.467</td>
</tr>
<tr>
<td>&quot;I feel deeply about the impacts of climate change on Glacier National Park resources.&quot;</td>
<td></td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>11 (5.6)</td>
<td>49 (24.9)</td>
<td>136 (69)</td>
<td>4.64</td>
<td>.587</td>
</tr>
<tr>
<td><strong>Interest</strong> - &quot;The information presented in the program was interesting to me.&quot;</td>
<td></td>
<td>1 (.5)</td>
<td>1 (.5)</td>
<td>10 (5.1)</td>
<td>56 (28.4)</td>
<td>128 (65)</td>
<td>4.58</td>
<td>.664</td>
</tr>
<tr>
<td>&quot;I am curious to learn more about an idea I heard from the program.&quot;</td>
<td></td>
<td>2 (1)</td>
<td>6 (3)</td>
<td>33 (16.8)</td>
<td>85 (43.1)</td>
<td>71 (36)</td>
<td>4.10</td>
<td>.857</td>
</tr>
</tbody>
</table>
Table 3. Data for Interpretive Response Indicator Items

<table>
<thead>
<tr>
<th>Interpretive Response Indicators</th>
<th>1 Strongly Disagree</th>
<th>2 Disagree</th>
<th>3 Neutral</th>
<th>4 Agree</th>
<th>5 Strongly Agree</th>
<th>Item Mean</th>
<th>Item SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gladness the Park is Protected - &quot;Attending the program made me glad that Glacier National Park is protected.&quot;</td>
<td>1 (.5)</td>
<td>0 (0)</td>
<td>6 (3)</td>
<td>36 (18.3)</td>
<td>154 (78.2)</td>
<td>4.74</td>
<td>.564</td>
</tr>
<tr>
<td>Desire to Help - &quot;I want to help protect Glacier National Park.&quot;</td>
<td>1 (.5)</td>
<td>0 (0)</td>
<td>8 (4.1)</td>
<td>60 (30.5)</td>
<td>126 (64)</td>
<td>4.59</td>
<td>.623</td>
</tr>
<tr>
<td>Intent to Change Behavior - &quot;I will change my behavior because of something I learned in the program.&quot;</td>
<td>3 (1.5)</td>
<td>16 (8.1)</td>
<td>40 (20.3)</td>
<td>71 (36)</td>
<td>63 (32)</td>
<td>3.91</td>
<td>1.001</td>
</tr>
<tr>
<td>Intent to Tell Others - &quot;I will change my behavior because of something I learned.&quot;</td>
<td>3 (1.5)</td>
<td>3 (1.5)</td>
<td>20 (10.2)</td>
<td>79 (40.1)</td>
<td>92 (46.7)</td>
<td>4.29</td>
<td>.828</td>
</tr>
<tr>
<td>Nonconfrontational Techniques - &quot;Overall, I believe that the techniques used by the Ranger made the topic of human-induced climate change non-confrontational.&quot;</td>
<td>1 (.5)</td>
<td>2 (1.0)</td>
<td>20 (10.2)</td>
<td>57 (28.9)</td>
<td>116 (58.9)</td>
<td>4.45</td>
<td>.760</td>
</tr>
<tr>
<td>Technique Effectiveness - &quot;Overall, I believe that the techniques used by the Ranger were effective in communicating the effects of human-induced climate change on Glacier National Park.&quot;</td>
<td>2 (1)</td>
<td>1 (.5)</td>
<td>6 (3)</td>
<td>60 (30.5)</td>
<td>116 (58.9)</td>
<td>4.58</td>
<td>.678</td>
</tr>
</tbody>
</table>

Note: % may not add to 100 due to missing data
Table 4. True/False Response Frequencies and Percentages

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>A glacier is a moving mass of ice.</td>
<td>193 (98)</td>
<td>4 (2)</td>
</tr>
<tr>
<td>The last glaciers at Glacier National Park are melting at such a rate that the last glacier is projected to be declassified in 100 years</td>
<td>136 (69)</td>
<td>60 (30.5)</td>
</tr>
<tr>
<td>The greenhouse gas effect is the process that is most responsible for the current warming trends</td>
<td>186 (94.4)</td>
<td>10 (5.1)</td>
</tr>
<tr>
<td>The accumulation and melting of a glacier is directly tied to temperature change</td>
<td>188 (95.4)</td>
<td>7 (3.6)</td>
</tr>
<tr>
<td>Glaciers carve sharp V-shaped valleys, such as McDonald Creek Valley and St. Mary Valley</td>
<td>108 (54.8)</td>
<td>88 (44.7)</td>
</tr>
</tbody>
</table>

*% may not add to 100 due to missing data

Scale Development and Descriptive Data on the Scales

Henker and Brown (2011) did not test whether the individual items loaded on the three latent factors or domains (i.e. emotional, intellectual, and stewardship response). To determine if the individual items statistically loaded upon Henker and Brown’s expected domains I employed exploratory factor analysis (e.g., principal components analysis). Factor analysis lets the data inform the groupings by putting together variables whose variances best correspond with one another. Table 5 illustrates how each variable loaded in regards to a rotated factor solution. The final rotated factor solution (using Varimax rotation and the Eigenvalue = 1 rule) suggested two key domains which were subsequently labeled as Provocation/Stewardship (6 items, Cronbach’s Alpha = .823) to signify the ability of interpretation to provoke interest in resources and reinforce their need for being protected (Tilden, 1957), and Emotional Response (5 items, Cronbach’s Alpha = .779) to exemplify the emotional reactions people often experience as a result of
environmental interpretation. The face validity of individual items and how they fit into the expected domains was the determinant in three items where the factors were similar (i.e., “interest,” “desire to help,” and “enjoyment.”) Climate change response items were considered separately and were computed into a single two-item index.

Table 5. Factor Analysis

<table>
<thead>
<tr>
<th>Factor Label Statement</th>
<th>Factor 1: Provocation/ Stewardship</th>
<th>Factor 2: Emotional Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intent to Tell Others</strong> - &quot;I will tell a friend or family member something I learned in the program.&quot;</td>
<td>.790</td>
<td>.057</td>
</tr>
<tr>
<td><strong>Intent to Change Behavior</strong> - &quot;I will change my behavior because of something I learned in the program.&quot;</td>
<td>.765</td>
<td>.205</td>
</tr>
<tr>
<td><strong>Curiosity</strong> - &quot;I am curious to learn more about an idea I heard from the program.”</td>
<td>.690</td>
<td>.173</td>
</tr>
<tr>
<td><strong>Response to Theme</strong> - &quot;I feel deeply about the impacts of climate change on Glacier National Park resources.”</td>
<td>.622</td>
<td>.220</td>
</tr>
<tr>
<td><strong>Interest</strong> - &quot;The information presented in the program was interesting to me.&quot;</td>
<td>.610</td>
<td>.525</td>
</tr>
<tr>
<td><strong>Desire to Help</strong> - &quot;I want to help protect Glacier National Park.&quot;</td>
<td>.569</td>
<td>.533</td>
</tr>
<tr>
<td><strong>Awe</strong> - &quot;I am awed by the glacial features of Glacier National Park.&quot;</td>
<td>.088</td>
<td>.798</td>
</tr>
<tr>
<td><strong>Smiles</strong> - &quot;I smiled or laughed at least once during the program.&quot;</td>
<td>.115</td>
<td>.746</td>
</tr>
<tr>
<td><strong>Gladness the Park is Protected</strong> - &quot;Attending the program made me glad that Glacier National Park is protected.&quot;</td>
<td>.365</td>
<td>.660</td>
</tr>
<tr>
<td><strong>Personal Relevance</strong> - &quot;Something I heard or saw in the program reminded me of something in my own life.&quot;</td>
<td>.213</td>
<td>.660</td>
</tr>
<tr>
<td><strong>Enjoyment</strong> - &quot;I enjoyed the program I saw.&quot;</td>
<td>.563*</td>
<td>.504*</td>
</tr>
</tbody>
</table>

Scale Reliability with Cronbach’s Alpha

| Scale Reliability with Cronbach’s Alpha | .823 | .779 |

* Enjoyment was placed in the Emotional Response scale due to its close association with emotion and the similar factor loading numbers
Means and standard deviations for the three domains (Provocation/Stewardship mean = 4.36, standard deviation = .56; Emotional Response mean = 4.57, standard deviation = .48; Climate Change Technique Effectiveness mean = 4.52, standard deviation = .67,) are illustrated in Table 6. Emotional Response had the highest mean, while Provocation/Stewardship had the lowest mean. Finally, a knowledge score scale (mean = 4.14, standard deviation = .91) was created to address intellectual response by summing the number of questions answered correctly and dividing that number by the total number of respondents to derive a final score. (Table 6.)

Table 6. Descriptive Statistics on the Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provocation/Stewardship</td>
<td>191</td>
<td>4.36</td>
<td>.56</td>
</tr>
<tr>
<td>Emotional Response</td>
<td>190</td>
<td>4.57</td>
<td>.48</td>
</tr>
<tr>
<td>Climate Change Technique Effectiveness</td>
<td>196</td>
<td>4.52</td>
<td>.67</td>
</tr>
<tr>
<td>Knowledge Score</td>
<td>192</td>
<td>4.14</td>
<td>.91</td>
</tr>
</tbody>
</table>

**Bivariate Relationships**

To address research questions one through four, Mann Whitney U Tests were run to compare the responses of visitors who had attended music vs. those who had attended non-music programs. Table 7 displays the results of Mann Whitney analyses comparing scale means for the music and non-music programs as well as the Mann-Whitney U value and significance level.

**Research Question 1:**

*Do interpretive programs with live musical elements result in higher intellectual responses (knowledge gain) compared to interpretive programs without live musical elements?*
Table 7 indicated that there were no significant differences between the ways those respondents who attended the live-music program answered and the respondents who attended the non-music program answered in regards to intellectual response (knowledge score). The p-value for this comparison was 0.66 (Live-Music mean = 4.16 and Non-Music mean = 4.12) and therefore not significant at the .05 level.

Research Question 2:

Do interpretive programs with live musical elements result in higher emotional responses compared to interpretive programs without live musical elements?

There was no significant difference between the way respondents who attended the live-music program answered and the respondents who attended the non-music program answered in regards to emotional response. The p-value for this comparison was .38 (Live-Music mean = 4.57 and Non-Music mean = 4.58) and therefore not significant at the .05 level (Table 7).

Table 7. Comparison of Interpretive Outcomes Between Program Formats

<table>
<thead>
<tr>
<th>Scales</th>
<th>Mean Live Music</th>
<th>Mean Non-Music</th>
<th>Mann-Whitney U</th>
<th>Z</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>4.16</td>
<td>4.12</td>
<td>4,443.5</td>
<td>-0.44</td>
<td>0.66</td>
</tr>
<tr>
<td>Emotional Response</td>
<td>4.57</td>
<td>4.58</td>
<td>4,175</td>
<td>-0.88</td>
<td>0.38</td>
</tr>
<tr>
<td>Provocation/Stewardship</td>
<td>4.36</td>
<td>4.34</td>
<td>4,574</td>
<td>0.08</td>
<td>0.94</td>
</tr>
<tr>
<td>Climate Change Technique Effectiveness</td>
<td>4.56</td>
<td>4.46</td>
<td>4,439.5</td>
<td>-0.075</td>
<td>0.94</td>
</tr>
</tbody>
</table>
Research Question 3:

Do interpretive programs with live musical elements result in higher stewardship responses compared to interpretive programs without live musical elements?

There was no significant difference between the way respondents who attended the live-music program answered and the respondents who attended the non-music program answered in regards to provocation/stewardship. The p-value for this comparison was .94 (Live-Music mean = 4.36 and Non-Music mean = 4.34) and therefore not significant at the .05 level (Table 7).

Research Question 4:

Are interpretive programs with live musical elements, as they pertain to climate change, perceived as more approachable (or less confrontational) compared to interpretive programs without live musical elements?

There was no significant difference between the way respondents who attended the live-music program answered and the respondents who attended the non-music program answered in regards to the level of confrontation they perceived in experiencing the climate change program. The p-value for this comparison was .94 (Live-Music mean = 4.56 and Non-Music mean = 4.46) and therefore not significant at the .05 level (Table 7).
Chapter 5

Discussion

Introduction

The purpose of this study was to test the effectiveness of live music as an interpretive technique. Through a static groups comparison design, an interpretive program with live-musical elements was compared with a program without live-musical elements. Four research questions were posed to ascertain if there were differences between these two different program types in terms of interpretive outcomes. In this chapter, implications from the descriptive results will be discussed, as well as a discussion of the group comparisons. In addition, conclusions will be drawn, limitations will be discussed, and recommendations for future research will be offered.

Discussion of the Descriptive Results

The demographic characteristics of the sample show that more females participated in the survey than men (60.4% to 39.6%). This is consistent with Henker and Brown’s (2011) study where women made up the majority of the respondents. Respondents represented an older demographic (average age = 45 years). This finding (both age and gender) echoes what Coble et al. (2006) discovered in their technical report entitled “Visitor’s Voices” prepared for the Division of Interpretation and Partnerships at Glacier National Park where females comprised 60% of the study sample and 73% were 45 years of age or older.

Considering the entire sample as one (i.e., combining live-music and non-music programs), results indicated that visitors scored very high on nearly all of the interpretive response indicator items as previously utilized by Henker and Brown (2011), who also reported high scores on nearly all interpretive response indicator items (from 3.59 to 4.85 on a five-point Likert scale). The high mean scores in this study (from 3.91 to 4.84 on a five-point Likert scale)
indicate that the programs were of high quality and that both programs were associated with favorable participant responses across all four effectiveness measures considered in this study.

Across the four measurement scales, emotional response scored the highest (4.57), climate change technique effectiveness scored second (4.52), and provocation/stewardship scored third (4.36). The knowledge score indicated that visitors got an average of 4.14 questions correct (out of five). These numbers indicate that the interpretive programs were more effective in eliciting emotional responses than provocation/stewardship responses or knowledge retention. Considering the artistic nature of the presentation (be it music or poetic recitation), this is not surprising. As has been noted in the literature, humans have an innate emotional response to music and the arts in general (Fick & Shilts 2006; Gray et al., 2001; Paul, 2009).

Amongst all four of the measurement scales, of particular note is the high score for the climate change technique effectiveness measure. In recent years, the interpretive profession has become very interested in how to best interpret climate change to the public. In an effort to better prepare interpreters to interpret the topic of climate change, many workshops, resources, and trainings have been developed to help accomplish this goal (Earth to Sky, 2009; Interpretive Development Program, 2013; National Park Service, 2011). The National Park Service’s official stance is that climate change is happening and is drastically impacting the functioning of our planet (NPS, 2012). In response, the NPS has established the Climate Change Response Program to coordinate system-wide efforts to understand what is happening, communicate these finding to the public (through interpretation), and reduce the agency’s impact on the planet. Based on the focus that the NPS has put into interpreting climate change, the way in which visitors responded favorably to the two climate change items is of considerable interest. These high item-mean scores indicate that the topic of human-induced climate change was received positively by the study participants and that the techniques used (either music or non-music) were effective in communicating the theme that human induced climate change is having a pronounced impact on
Glacier National Park resources. With these considerations in mind, the results from this study seem to indicate that climate change is a topic that is being more readily understood and accepted by visitors to Glacier National Park than was previously believed.

The knowledge score indicates that visitors did generally well on the five true/false questions. Visitors mastered three questions concerning the definition of a glacier (98% correct - “A glacier is a moving mass of ice”), the greenhouse gas effect and warming temperatures (94.4% correct - “The greenhouse gas effect is the process that is most responsible for the current warming trends”), and how temperature change impacts the size of a glacier (95.4% correct - “The accumulation and melting of a glacier is directly tied to temperature change”). Visitors struggled in responding to two of the questions concerning the rate of glacial recession at Glacier National Park (69% correct – “The last glaciers at Glacier National Park are melting at such a rate that the last glacier is projected to be declassified in 100 years”) and the shape of glacially carved valleys (54.8% correct – “Glaciers carve sharp V-shaped valleys, such as McDonald Creek Valley and St. Mary Valley”).

I believe that these two questions had more incorrect responses than the other three because they were drawn from specific information that was given near the beginning of the interpretive talk. When I gave my 15-minute “Goodbye to Glaciers” talk I often out presenting to only a few visitors, and as visitors saw me presenting the program, they would stop and listen to the program too (the eventual range of visitors attending my program was from 12 to 50 people). Therefore, many of the visitors who ended up taking a survey after the program missed the information that would have led them to answer the two questions correctly because it was given at the beginning of the program. This indicates the importance of stating critical information more than once, ideally at the end of the program.
Comparisons of the Two Different Program Formats

No significant differences were found across the four effectiveness measures (knowledge score, emotional response, provocation/stewardship, and climate change technique effectiveness). These results clearly reject all of the original hypotheses that predicted programs with live-musical elements would yield higher levels of interpretive response in regards to intellectual, emotional, and stewardship outcomes, as well as being perceived as less confrontational than programs without live-musical elements.

Therefore, it should be acknowledged that the use of live-music as an interpretive technique may not add any value to the interpretive program compared to non-musical approaches in regard to the interpretive outcomes assessed in this study. However, I believe that a number of limitations in this study are at least partly responsible for these findings. Future research into the study of music as an interpretive technique is needed and would benefit from a number of changes that might yield further insight into the role/merits of music within interpretation.

Limitations of the Study and Recommendations for Future Research

A number of potential explanations exist for why there were no differences between the two program formats in terms of interpretive outcomes. These explanations relate to the limitations of the study design and suggest recommendations for future research into the topic of music and interpretation. The following sections will shed some light about why I believe there was no difference between live-music and non-music programs. Each section will begin with a study limitation and conclude with recommendations for future research.
The Lack of Difference Between the Two Programs

The first limitation was the lack of difference between the live-music and non-music interpretive programs. In an effort to control for as many variables as possible within the experimental design, there might not have been enough differentiation established between the two program formats that were being studied. In the live-music program, a song was sung that summarized the thematic content of the program. In the non-music program, a poetic recitation of the lyrics was given. Essentially, the only difference between the two programs was the presence of melody and musical rhythm. Additionally, the two program formats both employed the use of artistic expression, whether it was music or poetry. Finally, the placement of these artistic elements within the programs is worth noting. The song or the poetic rendition of the lyrics were presented as the final part of the interpretive program; which has been shown to be the most impactful portion of the program as a whole (Brochu, 2008). This lack of substantial difference between the two programs could explain the lack of difference between the interpretive responses to the two programs.

In future research, if an experimental design is utilized, the researcher must ensure that there is a dramatic difference between the programs being compared. During the data analysis phase, it became clear that the results from the two program formats closely mirrored each other. A third program without music or poetry elements would have been valuable to gauge the effectiveness of an interpretive program without any artistic elements, acting to establish a baseline. Being that music and poetry both contain artistic expression, the two program formats that were studied might not have possessed enough differentiation from each other to draw conclusions about the effectiveness of the techniques.
Study Location

Glacier National Park is an iconic place that is filled with awe-inspiring beauty and offers once-in-a-lifetime opportunities for recreation. As a criteria for designating Waterton-Glacier (a combination of both Glacier National Park and its immediate geographic Canadian neighbor Waterton National Park) as a world heritage site, UNESCO declared Waterton-Glacier to be an “area of exceptional natural beauty and aesthetic importance.” Based on my experience in the park, I believe that the dramatic scenery of Glacier National Park evokes an inherent emotional response within visitors. Therefore, the aesthetic opulence that Glacier provides could explain the skew of the data towards the higher end of the response spectrum.

If this study was conducted at a less iconic location, the results of the surveys might better reflect the intended measurement variables, or demonstrate some variability in the measures, (emotional/intellectual/stewardship response to program format) rather than extraneous variables (the beauty of the study location). Additionally, this study could have been conducted in an indoor setting to mediate for the beauty-of-the-location confounding variable. If outdoors, a local park or forestland would be ideal to truly assess if there was a difference between live-music and non-music programs in regards to interpretive outcomes. Glacier National Park’s astounding location could have presented a confounding variable to the purpose of this study. A less iconic site could present a location that is more conducive to addressing the research questions.

Self-Selected Convenience Sample

Another limitation of this study was the lack of diversity in the sample. The inability to acquire a random sample must be restated. A convenience sample of self-selected visitors does not yield any form of randomization (aside from the fact that attendees to the program would be unknowingly assigned to either a music or non-music group based on the program being given).
The respondents in this convenience sample most likely possessed similar attributes across the entire sample. The potential for a similar respondent group is a reason why convenience samples are not ideal for social science research because they make it difficult to generalize to a broader population. Although, at this point, it must be noted that the methodological restrictions placed on the researcher by governmental agencies (the Office of Management and Budget and the National Park Service) that required the sampling and survey collection methodology that was employed. These requirements necessitated the survey collection approach that was implemented in this study wherein a self-selected convenience sample had to suffice.

Additionally, the sample was largely homogenous. Perhaps a study with different audience characteristics would respond differently to musical interpretation. Whether numerical data on demographics was collected (from this study or Coble et al, 2006) or anecdotal observed, the sample was typified by two groups: older (73% over 45), white people (96.7%), women (60%), who have high income (52.8% over $75,000), some college education or greater (81.8%), and young families comprised of parents with young children under eighteen years old (30%) (Coble et al, 2006). From this data it is clear that the population I drew my sample from was quite similar.

In future studies, ensuring a more diversified sample would be beneficial. This would include utilizing a random-sample selection technique and attempting to collect data amongst a less homogenous sample population. This homogenous sample corresponds with the limitation outlined above pertaining to the study location. It is believed that a less homogenous sample, especially one with variation in age, gender, and ethnicity could help to truly understand the power of music within interpretive programming and might yield different results in regards to the effectiveness of live-music as an interpretive technique. Furthermore, a study focusing on the responses of children to the live-musical approaches to interpretation would be valuable to assess the impacts that this approach has on a younger audience.
Survey Instrument

The survey instrument utilized in this study was adopted from the survey instrument used by Henker and Brown in their 2011 study of interpretive podcasts. This survey was based on the conceptual framework provided by Ham and Weiler (2006) that specified emotional, intellectual, and stewardship domains as the primary interpretive outcome domains. As such, these domains are widely accepted in the literature as the desired outcomes for interpretive programs (Brochu, 2008; Skibins et al, 2012). Unfortunately, the individual items from the survey instrument did not factor according to the previously stated domains. It was not clear if Henker and Brown (2011) conducted factor analysis or scale reliability tests. In this study, the number of items and their exploratory nature necessitated factor analysis, which created new scales for further analysis.

In future quantitative approaches to studying the effectiveness of live music within interpretive programming, a verified and reliable survey instrument should be utilized. In addition, other interpretive outcome items that could be added to the survey instrument in future quantitative studies include: efficacy of the techniques used items, (i.e., “I believe the interpreter used the best techniques possible to communicate the theme of the program”), age-related items (i.e. “Children would enjoy this program,” “Teens would enjoy this program,” or “Adults would enjoy this program”), and multiple learning style items (i.e. “The program engaged me as a learner in more than one way,” or “The program included opportunities to learn through seeing, through hearing, and through doing”). These new items would expand the questionnaire from being solely focused on emotional, intellectual, and stewardship responses, and reflect interest in programming for various age groups (Tilden, 1957) and learning styles (Brochu, 2008).
Finally, in the survey instrument, the items were not presented in a randomized list. Therefore, all the items were grouped in accordance to the original domains as proposed by Henker and Brown (2011). This resulted in respondents answering all of the emotional items first, then the intellectual items second, with the stewardship items third, and the climate change technique effectiveness items fourth. The lack of randomization of the items could have impacted the way that respondents answered the questionnaire. With emotional items being answered first (and likely the most positively received), this could have started a trend in which respondents answered very positively for the rest of the intellectual, stewardship, and climate change technique effectiveness items. In future quantitative studies, items need to be randomized on the survey instrument to ensure that this type of grouping does not occur again.

**Quantitative vs. Qualitative Methodology**

In future research, a change in methodology is suggested. Instead of relying solely on quantitative methods, future research into the effectiveness of live music within interpretive programming should include the application of qualitative methods. The quantitative focus of this study did not fully tap into the true utility of music as a powerful interpretive technique. Through five brief interviews (20 minutes to 1 hour in length) conducted with other interpreters (Barrett, 2012b) it became clear that qualitative methodology yielded a much deeper insight into the phenomenon of music and interpretation. As these five interpreters detailed, music evokes a rich and powerful emotional response in people. These responses can be used to connect people to places and make them relevant to their own lives. Additionally, the interviews revealed music to be a powerful teaching tool, especially for children. Through rhyme, repetition, and catchy melodies, music can elicit intellectual responses that cause visitors to think more deeply about a resource. These interviews showed me that there is much more going on during musical
interpretation that cannot be collected simply through the use of questions on a survey. Musical interpretation was shown to be a powerful tool that, as one interpreter described it, “meets the cognitive and emotional needs of the audience” (Barrett, 2012b, p. 8).

Future studies would benefit greatly from employing qualitative methodology in their studies that could more fully understand the visitors’ perspective on the effectiveness of music within interpretive programming. It is recommended that future researchers conduct in-depth interviews with park visitors who have experienced a live-music program. These interviews would focus on how the use of music did (or did not) contribute to their response to the interpretive program. Interviews could also be informative as to how music is effective in interpreting to children and adults. As a result of these interviews, new scales could be generated to explore the effectiveness of live-music within interpretive programming.

Conclusion

The research questions in this study were not supported. There were no significant differences in visitors’ emotional, intellectual, and stewardship responses in regards to live-music and non-music programs. Additionally, there was no difference in how visitor’s responded to the subject of climate change in regards to live-music and non-music programs. Visitors reported high scores for both live-music and non-music programs indicating that the programs were of high quality and that climate change was not perceived as an overly controversial interpretive topic.

These findings do not reflect positively on the assertion that music is a more effective interpretive technique than other approaches to interpretation. The inherent limitations of the study need to be considered, however, when drawing conclusions from the results. Based on the
data and the limitations, it is clear that more research into the effectiveness of live music as an interpretive technique needs to be conducted.
References


Barrett, A. (2012a) *The practical application of music as an effective approach to interpretation.*
(Term-paper, HDNRE 575: Ethical issues of human dimensions of natural resources and the environment). The Pennsylvania State University: University Park, PA.


Henker, K. B. & Brown, G (2011) *As good as the real thing?* A comparative study of interpretive podcasts and traditional ranger talks. *Journal of Interpretation Research*. 16(1)


Appendix A

Description of Interpretive Program

Title: “The Story of Glacier’s Glaciers”

Theme: The glaciers of Glacier National Park tell a dramatic story. Like any novel we may pick up and read, the glacier’s story contains triumph, troubles, resolution, and hope for the future.

Tangibles: Mountains, glaciers, pika, ptarmigan, mountains, lakes, and the alpine.

Intangibles: change, loss, rethinking our lifestyles, hope, conservation, the passage of time

Universals: loss, hope, change, time

Introduction:

• Welcome to Glacier/Logan Pass
• Introduce the goal to tell the story of Glacier’s glaciers
• Introduce the plot diagram as a tool to organize the talk
  o Discuss the different sections of the talk:
    ▪ The exposition: How the glaciers formed and carved the landscape (What is their evidence?)
    ▪ Rising Action: Our Changing Climate (introduce the concept of human-induced climate change)
    ▪ Climax: What’s happening now (the impacts of climate change on Glacier National Park resources)
    ▪ Falling Action: Playing our part (doing what we can to reduce our impact on the planet and lessen our role in this climate change conundrum)
    ▪ The Resolution: Singing “I am a Glacier,” or reciting the words in a storytelling activity

Section 1: The Exposition

Basic focus: Setting the stage: (Using Logan Pass as a backdrop)

Begin with a question: What happened here that makes Glacier’s landscape so majestic?

Tangibles: Glaciers, mountains, geology

Intangibles: Time, power of natural processes, change

Technique: Using Logan Pass as a backdrop and visual, I will discuss how the Pleistocene glaciers carved out this dramatic landscape.

• Have visitors put a hand above their nose (near their eyes) and run it from left to right.
I/O: Visitors can better understand how Glacier landscape took shape. They will also better understand basic geological concepts such as glaciation.

E/O: Awe, wonder, and appreciation for the power of nature.

Background information:

• “Rivers of Ice” moving through the landscape carving out the beautiful rock features that we have all come to enjoy
• **Technique:** Using the body to illustrate the size of the glaciers and hands to understand how glaciers carved the features we see around us
  o The St. Mary and McDonald Creek Valleys as U-Shaped Valleys chiseled by the procession of Glaciers
  o The Garden Wall as an example of an Arête
  o Point out Mount Reynolds as example of “horns”
• What are Glaciers and how did they form?
  o Glaciers are moving bodies of ice that form when snow accumulation in the winter/colder months exceeds snow-melt in the summer/warmer months.
  o Arbitrary size requirement, the simple definition is moving ice
    ▪ Can range in size from Gem Glacier to Harrison Glacier
  o High in the mountains and often at high latitudes

Transition: Telling the audience about how in 1850, there were 150 glaciers in GNP. Now there are 25. Within a relatively short geologic time-frame, we have lost a lot of glaciers. Question: How is this happening? Answer: Climate change.

Section 2: The Rising Action

Basic focus: What climate change is.

Begin with a statement about how scientists have come to three conclusions:

• The Planet is warming
• It is warming at an unprecedented rate
• Human processes are most directly responsible for these dramatic warming trends.

Tangibles: Glaciers, the alpine environment

Intangibles: loss, change

**Technique:** Using an analogy (sleeping with a blanket on in the Texas-summer heat) describe how the greenhouse gas effect works. (Going from a sheet….to a fleece blanket….to a down comforter….trapping heat and warming us up….just like our atmosphere)

I/O: Visitors can better understand what the scientific community believes is currently happening to our warming climate

E/O: Awe, wonder, and appreciation for the power of nature.

Background information:
Global Climate Change
  - Human-induced Climate Change
  - Explanation of the Greenhouse Effect

Transition: The changing global climate is having severe repercussions on the alpine environment.

Section 3: The Climax (Conflict)

Basic focus: How climate change is effecting Glacier National Park resources.

Building off of the transition statement, begin to discuss how Glacier’s alpine resources and particularly the glaciers are at risk.

Tangibles: Glaciers, ptarmigans, pikas

Intangibles: loss, change, despair, sadness, regret, anguish, dread, dismay

Technique: Focusing on the impacts right here at Logan pass, I will use laminated pictures as examples, describing the impacts that rising temperatures have had on GNP resources

I/O: Visitors will become aware of what is happening to the alpine ecosystems due to a changing climate. From this awareness, visitors will develop an understanding about how greatly impacted GNP alpine resources are by the changing climate.

E/O: Horror, despair, sadness, loss, the future

Background information:

- How has Glacier’s Ecosystem is being impacted by climate change and rising temperatures
- The average temperatures at Glacier National Park increased at a rate twice that as the planet as a whole.
- The melting of Glaciers:
  - Use repeat photography (Boulder Glacier in 1932 and 1988…completely gone)
- Impacts on the ecosystem:
  - Melting of Glaciers (glaciers are only responsive to changes in the climatic temperature) The rate of meltage is uncharacteristically high in comparison to historical data. The glaciers are projected to all be gone within the next 8 years (by 2020).
  - Impacts on wildlife:
    - Pikas:
      - Become heat stressed and cannot survive
    - Ptarmigans
      - Loose their camouflage abilities and become vulnerable to predators

Transition: Even though we are part of the problem, we are most of the solution. We need to realize that every decision we make is having an impact on the pika, the ptarmigan, and the glaciers.
Section 4: The Falling Action - Potential for Human Response to Climate Change

Basic focus: What changes can we make in our lives to reduce our impact on the planet?

Building off of the transition statement, begin to discuss how Glacier’s alpine resources and particularly the glaciers are at risk.

**Tangibles:** Any aspect of human civilization that contributes to climate change (CO2 emissions)

**Intangibles:** hope for the future, optimism, compassion for the earth

**Technique:** Questioning: What can we do to reduce our impact on the planet and curb our CO2 emissions.

**I/O:** Visitors will become aware of what they can do reduce their impact on the planet

**E/O:** Hope, happiness, inspiration to develop a conservation ethic.

- The choices that we make on a daily basis impact
  - Unplug electronics
  - Take public transportation
  - Advocate for clean energy
    - VOTE
  - Visit parks and continue to appreciate our natural resources

Section 5: The Resolution – Wrapping it up

Basic focus: Tell a story through song that sums up the life-cycle of a glacier. “I am a Glacier”

**Tangibles:** Glaciers, mountains, climate change.

**Intangibles:** Hope and optimism for the future.

**Technique:** Musical selection – “I am a Glacier”

**E/O:** Inspiring stewardship ideals within visitors. Connecting visitors with the problem and how they can contribute to the solution.
I am a Glacier

Music and Lyrics by: Austin Barrett

I am a glacier
I sit high in the peaks
I’ve been watching everything
For many centuries

I am so big
A thousand feet high
That under my weight
The snow turns to ice

I creep on down the valley
With gravity at the reigns
Carving stone around me
And making my moraines

You might say that the Park
Is all because of me
If I never was here
There would be no valleys

But I know I’m in trouble
My time is growing short
The temperature’s getting hotter
And I got nowhere to go

‘Cause when the summer is warmer
Than the winter is cold
I start melting faster
Than I accumulate snow

In twenty years or so
I will be gone
So will the 25 others
Who have been here so long

So now’s the time to say goodbye,
I don’t got much time left
Won’t you do me a favor son
Will you look after the rest

I know you can do it
You humans have the key
To turn around the causes
Of this worldwide warming

We live on the same planet
And it’s our duty to protect
The places that we love the most
For those comin’ next

I once was a glacier
And I sat high in the peaks
Now I’ve disappeared
Into the forests and the streams

But my spirit still is with you
I hope that you can hear
If we work together
Than we’ve got nothing to fear
I Am a Glacier

Capo 2

Verse
I am a glacier I sit high in the peaks been watching over every thing for many centuries I am so big about a thousand feet

Chorus
high that under my weight and pressure all the snow turns into ice I creep down in the valley with gravity at the reigns carving out the stones and making my moraines you might say that the park is here because of me if I never was here there'd be no valleys

Verse
But I know I'm in trouble My time is growing short The temperature's getting hotter And I got nowhere to go

Chorus
In twenty years or so I will be gone So will the 25 others Who have been here so long

Verse
I know you can do it You humans have the key To turn around the causes Of this worldwide warming

Chorus
I once was a glacier And I sat high in the peaks Now I've disappeared Into the forests and the streams

Cause when the summer is warmer Than the winter is cold I start melting faster Than I accumulate snow

Chorus
So now's the time to say goodbye, I don't got much time left Won't you do me a favor son Will you look after the rest

Verse
We live on the same planet And it's our duty to protect The places that we love the most For those comin' next

Chorus
But my spirit still is with you I hope that you can hear If we work together Than we've got nothing to fe
Appendix B
Survey Instrument

Interpretive Program Assessment Survey

Thank you for agreeing to participate. This voluntary survey will be used in a Master’s thesis project to better understand the effectiveness of this interpretive program. Please consider filling it out if you are over 18 years of age and have attended the entire program. For your participation, you will receive a stamped Logan Pass postcard.

1. The following statements assess your responses to the interpretive program. Please rate your level of agreement or disagreement with the following statements on a scale from 1 (strongly disagree) to 5 (strongly agree).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoyed the program I saw.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I smiled or laughed at least once during the program.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Something I heard or saw in the program reminded me of something in my own life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I am awed by the glacial features of Glacier National Park.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel deeply about the impacts of climate change on Glacier National Park resources.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The information presented in the program was interesting to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I am curious to learn more about an idea I heard from the program.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Attending this program made me glad that Glacier National Park is protected.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I want to help protect Glacier National Park.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I will change my behavior because of something I learned in the program.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I will tell a friend or family member something I learned from this program.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Overall, I believe that the techniques used by the Ranger made the topic of human-induced climate change non-confrontational.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Overall, I believe that the techniques used by the Ranger were effective in communicating the effects of human-induced climate change on Glacier National Park.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Survey continues on back
Please turn over to complete
2. The following statements assess your understanding of material presented in the program. Please try to answer the following statements to the best of your ability as either True (T) or False (F).

(Please circle only one)

<table>
<thead>
<tr>
<th>True (T)</th>
<th>False (F)</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>F</td>
<td>A glacier is a moving mass of ice.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>The glaciers at Glacier National Park are melting at such a rate that the last glacier is projected to be de-classified in 100 years.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>The greenhouse gas effect is the process that is most responsible for the current warming trends</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>The accumulation and melting of a glacier is directly tied to temperature change.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>Glaciers carve sharp V-shaped valleys, such as McDonald Creek Valley and St. Mary Valley.</td>
</tr>
</tbody>
</table>

3. The following statements assess your motivations or reasons for attending the program.

Please rate your level of agreement or disagreement with the following statements on a scale from 1 (strongly disagree) to 5 (strongly agree). (Please circle only one number)

<table>
<thead>
<tr>
<th>Statement I attended this program:</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>To learn more about Glacier National Park</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>To learn more about glaciers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>To learn more about climate change</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>To have fun</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>To share an educational experience with family and/or friends</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Because I have previously enjoyed similar ranger programs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>For no reason</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

4. Have you previously attended a Ranger-led program in this park?

(Please Circle One)

Yes  No

5. What is your gender? (Please circle one)

Male  Female

6. What is your age?

________ years of age

After completing the survey, please return it to the survey collection table and take one of the stamped Logan Pass postcards.

Thank you for participating.

This survey was printed on recycled paper.
Appendix C

Survey Collection Script

Read by the Glacier Natural History Association research assistant:

"Ladies and gentlemen, my name is ____________ and I work in the Glacier Natural History Association bookstore right behind you. If you have a few moments and are over 18 years old, please consider filling out a survey on this interpretive program. The survey will be used in a Masters Thesis project on park programs. After participating in the survey, you will receive a stamped Logan Pass postcard. The survey will take approximately 2-3 minutes. If you are interested, please take one of these clipboards and complete the survey. Thank you."
Appendix D

National Park Service Research and Collections Permit

![Permit Image]

Name of principal investigator:
Name: Austin Barrett Phone: (972) 900-9796 Email: agb149@psu.edu

Name of institution represented:
Penn State University

Co-Investigators:
Name: Dr. Andrew J. Mowen (Thesis Advisor) Phone: (814) 777-5848 Email: ajm194@psu.edu

Project title:
The Effectiveness of Live Music Within Interpretive Programming

Purpose of study:
This project will examine the effectiveness of live-music as an interpretive technique. Specifically, this study will center around a program that communicates the effects of human-induced climate change on Glacier National Park resources. The study is relevant to the park for two reasons. The first reason is that it will scientifically test to see if music is an effective technique for communicating the meanings of park resources. The Interpretation Division at Glacier National Park has a history of presenting programs containing livemusical elements. This study will address whether or not music is an effective technique. The second reason this study is important is because it centers on a very important topic and interpretive-theme to the park: the effects of human-induced climate change on GNP resources. This study could help inform the Division of Interpretation about how to better communicate the important (and somewhat confrontational) issue of human-induced climate change. Glacier National Park provides the ideal setting to explore these three relevant research questions:

1. Do interpretive programs with live musical elements result in higher intellectual, emotional, and stewardship responses than interpretive programs without live musical elements?
   Hypothesis: A program containing live-musical elements has more of an impact on visitors’ expressed levels of intellectual, emotional, and stewardship responses than a program without live-musical elements.

2. In the context of climate change, are interpretive programs with live musical elements perceived as less confrontational compared to interpretive programs without live musical elements?
   Hypothesis: Visitors will perceive a program containing live-musical elements as less confrontational than interpretive program without livemusical elements.

3. Are there differences in the emotional, intellectual, and stewardship responses to live musical and non live musical interpretation according to age, gender, prior experience with interpretive programs, and motivations for attending?

Scope of the Study:
Geographic: this study will be conducted at the Logan Pass Visitor Center at the top of the Going-to-the-Sun Road. It will be conducted outside of the Visitor Center on the concrete pathways near the Hidden Lake Trailhead.

Scientific: This study will contribute to the growing scientific literature on interpretative programming.

Intended use of results: The results from this study will be used in a Masters thesis to partially fulfill the requirements of a Masters degree in Recreation, Park, and Tourism Management at The Pennsylvania State University.
<table>
<thead>
<tr>
<th>Subject/Discipline:</th>
<th>Social Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locations authorized:</td>
<td></td>
</tr>
<tr>
<td>Description of study area: The study will</td>
<td></td>
</tr>
<tr>
<td>take place directly outside of the Logan</td>
<td></td>
</tr>
<tr>
<td>Pass Visitor Center at the top of the</td>
<td></td>
</tr>
<tr>
<td>Going-to-the-Sun Road. The specific area</td>
<td></td>
</tr>
<tr>
<td>will be the concrete pathways near the</td>
<td></td>
</tr>
<tr>
<td>Hidden Lake Trailhead. This is where</td>
<td></td>
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<tr>
<td>the Goodbye to Glaciers interpretive talk</td>
<td></td>
</tr>
<tr>
<td>is normally given.</td>
<td></td>
</tr>
<tr>
<td>Transportation method to research site(s):</td>
<td></td>
</tr>
<tr>
<td>As an Interpretive Ranger, I will be using</td>
<td></td>
</tr>
<tr>
<td>a NPS vehicle to access the Logan Pass</td>
<td></td>
</tr>
<tr>
<td>Visitor Center on data collection days.</td>
<td></td>
</tr>
<tr>
<td>Once there, I will access the study site</td>
<td></td>
</tr>
<tr>
<td>at the Logan Pass Visitor Center by foot</td>
<td></td>
</tr>
<tr>
<td>via the concrete walkways.</td>
<td></td>
</tr>
<tr>
<td>Collection of the following specimens or</td>
<td></td>
</tr>
<tr>
<td>materials, quantities, and any limitations</td>
<td></td>
</tr>
<tr>
<td>on collecting:</td>
<td></td>
</tr>
<tr>
<td>Collecting survey data. A park partner</td>
<td></td>
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<tr>
<td>volunteer or other non-park employee may</td>
<td></td>
</tr>
<tr>
<td>distribute surveys as described in the</td>
<td></td>
</tr>
<tr>
<td>proposal.</td>
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<tr>
<td>The P.I. must not be involved with survey</td>
<td></td>
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<tr>
<td>collection while on work duty.</td>
<td></td>
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<tr>
<td>Contact the permit coordinator if you need</td>
<td></td>
</tr>
<tr>
<td>more than 12 days to collect the surveys.</td>
<td></td>
</tr>
<tr>
<td>Name of repository for specimens or sample</td>
<td></td>
</tr>
<tr>
<td>materials if applicable:</td>
<td>n/a</td>
</tr>
<tr>
<td>Specific conditions or restrictions (also</td>
<td></td>
</tr>
<tr>
<td>see attached conditions):</td>
<td></td>
</tr>
<tr>
<td>Please coordinate with our Data Manager,</td>
<td></td>
</tr>
<tr>
<td>Richard Menicke, (406-888-7918 or</td>
<td></td>
</tr>
<tr>
<td><a href="mailto:richard_menicke@nps.gov">richard_menicke@nps.gov</a>) to discuss data</td>
<td></td>
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<tr>
<td>requirements.</td>
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<tr>
<td>Please contact a District or Area Ranger</td>
<td></td>
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<tr>
<td>prior to commencing field work for</td>
<td></td>
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<tr>
<td>information on current local conditions</td>
<td></td>
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<tr>
<td>and possible closures and to inform them</td>
<td></td>
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<tr>
<td>of your plans. Let them know what dates</td>
<td></td>
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<tr>
<td>you will be issuing surveys. It may be</td>
<td></td>
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<tr>
<td>necessary to stagger dates with other</td>
<td></td>
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<tr>
<td>social science projects. Please see the</td>
<td></td>
</tr>
<tr>
<td>attached Researcher Contact list for</td>
<td></td>
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<tr>
<td>information on who to contact for each</td>
<td></td>
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<tr>
<td>area you will be working in.</td>
<td></td>
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<tr>
<td>Safety briefings will be required for any</td>
<td></td>
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<tr>
<td>field personnel who have not previously</td>
<td></td>
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<tr>
<td>had a safety briefing from park staff</td>
<td></td>
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<tr>
<td>within the past 3 years. Contact a</td>
<td></td>
</tr>
<tr>
<td>Backcountry Permit Office to make an</td>
<td></td>
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<tr>
<td>appointment. Apgar--406-888-7859; St.</td>
<td></td>
</tr>
<tr>
<td>Mary--406-733-7751; or Many Glacier--406-</td>
<td></td>
</tr>
<tr>
<td>732-7740.</td>
<td></td>
</tr>
</tbody>
</table>
Recommended by park staff (name and title):

Reviewed by Collections Manager:

Yes ___ No ___

Approved by park official:

Date Approved:

Title:

Deputy Superintendent

I Agree To All Conditions And Restrictions Of this Permit As Specified

(Not valid unless signed and dated by the principal investigator)

(Principal investigator's signature) (Date)

THIS PERMIT AND ATTACHED CONDITIONS AND RESTRICTIONS MUST BE CARRIED AT ALL TIMES WHILE CONDUCTING RESEARCH ACTIVITIES IN THE DESIGNATED PARK(S)