Experience Qualities Re-examined: Improving the Measurement of Experiential Conditions in Outdoor Recreation

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EXPERIENCE QUALITIES RE-EXAMINED: IMPROVING THE MEASUREMENT OF EXPERIENTIAL CONDITIONS IN OUTDOOR RECREATION

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Parks, Recreation, and Tourism Management

by
Jessica Pearl Fefer
August 2019

Accepted by:
Dr. Jeffrey Hallo, Committee Chair
Dr. Elizabeth Baldwin
Dr. Matthew Brownlee
Dr. Rachel Collins
ABSTRACT

Visitor use management (VUM) is the proactive and adaptive process for managing characteristics of visitor use and the natural and managerial setting using a variety of strategies and tools to achieve and maintain desired resource conditions and visitor experiences (IVUMC, 2018). For nearly 40 years, the application and operationalization of visitor use management has relied on a normative approach, which assumes that visitors to parks and recreation areas have shared attitudes and preferences about resource and social conditions. Visitor use management frameworks and the normative approach rely on defining management objectives, identifying indicators and thresholds for the visitor experience, monitoring change in recreation conditions, and adapting management strategies where necessary. This dissertation reexamines some of the scientific methods historically used to inform visitor use management decisions.

This dissertation focuses on the development of indicators and associated thresholds, which has historically relied on visitor surveys, on-site interviews, and management expertise. Given the importance of incorporating the provision of quality visitor experiences into park and protected area planning, and the difficulties associated with understanding the nuances involved in shaping an experience, the purpose of this dissertation is to offer and explore unique techniques that may facilitate the development of indicators and associated thresholds. This dissertation first used visitor-employed photography to develop indicators of the wildlife viewing experience, where important visitor experience qualities emerged that were not found from survey or interview questions. This dissertation additionally offered a more efficient and perhaps more valid
technique for defining thresholds for the indicator of people at one time (PAOT), which is used as a proxy to indicate use-levels and crowding. Results indicate that a combination of the traditional and novel approach may be appropriate. Lastly, this dissertation explored the phenomenon of displacement, which has historically been treated as a negative outcome of the visitor experience. The results of this suggest that displacement should be operationalized as an indicator of the visitor experience, rather than an outcome. This dissertation overall contributes to the development and application of the normative approach to protected area management and planning.
DEDICATION

This dissertation is dedicated to my family, whose constant love, support and encouragement is unconditional and unwavering. To my mother, Peggy Wallace, whose positive outlook on life is contagious, and whose love and support burns stronger than the sun. To my father, Stewart Fefer, whose passion for travel and nature has fueled my desire to pursue my greatest achievements. And to my sister, Sarah Fefer, who is impossible to describe in one sentence. I thank you, Sarah, for being my role model. For being the smartest, funniest, most confident woman. I am so lucky to have grown up with such an amazing family. I thank you all and wouldn’t be here today without your love and support.
ACKNOWLEDGEMENTS

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I would also like to thank Delaware Water Gap and the Arctic National Wildlife Refuge for accommodating my research. The project staff that I worked with at both sites were paramount to my success, and I cherish the relationships we built. I thank the research assistance at Delaware Water Gap who helped me collect data. I thank the hospitality staff in Kaktovik for providing warmth and comfort as I bothered guests.

Lastly, I would like to thank my Clemson family. Brandon Harris, you have been with me since the beginning. I was lucky enough to meet you in stats class, and you have been my best support system and biggest cheerleader since. Your continuous encouragement and confidence in me has made this possible. To many more amazing people (Tori, Katie, Lauren, Dev, Kat, Alex, Brian – and so many others), what a ride! Going through thick and thin with you all has been some of the best and worst times of my life. I wouldn’t trade it for the world.
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CHAPTER ONE
INTRODUCTION

Protected areas are recognized for their contribution to the conservation of biodiversity, ecosystem services, providing livelihoods for local communities, and as havens for recreational adventure and escape (Dudley, 2008; Eagles, McCool & Haynes, 2002; Poudel, Nyaupane & Budruk, 2016; Ruschkowksi et al., 2003; Walpole, Goodwin & Ward, 2001). As a result, protected areas have proliferated globally, with nearly 20 million square kilometers of terrestrial and marine area conserved under 245,449 protected areas as of 2019 (IUCN and UNEP-WCMC, 2019). However, the many benefits of protected areas are often at odds with one another. For example, tourism and visitors to protected areas are criticized for impacting the natural and cultural resources they wish to see and experience, while protected area goals promote visitation and tourism activities within their boundaries (Nepal, 2000; Poudel et al., 2016; Ruschowksi, Burns, Arnberger, Smaldone & Meybin, 2013). As such, protected area managers are under increasing pressure to provide meaningful and educational visitor experiences and revenue for conservation management, while ensuring that tourism does not compromise the cultural and natural resources, and conservation values of the place (Eagles, 2013; Leung, Spenceley, Hvenegaard & Buckley, 2018).

In the United States, the federal protected area system is facing many of the same challenges. The U.S. federal government owns approximately 640 million acres, or 28% of land mass in the United States. Most of this land (approximately 610 million acres) is administered largely for preservation, recreation and development of natural resources by
four distinct land management agencies (Vincent, Hanson, Argueta, 2017). These agencies include the Bureau of Land Management (BLM), Fish and Wildlife Service (USFWS), the National Park Service (NPS), and the U.S. Forest Service (USFS). Visitation to U.S. protected areas is at all-time high, while spending budgets continue to be reduced (NPS, 2018). The NPS, for example, saw record breaking visitation for three consecutive years, from 292 million in 2014, to 331 million visits in 2016 (NPS, 2018). Additionally, the USFWS has reported a steady increase in visitation to the Refuge System, reaching a record breaking 48.5 million visitors in 2015 (FWS, 2016). Meanwhile, the budget for NPS’s 2018 fiscal year is $296.6 million less than 2017, and has a maintenance backlog of nearly $12 billion (NPS, 2018). Agencies have many competing needs (e.g., increasing visitation, deferred maintenance), and constrained funding limits the ability to meet all program needs.

Record-breaking visitation is indicative of the significant role that outdoor recreation plays in the lives of many Americans. Outdoor recreation is valued for the variety of benefits it offers to individuals and families. Outdoor recreation provides not only physical challenges, but also promotes mental well-being, helps develop social skills, and provokes curiosity in the natural world. Outdoor recreation likewise bonds family and friends, and has been found to instill pride in natural and cultural heritage (White et al., 2016). However, public lands are not only responsible for providing recreation to the public, but also with preserving natural and cultural resources for the enjoyment of this and future generations. The dual mandate of the U.S. federal land management agencies, along with protected area systems around the globe, means
seeking a balance between public use and protection. Unfortunately, the realization of these goals is difficult given that protected area managers often operate without adequate access to resources, and without the full breadth and depth of information required to make fully-informed management decisions. In response, the development and implementation of sustainable recreation management practices has become a primary concern for parks and similar protected area agencies. Sustainable recreation management refers to the appropriate management of recreation use on protected lands to ensure that recreational access to these areas is available for this and future generations (UNEP/UNWTO, 2005). This entails ensuring that natural and cultural resources are maintained and protected from over use.

Several approaches to sustainable recreation management have been introduced over the years, including carrying capacity (Stankey, 1982), which acknowledges that there is an ultimate limit to growth as constrained by environmental factors (Odum, 1959). In its early conceptualization, long before its application to recreation management, carrying capacity received wide use in wildlife and range management. It was not until the early 1960’s that the concept of carrying capacity was applied to outdoor recreation (Lucas, 1964; Wagar, 1964), when it was argued that with more people visiting an outdoor recreation area, not only are the natural resources being affected, but also the quality of the recreation experience (Wagar, 1964; 1968). Specifically, Wagar (1964) expanded carrying capacity from its dominant emphasis on impacts to natural resources, to an extended focus including social or experiential considerations, and amount and type of management activities. Wagar conceptualized the
idea in stating that as more people visit an outdoor recreation area, not only are the natural resources of the area affected, but also the quality of the recreation experience (Wagar 1964, 1968). This concept of recreational carrying capacity is recognized as having three-dimensions – resource, social and managerial – and has received considerable attention in the literature (Shelby & Heberlein, 1986; Stankey, Cole, Lucas, Peterson & Frissell, 1985; Stankey & Manning, 1986). Federal regulations that specifically require public land management agencies to provide capacity designations began during the late 1960’s when tracking and describing recreation use became essential to the sustainable management of protected spaces (McCool, Clark & Stankey, 2007). Examples of federal mandates requiring capacity assessments includes the Wild and Scenic Rivers Act of 1968, the National Trail Systems Act of 1968, and the National Park and Recreation Act of 1978.

Use and capacity estimates, where accurate, can assist recreation providers in curbing the negative effects of crowding and congestion. Still, challenges persist. How do practitioners decide how much impact or change should be allowed? While it is realized that some change in the environment is inevitable with recreational use (Hammit, Cole & Monz, 2015), if recreation goes unmanaged, the amount, nature and type of change will eventually become unacceptable by ecological, cultural and social standards (Frissel & Stankey, 1972; Stankey et al., 1985). Crowding in outdoor recreation can lead to congestion and overuse, problems with resource degradation, spoiled visitor experiences, reduced public access, decreased repeat visitation, and even litigation (Healy, 1994; Marion, 2016). These potential consequences become even more distressing in light of
the fact that global visitation to parks and protected areas continues to rise (Hadwen, Hill & Pickering, 2007). Thus, the problem of crowding in publically owned areas has clarified and somewhat justified the involvement of government agencies in regulating use in outdoor recreation spaces (Ruhanen, 2013).

To understand when inevitable impacts to the resource and experiences become unacceptable, several ‘management-by-objectives’ frameworks were developed, each for different federal land management agencies. Frameworks include, but are not limited to; Limits of Acceptable Change (LAC), Visitor Impact Management (VIM), Visitor Experience and Resource Protection (VERP), Carrying Capacity Assessment Process (C-CAP), Visitor Activity Management Process (VAMP) and most recently, the Visitor Use Management (VUM) Framework (Graefe, Kuss & Vaske, 1990; Hof & Lime, 1997; IVUMC, 2018; McCool & Cole, 1997; Nilsen & Tayler, 1997; Shelby & Heberlein, 1986). Despite their minimal differences, each framework consists of steps to help an area define management objectives, indicators and associated thresholds, monitoring protocols and adaptive management strategies where appropriate. Management objectives are broad, narrative statements that define the type of recreation conditions to be provided and maintained – including the condition of natural and cultural resources, the type of recreation experience, and the type and intensity of management action. Indicators are specific, measurable and manageable variables that reflect management objectives, while thresholds (previously referred to as standards) define the minimum acceptable condition of indicator variables (Manning, 2011).
In response to several existing frameworks that share the principles above, the Interagency Visitor Use Management Council (IVUMC) was formed. The IVUMC is a group of representatives from six federal agencies who joined forces to create a framework that can be applied across agencies and to any VUM planning process, regardless of size of complexity (IVUMC, 2018). The VUM Framework uses the same principles as existing frameworks and can be applied within existing planning structures of any federal agency. It provides systematic, transparent and defensible strategies for successful VUM, and maintains the ‘management-by-objectives’ strategies of defining objectives and measuring and maintaining progress towards those using an indicators and thresholds based approach.

Normative theory and related empirical methods have been applied extensively to organize concepts in outdoor recreation research and management, including the development of indicators and thresholds (Heberlein & Vaske, 1977; Manning, 2011; Donnelly, Vaske & Shelby, 1992). The work of Jackson (1965) formed the empirical basis for much of this work when he developed the return-potential model (RPM) for measuring social norms. The RPM defines group norms in terms of the way group members (e.g., visitors) approve or disapprove of a range of possible actions or behaviors (Linnan, LaMontagne, Stoddard, Emmons & Sorenson, 2005; Heywood, 2011), in the case of recreation management, environmental or social conditions (Shelby & Vaske, 1991; Manning & Freimund, 2004). Applied to parks and outdoor recreation management, if individuals do have shared attitudes regarding relevant aspects of their outdoor recreation experience, individual norms can be measured and aggregated to
formulate a normative threshold for social and environmental conditions (Manning & Freimund, 2004).

One way to measure attitudes about crowding is through understanding visitor perceptions towards a range of use-levels, using the indicator of the number of people at one time (PAOT). Photographs are often used to depict a range of PAOT, coupled with a survey asking respondents to rate the acceptability of each photograph. In this way, individual responses are aggregated, and the level at which the number of people becomes unacceptable to visitors can be determined. The first application of this kind was at Arches National Park (Manning & Lime, 1993), and has become the standard method for understanding the experiential aspects of carrying capacity, with few modifications.

As part of the VUM framework, the indicators and thresholds approach is most often based, at least in part, on the perceptions and attitudes of visitors to protected areas themselves. The goal of seeking visitor input about their experiences is to help manage public protected spaces to ensure the provision of high quality recreation experiences while minimizing negative impacts to natural and cultural resources. But why should managers concern themselves with providing high quality recreation experiences to visitors? This dissertation operates under the view that the use of public lands occurs because the experience is rewarding and enjoyable to visitors. The more people who use public lands, the more relevant they are to society, and public lands are largely protected because of their relevance to society. Therefore, managing visitor use and enjoyment, informed at least in part by visitor perceptions, is essential for the sustainability and management of parks and protected areas.
One critique of this line of research is the reliance on visitor perceptions to inform decision-making. Do visitors know best how to manage recreation spaces? Probably not. However, from a management perspective, information on visitor experiences is important to acquire and understand because experiences can reveal details about the physical, cognitive and affective outcomes of recreational participation in a given setting (Hansen, 2016; Jacobsen, 2007). The outcomes of recreation experiences can be both positive and negative, but they have in common that they influence visitor attitudes and opinions, and thereby visitor satisfaction (Manning, 2011). To secure the provision of quality experiences, visitor experiences need to be examined by recreation managers and planners as parameters and guidance for management decisions and planning measures. Indeed, it is an essential part of planning frameworks such as VUM, where management and monitoring of high quality experience opportunities are fundamental parts of recreation planning and management processes (Graefe, Thapa, Confer & Absher, 2000; Manfredo, Driver & Brown, 1983; Manning, 2011). One particular challenge is that studying visitor experiences requires experiences to be examined at the individual level (Dowart, Moore & Leung, 2009; Manning, 2011).

Problem Statement

To gain information and knowledge about visitor experiences beyond visitor numbers is not an easy process, as it concerns shifting to a focus on the experiential content and different meanings that visitors associate with recreation settings (Eisenhauer, Krannich & Blahna, 2000). Recreation experiences are often impacted and developed through a myriad of complex factors (e.g., expectations, motivations,
experience use history, recreation specialization, etc.), and may be difficult to express to other people not sharing the same experience. The traditional normative approach relies mostly on visitor questionnaires and interviews to study visitor opinions, attitudes, behaviors and preferences (Manning, 2011). However, when it comes to acquiring information about visitor experiences, the depth and details they provide is limited. The traditional methods for informing VUM sometimes fall short when retrieving more qualified information about what experiential qualities visitors appreciate or seek in a given setting (Bushell & Griffin, 2006; Hansen, 2016). Consequently, recreation managers are in need of alternative approaches to allow them to gain a more accurate and in-depth understanding of visitor experiences.

**Purpose Statement**

The purpose of this dissertation is to explore strategies to improve the validity and depth of methods used to understand and evaluate visitor experiences to ultimately improve the information used to inform decision-making. This research has purposively remained aligned with current frameworks (e.g., VUM) and approaches (e.g., normative approach) widely adopted in recreation resource management, yet offers novel methods and strategies for informing visitor use scholarship and decision-making. The overarching goal of this research is to improve upon current research methods for informing visitor-use related decision-making in parks and protected areas. Given that recreation attitudes, preferences and experiences are dynamic, this study is necessary to ensure that the academic community and recreation managers are equipped with a suite of tools to understand, communicate and incorporate visitor experience information into
management planning and decision making. The overarching research question guiding this work is, “How can research investigating visitors to parks and protected areas be better situated to ensure an accurate and in-depth understanding of nuanced visitor experiences in a variety of settings?” To achieve this goal, this dissertation specifically focuses on:

1) Applying a novel qualitative method (e.g., visitor employed photography) to inform the development of indicators for wildlife viewing;
2) Investigating the relationship between reported crowding preferences and the specific visual methods used to solicit responses;
3) Understanding the impact that displacement has on recreation experiences, and exploring the utility of displacement as an indicator of the visitor experience.

Research Sites

Two distinct sites representing diverse recreation opportunities and experiences were selected for this study: The Arctic National Wildlife Refuge (Arctic Refuge) and Delaware Water Gap National Recreation Area (DEWA). Site 1 is a small portion of the Arctic Refuge in the town of Kaktovik on Barter Island, which sits off the northern tip of Alaska within the Arctic Refuge. Kaktovik is becoming increasingly recognized as the seasonal home for some of the Southern Beaufort Sea polar bear (*Ursus maritimus*) sub-population. Given the presence of polar bears in Kaktovik, visitor use for polar bear viewing tourism has rapidly increased, and the Kaktovik area of the Arctic Refuge now represents one of approximately three tourism destinations to view polar bears worldwide. Site 2, DEWA, covers 40 miles of the Middle Delaware National Scenic and
Recreational River, and nearly 70,000 acres of adjacent mountains and valleys in New Jersey and Pennsylvania. Being an urban-proximate recreation area located within 100 miles of two large U.S. cities, New York City and Philadelphia, DEWA supports a range of recreation opportunities including river paddling and motor-boating, hiking, swimming, fishing and hunting.

Given the unique polar bear viewing opportunity offered at the Arctic Refuge, it is here that the novel approach of visitor-employed photography was applied to develop indicators of the wildlife viewing experience. Because DEWA is an urban-proximate recreation area offering a wide variety of recreation opportunities, crowding and conflict are prevalent, marking DEWA as an excellent location for studying issues of crowding and displacement.

**Structure of the Document**

The remainder of this dissertation is comprised of four chapters, one chapter for each of three sub-goals of this dissertation (formatted as journal manuscripts), a summary chapter, followed by appendices. Each chapter (except for Chapter 5) includes an introduction, literature review, description of methods and analysis, results, discussion and conclusions. Chapter 2 represents the investigation at the Arctic Refuge which applies visitor-employed photography to develop indicators of the wildlife viewing experience and addresses the following research questions:

1) Does visitor-employed photography produce more or different types of information than semi-structured interviews when investigating the visitor experience?
2) How can visitor-employed photography couple with the normative approach to inform the development of indicators for the wildlife viewing experience?

Chapter 3 represents the investigation at DEWA of the relationship between reported crowding preferences and the specific visual-based method used to solicit responses, and addresses the following research questions:

1) What effect does photo-type seen (e.g., simulated, field-based, base-photo) have on overall acceptability thresholds?
2) What effect does the range of conditions shown in each photo series have on photograph acceptability ratings?
3) What effect does the proportion of recreation-type seen have on photograph acceptability ratings?

Chapter 4 represents the investigation of displacement experiences at DEWA, and the potential application of displacement as an indicator rather than an outcome of the visitor experience, and addresses the following research questions:

1) How do visitors perceive the experience of being displaced?
2) What do visitors do when they are displaced?
3) How do visitor perceptions of being displaced relate to actions taken once displaced?

Chapter 5 is a summary of the results from these three studies and findings found in each chapter. This chapter expands the discussion to identify common outcomes across each of the three studies.
Definitions

Carrying Capacity:

The ultimate limits to growth as constrained by environmental factors (Odum, 1959). The overall concept of carrying capacity consists of three components; environmental, managerial and experiential. While they can be thought of as separate, overall carrying capacity should consider all three components when defining limits to growth (Manning, 2011).

Indicators:

Specific resource or experiential attributes that can be measured to track changes in conditions so that progress towards achieving and maintaining desired conditions can be assessed (IVUMC, 2018).

Management Objectives:

Broad, narrative statements that define the type of recreation conditions to be provided and maintained – including the condition of natural and cultural resources, the type of recreation experience, and the type and intensity of management action (Manning, 2011).

Normative Approach:

Developed in the disciplines of sociology and social psychology, normative theory and related empirical methods have been adapted to outdoor recreation to represent individual evaluations of social or resource conditions that are aggregated to test for social norms, or the degree to which norms are shared across groups (Manning, 2011).
Photo-Type:

The variety of photograph used to solicit responses about crowding norms. Types of photographs include simulated images (e.g., researcher-manipulated), field-based images (e.g., real, un-manipulated images with various recreation conditions depicted) and base images (real, un-manipulated photographs with no changes in recreation conditions shown).

Range-effect:

The range of conditions depicted in photographs represented to respondents when soliciting responses about crowding preferences (Gibson et al., 2014).

Recreation Displacement:

A behavioral coping mechanism consisting of spatial, temporal and absolute dimensions that facilitate a move away from a stressful or undesirable situation to regain feelings of satisfaction (Schreyer, 1979).

Recreation-type:

The type and proportion of recreation activities depicted in photographs represented to respondents when soliciting responses about crowding preferences.

Sustainability:

To create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations of Americans (Executive Order No. 13423, 2007).
Sustainable Recreation Management:

Providing recreation and tourism opportunities that conserve the natural environment and provide social and economic benefits to communities through minimizing unacceptable social, biophysical and economic effects (UNEP/UNWTO, 2018).

Thresholds:

The minimally acceptable conditions associated with each indicator (IVUMC, 2018).

Urban-Proximate Recreation Area:

A park or recreation area that is within 100 miles of a large, metropolitan center (Schneider, 2007).

Visitor Capacity:

A component of visitor use management, visitor capacity is the maximum amounts and types of visitor use that an area can accommodate while achieving and maintain desired resource conditions and visitor experiences consistent with the purpose for which the area was established (IVUMC, 2018).

Visitor Employed Photography:

A research technique that uses photographs taken by participants as data to inform a study, often as a means to gain a qualitative understanding of a complex socially driven topic, and with the intention of equalizing power between participants and researchers (Balomenou & Garrod, 2016).

Visitor Experience:
The perceptions, feelings, and reactions that a visitor has before, during and after a visit to an area (IVUMC, 2018).

Visitor Use Management:

The proactive and adaptive process for managing characteristics of visitor use and the natural and managerial settings using a variety of strategies and tools to achieve and maintain desired resource conditions and visitor experiences. Simply put, it means managing use well to provide sustainable recreation opportunities (IVUMC, 2018).
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CHAPTER TWO

PICTURES OF POLAR BEARS: USING VISITOR-EMPLOYED PHOTOGRAPHY TO IDENTIFY EXPERIENCE INDICATORS IN THE ARCTIC NATIONAL WILDLIFE REFUGE

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Abstract

The purpose of this research is to apply visitor employed photography (VEP) to recreation management to develop indicators of the wildlife viewing experience. To support this goal, VEP and semi-structured interviews are used at a popular polar bear viewing destination in the Arctic National Wildlife Refuge (Arctic Refuge). Visitors to the Arctic Refuge who participated in an on-site semi-structured interview were asked to participate in a VEP procedure after their visit. Twenty-four semi-structured interviews, and 17 VEP responses were collected and compared to test the utility of VEP to develop indicators of the wildlife viewing experience. Results indicate that VEP offers more and different types of information than semi-structured interviews. Potential indicators of the wildlife viewing experience that emerged from VEP include ‘time spent on the water viewing polar bears’, and the ‘number of vessels in view.’ Management and methodological considerations are discussed.
Introduction

It is well established that people enjoy, feel connected to, and desire to experience the outdoors. Indeed, people benefit from interaction with nature. One growing outdoor recreation industry is non-consumptive forms of wildlife oriented recreation (Duffus & Dearden, 1990), including wildlife viewing and wildlife photography. Activities oriented towards viewing and photographing wildlife have been among the fastest growing, both in terms of numbers of participants and number of activity days (White et al., 2016). Approximately 86 million U.S. residents participated in non-consumptive wildlife oriented recreation (NCWOR) in 2016; this up from 23 million participants in 2006 (National Fishing, Hunting and Wildlife Association, 2016).

One challenge associated with the growth of NCWOR is that there is no predetermined level of impact, therefore understanding and managing impacts is difficult and unique depending on species and form of recreation (Duffus & Dearden, 1990). Recreation and tourism scholars must understand how to manage the less obvious impacts of NCWOR, such as long-term impacts to the wildlife population, impacts to habitat from increased visitation, and impacts to the visitor experience due to crowding and other factors at desirable wildlife viewing locations. One way to mitigate the environmental and experiential impacts of NCWOR is through systematic and effective visitor management strategies.

Visitor use management addresses the challenge of protecting scenic and natural resources, while providing public enjoyment and access to the same (Interagency Visitor Use Management Council [IVUMC], 2017). Several management frameworks have been
developed to balance the visitor experience with resource protection, each of which relies on the normative approach for identifying indicators of quality, and associated thresholds that represents the minimum acceptable condition of the indicator variable (Manning, 2011). Regardless of the wide application of these frameworks across different national and state park systems, they have seen limited use for NCWOR in general, largely because there is little understanding of visitor experience qualities in NCWOR settings.

Research to understand visitor experiences in parks and similar protected areas has been largely reliant on on-site questionnaires and in-person interviews (Hallo, Manning & Stokowski, 2009; Manning, 2011; Ruane, Quinn, Spencer & Flanagan, 2011). A less common method uses participant-generated images (PGIs) to learn about tourist experiences. It has been argued that PGI’s can provide tourism researchers with a different kind of information that can capture the embodiment of the experience (Bell & Davidson, 2013; Emmison & Smith, 2000). Application of PGI’s in tourism and visitor experience research are limited but include using PGI’s as a monitoring strategy (Hansen, 2016), to analyze planning decisions in a recreational forest (Oku & Fakamchi, 2006), and to understand experiences on a pilgrimage route (Gou & Shibata, 2017).

This paper adopts a PGI strategy known as visitor employed photography (VEP) at the Arctic National Wildlife Refuge (Arctic Refuge) to identify indicators of the polar-bear viewing experience. The overarching goal of this study is to couple VEP techniques with the normative approach as a method for developing indicators of the polar-bear viewing experience at the Arctic Refuge.
Literature Review

Understanding & Managing Visitor Experiences

From a management perspective, information on visitor experiences is important because they can reveal details about the personal outcomes of recreation participation in any given setting (Jacobsen, 2007). To ensure high quality experiences, and high levels of satisfaction, visitor experiences need to be examined by recreation managers as one point of guidance for management decisions. However, gaining information about visitor experiences is difficult because it requires moving beyond visitor numbers to capture experiential content and symbolic meanings that are associated with different, unique settings (Eisenhauer, Krannich & Blahna, 2000). Traditional methods for understanding visitor experiences include questionnaires and on-site interviews (Manning, 2011) that tend to quantify experience qualities, falling short in terms of depth and details required to gain a more precise understanding of the experience (Hansen, 2016). Much of the research on incorporating experiences into recreation management fall under three unique approaches. These include the resource-based approach (Catlin, Felio & Fraser, 2011; Duffus & Dearden, 1990; Reynolds & Braithwaite, 2001), the experience-based management (EBM) approach (Manfredo, 2002; Manfredo, Pierce, Vaske & Whittaker, 2002; Montag, Patterson & Freimund, 2005), and the normative approach (Anderson et al., 2010; Manning & Hallo, 2010; Skibins & Sharp, 2017).

The framework that structures this paper uses the normative approach to describe visitor preferences and attitudes (Manning, 2011). Normative theory assumes that people have individual preferences regarding resource and social conditions that can be
aggregated to develop a social norm (Manning, 2011). Several outdoor recreation frameworks have been developed that rely on normative theory to inform decision-making in parks and similar protected areas. These frameworks are operationalized through defining management objectives, developing indicators and associated thresholds, and implementing monitoring protocols and adaptive management strategies where appropriate (Manning, 2011).

**Indicators of the Visitor Experience**

It is well accepted that indicators and thresholds are a key component of outdoor recreation management (IVUMC, 2018; Manning, 2011). Indicators are specific, measurable and manageable variables that reflect management objectives, and thresholds define the minimum acceptable condition of indicator variables (Manning, 2011). The indicators and thresholds-based approach has been applied consistently for nearly 40 years, and there are well-developed methods for identifying thresholds using social norm curves based on Jackson’s (1965) return-potential model (RPM) (see Manning, 2011 for a detailed review). While the social norm curve helps delineate thresholds of quality, it does little to explain how the indicator variable itself is identified. The literature has focused on two important issues regarding indicators of a visitor experience, criteria to define a good indicator and studies designed to identify indicators.

Several studies have explored criteria that might be used to define effective indicators of an experience (Manning, 2007; Merigliano, 1990; Stankey et al., 1985; Whittaker & Shelby, 1992). Effective indicators of quality are specific, objective, reliable and repeatable, related to visitor use, sensitive, manageable, measurable and significant.
These criteria help to further understand the role of indicators and thresholds of quality in outdoor recreation, and can assist in selecting among potential indicators (Manning, 2011). This paper uses criteria for effective indicators of the visitor experience to organize results, which are detailed later.

The most common method for identifying indicators of quality is through questionnaires directed at visitors and recreationists (Hallo et al., 2009). Visitors may be asked to rate the importance of a pre-determined list of potential resource and experiential impacts. The most important of those impacts are then weighed against criteria for a good indicator (Hallo et al., 2009). One limitation of this approach is that pre-determined lists of potential resource and experiential impacts reduces freedom in respondents’ answers. Open-ended responses slightly alleviate the issue by allowing respondents to write in variables important to them, yet this approach still does not encourage or allow for a depth of understanding.

Several studies have used interviews to ask questions about trip characteristics that are important to the visitor experience, encouraging narrative, in-depth responses (Anderson et al., 2010; Bullock & Lawson, 2007; Glaspell, Eatson, Kneeshaw & Pendergrast, 2003; Hallo & Manning, 2009; Hallo et al., 2009). For example, at Gates of the Arctic National Park in Alaska, 32 semi-structured interviews were used to identify elements of the wilderness experience that were then translated into indicators (Glaspell et al., 2003). Interviews were also used at Cape Cod National Seashore to understand off-road vehicle recreation (ORV) (Hallo et al., 2009). While interviews are a useful tool for
engaging visitors, they have been criticized for the limited depth and detail they provide (Hansen, 2016) given the inherent brevity associated with on-site interviews.

A combination of qualitative and quantitative methods have been used for identifying indicators (Cole & Hall, 2009; Hallo & Manning, 2009; Manning & Hallo, 2010; Manning, Lawson, Newman, Laven & Valliere, 2002; Watson et al., 2007). A mixed methods design was used at Denali National Park in Alaska, where 126 interviews and 707 questionnaires were administered to Denali visitors to determine indicators and thresholds for quality experiences (Manning & Hallo, 2010).

Other quantitative approaches exist, yet the outcomes may not fully represent the most important aspects of the visitor experience. An ‘importance-satisfaction’ analysis has been used (Manning, Lawson, Newman, Laven & Valliere, 2002; Pilcher, Newman & Manning, 2009), where visitors are asked to rate the importance of a pre-determined list of experiential variables, and then indicate how satisfied they are with the management of those variables. The outcome is a 4-square matrix that represents the relationship between importance and satisfaction with management performance, and identifies where management efforts should be directed. Another approach is a ‘threats matrix’ (Cole, 1994), which uses a matrix model that places important attributes in the rows, and potential threats to attributes as the columns. These types of analysis can be useful for identifying variables that are threatened and require management or monitoring (Manning, 2011), however they may draw attention away from variables that are most important to the experience. There is little to no evidence that links the areas where improved management is needed to the most important aspects of the visitor experience.
For example, these analyses might highlight that management needs to focus on cleaning restrooms, however clean restrooms may not be the most important variable to visitors.

A limited number of studies have focused on understanding indicator variables that are important for wildlife viewing specifically. Skibins and colleagues (2012) studied wildlife viewing in Denali National Park, and found that certain species impacted visitors’ satisfaction over others. Miller and Freimund (2017) focused on the distance to wildlife as an indicator. Their research describes the utility of measurement tools to understand visitor perceptions of acceptable distances to bison at Yellowstone National Park (YNP). Anderson and colleagues (2010) focus on indicator development for wildlife viewing at two diverse protected areas, Denali National Park in Alaska and Lake Umbagog National Wildlife Refuge in New Hampshire. A total of 126 semi-structured interviews, and two focus group sessions of visitors to the Denali Park Road were used to identify potential indicator variables. At Lake Umbagog, surveys with both close and open-ended question formats were used. Based on these data three important indicators for the wildlife viewing experience were identified and include the number of buses at wildlife stops, waiting times to see wildlife, and the percent chance of seeing wildlife (Anderson et al., 2010). Being among the only studies to focus on indicators of the wildlife viewing experience, Anderson and colleagues (2010) state that “There is a need to further develop and measure indicators and standards [thresholds] of quality for wildlife viewing” (p. 4).
Visitor Employed Photography

VEP is one of several techniques that uses photographs taken by participants as data, a term that has been coined participant-generated images (PGI) (Balomenou & Garrod, 2016). The term PGI is used to distinguish between methods that ask participants to contribute photographs themselves, from photo-elicitation, which uses researcher produced photographs as a discussion vehicle during an interview (Matteucci, 2013). With over 286 studies (as of 2016) that adopted PGI techniques, there appears to be a lack of consensus about what to call the method across and within disciplines (Balomenou & Garrod, 2016). The most common PGI techniques include photovoice, autophotography, photography, visitor-employed photography, photo-elicitation and participatory photography. Other terms have been offered by individual researchers for using participant images as a research tool, making it difficult to identify common or suggested methodological improvements, and contributions to theory and practice (Balomenou & Garrod, 2019). One theme emerged, noting that VEP is the term most frequently used in leisure, tourism and management studies (Balomenou & Garrod, 2016).

The first applications of VEP were visitor-oriented studies of landscape preferences (Cherem, 1972) and interpretive planning (Traweek, 1977). These studies developed out of a need to address researcher bias involved in photo-capture—choosing to put cameras in the hands of research participants (Balomenou & Garrod, 2019). These studies are precedents for an underutilized tool for illustrating participants’ experiences (Balomenou, Garrod & Georgiadou, 2017; Cherem & Driver, 1983; Garrod, 2008;
Loeffler, 2004; MacKay & Couldwell, 2004). Most VEP studies in tourism use participants as photographers and experts in their experiences. Participants may be tourism hosts (Beckley, Stedman, Wallace & Ambard, 2007; Bennet & Dearden, 2013; Brickell, 2012; Hueber, 2011; Kikuchi et al., 2014; Wu & Pearce, 2014), visitors (Cahyanto, Pennington-Gray & Thapa, 2016; Dowart, Moore & Leung, 2009; Ernawati & Moore, 2014; Fairweather & Swaffield, 2001; Fung & Jim, 2015; Gou & Shibata, 2017), tourism professionals (Schumann, 2015), or several user groups at the same destination (Balomenou & Garrod, 2014; Hansen, 2016; Prestholdt & Nordbø, 2015). Other studies using VEP have focused on the method itself and how it can be applied in tourism and outdoor recreation settings. For instance, Oku and Fukamachi (2006) demonstrate that pictures excel in capturing perceptions of recreationists regarding experience qualities in different settings. Steen-Jacobsen (2007) reveals that pictures are an excellent way to capture visitors’ construction of place meanings and visitor attachments in natural recreational settings. Hansen (2016) uses a case study in Sweden to demonstrate the utility of photographs to capture visitor perceptions of experience qualities in marine protected areas.

The common thread among these studies is that they were conducted to gain participants insights into their own experiences using photographic images that were interpreted by a corresponding method (e.g., interviews, captioning, focus groups). It has been argued that VEP can be adapted to reflect nearly any research approach or paradigm (Chambers, 2012; Chenoweth, 1984), and that the use of VEP in tourism is highly
appropriate (Balomenou & Garrod, 2014; Haywood, 1990; Matteucci, 2013) given the inherent connection between tourist experiences and photographs.

Still, most VEP studies focus on broader experience perceptions, and are criticized for their lack of theoretical underpinning (Bell & Davison, 2013). Therefore, this paper applies VEP to a unique polar-bear viewing experience in the Arctic Refuge, where viewing polar bears and taking photographs are inherent aspects of the experience. As part of a larger visitor use management (VUM) planning effort, where a normative approach is used to develop bear-viewing indicators and associated thresholds (Manning, 2011), VEP is applied to specifically isolate aspects of the bear-viewing experience that are most important to visitors, and that may be used as indicators of the bear viewing experience. To the best of the authors knowledge, this is the first study to couple VEP and the normative approach. As stated above, normative theory defines group norms in terms of the evaluations of social or resource conditions (Manning 2011; Shelby & Heberlein, 1986), emphasizing that individuals have shared opinions about appropriate conditions, which can be aggregated as social norms. The use of VEP has been justified using similar logic, when Jutla (2000) noted that people have their individual perceptions about a place, but that there is a group image on which a number will agree. Early VEP researchers assert that ‘universal’ or ‘consensus’ photographs that convey similar meanings exist (Chenoweth & Niemann, 1981; Cherem & Driver, 1983; Traweek, 1977), and help provide a potential solution to management issues (Barber, Cross, Khaleel & Beale, 2008). Just as the normative approach uses questionnaires and interviews to
identify the most common individual responses among a group of visitors (Manning, 2011), this VEP application uses photographs to do the same.

Balomenou & Garrod (2019) noted that the status of image-based research has been disproportionately low relative to text-based research, marking image-based techniques as undervalued and therefore under applied. Rodrigues (2016) echoed this sentiment by recognizing the inadequacy of the written word to convey tourist experiences. Therefore, the purpose of this paper is to apply VEP to a wildlife viewing planning effort using the normative approach as a guiding framework. Specifically, VEP is used to explore indicators of the visitor experience while polar bear viewing in the Arctic Refuge.

**Methods**

**Site Description**

This study takes place in the Arctic National Wildlife Refuge (Arctic Refuge). The Arctic Refuge is in the northeastern region of Alaska, and is the largest wildlife refuge in the country at nearly 19.3 million acres. The Arctic Refuge is administered by the United States Fish and Wildlife Service (FWS), and has emerged as a national symbol for wilderness and wildlife protection (Bengston, Fan & Kaye, 2010). The Arctic Refuge is home to a variety of plant and animal species, including caribou, wolves, polar bears, eagles and several species of migratory birds. It additionally is home to indigenous Alaskan tribes, including the Iñupiat and the Gwich’in tribes. The Arctic Refuge has become a centerpiece of social contention through political debate regarding energy

More specifically, this study takes place in the town of Kaktovik on Barter Island, which sits off the northern tip of Alaska within the Arctic Refuge. Kaktovik is home to approximately 250 native Inupiats. The place and the people of Kaktovik are currently experiencing significant shifts in culture, how land and sea are used and integrated with the community, and shifts with both the political and the physical climate (Dvorak & Brooks, 2013). Not only is Kaktovik within the area for proposed oil drilling in the Arctic Refuge, but it is becoming increasingly recognized as the seasonal home for a substantial portion of the Southern Beaufort Sea polar bear (Ursus maritimus) sub-population. The Southern Beaufort Sea sub-population consists of approximately 900 bears (Bromaghin et al., 2015), many of which have migrated towards land for food sources as sea-ice declines in areas where polar bears traditionally hunt seal (FWS, 2010). The bowhead whale remains from the annual subsistence whale harvest that are not used by the community are left in a pile just outside of town to ensure that bears do not wander into town and endanger residents (Miller, Proffitt & Schliebe, 2006). This pile, known in Kaktovik as the ‘bone-pile,’ is the centerpiece of the growing tourism industry in the small town. Due to the increase in polar bears on land, the Kaktovik area of the Arctic Refuge and the Inupiat community are experiencing an unprecedented increase in visitors from all over the world who seek the opportunity to view polar bears in their natural habitat. Visitor use from polar bear viewing tourism increased rapidly from 2011-2017, from 100 visitors to nearly 1,500 respectively (Reed & Duplisea, 2017). The Kaktovik
area of the Arctic Refuge now represents one of approximately three tourism destinations to view polar bears worldwide. Increases in polar bear and human visitation to the community are creating shifts in traditional Iñupiat values and attitudes (Dvorak & Brooks, 2013).

Procedure

VEP was implemented with visitors in Kaktovik, AK during the 2017 polar bear viewing season. This research is part of a larger study using the Interagency Visitor Use Management Framework (VUM) to guide decision-making about visitor use management and planning in the Kaktovik area of the Arctic Refuge related to polar bear viewing.

Data for this study were derived from 24 semi-structured interviews and 17 VEP interviews. Semi-structured interviews were used to both supplement and compare with results from the VEP method. Because VEP has never been used for identifying indicators, comparing more traditional interviews with VEP interviews will highlight if different types and/or depths of information are received. Therefore, rather than simply reporting on results from the VEP process, there is a systematic comparison between interviews and VEP to better situate conclusions regarding the utility of VEP for identifying indicators.

Semi-structured interviews

Semi-structured interviews were conducted with a sample of visitors to the site in 2017, during peak polar bear viewing season (i.e., September). Only those visitors who were 18 years of age or older and represented different types of visitors (i.e., a purposively chosen diverse sample) were asked to participate in the semi-structured
interview. For practicality, convenience sampling was used (Babbie, 2015), where participants were selected based on their survey participation and time available. Interview questions were developed to understand what motivated visitors to view polar bears in Kaktovik specifically; what was expected from their experience; surprising aspects of the experience; how other visitors, guides, community members and FWS staff impacted experiences; if they experienced any “epiphanies” or “aha-moments”; and if they would be willing to participate in the VEP portion of the study post-trip. All interview participants provided their e-mails for any potential follow up questioning. Interviews were audio-recorded in the field and then transcribed verbatim.

Visitor-employed photography

VEP participants were selected based on previous participation in the interview method. Visitors could participate in VEP if 1) they had participated in the on-site interview, 2) they had taken their own photographs during the trip, and 3) they were willing and able to share their photographs. Of the 24 semi-structured interview participants, 17 completed the VEP protocol. The VEP protocol for this study was unique, in that visitors were not, and realistically could not, be told before their experience that their pictures might be used for the study. While this was for practicality purposes, it also minimized the potential of bias that could occur had visitors anticipated the use of their photographs in this study (Den Breejen, 2007; Loeffler, 2004). Instead, all visitors who participated in an interview were contacted post-visit and asked to participate.
Participants were asked to choose photographs that aligned most closely with six researcher-driven categories. These categories were designed to parallel interview questions to ensure comparability between the two approaches. The categories were: ‘things you expected to see or experience’, ‘aspects of your experience that came as a surprise’, ‘epiphanies or aha-moments’, ‘elements unique and special to the place’, ‘the overall viewing experience’, and ‘elements that either detracted from or contributed to your experience’. Because data collection occurred electronically, participants were prompted to write a brief description or narrative of each photograph and highlight why they chose each photograph (e.g., photo-captioning). To avoid issues associated with data surplus, participants were limited to providing 1 or 2 photographs for each category.

Applying VEP in this context is appropriate for several reasons. First, photography is an inherent part of the recreation experience in Kaktovik. Nearly all visitors in Kaktovik for polar bear viewing would take photographs of their experience. Second, VEP is a useful tool for identifying landscape elements in a bounded space where participants experience similar landscape features and activity types (Gou & Shibata, 2017), and where the setting is an important aspect of that experience. This is particularly important when using consensus photos to drive conclusions (Jutla, 2000). Lastly, applying the VEP method post-experience, and asking for only 1 or 2 photographs for each category likely encouraged a process of exploration and reflection prompted by the photographs that would not occur with on-site interviewing.
**Analysis Strategy**

*Semi-structured interview analysis*

Interview transcripts were uploaded into NVivo10 qualitative analysis software for data management and subsequent analysis. Coding occurred in several rounds to facilitate data condensation (Miles, Huberman & Saldana, 2014). The first cycle of coding was open-ended, using descriptive codes (Miles et al., 2014) to characterize what was being said in each response. This first round of coding was both deductive and inductive. It was deductive because the researchers were already aware of current visitor experience indicators that might emerge, and assumed that some codes would fall into the researcher-driven categories developed for this study. However, given the uniqueness of the context, coding was also inductive to allow for emergent codes. The second round of coding, or pattern coding (Miles et al, 2014) was inductive because researchers had no prior conception of how visitor responses would relate to one another.

*Visitor employed photography analysis*

Analysis of the photographs first occurred separately from the participant narratives, as suggested by Keats (2009). In this way, photographs could ‘speak for themselves’, and their utility would not be diminished. Because each participant had a shared experience of viewing polar bears within a small boundary, receiving similar photographs that could be considered consensus photographs was expected (Jutla, 2000). For each researcher-specified category, photographs were first organized based on images within the photograph. Photographs of polar bears represented one group,
photographs of tourists represented a separate group, etc. As such, part of the analysis reports the frequencies of items captured in each photograph.

Photographs were then coupled with their associated narratives to facilitate meaning inferences. The same coding mechanisms were employed as the interviews described above. Researcher-driven categories were used to facilitate coding, however emergent codes were also reported and recorded. The original grouping of photographs based on images in the photo was preserved, however sub-groups emerged based on the narratives. For instance, of the images with polar bears, some narratives indicated emotional responses, thus photos of polar bears with captions inciting emotions became a sub-group of the original polar bear group (i.e., coded as an emotional response). In this way, consensus photographs that may represent a normative agreement about conditions emerged.

Results

In total, 24 semi-structured interviews were transcribed verbatim, interviews lasted an average of 22 minutes and 40 seconds. Additionally, 245 pictures with narrated descriptions of each photo were collected from the 17 VEP participants. Participants were primarily retired professionals between the ages of 51-70, with only 4 participants falling between the ages of 31 and 40. Participants were predominantly from within the U.S., with the majority of those from Alaska and California. Participants visiting from other countries included Germany, Russia and the United Kingdom. While the common demographics among participants is considered a limitation, survey data from the 2017
field season confirms that the sample of interview and VEP respondents align with the population of all visitors to Kaktovik in 2017.

Overall, VEP results revealed that respondents placed the highest number of photos in the ‘surprised’ category, and the least number of photos in the ‘environmental epiphanies’ categories (Table 1). Not surprisingly, most of the images related to the polar bear, with 209 photos showing at least one bear. Other frequent images include the bone pile, boats, and the Arctic landscape (Table 2).

Analysis of both the interviews and the VEP procedure revealed that only some interview questions and VEP categories were useful in capturing visitor experience qualities. Researcher-driven categories that were useful for this study’s purpose include ‘elements unique and special about the place’, ‘the overall viewing experience’, and ‘elements that either detracted from or contributed to the experience’. Additional themes emerged from interview and VEP analysis that were not explicitly researcher-driven categories, and include ‘cultural elements’ and ‘emotional elements’.

**Elements Unique and Special about the Place**

Results from semi-structured interviews and VEP suggest that the Arctic, natural setting was the driving factor in the decision to view polar bears in Kaktovik rather than somewhere else in the world. For instance, interviews revealed that “viewing bears in their natural environment” and “viewing bears in Alaska” were the most frequent reasons for choosing Kaktovik. One respondent stated in their interview that “…we felt this would be the closest to a natural polar bear viewing experience. You know, it’s not contrived in any way.” VEP results corroborated the interviews, suggesting that Kaktovik
was chosen to get closer to bears than would be possible in other viewing destinations, and because of the remote, un-spoilt Arctic setting. One VEP participant captioned their photo with, “we were much closer to the bears than I expected” (Figure 2a). Another respondent noted, “We liked the idea of viewing the bears from a vessel both at ‘eye level’ and in their own habitat” (Figure 2b). Another wrote “I wanted to experience the un-spoilt and un-commercialized nature of the place” (Figure 2c).

**The Overall Viewing Experience**

Participants were asked in both the interview and the VEP procedure to describe things that represented the overall polar bear viewing experience. Text and image responses referred most often to bear characteristics as contributing to their overall experience, including bear behaviors and proximity. One interview respondent described their overall experience positively, “…we got to see lots of bear behaviors and different behavior types… and the bears were a lot more active than I thought they would be.” Another stated “The boats allowed us to safely get closer!”

The unique and ‘exclusive’ nature of the polar bear viewing experience in Kaktovik was a common theme associated with the overall experience. One interview respondent stated that “The fact that there wasn’t a lot of people around was good. There didn’t seem to be that over-concentration of viewers we might have come across elsewhere.” VEP responses echoed this sentiment, noting that “the experience was enhanced by the challenge of getting there and the way you felt special being there” (Figure 3a). Several respondents noted that managers should keep the experience “small and intimate” so as not to detract from the tourist experience or the native Alaskan way
of life. Interestingly, one respondent expressed the importance of people “seeing for themselves” the effects of climate change on the natural and cultural conditions.

Together, these sentiments indicate the difficult balance between providing equitable and quality experiences to the public while minimizing impacts to the natural and cultural resources.

One major discrepancy between interviews and VEP methods emerged when VEP respondents noted that ‘time spent on the water’ viewing polar bears was an important contributing factor to their overall experience, a sentiment that was not captured in the semi-structured interviews. One participant captioned a photo with “Our polar bear viewing experience was fabulous. We spent 12 hours on the water over a two-day period” (Figure 3b). This response, along with several others, indicated that the amount of time they got to spend on the water contributed to their experience because they got to see things like “the beautiful changing morning and evening lights,” and could benefit from a positive experience without rushing around, “We did not have to rush from one sighting to another to get our monies worth” (Figure 3c).” Only one person inferred time as a factor during an interview when they noted that they did not feel like they had a premier polar bear viewing experience because there was “too much sitting around in the hotels.” Overall, the VEP procedure seemed to elicit reflections about the importance of long stretches on the boat viewing bears, given that they could experience a variety of Arctic conditions and witness different bear behaviors and activities.
Elements that Detracted from or Contributed to the Experience

Participants were inconsistent between interviews and VEP when reporting elements that contributed to or detracted from their experience. During interviews, participants mentioned positive attributes 59 times, with negative attributes mentioned only 12 times. Specifically, participants noted that the proximity to bears and the behaviors they saw were positive contributing factors. One interviewee stated “To get into tenderness is to use human emotions but from observation there is a lot going on with these animals other than the basics of survival, and that’s been particularly enjoyable.” Fewer touched on the number of bears, the boat features, and natural, wilderness qualities as contributing positively to their experiences. Most interview respondents stated that nothing detracted from their experience, however those that did identify negative aspects most often cited weather (11 mentions) and issues with viewing companions (1 mention).

VEP responses corroborated interviews, noting contributing factors such as bear behaviors, characteristics and interactions, and the unique opportunity to be there. One respondent was happy to see a range of behaviors, captioning their photo with “Having the opportunity to observe various bears and witness their behaviors during our time on the water enhanced our experience” (Figure 4a). One visitor felt that they had an authentic experience stating “This guy was comical in his moves. This really added to the trip, I felt like I saw a bear being a bear” (Figure 4b). Another participant was more impressed with the northern lights than the bears and stated “The unique landscape and opportunity to see the northern lights made up for the fact that an entire day of bear
viewing was cancelled. Even without the bears, the Arctic region is truly spectacular” (Figure 4c).

Interestingly, the VEP procedure highlighted more negative aspects than the on-site interview. There were 26 mentions of negative attributes and 17 positive, a striking difference from interview results. On ten separate occasions, respondents noted issues with other boats/vehicles viewing polar bears at the same time. Some respondents were concerned with seeing other boats getting too close to the bear(s), “I hate seeing his boat so close to the Bear! It invades their space and makes them too aware of someone’s presence. I would hope in the future that the tours will not ever get this close again” (Figure 5a). In other cases, participants were concerned about the number of other boats, rather than distance, “It was very unfortunate to see another boat on the water. It would have been a better experience to only have one boat out at a time. Seems as it’s a disturbance to this environment and to the bears” (Figure 5b). Still, other VEP responses showed less concern for the number and proximity of other boats, and more concern for other boats or vehicles in their viewshed. One VEP respondent captioned their photo with, “Having another vessel with people viewing the bears in our viewshed took away from this particular experience” (Figure 5c).

Cultural Elements

Cultural elements emerged as an important experiential theme. Participants related their experience to the unique cultural environment found in Kaktovik. For some, the cultural experience was a motivating factor to view bears in Kaktovik, while others reported that interactions with residents contributed to their experience but was not
expected. One respondent reflected on the subsistence whale harvest, “...the starkness of the setting and buildings on the North Slope, the sharing of whale products, the tools related to butchering” (Figure 6a). Some respondents felt saddened by the conditions in which the local people lived, while others felt there was a missed opportunity for formal education about, and interaction with, the local culture. One respondent captioned their photo with “There needs to be some way to integrate visitors and villagers into positive shared experiences, including instruction for tourists about local culture and acceptable ways to behave” (Figure 6b). Relatedly, “I loved talking to this woman! Had I not been introduced to her by my boat captain, I never would have had the chance to ask her so many questions. What a wonderful experience that I was lucky to have” (Figure 6c). The notion that cultural elements were described as motivators and contributors to the experience for some, yet were described as generally missing or evoking negative feelings for others, is indicative of the importance of the cultural element to the visitor experience.

**Emotional Elements**

Interview and VEP questions asked respondents to share any environmental ‘epiphanies’ or ‘aha’ moments that occurred during their polar bear viewing experience. Interview results showed 14 mentions of experiencing environmental epiphanies, with 9 reporting no epiphany. VEP analysis did not reveal a yes-no dichotomy, but rather evoked emotional responses about bears, local culture, and a changing climate more generally. Not all emotional responses were linked to epiphanies, therefore these are considered under a more general theme of ‘emotional elements’.
In one interview, a participant shared an epiphany about the connection between community and nature: “...how symbiotic the bears and nature and people are here and how intimately they coexist and always have. And the whale and bears...it’s just really amazing” (Figure 7a). While some VEP photo captions revealed positive emotional responses, such as bear behaviors and interactions, most were linked to environmental issues that visitors were experiencing first hand for the first time. One respondent stated “While the lack of ice was upsetting in itself, the conditions of buildings and infrastructure in Kaktovik saddened me even more” (Figure 7b). Lack of ice, dirty polar bears and the behaviors of the bears were cited as evidence of a changing climate. Respondents noticed that bears were either lounging, swimming, or “scavenging for food” (Figure 7c), and interpreted these behaviors as efforts to expend less energy, to cool off, and to desperately find food. Because emotion is unique to each individual and is not an objective measure, it is not considered an indicator for the visitor experience at this point.

**Indicators of the Wildlife Viewing Experience**

The purpose of this paper is to identify potential indicators of the visitor experience for boat-based polar bear viewing. Therefore, emergent variables from the VEP procedure are coupled with criteria for good indicators of quality. Table 3 relates VEP variables to criteria for a good indicator, revealing that two out of the eight potential indicators met all criteria. Variables that met all criteria include time spent on the water and vessels in viewshed. Proximity to other boats and proximity to bears were other variables that may be considered, yet did not seem to be as significant to visitors.
However, these latter variables may serve as proxies to measure and manage vessels in view. See the discussion section for additional thoughts on how these variables might serve as indicators of the viewing experience. Other potential indicators that emerged from the VEP procedure were either difficult to manage (e.g., bear behaviors, number of bears seen), or were difficult to measure given lack of specificity or objectivity (e.g., community interactions, exclusive setting).

**Discussion**

The results were interpreted based on the normative approach, using the VEP method to inform management and monitoring of polar bear viewing experiences in the Arctic Refuge. Based on the idea that visitors have normative opinions about appropriate conditions, indicators of quality have historically been derived from survey or interview data which tabulates the most frequently reported variables. In this study, the researchers used photographs and photo-captioning rather than quantitative or solely text data to tabulate common responses based on ‘consensus’ photographs (Jutla, 2000).

**Perspectives on Results**

To summarize, the interviews and VEP process shared some of the same sentiments, with a few key differences. Most notably, interviews and VEP both revealed the importance of the Arctic setting, and the remote and exclusive nature of the experience. Both data collection strategies likewise revealed that the number of bears seen, the proximity to the bears, and the interaction with the local community were important to their experience. In terms of interactions with the community, some participants had positive experiences, while others were left wishing for more education
about the culture, and how to behave in a remote, native Alaskan village. These results are indicative of the lack of visitor center or any formal mechanism for the careful and consistent interpretation of both natural and cultural resources in the area.

Other important findings emerged solely through the VEP process. These include the experiential importance of time spent on the water, and other boats or vehicles within the respondents' viewshed (Table 3). It is quite surprising that neither of these characteristics of the experience were raised in the interview, especially given the emphasis on both during the VEP process. Of course, a photograph capturing ‘time spent on the water’ is difficult to imagine. How does one capture an image of time? Analysis of VEP results began with a content analysis of what was pictured in each image, without consideration for the written narrative. During this early stage, the researchers did not code any of the images as reflecting ‘time.’ It was not until the photo-captions were analyzed with each photo that ‘time’ emerged as a theme. This demonstrates the importance of coupling photographs with either a caption or an interview. The respondents’ interpretation of the image was necessary for a successful VEP procedure in this case.

Unique to the VEP procedure was that of other vessels being within the participants’ viewshed or photograph range. It makes intuitive sense that this finding would emerge from VEP rather than interviews. Visitors may not have realized that there were vessels within their viewshed until they saw their photos. Content analysis of images revealed 13 photographs showing polar bears with either a boat or a vehicle. While the interpretation of those images could not immediately conclude a negative
connotation, the associated narratives quickly revealed the negative direction and the strength of the relationship. Given that photographs are an inherently important aspect of the tourist experience (Balomenou & Garrod, 2019), this sentiment seemed to ring true for many participants.

One important consideration is how ‘vessels in viewshed’ could be operationalized as a measurable and manageable experience indicator. Given challenges associated with measurement and management of this seemingly important variable, the best measurement approach may be to use other variables to serve as a proxy for ‘vessels in view.’ For instance, as part of the larger study not presented here, boats at one time (BAOT) on the water was tested and was a salient indicator. Coupling BAOT and distance to other boats (another variable that visitors related as important to their experience) may serve as a measurable proxy to manage the number of vessels in view for surrounding visitors. While this approach would do little to alleviate the issue of land-based viewing vehicles (e.g., vans, SUVs) within a viewshed, that is outside of the jurisdiction of this boat-based planning effort.

Emergent themes include cultural and emotional elements that impacted the visitor experience. Both the cultural and emotional themes are indicative of a need and desire for interpretive opportunities. Recognizing the challenges associated with providing consistent and coherent messaging in the remote reaches of the Arctic Refuge, the results indicate a need for interpretive programming to provide educational, cultural and behavioral messaging for guests. Interpretation has the additional potential of contributing to the emotional responses guests are already experiencing (Pooley &
O’Conner, 2000). Based on the results of this study, future research should explore how interpretive messaging can interact with and impact the emotional responses of visitors to promote pro-environmental behaviors or ambassadorship. Interpretive messaging has the potential to protect cultural and natural resources while simultaneously contributing to a quality visitor experience.

**Perspectives on Methods**

The study offers experiences on both benefits and challenges of using VEP to understand visitor experience qualities that are of importance to both managers and researchers. In terms of benefits, VEP primarily provided an opportunity to examine experiences in detail. In terms of challenges, VEP may be burdensome to a point of excluding some user groups (e.g., day visitors with limited time). The VEP results reveal differences in visitor interests that were not fully vetted in the interview analysis, potentially because VEP requires the taking, selecting, and discussing of photographs. This process can lead participants to explore their own recreational preferences, or discover new aspects of their experience by combing through their photographs. This VEP study was carried out in two unique ways that were meant to facilitate the reflective process that may be missing from more traditional text-based experiential explorations.

Respondents were not informed about the VEP study before their experience. Previous VEP studies have introduced the study pre-experience, directing visitors to take photos with specific question in mind. Therefore, participants in VEP studies have historically been aware of the study purpose during their experience, potentially subconsciously influencing the picture taking exercise (Loeffler, 2004). By informing
visitors about the study after their bear viewing experience, the results came from
authentic photographs that were in no way influenced by researcher driven questions.
Had respondents known ahead of time exactly why they were taking each photograph,
they may have spent less time reflecting on the photos they took and, in doing so, less
time reflecting on their experience. Because this study was specifically meant to facilitate
a better understanding of tourist experiences, and because taking photographs is
intimately intertwined with the tourist experience (Balomenou & Garrod, 2019), it was
reasonable to expect that visitors would be taking photographs without being prompted
by a researcher. This assumption may not be possible in other VEP studies, as
photographs may not be central to what is being examined. However, for understanding
experiences of tourists, informing visitors about the study post-experience may mitigate
potential biases and facilitate deeper reflections.

Another aspect of this study that contributed to the reflective process is the timing
of data collection. Some authors have warned that the timing of VEP data collection
should remain in line with research questions (Balomenou & Garrod, 2019), suggesting
that those interested in tourist experiences should collect data while visitors are
immersed. However, this study found unique results from on-site interviews and post-
experience VEP interviews. This suggests that the reflection process may allow time for
participants to develop or solidify opinions and suggestions that may be important for
managers, yet difficult to capture with on-site data collection strategies.

The VEP method also produced several practical challenges. For example, one
concern of previous VEP studies is the participant time and commitment required. Lack
of time and concern about using vacation time to participate in a study have been cited as reasons for non-participation (Hansen, 2016). While these are certainly valid limitations, the authors of this study could overcome such challenges by postponing VEP participation until after the visit. This approach allowed for participation in both an interview and VEP protocol without too much additional burden. Still, the post-experience data collection approach is not feasible in all locations, and has its own set of limitations, including participant drop-out. As stated earlier, of the 24 interview participants, only 17 participated in the VEP protocol. While only seven participants opted out, losing nearly one third of interview participants is quite substantial. Some VEP studies employ quantitative analysis strategies (Bock, Isermann & Knieper, 2011; Gou & Shibata, 2017; Heyman, 2012), an approach that would be more difficult in post-experience data collection given retention challenges.

**Conclusions**

One critique of VEP is that it is largely an academic pursuit, and has little utility and application in management scenarios. The authors of this and previous studies (Balomenou & Garrod, 2019, 2016; Gou & Shibata, 2017; Hansen, 2016) assert that VEP is a useful tool for understanding, managing and monitoring tourist experiences. Photographs have become common resources in the lives of most individuals, especially while they travel. With the advent of smartphones and increasingly effective photographic technology, photographs are a useful tool for discovering visitor motivations and preferences. In this study, Participant Generated Images (PGI’s) were used to identify wildlife viewing experience indicators that were not captured in other,
more traditional data collection procedures (e.g., interviews and surveys). While the interpretation of photographs required a narrative or caption written by the participant, the results of this study indicate that without reviewing their personal photographs, visitors may have reflected on their experience differently and missed opportunities to communicate important aspects of their experience to researchers or managers.

Therefore, the authors of this study suggest that visitor photographs are not only useful, but are necessary tools for fully understanding and managing experience qualities in unique tourist destinations where little is known about the visitor experience.
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Rodrigues, A. I. (2016). The camera as an educational tool: Reflective photography for examining impressions and perceptions about a destination. 1st international symposium of qualitative research.


Table 1. *Categories for visitor-employed photography*

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of photos (n=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of your experience that came as a surprise, either positive or negative</td>
<td>69</td>
</tr>
<tr>
<td>Things that are unique and special about the place that made you choose to come here</td>
<td>52</td>
</tr>
<tr>
<td>Things that either took away from or added to your experience</td>
<td>38</td>
</tr>
<tr>
<td>Things that represent your overall polar bear viewing experience</td>
<td>30</td>
</tr>
<tr>
<td>Things that you expected to see or experience</td>
<td>29</td>
</tr>
<tr>
<td>Things that represent any ‘epiphanies’ or ‘aha’ moments you experienced</td>
<td>25</td>
</tr>
</tbody>
</table>
Table 2. *Frequency of images in photographs*

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency (n=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear(s) on land</td>
<td>140</td>
</tr>
<tr>
<td>Bear(s) with cubs</td>
<td>42</td>
</tr>
<tr>
<td>Bears(s) in water</td>
<td>27</td>
</tr>
<tr>
<td>Bone pile</td>
<td>25</td>
</tr>
<tr>
<td>Boat(s)</td>
<td>17</td>
</tr>
<tr>
<td>Landscape</td>
<td>15</td>
</tr>
<tr>
<td>Other visitors</td>
<td>14</td>
</tr>
<tr>
<td>Whaling images</td>
<td>12</td>
</tr>
<tr>
<td>Local homes</td>
<td>10</td>
</tr>
<tr>
<td>Village</td>
<td>9</td>
</tr>
<tr>
<td>Local people</td>
<td>4</td>
</tr>
<tr>
<td>Vehicle(s)</td>
<td>3</td>
</tr>
<tr>
<td>Hotel accommodations</td>
<td>2</td>
</tr>
<tr>
<td>Graveyard</td>
<td>2</td>
</tr>
<tr>
<td>Paw print</td>
<td>2</td>
</tr>
<tr>
<td>Artwork</td>
<td>1</td>
</tr>
<tr>
<td>Bear(s) with collar</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Images may have more than one item
Table 3. *Evaluation matrix for selecting indicators of quality*

<table>
<thead>
<tr>
<th>Potential indicators of quality</th>
<th>Criteria for good indicators of quality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specific</td>
</tr>
<tr>
<td>Exclusive/unique nature of the experience</td>
<td>---</td>
</tr>
<tr>
<td>Vessels in viewshed</td>
<td>✓</td>
</tr>
<tr>
<td>Community Interactions</td>
<td>---</td>
</tr>
<tr>
<td>Time spent on water</td>
<td>✓</td>
</tr>
<tr>
<td>Number of bears seen</td>
<td>✓</td>
</tr>
<tr>
<td>Proximity to bears</td>
<td>✓</td>
</tr>
<tr>
<td>Behavior of bears</td>
<td>---</td>
</tr>
<tr>
<td>Proximity to other boats</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table adapted from Manning (2011)
Figures

Figure 1. *Kaktovik and boat-based viewing setting*
Figure 2. *Photographs representing ‘elements unique and special about the place’*

a.  

b.  

c.  

Figure 3. *Photographs representing ‘the overall viewing experience’*

a.  

b.  

c.  

Figure 4: *Photographs representing elements that contributed to the experience*

a. 

b. 

c. 

Figure 5. *Photographs representing elements that detracted from the experience*

a. 

b. 

c. 
Figure 6. Photographs representing cultural elements

a. b. c.

Figure 7. Photographs representing emotional elements

a. b. c.
CHAPTER THREE

EVALUATING VISUAL RESEARCH METHODS FOR MEASURING CROWDING NORMS IN OUTDOOR RECREATION

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Abstract

Visual-based research methods are commonly used to provide an empirical basis for formulating evaluative thresholds related to use levels at a recreation site. Visual research methods applied in this context are subject to several potential measurable biases. This article examines three potential factors that may impact visitor evaluations of site conditions. The three factors examined include photo-type effect, range effect, and recreation-type effect. Respondents evaluated different types of photographs at Delaware Water Gap National Recreation Area to evaluate the acceptability of People at One Time (PAOT) or Boats at One Time (BAOT). Results indicated that photo-type and recreation-type influenced photograph acceptability ratings, but that range of PAOT shown in images did not influence photograph acceptability ratings. Potential methodological revisions to the visual-based approach are discussed.
Introduction

The concepts of ‘indicators and thresholds’ have received considerable attention in the outdoor recreation literature (Manning, 2007), and are used extensively for informing visitor use management decisions on federally-protected lands in the U.S. (Interagency Visitor Use Management Council [IVUMC], 2018). Indicators are those specific and manageable attributes of a resource or experience that can be measured and that reflect management objectives. Thresholds (previously known as standards of quality) define minimum acceptable conditions of the indicator variable (Manning, 2011).

The way indicators and thresholds associated with the visitor experience are most often theoretically and empirically operationalized is through the lens of social norms. As applied to parks and outdoor recreation, norms are defined as “standards [thresholds] that individuals and groups use for evaluating behavior and social and environmental conditions” (Manning & Freimund, 2004, p. 559). When visitors have norms regarding relevant indicators of their experience, they can be used as a baseline for management and monitoring.

Visual-based methods have been used to investigate norms regarding the recreation setting for over 30 years (Shelby & Harris, 1985), with numerous studies supporting the validity of the approach, and few modifications (Freimund, Vaske, Donnelly & Miller, 2002; Hall & Roggenbuck, 2002; Krymkowski, Manning & Valliere, 2009; Manning & Freimund, 2004; Manning, Valliere, Minteer, Wang, & Jacobi, 2000; Miller & Freimund, 2017; Needham, Wood & Rollins, 2004; Needham & Rollins, 2005; Needham et al., 2011; Schults & Svajda, 2017).

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While visual methods are a valuable and useful tool for understanding visitor preferences in parks and protected areas (Manning & Freimund, 2004), questions remain regarding the construct validity and reliability of visual-based approaches. Construct validity refers to the degree to which a test measures what it purports to be measuring, while reliability refers to the overall consistency of a measure (Babbie, 2013). Do the photographs used for soliciting crowding preferences using visual-based methods measure the indicator in question? Similarly, how consistent are results using visual-based methods? This article addresses two aspects of the visual-based methodology not fully explored in the literature. The first, referred to as photo-type, concerns the type of image used to solicit responses regarding attitudes towards recreation conditions. The manipulation and editing of photos is the traditional visual-based approach (Manning, 2011; Manning & Freimund, 2004), yet no other type of photo (e.g., a field-based, un-manipulated photo) has been considered for use in these studies. One key difference between the traditional simulated photo-type, and the novel field-based photo-type, is that simulated photos allow for researchers to manipulate photos to show a greater range of conditions (e.g., a larger range of people at one time [PAOT]) in a photo series. Field-based photos show true, existing conditions of a site and therefore tend to display a lower range of conditions (e.g., fewer PAOT throughout the photo series). Manipulated photos also tend to control for density and distribution of visitors in an image, whereas field-based photos show conditions that are true to the experience because they are entirely un-manipulated. These fundamental differences between photo-types may impact acceptability ratings, and deserve attention.
The second aspect of visual-methods that will be explored in this paper is referred to as recreation-type, and concerns how different types and proportions of recreationists impact responses to visual-based question-types. Given that factors such as the behaviors and activities of other visitors’ impact feelings of crowding (Manning & Freimund, 2004), recreation-type shown in images has the potential to influence results. Care must be taken to use the most accurate tools, and to avoid pitfalls associated with potential, avoidable biases.

The purpose of this paper, therefore, is to capitalize on the strengths of applying visual methods to parks and outdoor recreation management, while addressing some of the associated limitations. The study setting is Delaware Water Gap National Recreation Area (DEWA), which provides the recreational resource and experiential complexity that visual methods are appropriate for. Three research questions are examined:

1. What effect does photo-type seen (e.g., simulated, field-based, base-photo) have on overall acceptability thresholds?
2. What effect does the range of conditions shown in each photo series have on photograph acceptability ratings?
3. What effect does the proportion of recreation-type seen have on photograph acceptability ratings?

**Literature Review**

Social science is often used to develop evaluative thresholds that establish acceptable social and resource conditions (Shelby & Vaske, 1991). One of the challenges in developing thresholds is obtaining quality data regarding attitudes towards a range of
resource conditions. An established method to effectively identifying thresholds uses visual-based approaches, yet procedural challenges persist. Because important and sometimes contentious decisions are informed by the results of studies using visual methods, it is important to continue modifying and improving the approach. The following review of literature outlines theoretical and methodological considerations in developing evaluative thresholds.

**Normative Theory as Applied to Parks and Outdoor Recreation Management**

Normative theory and associated methods have been applied extensively in the field of outdoor recreation (Heberlein & Vaske, 1977; Manning, 2011; Shelby & Heberlein, 1986). Much of the application of normative theory stems from the work of Jackson (1965), who developed the return-potential model (RPM) for measuring social norms. The RPM has been adapted in outdoor recreation research to define group norms in terms of their evaluations of social or resource conditions, and is often referred to as a social norm curve. Social norm curves are developed by aggregating acceptability ratings of various levels of social or resource indicators. A common indicator of experiential conditions is people at one time (PAOT). PAOT values can vary based on the needs of the park unit or the interests of the researcher, and the typical range of acceptability ratings is +4 (very acceptable) to -4 (very unacceptable), with a neutral point of 0. While the approach has been extensively applied in outdoor recreation, concerns of validity remain. Are the methods used reflecting a realistic summary of visitor experiences and expectations (Hall & Roggenbuck, 2002)? This research continues to explore answers to this difficult theoretical and empirical question. With changing demand for recreation
resources, and the growing need to manage sites to accommodate more use, methods for developing normative thresholds advanced and questions regarding norm characteristics, research methods, and validity of measurements have evolved.

**Visual Methods**

Visual methods were developed in the 1980’s in response to limitations associated with the narrative approach for evaluating normative thresholds (McCool, Benson & Ashor, 1986; Shelby & Harris, 1985). Visual methods can be used to portray conditions that might be difficult to find in the field, or that do not yet exist (Manning, Lime, Hof & Freimund, 1995). They can also help to focus more directly on the variables of interest, and can provide clarity in communicating conditions that might be difficult to describe. Visual methods may help minimize inferences inherent in the narrative approach, ensuring that all participants are responding to the same conditions (Manning, 2011; Manning et al., 1995; Manning & Freimund, 2004).

Studies using simulated photographs to represent resource conditions have been conducted extensively in the parks and outdoor recreation literature. Examples include normative evaluations of user densities or encounter norms (Manning, Freimund, Lime & Pitt, 1996a; Manning, Lime & Hof, 1996b; Needham et al., 2011; Zhang & Chung, 2015; Pierce & Manning, 2015), visitor behaviors (Budruk & Manning, 2003; Heywood & Murdock, 2002; Manning et al., 2000), resource conditions (Arnberger et al., 2018; Needham et al., 2011), preferences for recreation participation (Hall & Amsden, 2014; Hollenhorst, Brock, Freimund & Twery, 1993), facility development (Kim, Shelby &
Needham, 2014), and distance to wildlife (Anderson, Manning, Valliere & Hallo, 2010; Miller & Freimund, 2017).

With visual-based approaches dominating the development of evaluative thresholds, questions concerning validity have emerged. For this research, validity is defined as the degree to which visual-based methods measure what they are intended to measure—attitudes about the appropriate perceived levels of use at a given site at a certain time (Manning & Freimund, 2004).

**Normative Construct Validity & Reliability**

Protected area managers may identify management strategies, such as use limits or permit systems, based partially on data that suggests that thresholds have been exceeded (IVUMC, 2018), marking it critical to know how much confidence can be placed in visitors’ responses to normative question-types. This paper, therefore, examines the construct validity and reliability of photograph-based methods used to solicit responses about recreation preferences. The academic community has explored the impacts of methods used for understanding normative thresholds in protected areas, such as communication tools (Freimund et al., 2002; Heywood, 1993; Martin, McCool & Lucas, 1989; Shelby & Schindler, 1992; Vining & Orland, 1989), question format (Hall & Roggenbuck, 2002; Manning et al., 1995; Manning & Krymkowski, 2010; Roggenbuck, Williams, Bange & Dean, 1991), range effects (Manning, Lawson, Newman, Lavel & Valliere, 2002; Gibson et al., 2014), order effects (Cribbs et al., 2018; Gibson et al., 2014), and recreation-type effects (Jacobi et al., 2000; Lucas 19640). This
paper specifically focuses on communication tools (i.e., photos), range, and recreation-type to determine effects of each on visitor responses.

*Photo-Type Effects*

Communication tools used in studies of recreation preferences have received limited recent attention in the literature. Communication tools refers to the methods employed to describe recreation settings and conditions to visitors as they respond to normative question-types. Early studies on communication tools focused on differences in narrative descriptions vs. simulated photographs, and how those impacted acceptability ratings of visitors (Manning et al., 1995; Manning & Krymkowski, 2010). These studies led to a consistent shift from narrative descriptions to simulated photographs (Manning & Freimund, 2004) because simulated photos were thought to better communicate recreation conditions, allowing respondents to provide more informed and consistent responses. Other research tested additional communication tools, such as videos (Freimund et al., 2000). Videos were used in Gwaii Haanas National Park and Preserve in British Columbia (e.g., backcountry setting) to assess visitors’ norms for varying numbers of watercraft, sounds from aircraft and motorized boats, and the acceptability of floating outfitter camps. Results of the study showed that using videotape was a cost-effective way to evaluate both sight and sound impacts. Videos in this study were manipulated by researchers to control for intervening variables. To the best of the authors’ knowledge, no studies have tested the effect of using real, field-based, un-manipulated imagery to assess normative evaluations of recreation conditions. This study, which examines simulated (e.g, researcher manipulated photos), field-based (e.g, un-
manipulated photos) and base photos (e.g., unpopulated photos) to determine if differences in normative evaluations exist, operates under the following hypothesis:

\[ H_1: \text{Overall acceptability thresholds will differ based on photo-type when comparing simulated, field and base photos.} \]

**Range Effects**

Range effects are another important methodological consideration, and refers to the idea that normative responses will vary based on the range of conditions (e.g., PAOT) provided to the respondent. Research in political science and consumer behavior has shown that responses can vary depending on the frame of reference provided (Graves, 2013; Moore, 2002). Gibson et al. (2014) tested for potential range and order effects in a lab setting, where they examined non-sequential orders and multiple use level ranges presented to respondents to determine if acceptability thresholds would be influenced by sequence or range. The authors concluded that both range and order effects do influence photograph acceptability ratings, suggesting that range and order effects may contribute to variation in acceptability ratings across studies. However, findings from Gibson et al. (2014) differ from other studies that have concluded that variations in sequence or range do not greatly influence responses, likely due to the lab-based setting used by Gibson and colleagues (Cribbs et al., 2018; Freimund et al., 2002; Krymkowski et al., 2009; Manning, 2011; Manning et al., 2002; Manning & Freimund, 2004; Needham et al., 2004; Needham & Rollins, 2005; Needham et al., 2011). Though visual-methods have been employed for over 30 years, the potential influence of different PAOT ranges has yet to be fully investigated (Gibson et al., 2014). Therefore, this study tests two unique
photo-types (e.g., simulated vs. field-based) and two unique sites (e.g., beach and waterfall sites). The beach site shows a similar PAOT range in each photo-type series, while the waterfall site shows very different PAOT ranges in each photo-type series. Thus, this study operates under the following hypothesis:

\[ H_2: \text{Range of PAOT between photo types will have a significant effect on acceptability ratings. Therefore, where range is similar (e.g., beach site), acceptability ratings for each photo type will not significantly differ. Where range is different (e.g., waterfall site) acceptability ratings for each photo type will significantly differ.}\]

**Recreation-Type Effects**

Another potential issue concerning validity is the recreation activity of visitors represented in a simulated photograph. Jacobi, Manning, Valliere & Negra (1996) found that photos showing different proportions of hikers or bikers on the carriage roads at Acadia National Park impacted crowding preferences. Most normative visual-based approaches target the number of people in each image to evaluate visitor perceptions of crowding. Fewer have focused on the recreation activities visitors are engaged in to identify factors beyond use-levels that might influence feelings of crowding (Freimund et al., 2002; Jacobi et al., 1996; Lucas 1964), thus further research is warranted. Therefore, the effect of the recreation activity depicted on PAOT acceptability ratings is still unknown. This study uses a river-based setting to test if different proportions of paddlers and motor-boaters shown in an image impact acceptability ratings, and hypothesizes that:
H3: The proportion of recreation-types in each image will have a significant effect on photograph acceptability ratings.

In summary, establishing thresholds for measurable indicators of quality has become standard practice for outdoor recreation management, and visual methods have been found to be useful in formulating and measuring these thresholds (Manning & Freimund, 2004). Several studies have concluded that photo simulations are superior to narrative approaches, as they represent a more detailed depiction of resource conditions (Manning & Freimund, 2004). Daniel and Meitner (2001) suggest that the more realistic the computerized, manipulated image is to reality, the higher the representative validity. However, no photo simulation can represent a situation completely realistically (Manning, 1999; Sterl, Wagner & Arnberger, 2004). Because this is a limitation to the photo-based approach, it seems important to explore the possibility of using real, field-based photos rather than simulated or manipulated photos, to represent conditions to visitors. No studies have used real, field-based photos to depict use conditions at a recreation area. Another important consideration that warrants further exploration is the recreation-type of other visitors. Previous research suggests that feelings of crowding are influenced by multiple factors beyond just visitor numbers, including the type of recreation other visitors are engaged in (Manning & Freimund, 2004), yet current visual-based studies often falsely represent a homogeneous visitor population.
Methods

Study Area

Delaware Water Gap National Recreation Area (DEWA) covers 40 miles of the Middle Delaware National Scenic and Recreational River, and nearly 70,000 acres of adjacent mountains, valleys and floodplains in New Jersey and Pennsylvania. DEWA is home to over 200 miles of hiking trails and scenic roadways, colonial villages and landscapes, and operational agricultural fields that have been farmed for over 1,000 years. As an urban-proximate recreation site located near several large U.S. cities including New York City and Philadelphia, areas within DEWA have experienced changes in the amounts and patterns of use by visitors and residents. Many of these changes were not anticipated when the park’s General Management Plan (GMP) was finalized in 1987. This research is part of a larger project meant to inform the development and implementation of a Visitor Use Management (VUM) Plan at DEWA. Accurate normative thresholds for crowding-related indicators are essential in this effort.

Procedure

The results in this paper came from a larger visitor-use management study at DEWA, where data were collected in two phases. Phase I took place during the peak use season of 2015 (May-August). Based on a planning workshop and the results from Phase I (not presented here), four important indicators were identified. This study will focus on the indicator ‘people at one time (PAOT)’ at selected sites at DEWA.

Data collection for the study reported in this paper took place from May-August of 2016, on selected days (stratified on weekdays and weekends). Roving-based sampling
occurred between 10am and 5pm, and the survey was only given to visitors who were either exiting the site or had visited DEWA in the past. In groups consisting of family and/or friends, one qualified user per group (18 or over) was asked to complete the survey. All groups present at the site were approached. The survey was self-administered with a trained research assistant available for providing additional information. Each survey consisted of questions that prompted the respondent to provide evaluations of the acceptability of PAOT, along with attitudes towards different management strategies. Survey questions that are important for this study are described in detail below.

*Photo-Type Effect*

To compare acceptability thresholds using different visual methods, all respondents were asked a set of questions. First, all respondents were shown photos of eight sites that represented the spectrum of high and low use opportunities at DEWA. Specific sites were selected by experts and park staff. There were no people shown in any of the base photos (Figure 1- Base Photos), and respondents were asked to write-in “the number of people at one time that is acceptable to use the site. Traditional open-ended questions rely on a narrative statement and ask respondents to pencil in responses (Hall & Roggenbuck, 2002). The novel addition of a base-photo was intended to ensure that all participants were responding to the same bounded space, controlling for additional factors that might influence responses with no reference photo available, such as the size and facilities within the space. This type of photo is hereafter referred to as the ‘base-photo’.
In another survey question, the same respondents were given a series of photos depicting a range of use-levels and asked to rate the acceptability of each photograph on a scale of -4 (very unacceptable) to +4 (very acceptable) with a neutral point of 0. Respondents were asked to complete the close-ended response format for two selected sites at DEWA: a beach site (Smithfield Beach) and a waterfall site (Van Campens Glen Waterfall). While all respondents received this question, there were two different versions shown to two different experimental groups. Experiment group 1 was given the traditional method using simulated photos to evaluate PAOT. In other words, the photos they saw were computer-edited and manipulated by the researcher to depict various levels of use (Figure 1- Simulated Photos). This photo-type will be referred to as ‘simulated’ for the remainder of this paper. Experiment group 2 received a series of real, field-based photos that had not been manipulated by the researcher (Figure 1- Field-based Photos). The ‘field-based’ photos were captured in the early field season using a Moultrie i.85 game camera that was already in place to estimate use levels at each of the sites. The camera was set to a time-lapse function, where it would take a photo of the site every 30 minutes from 8am-6pm each day, capturing a range of use levels. A series of six photos were selected to represent the greatest range of use-levels possible. This photo-type will be referred to as ‘field-based’ for the remainder of this paper. Put simply, experiment group 1 saw base photos and simulated photos for two sites, and experiment group 2 saw base photos and field-based photos for the same two sites.

Due to differences in how simulated and field-based photos were developed, there are different ranges of PAOT shown in each photo-type. As has been stated, simulated
photos are manipulated to show current and future conditions, where-as field-based photos depict current conditions. Because field-based photographs are not manipulated, they do not show a greater range of PAOT than currently exists, therefore illustrates a smaller PAOT range than simulated photographs. As such, there is a natural experiment embedded with the question of photo-type which captures PAOT range. At the beach site, a predictive photograph was not added to the photo series until later in the data collection season, therefore PAOT range in each photo-type is very similar (e.g., 0-105 PAOT for field-based photos, and 0-110 PAOT for simulated photos). However, at the waterfall site, the range of PAOT differs between photo-type more drastically (e.g., 0-38 PAOT for field-based photos, and 0-65 for simulated photos) because of the lack of a photo depicting future conditions in the field-based photos at the waterfall site.

Recreation-Type Effect

To compare the effects of recreation type on PAOT acceptability ratings, river-users’ acceptability thresholds for the number of boats at one time (BAOT) were examined. Respondents were asked to rate a series of eight simulated photographs depicting different levels of BAOT on a scale of -4 (very unacceptable) to +4 (very acceptable) with a neutral point of 0. The first six photographs depicted a near-equal proportion of paddlers and motorized boaters, and ranged from zero boats in the first photograph, to 15 boats in the sixth photograph. Two additional photographs were examined, where respondents were asked to rate the acceptability threshold of nine BAOT, but with different proportions of paddle or motorized boats (Figure 2)
Simulated photos only were used for this portion of the study. Paddlers frequent the middle portion of the Delaware River (the location of this study) at a higher rate than motorized boaters. A systematic random sample was used to survey boaters, and only 12 motorized boaters were sampled, while a total of 468 paddlers (e.g., canoers, kayakers, rafters, tubers, paddle-boaters) were either contacted, or in a group with someone who was contacted. Therefore, to answer questions regarding responses to various proportions of activity-type, simulated photos were necessary.

**Analysis Strategy**

Data were analyzed using Statistical Package for Social Sciences (SPSS) software. The data were summarized using visual-based procedures typically used in other studies, which generally includes a reporting of means and standard deviations (Manning, 2011) comparing evaluations of PAOT. Evaluations were summarized based on overall thresholds to facilitate comparison to an open-ended response format (Table 1), and by individual photo to compare close-ended responses only (Tables 2).

To evaluate if differences exist between photo-type and overall acceptability thresholds, two approaches to statistical analyses were used. Non-parametric means comparisons were used before data-cleaning due to concerns with removing outliers that may be in fact be meaningful. For photo-type effects, a series of Wilcoxon signed-rank tests were used to compare medians of within subject responses. A Mann-Whitney U-test was used to compare means from independent samples. After data-cleaning, a series of paired and independent samples t-tests were used to evaluate differences in the overall acceptability threshold of simulated, field-based and base photos.
Two-way mixed ANOVAS were used to further explore the relationship between PAOT and acceptability ratings for each photo in the series for simulated and field-based photos at each site (Field, 2018). Mixed ANOVAS were chosen because independent samples were used to solicit responses from field-based and simulated photographs. Two-way mixed ANOVAS were used to test the interaction between photo-type (e.g., simulated, field-based and base photos), and photo number in the series (e.g., 1, 2, 3, 4, 5, 6). Base photos could not be included in this analysis because there was no photo-series used for this open-ended question type, and this analysis focuses on acceptability ratings for each photograph in the series, rather than overall acceptability thresholds. Recreation-type data were analyzed using a Repeated Measures ANOVA with post hoc comparisons to detect effect of recreation-type on PAOT acceptability ratings.

Results

To test for effects of photo-type on overall acceptability thresholds, individual thresholds for simulated and field-based photos were calculated to be compared to base-photos. Calculations were made using the ‘intercept’ function in Excel for each participant. The data testing the effect of each type of photo on overall acceptability thresholds were summarized using visual-based procedures including a reporting of a social norm curve (Figure 3), and means and standard deviations (Table 1) comparing overall acceptability thresholds based on photograph evaluations in terms of PAOT. Note that the means and standard deviations reported in Table 1 are based on all responses before and after data cleaning.
Photo-Type Effects on Overall Thresholds: Before Removing Outliers

Beach site

A Wilcoxon signed-rank test was conducted to determine the effect of different photo-types shown to the same respondent on acceptability thresholds. There was a statistically significant increase in acceptability thresholds when subjects were responding to simulated photos ($Mdn = 67.4$) compared to the base-photo ($Mdn = 50.0$), $z = -6.8$, $p < .001$. However, there was no statistically significant difference in acceptability thresholds when subjects were responding to field-based photos ($Mdn = 65.5$) compared to the base-photo ($Mdn = 50.0$), $z = -1.1$, $p = 0.27$. A Mann-Whitney U test was used to determine if there were differences in acceptability thresholds between simulated and field-based photos (e.g., independent samples). Acceptability thresholds were not statistically significantly different between simulated photos ($Mdn = 67.4$) or field-based photos ($Mdn = 65.5$), $U = 6752$, $z = -0.4$, $p = 0.69$.

Waterfall site

A Wilcoxon signed-rank test was conducted to determine the effect of different photo-types shown to the same respondent on acceptability thresholds. There was a statistically significant increase in acceptability thresholds when subjects were responding to simulated photos ($Mdn = 35.6$) compared to the base-photo ($Mdn = 12.0$), $z = -9.3$, $p < .001$. Additionally, there was a statistically significant increase in acceptability thresholds when subjects were responding to field-based photos ($Mdn = 23.4$) compared to the base-photo ($Mdn = 12.0$), $z = -4.1$, $p < .001$. A Mann-Whitney U test was run to determine if there were differences in acceptability thresholds between simulated and
field-based photos (e.g., independent samples). Acceptability thresholds were statistically significantly higher in simulated photos ($Mdn = 35.6$) than in field-based photos ($Mdn = 23.4$), $U = 7162.5, z = -7.5, p < .001$.

**Photo-Type Effects on Overall Thresholds: After Removing Outliers**

*Beach site*

Fifteen outliers, or 7% of the total sample ($N=215$), were detected that were ± 3 standard deviations away from the mean, and subsequently removed for further analysis. The assumption of normality in the ‘cleaned’ sample was not violated, as assessed by Shapiro-Wilk’s test ($p>.05$). Paired samples t-tests were run to determine whether there was a statistically significant mean difference between acceptability thresholds when responding to simulated and base-photos, and field-based and base-photos. Participants reported higher acceptability thresholds when seeing simulated photos ($M = 83.3, SD = 43.1$) as opposed to base photos ($M = 47.2, SD = 41.7$), a statistically significant mean increase of 36.1, 95% CI [26.7, 45.4], $t (108) = 7.7, p < .001, d = 0.73$.

(Note: Means compared here and elsewhere in this section do not exactly correspond with overall means in Table 2 because respondents were not always asked to provide answers for each photo-type). Participants reported similar acceptability thresholds when responding to field-based ($M = 77.9, SD = 50.4$) as opposed to base-photos ($M = 65.0, SD = 49.2$), CI [-0.8, 26.6], $t (65) = 1.9, p = .065, d = 0.23$. An independent samples t-test was run to determine if there were differences in acceptability thresholds between the group who saw simulated photos and the group who saw field-based photos. Similar acceptability threshold were reported by respondents who saw simulated photos ($M =$
80.9, SD = 44.7) and those who saw field-based photos (M = 77.6, SD = 47.3), CI [-9.5, 16.1], t (152.1) = 0.51, p = .61.

Waterfall site

Thirty-eight outliers, or 11.5% of the total sample (N=330), were detected that were ± 3 standard deviations away from the mean, and subsequently removed for further analysis. The assumption of normality was not violated, as assessed by Shaprio-Wilk’s test (p>.05). Paired samples t-tests were run to determine whether there was a statistically significant mean difference between acceptability thresholds when responding to simulated and base-photos, and field-based and base-photos. Participants reported higher acceptability thresholds when seeing simulated photos (M = 38.5, SD = 16.5) compared to base-photos (M = 16.2, SD = 12.5), a statistically significant mean increase of 22.3, 95% CI [ 19.6, 25.0], t (216) = 16.1, p < .001, d = 1.1. Participants reported higher acceptability thresholds when responding to field-based (M = 26.4, SD = 13.3) as opposed to base-photos (M = 17.2, SD = 14.0), a statistically significant mean increase of 9.2, 95% CI [5.0, 13.4], t (69) = 4.4, p < .001, d = 0.5. An independent samples t-test was run to determine if there were difference in acceptability thresholds between the group who saw simulated photos and the group who saw field-based photos. A higher acceptability threshold was reported by respondents who saw simulated photos (M = 38.4, SD = 16.2) than those who saw field-based photos (M = 25.9, SD = 13.3), a statistically significant difference, M = 12.5, 95% CI [9.1, 15.9], t (158.5) = 7.3, p < .001.

Summary
While medians, means and standard deviations were slightly altered by data cleaning, statistical associations were the same for both parametric and non-parametric testing. Generally, removing outliers in this case is not suggested, as it is likely that people have varying but equally valid opinions about use conditions during a recreation experience, and each of these opinions should be reflected in the data. This recommendation is supported by the notion that statistical inferences remain the same.

Given that effect of photo-type on acceptability thresholds is different in two unique sites, only partial support for hypothesis 1 was found. It was hypothesized that overall acceptability thresholds would differ significantly based on photo-type, yet results indicate that only base photos differ from the other photo types at each site. On the other hand, simulated and field-based photos only differ significantly at the waterfall site, where the PAOT range depicted between sets of photos differed to a much greater extent than the beach site. The relationship between acceptability ratings of each individual photo and photo-type may further explain the relationship between photo-type and acceptability. For this reason, additional analysis (i.e., Mixed Repeated Measures ANOVAs) were used to further explore the relationship between acceptability ratings, photo-type and photo number.

**Photo-Type Effects on Acceptability Ratings Across Photos**

Analyses of acceptability were conducted as a function of photo-type (e.g., simulated, field-based) and photo number (e.g., 1,2,3,4,5,6), with photo number as a repeated measure. Photo-type refers not only to simulated or field-based photos, but is also a function of unique PAOT ranges being depicted. At the waterfall site, field-based
and simulated photos show different ranges of PAOT, while the beach site shows similar PAOT ranges between photo-type. Therefore, if range of PAOT influenced acceptability ratings, differences in ratings would occur at the waterfall site, but not at the beach site.

**Beach site**

There was homogeneity of variances, as assessed by Levene’s test of homogeneity of variances ($p>.05$). However, the assumption of covariance was not met, as assessed by Box’s test for equality of covariance matrices ($p<.05$). Unfortunately, it is difficult to remedy a failure of this assumption. Most often, when the assumption of covariance is not met, a mixed ANOVA is run anyway, and the violation is reported, as is done here. Maulchy’s test of sphericity indicated that the assumption of sphericity was violated for the two-way interaction, $X^2(14) = 99.77, p < .001$. Therefore, results are reported using the Greenhouse-Geisser correction for the interaction and main effects.

There was a statistically significant interaction between the number of people in each photo and the type of photo seen (e.g., simulated or field-based) on acceptability ratings, $F(1.8, 454.2) = 5.429, p = .006, \eta^2_p = .021$. Main effects of photo number showed a statistically significant difference in mean acceptability ratings for different photos in a series, $F(1.8, 454.2) = 369.0, p < .001, \eta^2_p = 0.60$. The main effect of photo-type showed that there were statistically significant differences in mean acceptability ratings based on photo-type, $F(1, 250) = 6.5, p = .01, \eta^2_p = .03$. Interaction and main effects are summarized in Table 3.
**Waterfall site**

There was homogeneity of variances, as assessed by Levene’s test of homogeneity of variances ($p>.05$). Additionally, there was homogeneity of covariance, as assessed by Box’s test of equality of covariance matrices ($p=.895$). Maulchy’s test of sphericity indicated that the assumption of sphericity was violated for the two-way interaction $X^2 = (14) = 1217.6, p < .001$. Therefore, results are reported using the Greenhouse-Geisser correction for the interaction and main effects. There was a statistically significant interaction between the number of people in each photo and the type of photo seen (e.g., simulated or field-based) on acceptability ratings, $F (2.2, 931.3) = 6.0, p = .002, \eta^2_p = .01$. Main effects of photo number showed that there were statistically significant differences in mean acceptability ratings for different photos in a series, $F (2.2, 931.3) = 526.9, p < .001, \eta^2_p = .56$. The main effect of photo-type showed that there were statistically significant differences in mean acceptability ratings based on photo-type, $F (1, 417) = 4.0, p = .05, \eta^2_p = .01$. Interaction and main effects are summarized in Table 3.

**Summary**

Hypothesis 2, which stated that the PAOT range difference between photo-types at each site would cause models to behave differently, is refuted. Models of beach and waterfall sites both showed that photo-type and photo number have significant effects on acceptability ratings at both sites. This was unexpected because the beach site showed a smaller range difference of PAOT between simulated and field-based photos, while the waterfall site showed greater range differences between photo-types. If range of PAOT
influenced acceptability ratings, we would expect to see the observed differences at the waterfall site but not at the beach site. Therefore, results indicate that range of PAOT does not have a significant effect on acceptability ratings.

**Recreation-Type Effects**

A social norm curve was developed for evaluations of different types and numbers of recreational boaters on the Delaware River (Figure 4). A visual inspection of Figure 4 shows that the images with 9 boats at unequal proportions (photographs 7 and 8 in the series) are less acceptable to respondents than the image of 9 boats of near-equal proportions (photo 4 in the series). A repeated-measures ANOVA was conducted to test for statistical associations. A summary of results can be found in Table 4.

Analysis of BAOT acceptability ratings were conducted with photo number as the repeated measure. For each significant omnibus effect, effect size is reported as partial eta-squared ($\eta_p^2$). Bonferroni corrections (with a familywise alpha level of $p<.05$ for each analysis) were used for all post hoc pairwise comparisons.

There were 12 outliers in the data, as assessed by inspection of a boxplot. However, none of the outliers were extreme outliers, and would not impact the outcomes of the RM-ANOVA, so were not removed from the data. Acceptability ratings were non-normally distributed, as assessed by Shapiro-Wilk’s test ($p > .05$). However, an RM-ANOVA was still used because non-normality does not affect Type I error rate substantially and the one-way RM-ANOVA can be considered robust to non-normality when sample size is greater than 50 ($N=196$ in this case) (Field, 2018). Maulchy’s test of sphericity indicated that the assumption of sphericity had been violated, $X^2(27) = 754.0$, $p$
= < .001. Therefore, the Greenhouse-Geisser correction was used for the reporting of all results.

Acceptability ratings were statistically significantly different based on photo number in the series, $F(2.6, 419.4) = 330.9, p < .001, n_p^2 = 0.67$, with acceptability ratings decreasing from photo 1 ($M = 3.7, SD = 1.0$) through photo 6 ($M = -1.5, SD = 2.4$). Post hoc analysis with a Bonferroni adjustment were considered for photos 4, 7 and 8, as these photos showed the same number of BAOT (e.g., 9) with different proportions of paddlers and motor-boaters in each. It was hypothesized that photos 4, 7 and 8 would significantly differ from one another because of the unique proportions of recreation-types shown in each image. Post hoc analysis with Bonferroni adjustments revealed that acceptability ratings decreased from photo 4 ($M = 1.1, SD = 2.0$) to photo 7 ($M = -0.7, SD = 2.6$), a statistically significant mean decrease of $-1.8, SE = 0.2, p < .001$. Additionally, acceptability ratings decreased from photo 4 ($M = 1.1, SD = 2.0$) to photo 8 ($M = -1.1, SD = 2.6$), a statistically significant mean decrease of $-2.2, SE = 0.2, p < .001$. Lastly, acceptability ratings decreased from photo 7 ($M = -0.7, SD = 2.6$) to photo 8 ($M = -1.1, SD = 2.6$), a statistically significant mean decrease of $-0.4, SE = 0.1, p = .004$.

Summary

Hypothesis 3, which stated that different proportions of recreation-types shown in an image would impact acceptability ratings, was supported. The photographs of interest (e.g., photos, 4, 7 and 8) each showed 9 boats. Photo 4 showed near equal proportions of paddlers and motor-boaters, while photo 7 showed more paddlers, and photo 8 showed more motor-boaters. Acceptability ratings for each photo were significantly different
from the others, indicating that recreation-type, not only number of boats, impact feelings of crowding.

**Discussion**

The results of this study were interpreted using norm theory and associated visual-based methods to offer refinement and future research direction in the development of normative thresholds for social conditions (e.g., crowding). Visual-based methods are a useful tool for evaluating acceptability preferences for social conditions, yet methodological developments may be needed to increase validity while minimizing the resources used and limitations associated with photo simulations.

An examination of photo-type effects and recreation-type effects suggested substantial differences in responses based on the photo-type seen, or the diversity of recreation activities seen. Results from this investigation somewhat challenged the claim that methodological alterations of visual-based methods do not greatly influence self-reports of crowding preferences (Cribbs, 2018; Freimend et al., 2002; Hall & Roggenbuck, 2002; Krymkowski et al., 2009; Manning, 2011; Manning & Freimund, 2004; Manning et al, 1996a; Jacobi et al., 1996; Manning et al., 1999; Needham et al., 2004; Needham & Rollins, 2005; Needham et al., 2011). That said, none of these studies examined unique data collection tools (e.g., field-based or base-photos) and few have examined the effect of recreation-type (Freimund et al., 2002; Jacobi et al., 1996; Lucas, 1964). Therefore, the findings of this research offer unique insights that may have important implication for the validity of research using normative photo-based methods in the future.
Photo-Type Effects

Base photos

To reiterate, base photos were those that showed an unpopulated photo of the site, and were meant to provide a bounded frame of reference that respondents could refer to when prompted to write in their PAOT “acceptability level” in an open-ended question format. Results indicated that base-photos had the most restrictive PAOT threshold, and was the only photo-type to consistently differ from the other photo-types (e.g., simulated and field-based) at both sites. The results may be explained by question format. While no other research examining PAOT acceptability has used a base-photo to prompt open-ended responses, research has found that narrative, open-ended response formats may provide relatively conservative estimates of crowding norms when compared to visually-based, close-ended formats (Manning, 1999; Manning et al., 1995; Manning & Krymkowski, 2010). The same was found in this study using base-photos.

The more conservative estimates of PAOT acceptability using base-photos with open-ended response formats may exist for several reasons. First, in any normative question-type, researchers hope that as part of the process, respondents will envision a comprehensive and likely spectrum of conditions, including those that are very crowded (Hall & Roggenbuck, 1992; Manning et al., 1996a). However, the use of open-ended response formats, even when coupled with a base-photo, does not ensure that this is the case. A respondent might understandably assume that the question refers to their actual experience with conditions. If they had not experienced crowded conditions before, they may assume that the use levels were not a problem, and therefore report acceptability
based on personal experiences alone. A second explanation may be that this type of norm is rarely articulated. Most people know that if a site becomes crowded to a certain level, that this would impact their experience—however how often is that norm consciously expressed? Especially in highly developed sites, it may become difficult for respondents to articulate a level with no reference point. Providing anchor points, as occurs in close-ended formats depicting a range of conditions, enables respondents to refer to a shared and full range of possible conditions (Hall & Roggenbuck, 2002).

**Recommendation.** There are situations in which an open-ended response format coupled with a base-photo may be appropriate and recommended. For instance, in a recreation area that manages multiple, unique recreation sites (such as DEWA), there may be a need to investigate crowding preference estimates at many sites. In these cases, it would not be practical to use a series of populated photographs for all sites of interest. The time and resources it takes to build a series of photos, and the added burden on respondents to filter through many sets of photos is reason enough to use a different approach. The use of base-photos for each site, coupled with asking respondents to write in a maximum acceptable PAOT may be a useful alternative. Where base-photos and open-ended response formats are appropriate, caution should be observed and management judgement should consider that the visitor-reported maximum acceptable condition may indeed be a conservative estimate.

*Simulated and field-based photos*

To reiterate, simulated photos are those that have been manipulated by researchers to depict a specific range of conditions. Field-based photos are those that are real photos,
captured at the site of interest, depicting actual conditions at a site. For both types of photos, the photo-series is coupled with a close-ended Likert-type scale ranging from -4 (very unacceptable) to +4 (very acceptable) with a neutral point of 0. When comparing overall acceptability thresholds, the waterfall site showed significantly different thresholds based on photo-type, while the beach site did not. One potential explanation for these inconsistent results may be that simulated and field-based images naturally showed different ranges of PAOT in each photo series. The waterfall site had a greater range difference between photo-types than the beach site, leading to the conclusion that range of PAOT shown in images may in fact impact acceptability ratings. However, further investigation was warranted to confirm this conclusion, which involved examining acceptability ratings across all photos in each series, rather than overall acceptability thresholds.

Interestingly, additional analysis concluded that both photo number and photo type influence acceptability thresholds at both sites. It seems surprising that the Mixed-ANOVA models behaved similarly at both sites. It was expected that the interaction between photo number and photo type would show differences in acceptability thresholds at the waterfall site, where there was greater variability in PAOT ranges in each photo series. On other hand, it was expected that the same interaction would not be significant at the beach site, given similarities in PAOT ranges for each photo series. This surprising finding that both sites showed an impact on acceptability ratings by photo number and photo type may indicate that PAOT range is not the reason for differences in acceptability thresholds. Therefore, differences may stem from other photographic characteristics, such
as the density and distribution of people in the foreground and background of each photo. Given that one explanation for the results of this study may be photograph characteristics, it is important to consider the unique features of each photo-type, and the benefits and drawbacks associated with each method.

Benefits and Drawbacks of Photo-Types

Simulated and field-based photos may look similar, but have several key differences that may contribute to the occurrence of different acceptability ratings depending on photo-type. The next section explains how each type of photo is developed before exploring the different characteristics associated with each photo-type.

**Simulated photos.** Simulated photos are typically developed using *Adobe Photoshop* or a similar software, which takes time and careful practice to use effectively. Photos are most often developed in two unique ways. One common approach to developing simulated photos is to first gather images to populate a base-photo. The procedure begins by populating the base-photo image with the highest number of items, and then removing items at equal intervals until no more items are shown—resulting in a range of conditions from zero to a potential future condition. It can be especially challenging to place items in a photo when the original items and the base-photo are in different places—which is often the case. So, when base-photos are being populated with people, for example, the images of people are sometimes taken out of context. For instance, studies of outdoor recreation at a beach in California might use photos that have been populated with images from a beach in Vermont, if that is the only available
solution. This can result in unrealistic images and a misrepresentation of what people do and how they behave at a site.

The simulation of images allows researchers to control for factors that may influence responses, such as the spread of individuals to balance their placement in the foreground, background and across photos (Manning & Freimund, 2004). While this type of manipulation is meant to control for factors that might take attention away from the condition of interest (e.g., PAOT), it tends to unrealistically depict density and distribution of users across a site. Depending on which method was employed to develop simulated images, individuals in manipulated images may not be participating in recreation activities common to the site, such as swimming in a river or lounging at a beach. The act of selecting and manipulating placement of items in an image so as not to effect responses may in fact create unrealistic portrayals and issues with validity. Given that participants should be responding to conditions as close to reality as possible, accurately representing conditions at a site is an important consideration. Results of this study suggest that range may not be the factor that is influencing acceptability ratings, but rather other differences between photo-types such as the density, distribution and activities of people across a site—however future research is needed to isolate these specific factors. Yet, simulated photos seem more prone to concerns related to the construct validity associated with portrayed conditions.

Field-based photos. Field-based photos are developed by collecting a series of photographs that depict a range of conditions at a site. A field-camera was used for this purpose, as the camera can be deployed in the early field season and set to take a
photograph at specified intervals (e.g., every 30 minutes). In this way, different conditions are captured, and photographs that depict the truest range of conditions can be identified and used in subsequent data collection. Because field-based photos are un-manipulated, the density, distribution and activities of visitors to the site are represented accurately and realistically, and represent users and use conditions that are true to the site.

Employing field-based photos also has drawbacks. For instance, just as simulated photos sometimes require the use of field-cameras in the early field season, access to a site in the early field-season, or the season prior to data collection, is always required for the field-based approach. To be effective and accurate, a realistic range of use conditions must be captured. Image-capture in the early peak use season may result in a misrepresentation of actual use conditions. Employing field cameras during the season prior would be ideal, but fraught with logistical challenges such as access to the site and to research assistance to facilitate the process. Relatedly, using field-based photos diminishes the opportunity for predictive capabilities. Recreation managers may be interested in understanding at what future use level a site will reach minimum acceptable conditions, if it hasn’t already. Yet without manipulating photos, there is no way of depicting conditions that capture potential future higher use levels. Lastly, field-based photos may be considered less ‘experimental’ because researchers lose control of intervening variables, such as controlled incremental increases in PAOT between each photo, and the placement of people in the foreground or background.

**Recommendation.** Based on the results of this study, it is recommended to use a combination of both field-based and simulated photos where possible. The use of field-
based photos to evaluate crowding preferences can save time and resources commonly put towards developing simulated photographs. Moreover, field-based photos depict an accurate representation of conditions, ensuring that respondents’ preferences are based on reality. The suggestion to use a combination of field-based and simulated photos stems from potential management objectives that might require predictive capabilities. It is suggested that field-based photos are used to represent current conditions, while one or two simulated photos be manufactured directly from the most crowded field-based photo to represent likely future scenarios. This recommendation preserves the utility of photos to emulated future use conditions, while simultaneously presenting realistic use conditions and minimizing resources put towards developing a range of simulated photos.

**Recreation-Type Effects**

Research shows that factors beyond use-levels influence feelings of crowding. Other factors include the recreation activity others are engaged in, their mode of travel, and their group size (Jacobi et al., 1996; Manning & Freimund, 2004). This study examined visitor preferences about the number of boats at one time (BAOT), including how varying proportions of recreation activities shown might impact crowding preferences. Results suggest that at nine BAOT, a near-equal proportion of boat-types results in a significantly higher acceptability rating than unequal proportions of boat-types. This finding is somewhat surprising, given that many more paddlers frequent this area than motorized boaters. Less surprising, however, is the finding that the photo showing a higher proportion of motor-boaters was considered the least acceptable of the three photos.
Recommendation

The results of this study corroborate earlier work (Freimund et al., 2002; Jacobi et al., 1996; Lucas, 1964), that found that crowding-related preferences were influenced not only by number, but also by the types of other users. In the examination of crowding preferences in this study, a slight change in proportion of paddlers vs. motor-boaters had a significant effect on PAOT acceptability ratings. Therefore, realistic representation of the variety of recreation activities occurring at site is necessary for accurately evaluating crowding preferences using visual methods. As has been demonstrated, using field-based photos will ensure a realistic representation of activities at site, therefore they are recommended specifically in places where multiple forms of recreation are occurring simultaneously.

Conclusions

This investigation of the effect of photo-type and recreation-type on crowding preferences is indicative of the importance of examining the validity of visual-based methods. After nearly 40 years of applying visual-based methods to inform management decisions, it is essential that methodological improvements be considered where possible. While management decisions are not exclusively derived from the results of visitor questionnaires—the data collected does inform decisions that are related to management objectives. For example, at DEWA, these data were used to inform the development of a visitor use management (VUM) plan. This article is not an exhaustive investigation of potential issues with visual-based methods, but the results indicate ways to improve validity and suggestions for future research.
This study found that base-photos result in the most conservative PAOT thresholds. Extended analysis revealed that acceptability ratings of simulated and field-based photos were significantly influenced by photo number and the type of photo at both sites. Given that the waterfall site showed a large difference in PAOT range between photo-types, and the beach site showed similar PAOT ranges in each photo-type, it seems likely that PAOT range does not influence acceptability ratings—but that other factors such as density, distribution, and activities of visitors portrayed might influence acceptability ratings. Additionally, different activities engaged in by recreationists portrayed (e.g., paddlers vs. motor-boaters) impacted acceptability ratings. Future research is needed to isolate specific factors such as the density and distribution of people, background and image perspective, as these factors may be indicative of additional considerations people use to develop their feelings about crowding.

Overall, recreation experiences are a complex phenomenon which may never be fully understood. This study, and others like it, contribute to a more complete understanding of factors that impact crowding preferences, and the most effective ways of capturing such preferences in research design. This research adds to the ongoing literature supporting the science-based, systematic process of visitor management that helps to protect natural-resource based experiences at parks and other tourism sites.
References


### Tables

**Table 1. Summary of Mean Acceptability Thresholds by Photo Type**

<table>
<thead>
<tr>
<th>Location</th>
<th>Simulated Photo</th>
<th>Field-based Photo</th>
<th>Base Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>SD</td>
</tr>
<tr>
<td><strong>Outliers included</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beach Site</td>
<td>77.8</td>
<td>67.4(^a)</td>
<td>59.0</td>
</tr>
<tr>
<td>Waterfall Site</td>
<td>40.2</td>
<td>35.6(^ac)</td>
<td>27.0</td>
</tr>
<tr>
<td><strong>Outliers removed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beach Site</td>
<td>80.9(^a)</td>
<td>--</td>
<td>44.7</td>
</tr>
<tr>
<td>Waterfall Site</td>
<td>38.4(^ac)</td>
<td>--</td>
<td>16.2</td>
</tr>
</tbody>
</table>

*Note.* \(^a\) indicates significant differences between simulated and base-photos at \(p < .05\)  
\(^b\) indicates significant differences between field-based and base-photos at \(p < .05\)  
\(^c\) indicates significant differences between simulated and field-based photos at \(p < .05\)
Table 2. *Summary of Photograph PAOT Ranges and Photograph Acceptability by Photo Number and Photo-Type*

<table>
<thead>
<tr>
<th>Photo Type</th>
<th>Photo Number</th>
<th>PAOT in photo</th>
<th>Mean (SD)</th>
<th>PAOT in photo</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulated</td>
<td>1</td>
<td>0</td>
<td>3.6 (1.3)</td>
<td>0</td>
<td>3.6 (1.3)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>15</td>
<td>3.4 (1.2)</td>
<td>10</td>
<td>3.1 (1.6)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>30</td>
<td>2.7 (1.6)</td>
<td>20</td>
<td>2.3 (1.8)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>55</td>
<td>1.3 (2.0)</td>
<td>35</td>
<td>0.5 (2.4)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>80</td>
<td>-0.2 (2.5)</td>
<td>50</td>
<td>-1.3 (2.6)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>110</td>
<td>-1.6 (2.6)</td>
<td>65</td>
<td>-2.4 (2.5)</td>
</tr>
<tr>
<td>Field-based</td>
<td>1</td>
<td>0</td>
<td>3.6 (1.6)</td>
<td>0</td>
<td>3.5 (1.6)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
<td>3.4 (1.5)</td>
<td>5</td>
<td>3.1 (1.4)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>25</td>
<td>2.9 (1.5)</td>
<td>10</td>
<td>2.4 (1.8)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>38</td>
<td>2.2 (1.5)</td>
<td>22</td>
<td>0.8 (2.3)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>55</td>
<td>0.8 (2.4)</td>
<td>27</td>
<td>-0.4 (2.5)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>105</td>
<td>-1.0 (2.8)</td>
<td>38</td>
<td>-1.4 (2.5)</td>
</tr>
</tbody>
</table>

*Note.* PAOT = People at One Time. SD = Standard Deviation. Means are based on a 9-point Likert scale ranging from -4 (very unacceptable) to +4 (very acceptable) with a neutral point of 0.
Table 3. Mixed Analysis of Variance of Acceptability Ratings by Photo Number and Photo-Type

<table>
<thead>
<tr>
<th>Site</th>
<th>Predictor</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
<th>$n_p^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beach</td>
<td>Photo Number</td>
<td>5.0</td>
<td>4080.6</td>
<td>2246.2</td>
<td>369.0</td>
<td>.001</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>Photo Type</td>
<td>1.0</td>
<td>70.8</td>
<td>70.8</td>
<td>6.5</td>
<td>.012</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>PhotoNumber*PhotoType</td>
<td>1.8</td>
<td>60.0</td>
<td>33.1</td>
<td>5.4</td>
<td>.006</td>
<td>0.02</td>
</tr>
<tr>
<td>Waterfall</td>
<td>Photo Number</td>
<td>2.2</td>
<td>6542.1</td>
<td>2929.3</td>
<td>526.9</td>
<td>.001</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>Photo Type</td>
<td>1.0</td>
<td>55.7</td>
<td>14.0</td>
<td>4.0</td>
<td>.047</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>PhotoNumber*PhotoType</td>
<td>2.2</td>
<td>74.5</td>
<td>33.4</td>
<td>6.0</td>
<td>.002</td>
<td>0.01</td>
</tr>
</tbody>
</table>

*Note. SS = sum of squares, MS = mean squares, effect size = $n_p^2$, significant at the p < .05 level.*
Table 4. *Repeated Measure Analysis of Variance of Acceptability Ratings by Recreation-Type*

<table>
<thead>
<tr>
<th>Photo Number</th>
<th>Proportion of Activity-Type</th>
<th>Mean (SD)</th>
<th>Photograph Comparison</th>
<th>Mean Difference (SE)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5 paddlers, 4 motorized</td>
<td>1.1 (2.0)</td>
<td>7</td>
<td>1.8 (0.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td>2.2 (0.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>7</td>
<td>6 paddlers, 3 motorized</td>
<td>-0.7 (2.6)</td>
<td>4</td>
<td>-1.8 (0.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td>0.4 (0.1)</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>8</td>
<td>3 paddlers, 6 motorized</td>
<td>-1.1 (2.6)</td>
<td>4</td>
<td>-2.2 (0.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td>-0.4 (0.1)</td>
<td>&lt;.005</td>
</tr>
</tbody>
</table>

F (2.6, 479.4) = 330.9, p < .001, $n_p^2 = .67$

*Note.* The F-test reported in this table is the omnibus effect of photograph number on acceptability ratings, including all photographs in the original series (e.g., photos 1-8). All additional relationships are from post hoc Bonferroni corrections with a familywise alpha level of <.05.
Figures

Figure 1. Photo-Type Effects Sample Photographs

Beach Site (Smithfield Beach)  Waterfall Site (Van Campens Glen)

Simulated Photos

Field-Based Photos

Base-Photos
Figure 2. Recreation-Type Effects Sample Photographs

River-based Photos

Near-equal proportion of paddlers and motor-boaters
(5 paddlers, 4 motor-boaters)

More paddlers
(6 paddlers, 3 motor-boaters)

More motor-boaters
(6 motor-boaters, 3 paddlers)
Figure 3. Photo-Type Social Norm Curves

Beach Area (Smithfield Beach)

Waterfall Area (Van Campen Glen)

Note. Simulated photos neutral point: 78
Field-based photos neutral point: 78
Base-photos neutral point: 61

Note. Simulated photos neutral point: 40
Field-based photos neutral point: 26
Base-photos neutral point: 21
Figure 4. *River-based Social Norm Curve*

**River-based**

![River-based Social Norm Curve](image)

*Note.* Acceptability level at 9 boats with equal proportions: 1.13
Acceptability level at 9 boats with more paddlers: -0.7
Acceptability rating at 9 boats with more motor-boaters: -1.10
CHAPTER FOUR

FROM DISPLACED TO MISPLACED: EXPLORING THE EXPERIENCE OF VISITORS WHO WERE ‘CROWDED OUT’ OF THEIR RECREATION DESTINATION

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Abstract

This article reports on recreationists’ response to being displaced from their recreation destination or activity. Displacement occurs when visitors leave a site or change activities in response to an unacceptable or adverse change in social, managerial or resource conditions. This article specifically examines displacement as a response to crowding using a blended analysis of qualitative and quantitative data at Delaware Water Gap National Recreation Area (DEWA). Visitors who had been displaced in the past from DEWA were asked to evaluate their experience and associated outcomes using qualitative and quantitative measures. Results indicated that displacement occurs frequently and is a problem for visitors, but that it may be a successful coping strategy. Spatial displacement may serve as a better relief from stress than temporal displacement. The authors suggest that displacement be treated as an indicator of the visitor experience, rather than as an outcome.
Introduction

Visitor use management is among the most important considerations when managing national parks and similar protected areas. Wherever recreation is allowed, impacts to a place’s resources and the visitor experience are inevitable (Hammit, Cole & Monz, 2015; Manning, 2011). Yet, visitation is an essential mechanism to gain relevancy and support to help sustain protected areas. Recreational use of natural places occurs because the experience is desirable and people benefit in a variety of ways through interacting with nature. When visitors cannot, or do not want to recreate in protected areas, it often threatens the importance of these places in society.

Decades of research have been dedicated to understanding the quality of an outdoor recreation experience (Manning, 2011). Encountering undesirable conditions within a recreation setting such as crowding, conflict, poor natural or cultural resource conditions can lead to negative perceptions about the experience (Miller & McCool, 2003; Schenider, 2007; Schuster, Hammit & Moore, 2006). To evaluate the effects of unfavorable conditions on the recreation experience, a substantial amount of research has been dedicated to social conditions, such as crowding and conflict (Manning, 2011; Miller & McCool, 2003; Scheider & Hammit, 1995; Schuster et al., 2006).

One critique of visitor satisfaction research is the consistent finding in the literature that on-site conditions do not necessarily correlate with the quality of the visitor experience (Laven & Krymkowski, 2005), which satisfaction often serves to measure. Some argue that the measure of satisfaction may not adequately account for factors that either positively or negatively impact the overall experience, while others assert that the
relationship between on-site conditions and visitor satisfaction is multifaceted, and warrants further investigation (Manning & Valliere, 2001; Miller & McCool, 2003).

One explanation of this relationship is that visitors who have been disturbed during their experience engage in cognitive or behavioral coping strategies, allowing them to retain feelings of satisfaction regardless of on-site conditions (Manning & Valliere, 2001; Manning, 2011; Peden & Schuster, 2004; Schneider & Hammitt, 1995; Schuster et al., 2006). A coping strategy that has received considerable attention in the literature is displacement (Manning, 2011; Schneider, 2007). The causes and types of displacement are somewhat-well documented, however due to the difficulties associated with reaching visitors who may have been displaced from their recreation destination, there is limited understanding of the outcomes of displacement on the visitor experience (Booth, Cressford, McCool & Espiner, 2011; Schuster et al., 2006). Outcomes associated with displacement are of particular interest because of the on-site techniques used to evaluate visitor preferences about experiential conditions. If displaced visitors have lower crowding tolerances than visitors who were not displaced, for example, natural areas may be increasingly and incrementally managed towards only one segment of the population, those who can tolerate a higher density of visitors. The overarching goal of this study, therefore, was to explore perceptions and responses towards being displaced by those who have been displaced in the past from Delaware Water Gap National Recreation Area (DEWA).
Literature Review

Crowding and visitor conflict are among the most fundamental and important areas of research in outdoor recreation (Manning & Valliere, 2001). The steady increase in amount and diversity of outdoor recreationists since the 1960’s has threatened the quality of both the natural resources and the visitor experience, intensifying the challenge of fulfilling the NPS dual mandate. Decades of research have been dedicated to understanding how to provide a quality visitor experience without causing unacceptable damage to the resource or the visitor experience (Manning, 2007; 2011).

Crowding has received arguably the most attention in outdoor recreation research and practice (Manning, 2007; 2011), and can be defined as the negative response or evaluation of the level of use at a site (Kuentzel & Heberlein, 1992). Early research hypothesized that crowding and satisfaction were linked—the higher the use-levels, the more likely feelings of crowding will occur, and satisfaction with the experience will decrease (Manning, 2011). However, the relationship between crowding and satisfaction is weak, as outdoor recreation visitors tend to be satisfied regardless of experiencing feelings of crowding (Manning & Valliere, 2001; Manning, 2011; Propst, Schuster & Dawson, 2000). Coping theory is one explanation for the weak relationship between use-levels, crowding and satisfaction (Manning & Valliere, 2001).

Coping and the Transactional Stress-Coping Framework

One possible explanation for the unintuitive relationship between feelings of crowding and high satisfaction is that visitors find ways to cope with undesirable conditions (Johnson & Dawson, 2004; Manning, 1999; 2011; Manning & Valliere, 2001;
Schneider & Hammitt, 2005). Coping theory views outdoor recreation as goal-oriented, where visitors are seeking specific outcomes from their experience (Jacob & Schreyer, 1980; Schneider & Wynveen, 2015). If the goal is not achieved, it is assumed that goal-interference has occurred through recreation constraints and/or conflict (Schenider & Wynveen, 2015), and that visitors will adopt coping mechanisms to maintain the quality of their experience. Coping is generally defined as “constantly changing cognitive and behavioral efforts to manage specific external and internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984, p. 141).

Within the outdoor recreation literature, there is a substantial amount of work that has adopted the transactional-stress coping framework to study visitors’ responses to recreation interferences (Lazarus & Folkman, 1984). The transactional stress-coping framework (Figure 1) contains four primary components: 1) influencing factors, 2) appraisals, 3) coping, and 4) outcomes. Influencing factors consist of situational and personal variables (Propst et al., 2009). The appraisal process is two phased (i.e., primary and secondary), and simultaneously occurring, where a visitor determines if a situation is stressful and then decides if the stress can be controlled by adopting coping mechanisms (Lazarus & Folkman, 1984). If visitors perceive to have control over their stressor, a coping response will be employed to regain feelings of satisfaction. However, if satisfaction is not regained, future appraisals may occur and subsequently influence attitudes towards the overall experience either negatively or positively, depending on the success or failure of the coping strategy adopted (Schnieder & Hammitt, 1995; Schuster, Hammitt & Moore, 2003).
The transactional stress-coping framework classified coping mechanisms as either cognitive or behavioral (Lazarus & Folkman, 1984). More recently, Schneider and Wilhelm Stanis (2007) re-conceptualized cognitive and behavioral to problem focused (behavioral) and emotion focused (cognitive), terms used more commonly in stress research. Emotion focused, or cognitive coping mechanisms represent mental shifts that are undertaken to reduce stress emotions by either changing the meaning of the stressor, or by taking attention away from it (Arnberger & Eder, 2012; Oftedal, Kang & Schneider, 2015; Schnieder & Wynveen, 2015). These types of coping mechanisms are called product shift and rationalization, respectively. The hierarchical model of coping suggests that lower levels of stress will elicit an emotion focused, cognitive coping response, while higher levels of stress will provoke problem focused, behavioral coping strategies (Miller & McCool, 2003).

Problem focused, or behavioral coping mechanisms occur when levels of stress are high, and when visitors perceive that they have the power to change their negative situation and act to maintain desired satisfaction (Schneider & Wilhelm Stanis, 2007). Problem-focused strategies include behavioral responses, such as visitors taking direct action (e.g., telling a park ranger about the conflict or constraint), and displacement, whether spatial or temporal (Shelby & Vaske, 1991). The concept of ‘displacement’ as a behavioral coping mechanism has received considerable attention in the literature, likely because it occurs when cognitive coping strategies do not work (Miller & McCool, 2003), thus transpires in only high stress or high conflict situations.
The transactional stress-coping model suggests that adopting coping strategies will help to regain feelings of satisfaction and help maintain positive attitudes about the overall visitor experience. Interestingly, however, limited research has successfully examined the relationship between coping and satisfaction with the recreation experience. Outcomes associated with behavioral coping mechanisms are especially difficult to capture due to the complex spatial and temporal changes that limits access to displaced visitors (Booth et al., 2011). Those studies that have examined behavioral coping outcomes have found inconsistent results. Schuster and colleagues (2006) found that behavioral coping mechanisms (e.g., displacement, direct action) detract from the recreation experience and reduce satisfaction. Robertson & Regula (1994) found similar results, where boaters in Iowa reported lower satisfaction when they experience displacement. However, a study of Minnesota anglers (Schroeder & Fulton, 2010) suggests that adopting behavioral coping mechanisms may reduce or eliminate stress, while cognitive coping mechanisms leave the visitor in close contact with the stressor and are less effective. Given these discrepancies, Schroeder & Fulton (2010) assert that coping mechanisms should be explicitly defined and measured separately to clarify how unique coping responses can affect satisfaction. For these reasons, this paper focuses specifically on displacement as a coping strategy, and is the first to adopt qualitative approaches to understand the relationship between causes of stress, displacement and attitudes about the recreation experience.
**Displacement**

Within the realm of behavioral coping strategies, displacement is perhaps the most often studied response (Schneider, 2007). According to Schneider (2007), displacement occurs when visitors leave a site or change activities in response to an unacceptable or adverse change in social, managerial or resource conditions. Displacement as a response to social conditions (e.g., crowding, conflict and hassles) has been classified as spatial or temporal. Spatial displacement occurs when a user seeks out a more desirable location either within the same site (intra-site displacement) or at an entirely new area (inter-site displacement). Temporal displacement occurs when recreationists choose to visit at different times to avoid undesirable conditions. Some authors have classified these forms of displacement as substitution behaviors (Miller & McCool, 2003; Shelby & Vaske, 1991) because a visitor is substituting either the space or the time by which to participate in their activity. The most extreme form of displacement, or discontinued engagement with the resource entirely, is absolute displacement (Miller & McCool, 2003; Schnieder & Wilhelm Stanis, 2007; Shelby & Vaske, 1991). The hierarchical model of coping asserts that absolute displacement occurs only after cognitive coping strategies and spatial or temporal displacement fail to regain satisfaction (Fleishman, Feitelson & Salomon, 2007; Miller & McCool, 2003). The distinction between displacement and substitution is important yet unclear, and an extended dialogue can be found in the discussion section of this paper.

Beginning as early as 1977, displacement as a function of crowding has been examined in outdoor recreation (Nielsen & Shelby, 1977; Wohlwill & Heft, 1977). For
instance, Nielsen and Shelby (1977) found that rafters on the Colorado River in Grand Canyon National Park changed the amount of time spent at sites (i.e., temporal displacement) and the number of sites visited (i.e., spatial displacement) due to high use levels and feelings of crowding. Research at the Boundary Water Canoe Area in Minnesota found similar outcomes, where visitors were employing behavioral coping mechanisms to avoid undesirable conditions (Anderson & Brown, 1984; Peterson, Anderson & Lime, 1982). A study in Danube Floodplains National Park in Austria compared how nearby residents, regional visitors and tourists differed in their responses to crowding (Arnberger & Brandenburg, 2007). They found that local and regional residents were more likely to displace than tourists. A study examining spatial and temporal displacement of boaters on Lake Billy Chinook, Oregon found that about half of all respondents reported altering their behavior either spatially or temporally (Hall & Shelby, 2000). Spatial and temporal displacement have been repeatedly reported as the most frequent coping mechanisms as a response to crowding (Gramman, 2002; Hall & Cole, 2000; Hall & Shelby, 2000; Johnson & Dawson, 2004; Schneider, 2007).

Research suggests that visitors will adopt displacement behaviors to deal with problems of conflict (Schneider & Hammitt, 1995), recreation stressors (Schneider & Wilhelm Stanis, 2007), and managerial or resource changes (Cole & Hall, 2009; Schneider, 2007), with crowding conditions being the most common stressor or undesirable condition causing displacement (Cole & Hall, 2009; Schneider, 2007). Others have explored individual attributes that might influence engagement in displacement, such as recreation motivation and commitment (Lyu & Oh, 2014; White, 2008), past-use
history (Arnberger & Brandenburg, 2007), and everyday hassles or annoyances (Schuster et al., 2006) on decisions to displace. Still, most displacement studies focus on influencing factors, appraisals and decision to cope when applying the transactional stress-coping model, and less attention is given to the outcomes associated with experiencing displacement.

Research Purpose

Past research has explored and successfully described reasons for displacement and actions taken to relieve it, yet it is still unclear if displacement behaviors are adequate relief from conflict or stress (Schneider & Wynveen, 2015). For instance, limited studies have effectively evaluated attitude shifts after coping has occurred. Several explanations exist for this gap in the literature, and largely fall into two lines of reasoning. First, given current data collection approaches, it is difficult or not feasible to reach visitors who may have coped by leaving the site—marking it nearly impossible to understand how/if their attitudes shifted after they coped. Booth et al. (2011) noted that the outcomes of behavioral coping mechanisms have been examined less due to the difficulty of these measures. Laven & Krymkowski (2005) suggest that the ideal data collection method to reach visitors who have already been displaced would employ off-site contacts. Realistically, however, the field of outdoor recreation research has not yet advanced in ways that will pragmatically, accurately and consistently address displaced visitors using off-site methods. It seems likely that off-site methods would fail to reach enough visitors who have been displaced from a specific recreation area, with the additional burden of being expensive and time consuming. Second, the few studies that have linked coping
strategy with feelings of satisfaction have produced inconsistent findings (Arnberger &
Eder, 2012; Chen, 2013; Hung & Hsieh, 2014; Schuster et al., 2006; Schroeder & Fulton,
2010). The authors of these studies have cited measurement error associated with varying
definitions of coping constructs (Schroeder & Fulton, 2010), and the time frame of the
evaluation (e.g., evaluating an entire season vs. a specific event) (Miller & McCool,
2003) as potential explanations for these inconsistencies.

Therefore, this research continues to use on-site methods, yet is more intentional
and detailed than previous coping research in that it 1) focuses specifically on one social
detractor (e.g., crowding), 2) focuses on the definition of, and responses to, one coping
strategy (e.g., displacement), and 3) specifically asks respondents about their feelings and
attitudes towards being displaced using both quantitative and qualitative strategies.

Given that displacement may be the most extreme reaction to recreation stress or
conflict (Fleishman et al., 2007; Miller & McCool, 2003), the number of displaced
visitors and their attitudes about being displaced may be indicative of the quality of the
recreation resources available to them. Therefore, an exploration of displaced visitors,
their attitudes towards displacement, and displacement serving as a direct management
consideration has great potential and is explored in this paper based on the following
research questions:

1) How do visitors perceive the experience of being displaced?

2) What do visitors do when they are displaced?

3) How do visitor perceptions of being displaced relate to actions taken once
   displaced?
Methods

Description of the Research Location

People visit the National Park Service’s Delaware Water Gap National Recreation Area (DEWA) for its diverse natural and historic attractions. DEWA covers 40 miles of the Middle Delaware National Scenic and Recreational River, and nearly 70,000 acres of adjacent mountains, valleys and floodplains in New York, New Jersey and Pennsylvania. DEWA is home to over 200 miles of hiking trails and scenic roadways, river-side beachfronts, colonial villages and other historic places, and operational agricultural fields that have been farmed for over 1,000 years (NPS, 2018). DEWA is considered an urban-proximate recreation area because it is located within 100 miles of two of the Eastern U.S.’s largest cities - New York City and Philadelphia (Schneider, 2007. Given the diverse range of recreation opportunities offered at DEWA, and its proximity to two large metropolitan areas, DEWA receives over 5 million recreation visits annually (NPS, 2018). Recreation activities available include hiking, biking, swimming, running, motorized and non-motorized boating, site-seeing, visiting historic places, fishing and hunting.

Data Instruments and Data Collection

As part of a broader study at DEWA to inform a visitor use management plan and a recreational carrying capacity determination, surveys were conducted in 2015 and 2016. This study uses only the surveys from 2016. Semi-structured interviews were also conducted in 2016 to explain displacement.
Surveys

Survey questions were generated through discussion and information needs described by DEWA and NPS staff in study planning workshops. The questions applied in the survey instrument included those adapted from established visitor use and visitor capacity assessments and original questions written by the project team. Staff at the NPS Social Science Program and the Office of Management and Budget (OMB) reviewed and granted final approval for the instrument and granted permission to collect data at DEWA. The survey was developed to determine the importance of indicator variables at DEWA, identify normative thresholds for selected indicator variables (i.e., PAOT), and assess visitor attitudes towards management alternatives. Essential questions for the current paper include past use history, occurrences of substitution and displacement, assessments of PAOT, and attitudes towards management alternatives.

Questionnaires were distributed during the high-use season (June 1st-August 15th) of 2016 by Clemson University research staff to a sample of park visitors. A representative sample was sought by sampling visitors on randomly selected days (stratified by weekday versus weekend) at a variety of locations that were selected by DEWA staff as sites that would provide a good representation of visitor use across the recreation area. Surveys were conducted by asking those users present at the site (with one member per group age 18 or over selected) to complete a survey. The survey was self-administered with a trained research assistant available to answer questions and assist when needed. The survey was given only to those exiting the sites.

Semi-structured interviews
Interview questions were generated using advice from Creswell (2014) regarding mixed-methods research, previous literature on displacement, and the overall research questions. While qualitative research does not usually rely on a randomized sample (because the goal is not to generalize), the interview respondents for this study were based off survey answers, thus participants in the interview process were selected purposively based on an already randomly selected sample of the population. Specifically, anyone who answered “yes” to the survey question “have you ever not been able to, or chosen not to visit Delaware Water Gap NRA because it was crowded?” was asked to further participate in interview questioning. Visitors typically did not agree to audio-recordings after completing a survey. Instead, a researcher took detailed notes about the follow-up conversation because this method did not deter visitors from talking further about their experience with displacement. While notes may not be as detailed and accurate as a transcribed interview, this was the only way the information could be feasibly captured and documented in this case. Interviews lasted an average of seven minutes beyond completing the survey. Approximately two pages of notes were taken for each interview and later transcribed into NVivo10 qualitative data analysis software.

Data Analysis

Qualitative and quantitative methods have different strengths and weaknesses, and generate different types of information. Both are equally relevant in the application of social sciences in natural resources management (Buckley, 2018). This paper uses strengths of each approach to combine two unique but related data sets to answer the research questions presented in this paper.
Most mixed-methods approaches to date have used separate data sets for qualitative and quantitative components of one study. While this study aligns with these more common mixed-methods approaches (e.g., collecting separate qualitative and quantitative data), the authors propose that simultaneous analysis of both data sets is an interesting, valid and novel way to interpret and report social science data. This idea of simultaneous analysis as presented in this paper is quite like a form of simultaneous analysis that Buckley (2018) offered, however unique distinctions between the approaches exist and are worth noting.

Buckley (2018) proposed that simultaneous analysis of qualitative and quantitative social science data can be a useful, rigorous and unique way to answer certain research questions related to the conservation social sciences, if four caveats are met. The four caveats include; a) adequate sampling methods as well as theoretical saturation, b) a clear distinction between structural and statistical associations, c) an explicit description of the conversion from qualitative constructs and codes to quantitative categories, and d) ensure that precision, reliability and generalizability are considered appropriately within both analysis (see Buckley 2018 for a discussion of these caveats). What differentiates mixed-methods and simultaneous analysis is the distinction of using one data set to analyze using qualitative and quantitative approaches, rather than the more traditional approach of collecting qualitative and quantitative data separately, analyzing separately, and then merging results to answer relevant research questions.

There is no disagreement that the simultaneous analysis proposed by Buckley (2018) may be useful in some cases. These cases include systematic literature reviews,
comprehensive evaluations of document sets, and textual analysis of social media sites. However, the authors of this study assert that applying ‘simultaneous analysis’ may be infeasible and impractical to answer many conservation social science research questions. For instance, in situations where primary data is collected on-site to solve unique management challenges (as is often the case in the conservation social sciences), it is unlikely that the amount of qualitative data collected would meet the caveats proposed by Buckley (2018).

Therefore, recognizing the utility in mixed methods and simultaneous designs, this paper combines both concepts to develop a unique approach to handling qualitative and quantitative data, which is being referred to as ‘blended analysis’. In this approach, two separate data sets were collected (e.g., surveys and interviews) in the more common ‘mixed-methods’ fashion, however the two data sets were blended during analysis to capture the strengths and weaknesses of each research approach.

**Simultaneous Analysis of Surveys and Interviews**

For the purposes of this study, qualitative data was analyzed separately and then coupled with the responses to one survey question to facilitate further analysis. Coding was the primary analytical approach used for this study. The transcribed data were condensed and categorized, and themes ultimately identified (Miles, Huberman and Saldana, 2014). As suggested by Saldana (2013), coding occurred in two cycles. First cycle coding is inductive (Patton, 2002), using descriptive codes to assign labels to the data to describe the overall meaning of a passage (Miles et al., 2014). The second cycle uses pattern coding, which consists of merging descriptive codes into broader themes.
both within and between separate interviews (Miles et al., 2014). The second cycle was
deductive, as descriptive categories are aggregated into broader themes. While
frequencies are often not of concern in qualitative data analysis (Marshall & Rossman,
2011), calculating code frequency helped facilitate subsequent analysis, particularly
given the quasi-representative selection of interviewees and the blended analyses design
being used.

After coding qualitative interviews and calculating frequencies per theme, each
survey and interview was coupled by respondent. During data collection, the researcher
recorded the survey ID number into their field notes, ensuring that interviews and surveys
could be traced back to the same respondent for analysis. In this way, qualitative
interview responses could be related to survey responses. Specifically, respondents on the
survey who answered ‘yes’ to having been displaced in the past went on to answer the
question “How much of a problem do you think it is that you were not able to visit on this
occasion?” (check one box). Response options were “not a problem, small problem, or
big problem.” Codes from interview analysis were then blended with individual
‘problem’ ratings to facilitate results and following discussion.

Results

Throughout the data collection season, the researcher approached 555 visitors and
500 elected to participate in the study, yielding a 90% response rate and a 4.4%
confidence interval (at a 95% confidence level). Data were collected at multiple sites
throughout the recreation area, each selected by park staff to represent the range of
recreation opportunities available throughout DEWA. Demographic data (e.g., race, age,
sex and income) were not collected to preserve the privacy of respondents, and to reduce the burden on visitors by asking fewer questions. Researchers did, however, collect postal codes to determine where visitors to DEWA were travelling from. Of the 500 respondents, 98.3% were from the United States, and 83.4% were from the states directly bordering DEWA—New Jersey (38.3%), Pennsylvania (26.9%) and New York (18.2%).

Of the 500 visitors surveyed, 18.6%, or 88 visitors, indicated that they had been displaced in the past. Like the overall population, 84.9% of visitors who had experienced displacement in the past were from the states directly surrounding DEWA—New Jersey (39.7%), Pennsylvania (41.9%), and New York (3.2%). Other visitors who had experienced displacement in the past at DEWA were from Maryland, Florida, South Dakota and California.

Of the 88 participants who answered ‘yes’ when asked if they had been displaced in the past due to crowding at DEWA, 57 refused an interview, while 31 agreed to participate. The authors wanted to know if those visitors who participated in the interviews had unique attitudes about their experience when compared to those who had been displaced but did not wish to participate in an interview. A chi-square test of independence was conducted between interview participation and problem extent. There were no statistically significant associations between interview participation and problem extent, $X^2 (2) = 3.3, p = .195$, indicating that the two sub-populations indeed had different attitudes about their displacement experience. A review of Table 1 highlights these differences, revealing that a greater proportion of interview participants considered displacement to be a problem. This may indicate that people who had negative attitudes
about being displaced were more likely to share their stories than those who were less bothered. This limitation should be considered when interpreting results.

**Attitudes and Reactions to being Displaced**

Researchers considered two questions from the 2016 interviews to be foundational for understanding perceptions and reactions to being displaced. In the first question, respondents were asked “Could you tell me what you were feeling and thinking when you experienced this?” The most frequently occurring attitudes included “not a problem,” “disappointment,” and “feelings changed after coping” (Table 2). For instance, one respondent who thought displacement was ‘not a problem’ stated [paraphrased] ...no big deal at all. I knew about this site already, so when I saw it was crowded at Smithfield I wasn’t bothered, I just came here instead.” Another respondent who expressed disappointment said [paraphrased] I guess we were just disappointed. We had never come here and witnessed such a mess in the parking lots. Lastly, one of the respondents who indicated that they changed their feelings after coping detailed their experience with [paraphrased] We were annoyed at first when it happened—we didn’t expect to be turned away. But it ended up being nice to drive around and discover some less known places.

Other responses identified attitudes about the common debate in many tourism driven communities—locals vs. tourists. Some respondents felt strongly that ‘out-of-towners are to blame for problems associated with overcrowding. For instance, one person explained [paraphrased] I feel forced out of the place I grew up in by other visitors. Specifically, people from New York who aren’t from around here come in huge groups and make a mess of everything. I don’t want to be here when they’re here. Others
took a different stance, expressing empathy for ‘out-of-towners’, and voiced feelings of happiness in seeing people from the city enjoy the outdoors. For instance, one respondent stated [paraphrased] *I empathize with people who don’t live so close to here and are looking for a free or cheap way to get family outdoors.* Another respondent said [paraphrased] *I think it’s great that out-of-towners can find a place to come be outdoors. I think it’s a little snoot-ish when locals act better than tourists—we’re all tourists sometimes.*

The second interview question focused on specific reactions to being displaced, and asked respondents “How did you cope with or react to it being too crowded? Did you go somewhere else instead?” All responses were categorized as either temporal displacement, spatial displacement, or both. The most frequent response was spatial changes (Table 3), most commonly in the form of “intra-site movement, same activity” and “inter-site movement, activity substitution.” For instance, respondents who indicated the former shared that they [paraphrased] *know the park so can easily go to nearby familiar hiking trails,* or *I went to a lesser known trail that does not provide such spectacular views but it’s nearby and has fewer people.* Respondents who left the park for an entirely different activity specified that they [paraphrased] *went to a flea market after feeling too crowded in two separate sites within DEWA.* Another respondent [paraphrased] *took the kids out to lunch because the lake [Crater Lake] was entirely packed out. It wouldn’t have even been enjoyable had we stayed.*

Other responses included temporal changes (Table 3). All respondents who adopted temporal shifts in visitation shifted to “avoid weekends and holidays.” For
instance, one visitor exclaimed [paraphrased] *I would come every weekend and try to go hiking, and every weekend I would be turned away. Now I don’t even try. I’m able to get there just often enough during the week, and have learned to live with that.* Another participant reflected [paraphrased] *The most recent time was Memorial Day weekend, which I guess was our fault because we should have known.* No respondent reported temporal shifts within the same day, to different, non-peak hours.

Some respondents indicated both temporal and spatial shifts in their visitation after being displaced. One participant described their experience stating [paraphrased] *I used to take my family to Dingmans Falls all the time. Now we avoid Dingmans on the weekends [temporal], and go to Crater Lake instead [spatial].* Another respondent reflected [paraphrased] *The day we left Van Campen it was just far too crowded so we went to a different nearby waterfall [spatial], and now we’ve just learned to avoid Van Campen on the weekends [temporal].*

**Effect of Coping Behavior on Attitudes Towards Experience**

Researchers wanted to see if the quantitative approach to identifying the level to which being displaced was a problem (e.g., 3-point scale from 1= not a problem to 3= a big problem) aligned with experiences visitors were recalling during the qualitative follow-up interviews. This line of inquiry is interesting because it may result in insights about the time frame of the evaluation (Miller & McCool, 2003). For instance, the survey question prompted answers about *past displacement*, and asked respondents to report the level to which being displaced was a problem for them on this occasion. Some respondents might interpret this to mean their attitude at the time of experiencing the
stressor, while others might interpret this to mean their attitude after they adopted their coping mechanism. The qualitative interviews are one way to get beyond this issue.

Interview participants had the opportunity to expand on their experiences and indicate the part of their experience, or time-frame, they were speaking about. Given that survey questions may have been interpreted differently by respondents, the first step was to see if the attitudes reported on the surveys aligned with the attitudes that people were sharing during their interviews.

Table 4 relates the survey response ratings (e.g., 1=not a problem, 3=big problem) to qualitative responses when visitors were asked “could you tell me what you were feeling and thinking when you experienced this?” In this way, researchers could determine if the survey ratings were a dependable assessment of the stories that people were sharing about their experience. In other words, do the attitudes reported on a survey align with attitudes reported in the qualitative interviews?

As was expected, qualitative interviews resulted in more nuanced responses than the rating scale of ‘not a problem, small problem or big problem,’ however it appears that attitudes reported on the survey and through the interview process were mostly correlated (Table 4). For instance, of the respondents who described their feelings using terms such as ‘empathy for non-locals’ or ‘it’s great that people are outside’, none reported that they had a big problem with crowding caused displacement. On the other hand, respondents who described their feelings using terms such as ‘blame non-locals’ or ‘annoyed’ or ‘disappointed’ tended to report that crowding caused displacement was a big problem for them (Table 4). Therefore, the results suggest that the quantitative survey responses can
be reliably associated with coded responses regarding individual actions taken once displaced to identify effective coping strategies associated with displacement at DEWA. Some cases did not directly fit this pattern, yet interviews helped to explain discrepancies. For instance, Table 4 reveals that two respondents reported that displacement was a ‘big problem’ on their survey, but highlighted that their concern was not for themselves, but other visitors who might be displaced. For example, one respondent noted, [paraphrased] If I didn’t live here and had to travel far to come and then couldn’t find a spot for my car or my butt on the beach, I’m sure I would be pretty unhappy.

Relating Attitudes and Reactions

The interviews captured one phenomena in a way that surveys could not fully address—that of shifting attitudes after they experienced displacement. Nine respondents reported in their interview that their attitudes about being displaced changed after displacement occurred (Table 2). Each respondent who reported an attitude change noted that their attitude shifted from a negative response to being displaced, to a positive response after the experience. For instance, one respondent was intending to go to a waterfall, the nearby parking was full, and her group had to park further away and hike to the waterfall instead. She said [paraphrased] I didn’t feel like hiking so I was annoyed. But nobody could help the fact that the parking was full so I went along with the plan, and ended up enjoying the hike because it added an unexpected element to my day and I got some exercise in. I guess worse things could have happened. Another respondent, who was taking her kids to a hike-in only waterfall noted [paraphrased] At the time it was
frustrating, just because we hiked all the way in before deciding it was too busy for us to enjoy ourselves. But it taught us to just not come on the weekends, and if I remember correctly we had a really nice day as a family regardless. It’s no big deal because we live around here so we can manage to get here during the week.

While it is intuitively not surprising to see a positive attitude shift after a coping behavior is adopted, this phenomenon has been difficult to capture using traditional quantitative methods (see literature review). Given the scarcity of empirical evidence to link coping strategies to regaining feelings of satisfaction in outdoor recreation, and that a positive attitude shift after experiencing displacement was identified in the interviews, the researchers were interested in understanding how quantitative attitudes about the experience and qualitative assessments of displacement behaviors relate to one another. To facilitate this understanding, the interview questions described above were related to the survey. Specifically, codes from qualitative responses were associated with the survey question which directed respondents to rate the level to which being displaced had been a problem for them, on a 3-point scale (1=not a problem, 2=small problem, 3=big problem). Organizing the data in this way facilitates an understanding of how coping strategies might influence attitudes or feelings about the experience, or vice versa. All respondents who coped through participating in the same activity outside of DEWA (e.g., inter-site, same activity) reported that displacement was not a problem for them. Similarly, most respondents who adopted both spatial and temporal coping mechanisms reported that displacement was not a problem for them, with only one person reporting a small problem (Table 5). The two coping mechanisms that seem unlikely to alleviate
problems associated with displacement include ‘finding a different way in,’ and ‘participating in a different activity than intended outside of DEWA’ (e.g., inter-site, activity substitution). Interestingly, temporal displacement (i.e., avoiding weekends and holidays) was frequently adopted by those who live close enough to enjoy DEWA on the weekdays, however respondents who temporally displace still report negative feelings about the experience (Table 5).

**Discussion**

The results were interpreted using coping theory and the transactional-stress model to offer refinement and future research directions in recreation coping research. Based on the hierarchical model of coping (Miller & McCool, 2003), the researchers focused on displacement because it is considered the ‘last resort’ when appraising coping options. In other words, previous research found that people adopt displacement as a coping strategy only after cognitive coping does not relieve feelings of stress, or when the magnitude of stress requires physical separation from the hassle (Schuster et al., 2006). Given that displacement may be indicative of severe social detractors (e.g., crowding, conflict, or hassles), the authors of this paper assert that understanding perceptions about being displaced, and how actions taken once displaced relate to attitudes towards the recreation experience is an essential step for effectively managing visitor experiences in a popular and diverse protected lands system.

**Theoretical Considerations**

Analysis of data from visitors to DEWA who have experienced displacement in the past has provided insights into how we define displacement in outdoor recreation.
This paper was conceived based on previous research that defines displacement as a behavioral coping mechanism consisting of spatial, temporal and absolute dimensions that facilitate a move away from a stressful or undesirable situation to regain feelings of satisfaction (Schreyer, 1979). However, there appears to be inconsistent classifications between spatial, temporal and absolute displacement throughout the coping literature. For instance, some authors have defined spatial and temporal changes as substitution behaviors, where substitution refers to the ability to alter a recreation experience by means of replacing it with a comparable entity (Brunson & Shelby, 1993). Shelby and Vaske (1991) developed a substitution typology to address recreation alternatives in the face of detractors, which consists of 1) temporal substitution, 2) resource substitution, and 3) activity substitution. Authors using these definitions additionally note that displacement only occurs when a recreation visitor changes both the activity and the resource—what has been termed absolute displacement (Miller & McCool, 2003). Other authors, however, have coined the same concepts as displacement. “Displacement occurs when users leave the site or change activities in response to an unacceptable or adverse change in social, managerial, or resource conditions…Essential components of the displacement process are changes in behavior, time, or in the environment” (Schneider, 2007, pp. 23-24). These conflicting yet overlapping definitions of displacement and substitution exist throughout the literature, and deserve clarification.

The results of this study support the definition of displacement provided previously in this paper, which states that displacement entails a response to a negative situation (e.g., crowding), and involves modifying behaviors to regain feelings of
satisfaction (Schneider, 2007). Substitution, on the other hand, refers to a neutral or positive reaction to sub-optimal conditions. The definition of displacement is supported in our results, and comes from the voices of those who have experienced displacement in the past. Visitors were not asked to differentiate between coping strategies, or between reasons for adopting a coping strategy—instead they were specifically asked to report on their displacement experience in response to crowding. This pointed and direct line of questioning led researchers to a viable conclusion that what visitors described in their responses was indicative of their personal definition of displacement. Therefore, the authors suggest that the research community reflect this definition by more directly differentiating displacement and substitution. In doing so, we gain the ability to compare results and bolster existing and future knowledge about displacement behaviors.

An important point related to defining displacement consistently in the literature, is the dichotomous relationship the scientific community has theorized about coping responses. The transaction-stress-coping model demonstrates that coping can take the form of either cognitive or behavioral coping mechanisms (Lazarus & Folkman, 1984). A behavioral response to a negative situation assumes that a visitor has accurate and full knowledge of the situation, and perceives that they have control to change the negative situation (Schuster et al., 2006). Given that this study focused specifically on displacement, the coping responses enacted by participants were originally conceived of as behavioral and problem-focused, aligning with current theoretical constructs. However, when respondents were asked about the specific actions they took when they were experiencing displacement, the behaviors enacted did not appear to be altering the
source of stress. Instead, participants were acting in ways that helped them negotiate the symptoms of the stressor, crowding. Because this study focused specifically on crowding-caused displacement, it seems plausible that participants perceived that they did not have the power to change the source of stress through responding in a problem-focused way, but rather responded to the symptoms related to the stress by changing their own behaviors. In other words, instead of changing the source of the stress by asking everyone around them to leave (e.g., problem-focused), participants took it upon themselves to leave the stressful situation (e.g., symptom-focused). While this behavior is nothing new, the authors assert that displacement should be classified as a unique coping mechanism, rather than operationalized and conceived of as one that is behavioral. While considering coping in a symptom-focused way is not new (Gowan, Richard & Gatewood, 1999; Leana & Feldman, 1994; Schuster et al., 2006), coping research in outdoor recreation has yet to conceive of displacement as symptom-focused, potentially limiting the collective ability to adequately and accurately measure and empirically link coping and recreation satisfaction.

**Research Considerations**

The results of this study help inform the unclear relationship between coping and recreation satisfaction. Much of the coping research in outdoor recreation is based on the transactional-stress-coping model, which identifies satisfaction as a main outcome of the stress and coping process. Theoretically, this relationship makes sense. Empirically, however, there is little evidence that coping in fact increases satisfaction with the experience. Some research has found the exact opposite—coping causes more stress in
the short-term and therefore actually detracts from experiences – a concept that Leana and Feldman (1994) coined as stress proliferation. In theory, the action of being displaced may contribute to stress and therefore detract from satisfaction in the moment, but may indeed lead to increased satisfaction after the experience (Schuster et al., 2006). The results of this study indicate that this relationship occurs—however quantitative research designs have not yet found effective and consistent means to capture this nuance. Because the theoretical basis for combining stress, coping and satisfaction is based on a process, so too should the research methods employed to capture the relationship. Future research designs should begin to employ qualitative or repeated measures methods to capture feelings before, during and after the experience. The qualitative methods employed in this study were post-hoc (e.g., asked visitors to think about past experiences), and results indicate that visitors’ feelings about stress, displacement and attitudes about the experience are developed through a process, and responses are likely different depending on the stage of displacement a respondent is in. Future research should help to investigate the process of displacement and the factors and outcomes it involves.

Management Recommendations

The results of this study are largely based on the survey question “Have you ever not been able to, or chosen not to visit Delaware Water Gap NRA because it was too crowded? (please check yes or no).” Nearly 1 in 5 visitors reported that they had been displaced in the past. This is an alarming number when you consider that displacement represents a move away from a negative situation, and is the most extreme failure in the
provision of quality recreation and park experiences. When people are displaced from one area, where do they go? What do they do? Answers to these questions are important for informing management for several reasons.

The results of this study indicate that spatial displacement is more frequently adopted than temporal at DEWA. This relationship is important for managers, as spatial displacement not only impacts the original, crowded site, but also impacts the areas where visitors are going. Many respondents reported going to nearby state or municipal parks to participate in the same activity they had intended at DEWA, and most of those respondents did not think displacement was a problem. However, those visitors who had to participate in a different activity tended to evaluate displacement as a big problem, suggesting that efforts to accommodate the original intended activity is important in maintaining a quality experience. Communication across agencies, especially in areas where displacement is occurring, is one way to facilitate this process. Some participants reported that displacement was not a problem for them because they got information from park staff about nearby places to go. With clear communication between agencies and nearby recreation sites, a consistent stream of information can be provided to visitors, managers can be ready to shift resources as needed, and issues associated with displacement can be managed and mitigated.

Relatedly, no respondent noted temporal shifts by time of day through visiting at unique, non-peak hours. Instead, all participants who reported temporal displacement shifted the day of their visit from weekends to weekdays. This is a surprising finding, and may reflect how experiences are allocated in the park. For instance, some of the activities
at DEWA are dependent on recreation services and outfitters that have set hours of operation. To encourage visitation throughout the day, which would distribute rather than concentrate use across time, park managers may consider providing night-specific interpretive programming, or night-specific guided activities (e.g. paddling).

Based on the results of this study, the authors suggest that displacement be thoughtfully considered as an indicator of the visitor experience. Park managers work daily to both preserve the natural and cultural resources within the park, and to provide quality experiences to their visitors. Displacement is one mechanism that, if left undocumented and unmanaged, may deteriorate both the resource conditions and experiential quality. Displacement has been reflected in previous research to inform a range of thresholds as one of several evaluative dimensions in response to an identified indicator (Manning, 2011). While applying displacement as an evaluative dimension provides information about conditions that would prompt visitors to displace, it does not effectively serve as a mechanism to bring to light that displacement is happening frequently, and that it is a fundamental problem. Rather, it treats displacement as an outcome of the experience, rather than as an indicator of the experience. Additionally, several criteria have been suggested for selecting good indicators of quality (Manning, 2011). According to the criteria, an indicator should be specific, objective, reliable and repeatable, sensitive, measurable, efficient and effective to measure, and significant.

Future research should apply displacement as an indicator of the visitor experience to better understand how displacement might be operationalized as an indicator. It seems likely that displacement as an indicator would be best applied in front-country, highly
visited sites. In this way, displacement may be operationalized in a way that is fundamental to recreation experiences, and will help protect against pervasive issues associated with use-levels, crowding, and displacement.

**Conclusion**

This research was designed to better understand visitor attitudes, perceptions, experiences and outcomes with being displaced. Specifically, the authors wanted to more deeply understand how displacement as a response to crowding impacted visitor experiences. To that end, this study employed qualitative and quantitative methods to assess post-displacement perceptions, attitudes and experiences. Displacement has historically been conceptualized and measured as a behavioral coping mechanism that visitors engage in when they experience negative resource or social conditions during a recreation experience. Theoretically, displacement should help visitors regain satisfaction with their experience because they acted to alleviate a stressful situation. However, there has been little evidence to specifically link displacement with quality experiences. This research blended qualitative and quantitative analysis to highlight the displacement, satisfaction link—concluding that visitors have different behavioral responses that are all classified as displacement. Some responses, such as participating in the same activity in a different location, result in greater stress alleviation, and better recreation experiences, than other responses, such as visiting on weekdays instead of weekends.

This research adds to the displacement literature by clearly linking specific displacement behaviors to quality recreation experiences. In doing so, we consider the utility of conceptualizing displacement as an indicator of the visitor experience, rather
than an outcome. This research additionally offers a unique analysis approach that can be used in other outdoor recreation research where surveys and interviews are popular data collection methods, and where post-hoc evaluations may be appropriate. For instance, blended analysis of qualitative and quantitative data might be used to dig deeper into displacement experiences by asking questions about the entire transactional-stress model, including influencing factors, appraisals, coping and outcomes. Additionally, blended analysis may be used to assess visitor attitudes and reactions to certain recreation provisions, outfitters, or managed access strategies, among many other applications.
References


### Tables

**Table 1. Attitudes about being Displaced: Quantitative**

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<thead>
<tr>
<th></th>
<th>No interview (n=57)</th>
<th>Interview (n=31)</th>
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<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
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<tr>
<td>Not a problem</td>
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<tr>
<td>Small problem</td>
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<tr>
<td>Big problem</td>
<td>11</td>
<td>19.3</td>
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Table 2. *Attitudes about being Displaced: Qualitative*

<table>
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<tr>
<th>Codes</th>
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<tr>
<td>No problem</td>
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<tr>
<td>Feelings changed after coping</td>
<td>9</td>
</tr>
<tr>
<td>Annoyed/disappointed</td>
<td>7</td>
</tr>
<tr>
<td>Surprised</td>
<td>4</td>
</tr>
<tr>
<td>Blame non-locals</td>
<td>4</td>
</tr>
<tr>
<td>Love to see others enjoy it here</td>
<td>3</td>
</tr>
<tr>
<td>Empathy for non-locals</td>
<td>3</td>
</tr>
<tr>
<td>Dependent on behavior of others</td>
<td>2</td>
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<tr>
<td>Safety concern for self and others</td>
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Table 3. *Displacement Categories*

<table>
<thead>
<tr>
<th>Codes</th>
<th>Sub-codes</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Spatial</td>
<td>Intra-site, same activity</td>
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<td></td>
<td>Inter-site, activity substitution</td>
<td>5</td>
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<tr>
<td></td>
<td>Went home</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Inter-site, same activity</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Intra-site, activity substitution</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Found different way in</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Temporal</td>
<td>Avoid weekends and holidays</td>
<td>10</td>
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<tr>
<td>Both</td>
<td>Experience spatial and adopt temporal displacement behaviors</td>
<td>6</td>
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Table 4. Relating Qualitative and Quantitative Reports of Attitudes towards Displacement

<table>
<thead>
<tr>
<th>Feelings about being Displaced</th>
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<th>Small Problem (2)</th>
<th>Big Problem (3)</th>
<th>N</th>
<th>Mean</th>
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<tr>
<td>Empathy for non-locals</td>
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<td>-</td>
<td>-</td>
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<td>1.0</td>
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<tr>
<td>Love to see others enjoy it here</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>Dependent on behavior of others</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>No problem</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>15</td>
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<tr>
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<td>1</td>
<td>2</td>
<td>4</td>
<td>2.3</td>
</tr>
<tr>
<td>Blame non-locals</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2.3</td>
</tr>
<tr>
<td>Safety concern for self and others</td>
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<td>1</td>
<td>1</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Annoyed/disappointed</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>2.6</td>
</tr>
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*Note.* Means are based on a scale of 1 (not a problem) to 3 (big problem)
Table 5. Relating Attitudes and Displacement Categories

<table>
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<tr>
<th>Coping Mechanism</th>
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<th>Big Problem (3)</th>
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<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-site, same activity</td>
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<td>-</td>
<td>-</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>Both spatial and temporal</td>
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<td>1</td>
<td>-</td>
<td>6</td>
<td>1.2</td>
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<tr>
<td>Intra-site, same activity</td>
<td>3</td>
<td>5</td>
<td>-</td>
<td>8</td>
<td>1.6</td>
</tr>
<tr>
<td>Home</td>
<td>4</td>
<td>-</td>
<td>2</td>
<td>6</td>
<td>1.7</td>
</tr>
<tr>
<td>Intra-site, activity substitution</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Avoid weekends and holidays</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>7</td>
<td>2.0</td>
</tr>
<tr>
<td>Inter-site, activity substitution</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>2.4</td>
</tr>
<tr>
<td>Found different way in</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2.5</td>
</tr>
</tbody>
</table>

*Note. Means are based on a scale of 1 (not a problem) to 3 (big problem).*
Figures

Figure 1. *Transactional Stress-Coping Model (Lazarus & Folkman, 1984)*
CHAPTER FIVE
CONCLUSION

Major Findings

This dissertation was intended to reexamine the current research design and methods that drive the normative approach traditionally used to inform recreation management and planning. By thinking critically about how information regarding visitor experiences in parks and protected areas have been collected and interpreted, it was realized that the same approach has been applied for nearly 40 years with very few modifications. There was a need to reexamine the methods and application of understanding visitor experiences in parks and protected areas. While the normative approach that drives our understanding of visitor preferences regarding recreation conditions is useful, the application of normative theory may be improved through the development of new strategies to increase validity and bolster different types of information that might be valuable in answering questions that have been asked for years and are yet to be fully understood. Throughout this dissertation, the development of indicators and thresholds are reconsidered, and methods not yet applied specifically to the management of outdoor recreation experiences are introduced and tested.

Chapter two of this dissertation addressed the development of indicators for the wildlife viewing experience. Wildlife viewing and photography are both growing in popularity, yet the normative approach has infrequently been applied to address this specific form of recreation. Few studies in the past have been dedicated to developing indicators for the wildlife viewing experience, thus this study was designed to assess
polar bear viewing experiences with a specific eye towards identifying good indicators of quality. The qualitative, photo-based method known as visitor-employed photography (VEP) was applied and compared to more traditional semi-structured interviews to see if VEP produced more or different types of information than semi-structured interviews for developing indicators of quality. Of interest in chapter two was the conclusion that VEP is a useful tool for exploring visitor experiences in a setting where visitors have shared experiences. Indicators of quality were developed for the polar bear viewing experience, and include time spent on the water, and boats within the viewshed.

Chapter three of this dissertation addressed the validity of current visual-based methods used to define thresholds of indicator variables. Specifically, simulated photos are often used to develop thresholds (minimum acceptable conditions) for the indicator variable people at one time (PAOT), which is used as a proxy for measuring crowding. This chapter examined the utility of using field-based and base photos rather than the traditional simulated approach to offer methodological improvements. This chapter also examined how range of PAOT and different forms of recreation shown in images might impact the self-reports of visitors. This chapter offered improvements to the method that will minimize some of the difficulties associated with developing research materials, while also improving the validity of responses, and thus utility to managers.

Chapter four of this dissertation addressed recreation displacement as a response to crowding. Displacement has been considered problematic in recreation resource management for decades, yet still little is known. Due to challenges associated with reaching visitors who may no longer visit a site because they have already been
displaced, linking displacement to outcomes has been difficult. This chapter uses a mixed-methods study design to understand visitors who have experienced displacement in the past and their reactions, responses and attitudes towards being displaced. The study offers a unique blended analysis approach to better understand if and how displacement serves as a coping strategy. The results indicate that displacement happens frequently at Delaware Water Gap National Recreation Area (DEWA). This chapter proposes that displacement be considered an indicator of the visitor experience, rather than a negative outcome. In this way, displacement can be operationalized as more than an evaluative dimension (e.g., outcome) to inform management decisions related to displacement behaviors.

**Dissertation Contributions**

This dissertation aimed to reexamine how information about visitor experiences is collected, interpreted and applied to the management of parks and protected areas. From a theoretical standpoint, this dissertation aligns with previous work which relies on normative theory to conceptualize and measure variables related to visitor experience qualities. Normative theory, as applied to recreation management, asserts that people have shared opinions and preferences about resource and social conditions. Indicators of quality and associated thresholds are used to measure and monitor visitor experience qualities, and have been the approach to operationalizing normative theory for nearly 40 years. It is the development and use of indicators and thresholds that are reconsidered in this dissertation.
Methodologically, therefore, this dissertation contributes to how the normative approach is applied, and aims to improve validity and expand on the types of information being considered. By improving the methods used to gather and interpret visitor experience information, the hope is to provide more accurate and more qualified material to help inform management and planning in parks and protected areas. This dissertation makes a conscious effort to remain aligned with current management frameworks (e.g., VUM) and approaches (e.g., normative theory), as the applied nature of this work means that the improvements offered in this dissertation must be applicable and compatible with the current management paradigm of federal land management partners. In this way, methodological improvements are offered, and implications for management are considered.

**Limitations**

While this dissertation remains aligned with normative theory and the indicators and thresholds based approach by offering methodological improvements, one dissertation could not cover the breadth of potential issues that may arise. The alignment of this dissertation with the traditional management paradigm means holding onto a system that may need improvement. The science that we do to inform management decisions sometimes feels dictated by the regulatory pressures that require a ‘minimum acceptable condition’ to be provided regarding resource and social conditions. The normative question-types that are used in studies to inform management rely on the notion that the indicators being operationalized are important to the visitor experience, and that managing to avoid minimum acceptable conditions will improve the experience
for visitors. This is sometimes seen as problematic for several reasons. Scientists and managers alike recognize that some of the common indicators used (e.g., PAOT) do not necessarily align with visitor satisfaction. The information gathered relies on self-reports of visitors who may not put much thought into park conditions. Responses to normative question types might be based on current conditions rather than preferences, especially for those who aren’t familiar with a site. Additionally, visitors who may be most sensitive to indicators such as PAOT may no longer visit the site therefore are not being represented in the sample. Yet, despite some fundamental questions regarding the application of the normative approach, it does provide parks with systematic and repeatable methods to justify and defend management decisions. In short, a limitation of this dissertation is the reliance on an approach that has some clear restrictions, but that currently drives the management paradigm in the United States. Therefore, working to make a potentially flawed yet institutionalized and reliable system a little bit better is a worthy pursuit.

Another separate yet important limitation is that this dissertation work was conducted at two unique recreation sites, thus there may be concerns with generalizability to other areas. Specifically, the boat-based polar bear viewing experience at the Arctic Refuge is quite unique and may not represent other wildlife viewing opportunities. Additionally, studying displacement at Delaware Water Gap makes sense due to the high use-levels and multiple recreation opportunities provided at DEWA, yet results may not be indicative of other behaviors that visitors engage in when they are displaced. Studying visitor experiences in parks and protected areas is not only variable due to individual
differences, but also variable due to the intrinsic relationship between the context and experiences.

**Implications**

This dissertation has both methodological and managerial implications. Methodologically, the work here highlighted deficiencies in the traditional approaches to collecting, interpreting and applying visitor preference data for the sustainable management of parks and protected areas. This dissertation created alternative methods to the use of visual-based approaches in two unique ways. First, it introduced the use of visitors’ photographs to gain more and different types of visitor experience information. Second, it examined aspects of researcher-produced photographs used to solicit responses about use preferences to improve the validity of how resource and social conditions are communicated. This dissertation additionally created an alternative method to blend qualitative and quantitative data during analysis to better understand actual (rather than hypothetical) responses and attitudes about being displaced.

Practical, or applied implications of this dissertation are many. First, the overarching aim of this dissertation was to improve upon the current methods used to understand visitor experiences in parks and protected areas. The justification and the need to accurately understand visitor experiences lies largely in the utility of this information for helping to inform management recommendations and strategies. Management strategies that do not consider public opinion, especially when they are contentious, will be unsuccessful and lack public support. Collecting and incorporating visitor experience data in parks and protected areas not only bolsters the evidence available to make fully-
informed decisions, but also demonstrates that public opinion is valued for the successful management of public lands.

More specifically, this dissertation is based on the notion that just because we have used similar approaches to collect information about visitor experiences and preferences for nearly 40 years, and few have modified the approach, does not mean that it is the best way. One intention of this dissertation was to spark curiosity around unique ways we can answer reoccurring questions. As such, management implications that come from this dissertation include strategies to collect and analyze visitor information that improve validity, improve the types of information received, and recommend additional indicators of quality that may be applied and tested across settings. For instance, article one recommends that visitor produced photographs may be a useful tool for understanding experience qualities associated with wildlife viewing. The method may be most useful to answer specific questions in certain contexts, which are outlined in the article. Article two offers the use of real, field-based photos to solicit responses about use-conditions, rather than images that have been manipulated by researchers to depict realistic conditions. Article three explores the phenomenon of displacement and recommends that displacement be considered an indicator, rather than an outcome, of the visitor experience.

**Future Research Direction**

From this dissertation, the most logical move forward is to test and apply the unique methods introduced in the three studies. For instance, this dissertation was the first application of visitor-employed photography (VEP) for specifically developing
indicators of the visitor experience. VEP has been used sparsely in other tourism management contexts, but is still undervalued and therefore underrepresented as a research tool. In tourism and protected area management contexts, where photographs are an inherent part of the visitor experience, VEP should be applied and clear and systematic methods for analysis should be developed. Given the limited application and lack of consensus about terminology associated with VEP and other participant-generated image methods, a clear and systematic analysis strategy should be developed to encourage the application of the method in tourism and protected area management research.

This dissertation was additionally the first application of field-based photos to develop thresholds associated with PAOT. Given that field-based photos are not manipulated, it is difficult to control for other variables that may impact visitor responses. Therefore, an extended examination of other differences between simulated and field-based photos should be considered. Future research should additionally use field-based photos in other locations and in response to alternative indicators (e.g., trail impacts) to test the utility of field-based photos in other contexts and in response to other management challenges.

Additionally, this dissertation was the first to examine one coping strategy (i.e., displacement) as a response to one stressor (i.e., crowding). Previous coping research in outdoor recreation tends to include all potential coping mechanisms in their models, minimizing the ability to isolate specific reactions and outcomes associated with each strategy separately. Based on this dissertation, it is recommended that future research focus specifically and singularly on one coping strategy at a time to make stronger
associations with positive or negative outcomes. Future research in outdoor recreation should also test the new ‘blended analysis’ approach that is offered in this dissertation. Given the common reliance on visitor questionnaires and interviews administered on-site, many outdoor recreation studies are equipped with the type of information that works well for this analysis approach.

Lastly, paper three explored the phenomenon of displacement using on-site surveys and interviews. One limitation of this approach is the notion that visitors who have been displaced from the site are no longer at the site to share their displacement experience. Linking displacement to outcomes is difficult because of the challenges associated with reaching visitors who have been displaced. While the research community has thoughtfully examined alternative ways to reach displaced visitors, there is not yet a practical or feasible solution. Research should continue to explore how to capture the outcomes of being displaced through contacting visitors who no longer go to a site because they have been ‘crowded out’ of their recreation destination.

**Final Thoughts**

This dissertation evolved from an interest and curiosity about how parks and protected areas are managed. In response to this curiosity, I pursued a masters’ degree in the human dimensions of resource management at the University of Maine. Here, I began my thesis work about the decision-making frameworks (e.g., LAC, VERP, VUM) that are used to guide park and recreation management in the U.S. I began talking to and learning from experts about their experiences with these frameworks, what worked and what did not, and considerations for improvement. This thesis work not only introduced me to the
experts in my field that I would come to know and respect, but exposed me to the research methods that are used to inform the management frameworks I was curious about.

In learning about approaches such as normative theory, indicators and thresholds, the reliance on visual-based methods, and the utility of visitor information in helping inform management decisions, I began to question the validity and depth of information being received. I simultaneously valued and questioned the theory, design and application of research to understand visitor experiences. I valued the information for its utility in helping to make informed management decisions, but questioned how the information was being collected and interpreted. This is not to say that the work of the last 40 years using normative theory and the indicators and thresholds based approach is not valuable. Indeed, this entire dissertation is based on such significant efforts. Instead, the more I learned about these concepts, the more I wanted to contribute to the ongoing work of improving this line of research to become more valid, robust and accessible to managers. As such, this research was not designed to be a beginning or an end in understanding visitor experiences as they relate to the management and planning of parks and similar protected areas. Instead, it was an opportunity to explore and offer new approaches that might improve the accuracy and applicability of visitor experience research by focusing more heavily on decisions, behaviors and contexts in which experiences occur. It is my hope that this work will reach others who are interested in improving upon the study of visitor use and experience in recreation areas, and together we can continue to move the field forward.
One of the greatest contributions of this dissertation is the mix of methods used to understand visitor experiences. One article uses the more traditional, quantitative approach, another uses a mixed-methods design with a blended analysis approach, and the other is purely qualitative. Not only does this contribute to my learning as a researcher, but it also expands the purview of what types of information should be valued when considering how to best inform management decisions. My concern with the types of information that are valued in visitor experience research has led me, and consequently this dissertation, to identify with ‘pragmatism’ as a philosophy and guiding research framework.

While mixed-methods research is often associated with pragmatism, this is not the reason that I associate pragmatism to myself and this dissertation. It is recognized that there is an affinity between paradigms and methods, however there is no link that forces the use of a particular paradigm with a particular set of methods. In this case, pragmatism is not only linked to this research by the inherent value of both qualitative and quantitative research traditions, but it is additionally a philosophy that highlights workable approaches to problem-solving. Just as park and recreation resource management is an applied field which seeks to identify problem-based solutions, pragmatism is a philosophical research approach that views research as a tool to solve problems, placing the emphasis on how to conduct research to best gain the information being sought.

Pragmatism relies on the notion that the meaning of an event cannot be given in advance of the experience –thus the focus remains on the consequences and meanings of
actions. The reason that meanings cannot be understood before experiences is that meanings are largely driven by the personal decisions and context in which an experience is occurring. Applied to visitor experiences, the pragmatic philosophy highlights that the meaning of outdoor recreation experiences is reliant on the decisions, associated behavioral responses, and context in which experiences occur. As such, this dissertation was developed and operationalized recognizing the importance of decisions, behaviors and contexts in driving visitor experiences. It is my hope that this dissertation has offered insights into visitor experience qualities, data collection methods and analysis approaches that can assist in the management and protection of parks and other natural areas.
APPENDICES
APPENDIX A

Semi-structured interview questions protocol for the Arctic Refuge study

ARCTIC NATIONAL WILDLIFE REFUGE: GUIDING QUESTIONS FOR SEMI-STRUCTURED INTERVIEWS OF COMMERCIALLY-GUIDED BOAT-BASED POLAR BEAR VIEWERS

Hi, my name is ________________. I’m from [Clemson or Central Michigan] University. Could I ask you a few questions about your experience viewing polar bears in this area? Participation is voluntary and your responses will be anonymous. If No: OK. Thank you for your time. Have a good day. If Yes: It should take about 25 minutes, and I’d like to tape record our conversation so I can remember it later on. Is this OK with you?

Could you tell me a bit about yourself, such as your age, occupation, and where you are from?

Who are you taking this trip with and what are your plans?

How did you go about planning this trip? How did you pick the guide you went with?

What motivated you to take a trip to view polar bears?

Why did you choose to come to the Kaktovik area of the Arctic National Wildlife Refuge to view polar bears instead of somewhere else in the world?

What was your experience on the water viewing polar bears like? What were the most unique or special aspects of it? What detracted from your experience?

How did other visitors influence your experience, either positively or negatively, while on the water?

How did your guide influence your experience while on the water? How did they add to or detract from it? How did their knowledge or behavior, or your trust in them, affect your experience?

Did you get a chance to interact with any official staff from the U.S. Fish and Wildlife Service? If so, what did you think about this interaction and the information you got from it? If not, is this something you would want to do during your trip? Why or why not?

Staff at the Arctic National Wildlife Refuge, who manage the waters in the Kaktovik area but not the land, want to provide a world-class, premier polar bear viewing experience for visitors. What would constitute a “premier” polar-bear viewing experience while you are on the water? How about while you are on land?
The staff at the Arctic Refuge also want your experience on the water to reflect the remote, wilderness-like qualities that the refuge was created to protect. Did you feel like you were in this type of setting while you were on the water? Why or why not?

Did learning about and experiencing the native Iñupiat culture influence your polar bear viewing experience? If yes, how so? If yes, what aspects of this culture were most important to learn about or experience for you and why?

What was your impression of the Kaktovik community and your stay there? Did you notice any effects of tourism on it, either positive or negative? How do feel about these effects?

Now, I’d like for you to consider your overall experience here. How did this polar bear viewing experience affect you? Did it affect what you think about polar bears and where they live, or what you would do once you get back home? If yes, how so?

During your time here did you experience any environmental epiphanies, “aha” moments, or moments when your thinking about your connection to nature really shifted substantially? If yes, could you describe it to me in detail? What do you think caused it? Are there any aspects of this place that helped cause it?

I’d like to follow up on a few of my questions a couple of months after you get home. Would you be willing to provide your email address to me? If yes, what is it? If no, that’s OK, thank you for considering it.

My last question is if you’d be willing to share a few photos with me from you experience on the water and take a few more minutes with me to tell me about them? It would help me understand your experience better, and what adds to it or detracts from it. If yes, great I’ll give you a memory stick to put them on, some further instructions, and we’ll plan to meet or talk at a time that is convenient for you. If no, that’s OK, thank you for considering it.

That was my last formal question. Before we end, do you have anything you might like to add – anything I should have asked you about or anything you forgot to tell me? Thank you very much for your time today!

This information is being collected by Clemson University and Central Michigan University researchers. This survey’s results will be provided to Arctic National Wildlife Refuge staff to help them better understand and manage visitors and their polar bear viewing experience. Responses to this request are voluntary and anonymous. Direct comments regarding this survey or other aspect of this data collection to: Dr. Jeffrey C. Hallo, Associate Professor, Clemson University, Department of Parks, Recreation and Tourism Management, 280B Lehotsky Hall, Clemson, SC 29634-0735, jhallo@clemson.edu
Visitor Employed Photography protocol and consent for the Arctic Refuge study

Instructions for Refuge Visitors Willing to Share Photos

Thank you for agreeing to share some of your photos from the viewing experience in the Kaktovik Area of the Arctic National Wildlife Refuge! We will use them, and your description of them, to better understand what adds to or detracts from your experience while viewing polar bears in the Kaktovik Area of the Arctic National Wildlife Refuge.

Please follow these instructions:

1. Choose 1 or 2 photos that align most closely with each of the following categories:
   - things that you expected to see or experience during your time in Kaktovik.
     Photo name#: __________  Photo name#: __________
   - aspects of your experience that came as a surprise, either positive or negative.
     Photo name#: __________  Photo name#: __________
   - represent any epiphanies or ‘aha’ moments you experienced? If you did not experience any epiphanies or ‘aha’ moments, you may skip this part.
     Photo name#: __________  Photo name#: __________
   - what is unique and special about Kaktovik that made you choose to visit.
     Photo name#: __________  Photo name#: __________
   - your overall polar bear viewing experience.
     Photo name#: __________  Photo name#: __________
   - things that either took away from or added to your experience.
     Photo name#: __________  Photo name#: __________

2. Please write a brief description of each photo and why you chose the photo for each category. (Try to identify the photograph and the description as the same name/number listed above so I can pair the photographs and descriptions to one another).

3. Place each photograph and the associated narrative into the shared google drive folder. Please type the name/number of each photograph/narrative into the space provided above.

4. Consider if you would allow your photos to be reused for non-commercial, educational, or research purposes. This might include using your photos in presentations, publications, internet/social media, or outreach material developed by Clemson University and/or Central Michigan University. Permitting reuse of your photos is voluntary and does not affect your participation in other aspects of this effort. You would be credited as the photographer.

PHOTO MEDIA RELEASE
I grant Clemson University and Central Michigan University the right to use my photos in presentations, publications, internet/social media, or outreach material for non-commercial, educational, or research purposes.

*Signature (you can type your name here): ____________________________

*Preferred name credit: ____________________________

**If you cannot sign this release form for any reason, you can let Jessica know via e-mail if/how you would prefer your photos to be used in the future, and under what name you would prefer for receiving credit. You can reach Jessica at jfefer@g.clemson.edu.
APPENDIX B

General visitor survey instrument for Delaware Water Gap visual-based methods study

Delaware Water Gap National Recreation Area (NRA)
2016 Visitor Survey

PAPERWORK REDUCTION ACT and PRIVACY ACT statements: The National Park Service is authorized by 16 U.S.C. 1a-7 to collect this information. This information will be used by park managers to understand the visitor use and the perceptions of recreation management at Delaware Water Gap National Recreation Area. Responses to this request are voluntary and anonymous. No action may be taken against you for refusing to respond to this questionnaire. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

BURDEN ESTIMATE STATEMENT: Public reporting burden for this form is estimated to average 15 minutes to complete this questionnaire. Direct comments regarding the burden estimate or any other aspect of this collection to: Jeffrey C. Hallo, Associate Professor, Clemson University, Department of Parks, Recreation and Tourism Management, 280B Lehotsky Hall, Clemson, SC 29634-0735, jhallo@clemson.edu (email).

1. Have you ever not been able to, or chosen not to visit Delaware Water Gap NRA because it was too crowded? (Please check ‘yes’ or ‘no’. If yes, please answer the other questions below it.)

   ☐ Yes
   
   a. What did you do instead of visiting on this, or these, occasions?

   __________________________________________________________________________
   __________________________________________________________________________

   b. How much of a problem do you think it is that you were not able to visit on this occasion? (Check one box)

   Not a Problem □ Small Problem □ Big Problem □

   ☐ No → Go to next question.

2. Did you get a park map on this visit?

   ☐ Yes, a printed one
   ☐ Yes, one online
   ☐ No, but I wanted one
   ☐ No, but I didn’t want one

3. Did you get information during this visit from a park ranger or staff person?
☐ Yes
☐ No, but I wanted to
☐ No, but I didn’t want to

4. Please check which of the following information sources you used for planning this trip to Delaware Water Gap NRA. Then please indicate how useful each information source was to your planning. If you did not use an information source then leave that line blank.

<table>
<thead>
<tr>
<th>Check if you used this information source</th>
<th>How useful was this information source to planning your trip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendation from a person</td>
<td>Not useful at all</td>
</tr>
<tr>
<td>Visitor center</td>
<td>☐</td>
</tr>
<tr>
<td>Road signs</td>
<td>☐</td>
</tr>
<tr>
<td>Newspaper or magazine</td>
<td>☐</td>
</tr>
<tr>
<td>Travel guidebook</td>
<td>☐</td>
</tr>
<tr>
<td>Television</td>
<td>☐</td>
</tr>
<tr>
<td>Social media (e.g., Facebook, Twitter, YouTube, etc.)</td>
<td>☐</td>
</tr>
<tr>
<td>National park website</td>
<td>☐</td>
</tr>
<tr>
<td>Other website (please specify):</td>
<td>☐</td>
</tr>
<tr>
<td>Other information source (please specify):</td>
<td>☐</td>
</tr>
</tbody>
</table>

5. What suggestions do you have for improving how you get information, or the information itself, for your visit to Delaware Water Gap NRA?

__________________________________________________________________________

6. Please look at Photos A through H and indicate the maximum number of people at any one time that....

<table>
<thead>
<tr>
<th>...Is acceptable to use this site.</th>
<th>...Would cause you to no longer use this site.</th>
<th>...You typically saw using this site during your visit. (leave blank if you don’t know or didn’t visit the site)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo A - Van Campens Glen Waterfall</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Photo B - Smithfield Beach</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Photo C - Dingmans Waterfall</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Photo D - Childs Park</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Photo E - Crater Lake</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Photo F - Hialeah</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Photo G - Toms Creek</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Photo H - Kittatinny</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
7. a. How many other hiking groups do you think it is acceptable to encounter per hour while hiking on trails at Delaware Water Gap NRA. A group may consist of one or more people.

Acceptable number of hiking groups to encounter per hour: __________ OR ❑ I don’t know

b. What is the typical number of hiking groups you encountered per hour on trails today?

Typical number of hiking groups encountered per hour: __________ OR ❑ I don’t know

8. We would like to know how many people you think could use a waterfall area at Delaware Water Gap NRA without you feeling too crowded. To help judge this, we have a series of photographs that show different numbers of people at a waterfall area. Please look at the photographs of the Waterfall Area.

a. Please rate each photograph of the Waterfall Area by indicating how acceptable you think it is based on the number of people shown. A rating of -4 means the number of people is “very unacceptable” and a rating of +4 means the number of people is “very acceptable”. (Circle one number for each photograph.)

<table>
<thead>
<tr>
<th></th>
<th>Very Unacceptable</th>
<th>Unacceptable</th>
<th>Moderately Unacceptable</th>
<th>Slightly Unacceptable</th>
<th>Neither Acceptable or Unacceptable</th>
<th>Slightly Acceptable</th>
<th>Moderately Acceptable</th>
<th>Acceptable</th>
<th>Very Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo 1</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 2</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 3</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 4</td>
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<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 5</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 6</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
</tbody>
</table>

b. Which photograph shows the level of use that is so unacceptable that you would no longer use the waterfall area?

Photo number: ______ OR ❑ I don’t know OR ❑ None of the photographs are so unacceptable that I would no longer use the waterfall area

c. Which photograph looks most like the number of people you typically saw at the waterfall area?

Photo number: ______ OR ❑ I did not visit the waterfall area
9. We would like to know how many people you think could use a beach area at Delaware Water Gap NRA without you feeling too crowded. To help judge this, we have a series of photographs that show different numbers of people in a beach area. Please look at the photographs of the Beach Area.

a. Please rate each photograph of the Beach Area by indicating how acceptable you think it is based on the number of people shown. A rating of -4 means the number of people is “very unacceptable” and a rating of +4 means the number of people is “very acceptable” (Circle one number for each photograph.)

<table>
<thead>
<tr>
<th></th>
<th>Very Unacceptable</th>
<th>Unacceptable</th>
<th>Moderately Unacceptable</th>
<th>Slightly Unacceptable</th>
<th>Neither Acceptable or Unacceptable</th>
<th>Slightly Acceptable</th>
<th>Moderately Acceptable</th>
<th>Acceptable</th>
<th>Very Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo 1</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 2</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 3</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 4</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 5</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 6</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
</tbody>
</table>

b. Which photograph shows the level of use that is so unacceptable that you would no longer use the beach area?

- Photo number: _____ OR ☐ I don’t know OR ☐ None of the photographs are so unacceptable that I would no longer use the beach area.

c. Which photograph looks most like the number of people you typically saw at the beach area?

- Photo number: _____ OR ☐ I did not visit the beach area

10. Do you live in the United States? (Please check one and fill in the appropriate blank.)

- ☐ Yes (What is your zip code? ___________)
- ☐ No (What country do you live in? ___________________________)

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Delaware Water Gap NRA staff is considering potential alternatives to guide opportunities for access and management of facilities and services. Below are summaries of these potential alternatives. In these, the term ‘park resources’ refers to the natural and historic things in the park. More detail on each alternative is available from the person who gave you the survey.

Please indicate below if each potential alternative is unacceptable or acceptable to you, AND then rank them in order from 1 – “most preferred” to 4 – “least preferred”.

<table>
<thead>
<tr>
<th>Potential alternative</th>
<th>Unacceptable</th>
<th>Acceptable</th>
<th>Rank (from 1 to 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refocus management on key park resources and recreation opportunities. Areas not as important are closed to ensure enough money to support management of identified priorities. Fees at recreation sites remain as they are now.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refocus management to provide better recreation opportunities and improve park resources. This is done by expanding or creating new facilities to better serve visitors. Park resources are better protected by developing facilities to reduce impacts, and some repair of impacts would occur. A park-wide entrance fee of $10 per person or $20 per vehicle or $40 for an annual pass would be started. Also, new or higher fees at some recreation sites help support better recreation opportunities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refocus management to better protect and repair park resources. This is done by improving opportunities for low-impact recreation and reducing harm to the environment from recreation. New fees are charged at some sites and current site fees increase to $7-15 total. These fees help repair park resources and improve low-impact recreation opportunities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keep with current management focus, knowing that not enough money exists to manage all park resources and recreation opportunities. The park protects resources and provides recreation opportunities by reacting to major issues. Some issues, park resources, and recreation opportunities go mostly unaddressed. New fees are charged at some sites and current site fees increase to $7-15 total.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. What questions, concerns, or suggestions do you have regarding the potential alternatives listed in the previous question?

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

Thank you for your help with this survey! Please return it to the person who gave it to you.
Boater survey instrument for Delaware Water Gap visual-based methods study

Delaware Water Gap National Recreation Area (NRA)
Boater Survey

PAPERWORK REDUCTION ACT and PRIVACY ACT statements: The National Park Service is authorized by 16 U.S.C. 1a-7 to collect this information. This information will be used by park managers to understand the visitor use and the perceptions of recreation management at Delaware Water Gap National Recreation Area. Responses to this request are voluntary and anonymous. No action may be taken against you for refusing to respond to this questionnaire. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

BURDEN ESTIMATE STATEMENT: Public reporting burden for this form is estimated to average 15 minutes to complete this questionnaire. Direct comments regarding the burden estimate or any other aspect of this collection to: Jeffrey C. Hallo, Associate Professor, Clemson University, Department of Parks, Recreation and Tourism Management, 280B Lehotsky Hall, Clemson, SC 29634-0735, jhallo@clemson.edu (email).

12. How many of the following types of watercraft are being used in your group today?
   - Number of canoes ________________
   - Number of kayaks ________________
   - Number of rafts ________________
   - Number of tubes ________________
   - Number of motorboats ________________
   - Other (please specify the type and number): __________________________________

13. Were you using the river with a paid guide, group or canoe livery/outfitter? (Please check one)
   - □ Yes
   - □ No

14. Did you rent the watercraft that you are using today? (Please check one)
   - □ Yes
   - □ No

15. a. Did you have to wait to use a boat launch today?
   - □ Yes → How long did you wait? _________ minutes
   - □ No

   b. How long of a wait to launch your boat is acceptable to you? ____________ minutes
16. a. We would like to know how many watercraft you think it is acceptable to see at one time while on the Delaware River in Delaware Water Gap NRA. To help judge this, we have a series of photos that show different numbers of watercraft. Please look at these photos and rate the acceptability of each one. A rating of -4 means the number seen is “very unacceptable”, and a rating of +4 means the number seen is “very acceptable”. (Circle one number for each line.)

<table>
<thead>
<tr>
<th>Photo 1</th>
<th>Very Unacceptable</th>
<th>Unacceptable</th>
<th>Moderately Unacceptable</th>
<th>Slightly Unacceptable</th>
<th>Neither acceptable or unacceptable</th>
<th>Slightly Acceptable</th>
<th>Moderately Acceptable</th>
<th>Acceptable</th>
<th>Very Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
<td></td>
</tr>
<tr>
<td>Photo 2</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 3</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 4</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 5</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 6</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 7</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
<tr>
<td>Photo 8</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
</tr>
</tbody>
</table>

b. Which photograph shows the number of watercraft that is so unacceptable to see at any one time on the Delaware River that you would no longer boat at Delaware Water Gap NRA?

Photo number: ________

OR

❑ None of the photographs are so unacceptable that I would no longer boat at Delaware Water Gap NRA.

c. Which photograph shows the highest number of watercraft you saw at any one time on the Delaware River today?

Photo number: ________

OR

❑ I don’t know.

17. a. Now, we would like to know how encountering different types of watercraft affect your feelings of it being too crowded. Please rate the acceptability of encountering each of the following numbers and types of watercraft on the Delaware River per hour. A rating of -4 means it is “very unacceptable”, and a rating of +4 means it is “very acceptable”. (Circle one number for each line.)
b. What is the approximate number of the following types of watercraft that you encountered per hour on the Delaware River today?

Number of non-motorized boats encountered per hour: ________ OR ❑ I don’t know
Number of tubes encountered per hour: ________ OR ❑ I don’t know
Number of motorboats encountered per hour: ________ OR ❑ I don’t know

c. How many watercraft were together in the largest group you encountered on the river today?

Number of watercraft in the largest group encountered: ________ OR ❑ I don’t know

18. Have you ever not been able to, or chosen not to visit Delaware Water Gap NRA because it was too crowded? (Please check ‘yes’ or ‘no’. If yes, please answer the other questions below it.)

❑ Yes

c. What did you do instead of visiting on this, or these, occasions?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

d. How much of a problem do you think it is that you were not able to visit on this occasion? (Check one box)

<table>
<thead>
<tr>
<th>Not a Problem</th>
<th>Small Problem</th>
<th>Big Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑</td>
<td>❑</td>
<td>❑</td>
</tr>
</tbody>
</table>

❑ No

Thank you for your help with this survey! Please return it to the person who gave it to you.
1. Have you ever not been able to, or chosen not to visit Delaware Water Gap NRA because it was too crowded? (Please check ‘yes’ or ‘no’. If yes, please answer the other questions below it.)

☐ Yes

a. What did you do instead of visiting on this, or these, occasions?

b. How much of a problem do you think it is that you were not able to visit on this occasion? (Check one box)

<table>
<thead>
<tr>
<th>Not a Problem</th>
<th>Small Problem</th>
<th>Big Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

☐ No → Go to next question.
Semi-structured interview protocol for the Delaware Water Gap displacement study

DELAWARE WATER GAP NATIONAL RECREATION AREA

GUIDING QUESTIONS FOR SEMI-STRUCTURED INTERVIEWS OF VISITORS WHO EXPERIENCED DISPLACEMENT

You indicated in your survey that at one or more times you have not been able to, or chosen not to visit Delaware Water Gap NRA because it was too crowded. Could I ask you a few more questions about this? Participation is voluntary and your responses will be anonymous.

If No: OK. Thank you for your time. Have a good day.

If Yes: It should take about 5 minutes, and I'd like to tape record our conversation so I can remember it later on. Is this OK with you?

Could you tell me about these times when you couldn’t or didn’t want to visit Delaware Water Gap NRA because it was too crowded?

When and where did they occur?

Could you tell me what you were feeling and thinking when you experienced this?

What do you think caused it to be too crowded?

- Did the type of other visitors influence your feelings?
- Did their behavior influence your feelings?
- Did the number of visitors influence your feelings?
- Did you have other concerns related to it being too crowded?

How did you cope with or react to it being too crowded? Did you go somewhere else instead?

What are some ideas you have that might help reduce your feelings of it being too crowded?

Before we end, do you have anything you might like to add – anything I should have asked you about or anything you forgot to tell me?

OMB Approval #XXXX-XXXX (NPS #XX-XXX).
Expiration Date: XX/XX/20XX

PAPERWORK REDUCTION ACT and PRIVACY ACT statements: The National Park Service is authorized by 16 U.S.C. 1a-7 to collect this information. This information will be used by park managers to understand the visitor use and the perceptions of recreation management at Delaware Water Gap National Recreation Area. Responses to this request are voluntary and anonymous. No action may be taken against you for refusing to respond to this questionnaire. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

BurdEN ESTIMATE STATEMENT: Public reporting burden for this form is estimated to average 5 minutes to complete this interview. Direct comments regarding the burden estimate or any other aspect of this collection to: Jeffrey C. Hallo, Associate Professor, Clemson University, Department of Parks, Recreation and Tourism Management, 280B Lehotsky Hall, Clemson, SC 29634-0735, jhallo@clemson.edu (email).