ABSTRACT

MITAS, ONDREJ. The Visitor Experience at Jockey’s Ridge: Humans and Nature in a Dynamic Coastal Landscape. (Under the direction of Dr. Gene Brothers).

As population and developed areas in the U.S. continue to grow, rapidly changing environments such as dunes, swamps, floodplains, and cliffs will have to be managed with more attention to surrounding civilization. In some cases, human interventions can “freeze in time” aspects of these environments, preserving landscape features for future generations, but also fundamentally changing their naturalistic character. To be socially equitable, such decisions must be informed by empirical measures of the benefits visitors gain from the park in its current state as well as the benefits they gain from the processes that are visibly changing it.

Jockey’s Ridge State Park in Nags Head, North Carolina contains the largest active sand dune on the U.S. Atlantic coast. The park is located in the midst of dense, commercially-oriented tourist development. Long-term management of Jockey’s Ridge State Park will require understanding the experiences of the nearly 800,000 annual visitors it serves. Knowing what the visitors most value in the opportunity to visit and experience the park is especially important.

Data were collected by a paper questionnaire given to a systematic sample of visitors entering the park at various times of day during the peak summer season and also during the early fall of 2005. The questionnaire contained 24 interval-level scale items as well as several open-ended questions that asked visitors for their thoughts on Jockey’s Ridge as a unique attraction in the Northern Outer Banks tourism context and their feelings on the dynamic nature of the park’s natural features. A factor analysis of scale items revealed five factors: Personal Benefits, Observing Nature, Sensational Benefits, Structured Activities, and Solitude. The scores for these five factors were then entered as independent variables for a series of linear and logistic regressions. Several significant relationships were found between the factors and behavioral and perceptual variables.

Responses to the open-ended questions were content analyzed for themes and coded to determine theme occurrences and relationships, revealing a variety of important themes in the experience of the dynamic landscape of Jockey’s Ridge in the context of
Outer Banks tourism. The importance of nature as communicated in the qualitative responses suggested that for many visitors nature is at the center of the Jockey’s Ridge experience. The nature-oriented management of Jockey’s Ridge as a State Park and the natural character of its landscape offer visitors a relief or contrast from the highly developed touristic environs of the Northern Outer Banks. The experience of nature with the dune feature as its chief attraction provided opportunities for family time and bonding, peace and quiet, and visual enjoyment of a spectacular natural scene.

Experience of Jockey’s Ridge as a natural setting led to the predominant perception that the ever-changing size and shape of the dune are caused by natural processes. Most respondents experienced changes as enjoyable or simply inevitable.

The importance of nature to the Jockey’s Ridge experience shows that the active dune should be managed with the minimum visible interference that is necessary. The results suggest that in a densely developed tourism context, visitors enjoy many nature-based attractions as a relief from or contrast to commercial, impactful, and crowded activity options. When an attraction such as Jockey’s Ridge offers a significant area for free movement, natural and cultural significance, and interpretive facilities, visitors gain a variety of benefits that can facilitate social and familial cohesion as well as ecological awareness.
THE VISITOR EXPERIENCE AT JOCKEY’S RIDGE: HUMANS AND NATURE
IN A DYNAMIC COASTAL LANDSCAPE.

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DEDICATION

I dedicate this thesis to my family, especially my parents Helena and Lubos, and my grandparents Laco, Joy, Jan, and Melanka. All six of them have been professors of the natural sciences, but they have been supportive of my seemingly unprecedented interest in social science. They have inspired me to carry out work such as this thesis to the very best of my abilities.
BIOGRAPHY

Ondrej “Andy” Mitas was born in Bratislava, Czechoslovakia and moved to the United States in 1990 at the age of seven. He lived in Champaign, Illinois up to his graduation from the University High School. He studied a variety of subjects at North Carolina State University and graduated in 2004 with a B.A. in Arts Applications and a minor in Computer Programming. He has been inspired by the scholars in the leisure studies field to begin examining the relationships between social groups, leisure experiences, and the landscape. He looks forward to developing a career as a professor in the leisure studies field while keeping up his interests in model aviation, visual art, and music on the side.
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CHAPTER 1
Introduction

Outdoor Recreation Experiences

In the seminal environmentalist text *The End of Nature* (1989), Bill McKibben wrote that no corner of the earth is immune from some degree of human influence due to the alterations that industrialization has made to the atmosphere. In this sense, even the most remote wilderness is now a “garden,” forever touched by human civilization. Landscapes of natural reserves such as state and national parks, however, are still experienced as wild and natural by human visitors. Outdoor recreation is the name given to human activities that create leisure experiences in such settings.

Due to biological and geological processes, all naturalistic settings undergo constant change. In most cases, this change is either predictable (e.g., the seasons) or imperceptibly slow (e.g., cliff erosion in the Grand Canyon). When key features of a park’s landscape naturally change quickly enough to be noticed over 5 or 10 years, however, significant questions about management arise. The need to respect the area’s physical and political limitations must be balanced against the recreational and environmental value of the park’s natural resources. In their environmental ethics review of one setting in Michigan, the Great Sable and Sleeping Bear Dunes, Harman and Arbogast (2004) suggested that “the ethical principle of respecting what others value out of respect for them be applied in such matters” (p. 23) putting the imperative on park managers to understand the visitor experience.

Much can be gained from understanding visitor experiences in the setting of a dynamic landscape. As population and developed areas in the U.S. continue to grow, rapidly changing environments such as dunes, swamps, floodplains, and cliffs will have to be managed with more attention to surrounding civilization. In some cases, human technology can intervene to “freeze in time” some aspects of these environments by preserving their present state for future generations, but also fundamentally changing their naturalistic character. To be ethically sound, decisions must be informed by empirical measures of the benefits visitors gain from the park in its current state as well as the benefits they gain from the processes that are visibly changing it.
Research provides a substantial precedent for understanding and empirically measuring benefits of outdoor recreation experiences. Manning (1999) cited a large number of studies from 1961 onwards in his review of benefits and motivations literature in outdoor recreation. He noted that a view of recreation benefits as stemming from activities is incomplete. Progress in studying motivations for recreation over the past 25 years is based on the view that benefits result from the overall recreational experience. This finding is especially true of naturalistic settings where limited facilities shift the focus of the visitor from “doing” something to simply “being” there. Under this experience perspective, Knopf and Lime (1984) suggested that the management of a park for a certain type of experience with its associated benefits becomes important. To inform management policies, knowing what benefits the landscape and facilities of the park are uniquely positioned to offer is important.

Jockey’s Ridge in the Northern Outer Banks Context

Jockey’s Ridge State Park in Nags Head, NC contains the largest active sand dune on the U.S. Atlantic coast (Figure 1). Founded in 1976, the park covers 413 acres on North Carolina’s Outer Banks barrier islands and offers a wide range of recreational settings. Considering which settings the visitor may be seeking and may ultimately experience is necessary. As a destination, the Northern Outer Banks area offers experiences that range from completely manufactured attractions (e.g., minigolf) to authentic historical sites (e.g., lighthouses) and state and national parks (e.g., Pea Island National Wildlife Refuge). Understanding the role of Jockey’s Ridge in the visitor experience of the entire destination area for marketing and sustainability considerations is important. The principle of diversity in recreational opportunities is likewise mentioned in the State Parks mission statement (Appendix A), which means that opportunities at Jockey’s Ridge must be compared to those offered by other NC State Parks.
Jockey’s Ridge holds cultural and historical significance. Nags Head is one of the oldest settlements in this region of the Outer Banks, and retains a dedication to its heritage as evidenced by the “unpainted aristocracy” of shipwreck-wood cottages that still stand throughout the town. The first hotel on the Outer Banks, the Nags Head Hotel, was located at the southern foot of Jockey’s Ridge (Bachman, 2005). It may be seen, therefore, as the first location of tourism in the area. Interestingly, the geophysical movement of Jockey’s Ridge created problems for the hotel. At one time all patrons were given shovels along with room keys so that they could dig their way to their rooms through the sand drifts before Jockey’s Ridge buried the hotel completely (Bachman, 2005). The location plays host to other historical episodes, which the recently refurbished interpretive displays at the park’s Visitor Center cover in detail. While the cultural history is secondary to the natural history in these displays, knowing how much importance visitors attach to each could be informative.
Beyond Jockey’s Ridge, the entire Outer Banks area is geophysically dynamic, leading to perennial political disputes about funding for beach renourishment, dredging, and the acceptable level and type of development for tourism. Information about the role of Jockey’s Ridge in the northern Outer Banks tourism context will be useful as objective content in discussions over the area’s future.

**Jockey’s Ridge as a Dynamic Landscape**

An example of a landform “frozen” in time is the dune at the Wright Brothers National Memorial, just north of Jockey’s Ridge. Before the Memorial was built, this dune was similar in character to Jockey’s Ridge. It was planted with grass so that it would not move or erode as an active dune like Jockey’s Ridge does.

The other extreme in resource management strategies is to protect the process of change in the environment under the understanding that the present state – in this case, the height of the dune – may be lost forever. Under the determination to “let nature have its way,” the focus shifts to protecting the variables in the natural process from human interference. This “hands off” option for Jockey’s Ridge was rejected as politically and practically unfeasible (Ellis, 1996), as it would mean allowing the park to overtake houses to its south.

If the experience of natural processes is deemed to be a priority, certain natural processes that cause the park’s landscape to change may intentionally be left undisturbed. The mission statement of North Carolina’s Division of State Parks (Appendix A) mentions conservation as well as preservation of “natural features,” and thus slants toward the policy of interrupting processes that threaten a feature perceived as natural. This stance is not, however, explicit and invites the interpretation of park management in questions of landscape management.

Understanding how visitors perceive the natural attributes of Jockey’s Ridge in its currently managed rapidly changing state is important. Understanding whether the process (the fact that the dune is constantly shifting) or the feature’s present state (90 feet high) has a greater influence on the visitors’ experience is also important. In particular, knowing which
attributes of the park produce key benefits to visitors will be useful to park managers as they solve individual management issues that arise out of the movement and erosion of the dune.

Park History

As tourism grew in the Northern Outer Banks area in the mid-1970’s, the large dunes such as Jockey’s Ridge that once moved along the Banks were developed for vacation homes. As it was the largest and best-known of the dunes, Jockey’s Ridge was already used for some recreational activity, and its development was stopped by citizen protests which quickly turned into a movement to keep the area natural. Over 25,000 signatures were collected in just days (Ellis, 1996). A state government grant enabled an initial purchase of 152 acres, which was an unusually small area for a State Park. Remaining land acquisition followed the publication of a Master Plan.

The park is located in the midst of dense commercial and residential development. The alleged combination of anthropogenic and natural processes that shape the dune have reduced its elevation and slope, making it less impressive and less exciting for some recreational activities such as hang gliding. These processes have also caused the dune to migrate outside the boundaries of the park. As a result, 150,000 cubic yards of sand were removed from the south dune of the dune field in 2003 and moved beyond the dune to the northern section of the park.

Recreation at Jockey’s Ridge

The entire park area is open for free pedestrian activity (Figure 2). The area includes two inconspicuously marked pedestrian trails through the park, a wheelchair-accessible boardwalk with interpretive displays and an excellent view of the main dune, and a visitor center with extensive information about park wildlife and some natural and cultural history. Hang-gliding lessons are offered by an in-park concessionaire with about 12,000 students per year (Ellis, 1996). Additionally, hang gliding is allowed year-round by permit to about 1000 certified hang glider pilots. While hang gliding activities represents a less than 2% of total visitation to the park, images of hang gliding on Jockey’s Ridge are prominent in state and
area tourism materials. The park is recognized in the hang gliding community as an extraordinarily safe and favorable area for absolute beginners to be introduced to the sport.

Sandboarding is allowed on the west side of the main dune outside of the peak season. In addition, the park staff carry out a number of free interpretive programs, regulated on a first-come, first-served basis. The programs explain aspects of the park’s natural history and teach recreational activities such as kayaking. Funding for park activities and upgrades is supplemented by the Friends of Jockey’s Ridge nonprofit organization. The Friends operate a gift shop inside the visitor center, solicit private donations, and maintain a website for the Park separate from the North Carolina Division of State Parks site.

Figure 2. Map of Jockey’s Ridge (State of North Carolina, 1976).
Research Purpose and Objectives

Information is needed about the visitor experience at Jockey’s Ridge. The park is a highly dynamic landscape in a context of dense commercial development. Knowing what the visitors most value in the opportunity to visit and experience the park is especially important. The recreational experiences that visitors enjoy at the park are integral to its future, especially from the perspective of management. The project, therefore, addressed the following research question:

Which aspects of Jockey’s Ridge State Park are important to the visitor experience, and how do visitors’ priorities at the park relate to possible management actions?

The first seven of the following research objectives will inform the research question with a quantitative, multiple-choice instrument administered to visitors on the site of the park. Research objectives 8 and 9 will be addressed by qualitative data obtained on-site using open-ended questions on the survey questionnaire.

1) To describe demographics and attraction visitation history of Jockey’s Ridge visitors,
2) To determine the factors that underlie visitor benefits at the park,
3) To determine the relationship of those factors to distance traveled,
4) To determine the relationship of those factors to time spent in park,
5) To determine the relationship of those factors to stated importance of dune height,
6) To determine the relationship of those factors to stated awareness of natural processes at the park,
7) To determine the relationship of those factors to repeat visitation history,
8) To explain the meanings to visitors of Jockey’s Ridge as a unique attraction in the Northern Outer Banks tourism context, and
9) To describe visitors’ emotional reactions to the dynamic landscape of Jockey’s Ridge.

The factors underlying visitors’ motivations for coming to Jockey’s Ridge organizes the attributes and activities at the park into areas of benefits sought by visitors. Using these factors to predict repeat visitation and distance traveled shows what influence these domains of benefits wield on users’ actual behavior. Determining the relationships between factors of benefits and visitors’ interpretations of the dynamic landscape reveals the role of the landscape in the visitor experience. The elicited meanings of Jockey’s Ridge stated by visitors explain how attributes of the park motivate visitation and create benefits. Finally, describing users’ reactions to the natural changes at Jockey’s Ridge directly connects the visitor experience to potential management implications.

Organization of the Thesis

The following chapters describe the study undertaken to address these objectives and empirically support an outcomes-oriented management policy for the park. Chapter 2 integrates previous research on the park, dynamic landscapes, and motivations for outdoor recreation. Chapter 3 explains the methods used to collect and analyze data. Chapter 4 describes the results obtained. Finally, Chapter 5 discusses the implications of the findings for Jockey’s Ridge State Park, similar situations, and for further research.
CHAPTER 2  
Literature Review  

Introduction  

The purpose of the present study was to collect information about the Jockey’s Ridge visitor experience to inform current management issues. Substantial precedent for theoretical and applied inquiry into benefits that participants seek from outdoor recreation experiences exists (Manning, 1999). Changes to parks have been discussed in the tourism research literature (e.g., Hochtl, Lehringer, & Konold, 2005; Nyaupane & Thapa, 2004; Johnston, 2001; Tooman, 1997). Most research of tangibly changing tourist destinations, however, usually concerns anthropogenic changes. Natural processes that tangibly change dune environments have been studied from geomorphological perspectives (e.g., Lepzcyk and Arbogast, 2005; Kuitel, 2001; Marsh and Marsh, 1987). Previous research on Jockey’s Ridge and similar dune environments in the natural sciences offers park management important but incomplete information on issues faced by the park (Mitasova, Overton, and Harmon, 2005; Havholm et al., 2004; Judge, Courtney, & Overton, 2001; Runyan and Dolan, 2001).  

Measurement of Recreation Experience Benefits  

Research on preferences of outdoor recreation experiences has sought to reliably measure benefits expected or derived by participants with the goal of informing management strategies for natural and protected areas. The initial theoretical achievement of this work was development of the Recreation Experience Preference (REP) scales (Driver, 1977). Subsequent research has established the REP scales as a dependable instrument for measuring benefits to inform park management issues. However, qualitative methods have rarely been a component of such studies, and objections have been raised about the social and economic implications of past benefits research. Amendments have been proposed to the framework of management based on measurable visitor benefits to address these limitations. Established benefits-based management research procedures have not been applied to rapidly changing environments such as coastal dunes.
The REP scales were developed as an application of the expectancy theory of human motivation to recreation experiences. Expectancy theory suggests that human behavior is oriented towards attainment of achievable goals. Based on this idea, Driver and associates created the REP scales using measurable benefits such as social interaction, exercise, use of equipment, and stress relief under the hopes that recreational resources could be managed to provide these benefits as prioritized by studies of visitor motivations (Manning, 1999). Scale items emphasize outdoor and nature-based recreation.

Nearly twenty years of research using the REP scales were examined in a meta-analytical study by Manfredo, Driver, and Tarrant (1996). Manfredo et al. indicated that, as intended, the utility of the REP scales is in their capability to “help managers understand and meet the desires of visitors” (p. 209). The first three of six types of studies cited by Manfredo et al. described relationships between visitor preferences and activities, visitor segmentation based on benefits, and visitor preferences and settings. These types of studies are applicable as precedents to the present study.

An example cited by Manfredo et al. (1996) of the use of the REP scales to benefits segmentation is McIntyre, Cuskelly, and Auld’s (1991) study of urban parks in Brisbane, Australia. Twenty of the REP scale items were used to measure park visitors’ motivations for park use. A cluster analysis was then applied to group the respondents based on the benefits sought. The validity of the McIntyre et al. study was limited by the decision to only survey on weekends.

In a more recent study, the REP scales were used by Siderelis and Moore (in press) to determine the relationship between participant activity choices and benefits sought on the lower scenic segments of the Chattooga River. The study found two distinct user segments based on the choice of commercially guided or self-guided rafting as the recreational activity.

Studies that use the REP scale or similar instruments have generally used two forms of quantitative statistical analysis. Cluster analysis is used to group respondents’ based on groupings that occur in the dependent variable. It is most useful for studies of customer segmentation when managers perceive a need to reach groups of users with different messages based on their recreation motivations and benefits sought. Factor analysis is used to reduce “a large number of variables into a smaller number of independent (orthogonal)
dimensions or factors” (Stynes, 2005). Instead of grouping respondents based on individual preferences, factor analysis groups the preferences themselves based on collinearity. The resulting factor scores then form an easily manageable data set for analysis of variance or regression analysis.

In contrast to studies using the REP scales, Mugica and De Lucio (1996) studied the Donana National Park in Spain using a visual approach to outdoor recreation experience preference, oriented towards landscape rather than activity or benefits. The park contains active and stable dunes as well as valuable wetland ecosystems. It is only accessible through organized 4WD tours. A sample of 260 visitors who took the tour was shown pairs of photos, one of the coastal swamp and dunes of Donana, and one of a more romantic “traditional” mountain landscape. Their choices were analyzed for principal components resulting in four attribute dichotomies pertaining to presence of water, mountains, marsh vs. dune, and animals vs. elements not found in the park. The authors conclude based on their results and other studies concerning Donana that visual landscape preferences were influenced by environmental education.

Benefits-Based Park Management

The ultimate goal of research on recreation experience preference has been to create background knowledge and reliable instruments to inform issues of park and protected area management. The interest in managing based on benefits visitors may enjoy from parks is in protecting natural resources while utilizing them in the most equitable and beneficial way possible. In his chapter on motivations for outdoor recreation, Manning (1999) defined Benefits-Based Management (BBM) as study of “the ultimate or higher-order benefits of recreation that flow to individuals and society at large” (p. 171) in ways that can be measured by park managers. He then outlined a dozen principles for management of outdoor recreation resources based on the past 40 years of outdoor recreation research. He argued for a threefold perspective on issues surrounding parks, examining them from natural, social, and managerial perspectives. He also pointed out the importance of diversity and managing for benefits and quality of experience, rather than visitation levels or other inconclusive measures.
Pierskalla, Lee, Stein, and Anderson (2004) examined nine pilot studies of BBM using meta-analysis. The studies included several State Parks in Minnesota as well as State Parks and private natural areas in Colorado and Arizona. The activities available to visitors at the nine study areas covered a spectrum of equipment and skill required. The authors used a two-way ANOVA to test for relationships between 12 possible benefits and settings as well as activities. Activity inputs had significant effects on five of the 12 benefit variables, whereas setting was significantly affected by only one, leading the author to conclude that “not all outcomes require certain types of activity and setting inputs” (p. 172). Overall, in the study areas, benefits depended more strongly on activities than settings. However, the authors also suggested the difference may be due to difficulty in operationalizing setting variables.

Research intended to inform BBM approaches to parks have contributed toward understanding benefits sought by recreation participants. However, the approach of BBM research has been criticized as being narrow in method and domain. Recent studies have explored possibilities of variables besides benefits that may be important to measure for management, and stakeholders besides participants whose perceptions may be important to management.

Hemingway and Parr (1999) criticized quantitative research informing management questions from a BBM point of view as affirming only relationships, not causes. Therefore, they suggested a need to research benefits of recreation from the interpretive paradigm. Qualitative data are especially important in addressing the effects of management issues on a deeper level than the REP scales can address. Hemingway and Parr also mentioned the need to collect demographic data to avoid spreading an impression of “disembodied participants” whose behavior is related only to the resource of the park and how it is managed.

Much of the previous research in park management discussed by Manning (1999) has been directed towards the dilemma of limiting use to maintain experience quality. More (2002), however, pointed out that use limitations are often motivated by budgetary issues, and that limitations on use actually threaten stated goals such as social cohesion and learning. More also objects to the assumption that the goals measured by the REP scales are universally beneficial. He concluded that benefits-based management has been the most promising framework for equitable management of outdoor recreation resources, though
BBM research may be biased by interests of research funding. In his response to More (2002), Driver (2002) explained that the model of management by measurable outcomes is the most thoroughly tested framework for making management decisions about outdoor recreation resources.

Other recent studies have indirectly addressed criticisms of BBM by broadening the variables and stakeholders studied. A study of greenway recreation by Frauman and Cunningham (2001) expanded the list of variables that may be measured for park management to include site attributes and participants’ personal values as well as benefits sought. The format of the questionnaire administered to greenway users was similar to studies that use the REP scales to answer management questions, but included items pertaining specifically to greenway attributes and amenities and personal values of participants.

Stein, Anderson, and Thompson (1999) explored benefits of two Minnesota State Parks to the surrounding communities in a descriptive study of stakeholders. They collected quantitative and qualitative data from a purposive sample of community stakeholders that were familiar with the nearby parks. They found that stakeholders believed the park to be beneficial for economic impact and environmental education. Based on the exploratory nature of the study and promising results, the authors suggested that visitor preference information should be consistently expanded to plan for stakeholder and community impacts with a focus on park-community partnerships.

The BBM framework uses measurements of visitor benefits to guide management of parks and protected areas in a systematic, empirically based manner. The REP scales have been accepted as a well-tested, highly reliable instrument for measuring benefits to inform BBM studies. Criticisms of the incomplete or subjective application of BBM have led to a broader perspective on managing protected areas by accounting for social and class issues and non-visitor stakeholder groups.

Managing Changes in Destination Settings

Benefits-based management research typically captures the visitor experience at a park during a particular “slice in time” when the landscape of the park is not tangibly
Research concerning change to tourism destinations or attractions, including protected natural settings, usually concerns either effects of management actions or trends due to human development. The anecdotally familiar changes in urban or semi-urban tourism environments as they are “discovered” and exploited for commercial gain have been described by the Butler life cycle model (1980). This model describes the decreasing visitation that results from commercial exploitation of a destination’s formerly authentic appeal. Numerous studies have applied this model (e.g., Johnston, 2001; Tooman, 1997). Implications of natural change in these contexts, though noted, have not been thoroughly explored.

An exception to this pattern of research is a study of Italy’s largest wilderness area, the Val Grande National Park (Hochtl, Lehringer, & Konold, 2005). The park had undergone a process of rewilding “in which a formerly cultivated landscape develops without human control” (p. 86). Residents were randomly selected to receive questionnaires, while tourists were intercepted during hikes and also self-selected at the visitor center. Comments were coded into lists of positive and negative effects of the rewilding. Residents reported that increased wilderness of their pastures made their agricultural work dangerous or impossible and threatened their culture. Visitors regretted this loss of culture but sometimes commented favorably on the dynamic, naturalistic landscape that resulted. Also, rewilding was shown to interfere with recreational facilities by slowly destroying the park’s recreational value. The authors concluded that in historically developed areas, “Decision-makers should be aware of the positive and negative aspects of a large-scale rewilding, and all stakeholders, especially affected local communities, should be included in any decision making process” (p. 85).

Most other studies about destination change are concerned with anthropogenic changes such as globalization, war, or impacts of the tourist industry itself. Usually, these impacts are assessed through the life cycle and ecotourism theories. A large-scale example of such a study is a comparative analysis of traditional and ecotourism operations in Nepal (Nyaupane & Thapa, 2004). The study found that managing for ecotourism created fewer impacts, either positive or negative, on residents. Positive economic impacts were determined to be unevenly distributed. The tourism research literature lacks a solid base of knowledge on the subject of natural changes or rapid natural processes in relation to the recreational tourist experience.
Dune Geography

*Studies of Dune Geomorphology.* Morphologically dynamic landscapes such as active dunes have not been studied from the perspective of the visitor experience. However, dune environments across the world have long been studied by geographers and biologists interested in their natural history and dynamic morphology. Recently, technologies of LIDAR elevation data, core sampling, and radiocarbon dating have facilitated discoveries based on dune stratigraphy. Likewise, 3-dimensional computer visualizations and analyses using Geographic Information System (GIS) software have allowed researchers to quantify and illustrate dune movements. This increasing body of knowledge about dune environments has sparked discussions about ethical and sustainable management possibilities.

Several studies have examined dunes in Europe and the Middle East that bear notable resemblance to Jockey’s Ridge from geographical perspectives. In a review of dune management policies, Kuitel (2001) pointed out that the overall paradigm in dune conservation has shifted from stabilization by planting to creating conditions for active dunes to constantly move and change, as they would in the absence of humans. Arens, Geelen, Slings, & Wondergem (2005) examined cases of attempted “re-mobilization” of coastal dunes in the Netherlands by removing vegetation from a dune that had previously been stabilized. The removal of vegetation was justified under the view that, as stated above, an active freely moving dune is more “natural” and holds more ecological value. The authors’ introduction focuses on the belief that “good management of the landscape should form the basis for good management of ecological values” (p. 1). Interestingly, they also suggest that stabilization of the dunes may have been accelerated by global climate change. The monitoring by Arens et al. (2005) documented the movements of dune formations once they were freed from stabilizing vegetation. These studies showed that it is possible to return a dune to a former state of active dune function, which is suggested to be preferable from an ecological standpoint.

Other studies explore the natural history and processes of dunes on the shore of Lake Michigan characterized by Harman and Arbogast (2004) as “intensely utilized and managed” (p. 6). These dunes serve as prominent features in several State and National Parks, but are
also mined for foundry sand in unprotected locations. Lepczyk and Arbogast (2005) described dune classifications and morphology at Petoskey State Park on Lake Michigan. Using a combination of computer-based modeling and dating of samples from dune material, the authors found an unusual diversity of both stable and active dune forms within the park. Little mention of management towards recreation or tourism, however, was made in the study. Marsh and Marsh (1987) used stratigraphy to quantify Lake Superior dune movements and erosion, and found that seasonal wind and frost patterns significantly influenced erosion rates.

The 2004 study by Harman and Arbogast addressed the ethical implications of dune geomorphology research. Based on previous geomorphological study of Michigan dune environments, the authors sought to “use that work to propose a value theory” (p. 24) about dune conservation. Along the lines of Kuitel (2001), Harman and Arbogast wrote that “data suggest that the dunes reflect episodic, ongoing geomorphic and plant ecological processes as opposed to singular, static past environments” (p. 24). The value theory that the authors presented assigns value to environments based on respect for humans that value the environments directly. Under this theory, finding empirical support for visitor benefits of dune areas becomes critical to conservationist management actions.

*Studies specific to Jockey’s Ridge. Jockey’s Ridge is an example of an active coastal dune that has been protected from development and is allowed to move according to natural processes. A 1995 symposium of State Parks officials, park stakeholders, and research geographers resulted in a research agenda for Jockey’s Ridge. The agenda concerned several aspects of the park’s geography with an emphasis on the changing size, shape, and position of the dunes (Ellis, 1996). In the past ten years, much of that agenda has been addressed using 3-dimensional GIS modeling and geological data that reveal the dune’s natural history.

Runyan and Dolan (2001) hypothesized that the dune was thousands of years old and that surrounding development was depleting its source of sand and therefore causing the observed loss in height. They cited the composition and apparent sources of sand found at Jockey’s Ridge as evidence. A stratigraphical study by Havholm et al. (2004) that used ground-penetrating radar and core samples showed that the dune had historically cycled
between high-growing maritime forest such as seen today just north of the Ridge, in Nags Head Woods and the current unvegetated active dune. Samples collected from exposed “bands” of soil on the dune were dated revealing these forest-dune cycles to typically only last a few hundred years.

GIS modeling and historical research by Mitasova, Overton, and Harmon (2005) quantified the processes that shaped Jockey’s Ridge by measuring the dune’s deflation and migration rates. This research confirmed the findings by Judge, Courtney, & Overton (2001) that sand from the windward side and tops of the dunes is deposited on the leeward side immediately in front of the dunes, rather than being blown into the Roanoke Sound as once thought. Vegetation at the north edge of the dune field, rather than development further north, apparently is responsible for anchoring the source sand for the dune causing the present deflation at a rate of about one foot per year. Mitasova et al. also showed that elevation of the east dune and west ridge of the main dune have recently slightly increased, suggesting that there is enough sand still in the park to at least maintain the dunes’ height.

These studies provide a dependable body of knowledge about the natural history and present geomorphological processes at Jockey’s Ridge. This information is inadequate support, however, for management planning. The visitor experience at Jockey’s Ridge is not well understood. The park management has an anecdotal understanding of the park visitor motivations but they have not been rigorously examined. Research literature in outdoor recreation and in tourism offers only peripheral understanding of visitor experiences in naturally dynamic recreational settings.
CHAPTER 3
Methods

Introduction

A need to collect information from Jockey’s Ridge visitors about their experience at the park exists. The following chapter explains techniques of measurement, sampling, and analysis that were used to study the visitor experience. First, the process of developing the instrument based on management issues is discussed. An explanation of sampling techniques used to survey a variety of visitors follows. Finally, techniques of analysis of the qualitative and quantitative data collected by the study are discussed.

Identification of Issues

A number of informal, open-ended interviews were conducted with resident representatives of three Jockey’s Ridge stakeholder groups – park management, the concessionaire operator, and the Friends of Jockey’s Ridge (a nonprofit organization that sponsors park programs, infrastructure, and maintenance). The representatives were asked for their views on the present and future of the park within its highly-developed touristic context, and for their input into the present study. As a result, a list of major issues was developed and integrated into the research purpose and survey instrument.

The major issues identified in these conversations helped to complete the list of research objectives with ideas for specific questions and question wording. Several relevant topics such as environmental education might have been excluded from the study if they had not been brought up by stakeholders. By involving the resident stakeholders in the research process, these conversations also ensured that the occasional presence and disruptions of the researcher would be understood as ultimately beneficial to the park.

Survey Questionnaire

A paper and pencil questionnaire was chosen as the method to collect data from visitors because it could be completed during the visit with minimum disruption to the visitor experience. The questionnaire was designed to be carried by visitors into the park and filled
out at the beginning, end, or anytime during their visit. This method reduced non-response biases as well as rushed or incomplete answers.

The front page of the questionnaire assessed the respondents’ history of visits to Jockey’s Ridge and details of their current visit to the Northern Outer Banks area and to the park, including the size of their party, how long they intended to stay at the park, and what other attractions in the area they had seen. These items were intended to partially address the first research objective by describing tourist behavior of Jockey’s Ridge visitors. The second page contained 25 quantitative scale items to measure motivations for visiting the park. These scale items were used to address the second through seventh research objectives pertaining to the relationships between visitor behavior, perceptions, and factors of benefits. The third page began with a question about the importance of the height of the Ridge and followed with several open-ended questions that addressed the last two research objectives pertaining to meanings of Jockey’s Ridge as a unique attraction and visitors’ perceptions of and reactions to changes in the park landscape. The fourth page asked for demographic information that would describe visitors to the park as proposed in the first research objective. The complete questionnaire is shown in Appendix B exactly as it appeared to respondents.

Measurement of Visitor Motivations

The quantitative portion of the questionnaire was designed to assess the experience of the visitor using an interval-level response format based on the Recreation Experience Preference (REP) scales. The REP scales have been shown to be a reliable method of measurement for a variety of outdoor experiences. The initial studies that led to the development of the scales resulted in Cronbach’s alphas of 0.67 and higher for all scales except Privacy, which was not used for the present study. The REP scales have been applied in studies with management questions similar to the present study. Relevant items from the REP scales were supplemented by specific items about Jockey’s Ridge activities such as hang gliding and kite flying. All of these items were presented in a 1-5 interval-level response format under the question, “How important were the following to your experience at Jockey’s Ridge?”
Measurement of Unique Park Attributes and Reactions to Change

The first open-ended question was aimed at uncovering the symbolic and actual meanings of the visitor experience at Jockey’s Ridge in the Outer Banks context, asking, “What about Jockey’s Ridge makes it unique or different from the other attractions you’ve visited in the area?” The question asked respondents what makes Jockey’s Ridge unique as a prompt to reveal visitors’ experience of Jockey’s Ridge in the context of their trip as well as the context of the Northern Outer Banks destination.

The following question asked in a yes-or-no format whether the respondent was aware of the natural processes that have changed Jockey’s Ridge. The “yes” blank graphically directed the respondent to a second set of open-ended questions, “How do you think time has changed Jockey’s Ridge?” and “How do you feel about these changes?” The first question was designed to assess how visitors perceived the changes at the park given their own background knowledge, their perception of the park’s natural features, and their interaction with interpretive displays. Understanding what visitors thought was changing at the park was necessary to attempt to explain how they felt about it. Given this antecedent information, the follow-up question about their reaction to the changes was designed to elicit affective responses without leading toward either positive or negative feelings.

Finally, the remaining space on the third page was provided for additional comments about the experience with the prompt, “Please take the opportunity to comment on other issues regarding Jockey’s Ridge, which may not have been discussed above.” Such an item is typical for surveys with open-ended questions and offered respect for respondents’ opinions that may not fit under preceding questions. It was also an opportunity to collect verbal data in a less structured way and to reveal priorities of the visitor in the comments they choose to write.

Sampling

Data collection was carried out over three visits to the park. Two visits were made during the peak summer season in mid-August, and one visit was made during the fall shoulder season in mid-October. These times were selected to mitigate the effects of
seasonality on the study’s area of interest. The first sampling visit lasted only half a day. The second and third visits were each three days and included both weekdays and weekend days. Times for sampling within each visit were also chosen for diversity including a minimum of three hours each day. Manfredo et al. (1996) recommend administering surveys using the REP scales as close to the time of interest in a respondents’ trip as possible. Therefore, respondents were sampled at the beginning of their visit and could fill out the questionnaire anytime before they left park.

The entire population of visitors to Jockey’s Ridge was of interest to the study. However, because of resource limitations, it was only possible to sample at one of three entry points to the park. The other two entry points receive comparatively little traffic but may serve different segments (see map, Figure 2). The south entrance contains a small parking lot and presents almost immediate access to the beach on the sound side of the barrier island. A pedestrian entrance is said to be used heavily by locals, but cannot support frequent crossings because it intersects Highway 12, with heavy vehicular traffic during the tourist season.

The sampling frame, therefore, consisted of visitors entering the park through the main entrance. The main entrance is located at the corner of the large main parking lot and adjacent to the visitor center. The researcher approached visitor parties as they walked from their cars in the lot. A few respondents who live in the area walked from the highway rather than from cars in the lot. Parties were selected in a systematic manner. When possible, every party seen entering the park from the main parking lot was sampled. During times of high visitation, when it was impossible to approach every party, every 2nd or 3rd party was sampled. Parties were approached and told,

“Hi, good morning (afternoon), I’m doing research on Jockey’s Ridge visitors for the State Park and North Carolina State University. We’re trying to find out what activities and aspects of the park visitors value. Would you be willing to take a survey with you into the park and give it back to us when you leave?”

If respondents gave consent to participate, they were given the paper questionnaire. Respondents were randomly selected from within the party by selecting the adult who had the most recent birthday. However, approximately half of the parties were unwilling to wait through this selection procedure, and some were confused and gave it to the youngest
member of the party over 18. Some respondents also handed the survey task off to other members of the party. These limitations were possible sources of bias. A response rate of 86% was only recorded during the fall data collection but was noted by the researcher to be approximately similar to the response rate during the summer data collections.

The Friends of Jockey’s Ridge nonprofit organization agreed to donate several hundred keychains to be given to respondents as a thank-you gift. These keychains arrived in time to be used for the second summer and fall data collections. Respondents were told, “thank you, and I’ll have a keychain for you under the pavilion [pointing to park entry point with pavilion] when you return.” Of all 221 useable surveys returned, 75% contained some useable response to the open-ended section of the survey.

Quantitative Analysis

Data were entered from the completed questionnaire forms into an Excel spreadsheet. Excel functions AVERAGE(), MEDIAN(), and MODE() were used to compute descriptive statistics. The data were then exported into SPSS for Windows 13.0. The final analyses reported in this study were done using the statistical software package SPSS for Windows 14.0.

The scale items in the questionnaire were reduced from 22 multiple-choice items to five factors using a maximum-likelihood factor analysis and principal components analysis, each with varimax rotation. The purpose of factor analysis, originally developed to study human intelligence, is to uncover underlying factors that result in common responses to various interval-level questions (DeCoster, 1998). The validity of factor analysis depends upon an actual, theoretically supported set of factors that cause certain groups of questionnaire items to load together. Principal component analysis, on the other hand, does not assume underlying factors but simply groups scale items into groups for the purpose of data reduction. After the initial factors are extracted, in either case, the factors are rotated for easier theoretical interpretation. The widely used varimax rotation is orthogonal, meaning that it produces a set of uncorrelated, and therefore independent, factors.

The two analyses led to similar solutions. In either case, the factors appeared to have a strong theoretical basis, with conceptually coherent groups of motivations loading together.
The solution derived with maximum-likelihood extraction was therefore chosen for further analysis. A five-factor solution was chosen based on the Kaiser criterion of choosing factors with eigenvalues greater than 1. The item concerning the importance of free entry to the park was dropped because its factor loading after the rotation was less than 0.4. All other factor loadings were above 0.4.

The factor scores for the 184 cases included in the factor analysis were then used as independent variables in a series of stepwise regressions to address the research objectives of determining relationships between visitor behavior, benefits, and perceptions. Time spent in park, distance traveled, and stated importance of dune height were entered as dependent variables into the Linear Regression function with stepwise selection in SPSS for Windows 14.0. The resulting models address research objectives 3-5, respectively. The awareness of natural processes at the park was entered as a dependent variable into the Binomial Logistic Regression function with Likelihood Ratio forward stepwise selection to address research objective 6. Research objective 7, previous visitation history, was addressed by two different analyses. First-time visitation was analyzed as a dichotomous variable (coded as 0 if the respondent had visited previously, 1 if this was their first visit) and entered as the dependent variable into the Binomial Logistic Regression function. The variable of years since first visit (for repeat visitors) was entered as the dependent variable for a Linear Regression.

Distance traveled was calculated using the Melissa Data Corporation online lookup tool for distance between zip codes and rounded to the nearest integer. The inputs were the zip code given by the respondent and the zip code of the listed mailing address for Jockey’s Ridge State Park, 27959.

Qualitative Analysis

Following the procedure developed by Strauss and Corbin (1998), the open-ended responses were coded using a procedure of micro, open, and selective coding. Micro coding involves looking at individual words in responses and uncovering possible patterns based on frequencies and proximities of words. Open coding then refines the patterns into coherent themes. Often, the information revealed is so complex that it must be further coded into sub-themes and categories. At this stage, relationships between themes begin to emerge forming
that basis of a theory that is directly related to the data. Selective coding then brought attention to quotations that are particularly exemplary of key findings for use in the results.

The responses to open-ended scale items and open-ended questions about unique attributes and perceived changes at Jockey’s Ridge were read several times to identify potential words and themes of interest. Frequently occurring words were then counted and examined for context. Contextual clues revealed categories of meaningful responses to the research questions for this study, which were then coded over repeated readings of the data document. This process was repeated until theoretical saturation was reached; that is, no new themes emerged upon repeated readings of the data. Themes that were thought to be significant to the research objectives but occurred only a few times were marked with memos rather than codes.
Chapter 4
RESULTS

Introduction

Data were gathered and analyzed on the visitor experience at Jockey’s Ridge. The present chapter describes the results of quantitative and qualitative analyses on the data. Demographic and tourism behavior is summarized by descriptive statistics. Results of the factor analysis of multiple-choice items and regressions based on those factors are explained. Finally, the results of a content analysis of verbal qualitative responses are discussed and a resulting framework for understanding the visitor experience at Jockey’s Ridge is proposed.

Description of Visitors

Demographic Data. Of the 217 usable responses to the demographic section of the survey, visitor parties came from a variety of zip codes of origin, with only one (27265, Raleigh, North Carolina) occurring more than twice. Two respondents listed postal codes from the United Kingdom, and two from Australia. Median distance traveled between U.S. zip codes of origin and zip code of Jockey’s Ridge (27959) was 243 miles. Mean age of respondents was 40 years. The gender breakdown of respondents was 46% female, 54% male. Among the 213 respondents that supplied their level of education, 84% had some education beyond high school with 65% having at least 4 years of higher education. Of 165 respondents that chose one of the provided choices for profession, the most common response (55%) was “professional.” Median household income was $84,000, ranging from $0 to $500,000. Only 160 respondents (70%) filled out the income item on the questionnaire, so conclusions involving visitor income should be made with caution.

Attraction Visitation History. Of the 217 usable responses to the survey’s questions about their present and previous visits to the Northern Outer Banks area, 52% had visited Jockey’s Ridge previously. Among these repeat visitors, mean number of previous visits was 10. Median year of first visit for previous visitors was 1995. Other attractions visited in the area included a wide range of natural, cultural, and commercial sites (Table 1). Places of
cultural interest such as lighthouses, the Wright Brothers National Memorial, and the Festival Park in Manteo occurred frequently. The plurality of respondents said the main attraction that brought them to the Northern Outer Banks region was the beach (28% of 201 completed responses to this question). Interestingly 32% of 216 respondents wrote that they found out about Jockey’s Ridge by seeing the parks’ sign or the dune itself from the road as they drove by. A combined 21% of respondents reported friends or family as their source of information about the park, and 8% had learned about it from tourist literature.

Table 1. List of Attractions Visited by More Than 1% of Respondents on Their Trip to the Northern Outer Banks Area

<table>
<thead>
<tr>
<th>Attraction</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wright Brothers National Memorial</td>
<td>37.0%</td>
</tr>
<tr>
<td>Lighthouses</td>
<td>32.4%</td>
</tr>
<tr>
<td>Roanoke Island Aquarium</td>
<td>23.1%</td>
</tr>
<tr>
<td>Manteo Areaa</td>
<td>19.0%</td>
</tr>
<tr>
<td>Cape Hatteras National Seashore</td>
<td>12.5%</td>
</tr>
<tr>
<td>Elizabethan Gardens</td>
<td>8.3%</td>
</tr>
<tr>
<td>The Lost Colony Outdoor Drama</td>
<td>7.4%</td>
</tr>
<tr>
<td>Pea Island National Wildlife Refuge</td>
<td>5.1%</td>
</tr>
<tr>
<td>Beach</td>
<td>5.1%</td>
</tr>
<tr>
<td>Currituck/Corolla Areaa</td>
<td>4.2%</td>
</tr>
<tr>
<td>Fort Raleigh National Historic Site</td>
<td>2.3%</td>
</tr>
<tr>
<td>Shopping</td>
<td>1.9%</td>
</tr>
<tr>
<td>Nags Head Woods</td>
<td>1.4%</td>
</tr>
<tr>
<td>Graveyard of the Atlantic Museum</td>
<td>1.4%</td>
</tr>
<tr>
<td>Elizabeth II</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

*Note. Percentages add up to more than 100% because most respondents noted several attractions.

*If visitors to Manteo or Corolla areas did not note a single specific attraction, the response was coded into one of these categories, respectively.

Benefits Sought by Visitors. Multiple-choice scale items were offered as possible responses to the question, “How important were the following to your experience at Jockey’s Ridge?” Among these scale items, the item with the highest mean was #8, “to enjoy the
scenery.” The next highest items were, respectively, “to see such an unusually large dune” and “to look at the pretty view from the dune.” The item with the lowest mean was #3, “to fly other model aircraft.” Three blank lines and choices of 3 (Somewhat Important) to 5 (Very Important) were offered below the scale. The few additional reasons offered were analyzed with the other qualitative data. The modal response to the multiple-choice question about importance of dune height was 5 (“Very Important,” 39% of n=218). The mean response to this question was 3.89. Slightly more than half (52%) of 213 respondents indicated that they were aware of the natural processes that have changed Jockey’s Ridge over the years.

Descriptive statistics showed data such as repeat visitation and demographics from summer and fall collections to be very similar, suggesting that the peak summer and shoulder fall seasons serve similar segments of visitors to Jockey’s Ridge.

Factors of Benefits

The factor analysis extracted by maximum likelihood estimation led to a five-factor solution, based on the Kaiser criterion of selecting factors with eigenvalues over 1 (Table 2). A chi-square goodness-of-fit test returned a p-value of <0.000 for the resulting solution, showing that the factor solution is statistically significant for the data.

The five factors extracted form a conceptually coherent framework of benefits sought by Jockey’s Ridge visitors. The first factor includes items pertaining to exercise, spiritual benefits, creating memories, and being in touch with nature. These are all direct benefits to the visitor’s self, and concern various types of personal development. Therefore, this factor was named Personal Benefits. It explained 14.5% of the variance and had a mean score of -0.0124.

The next five items, including the motivations to learn about nature and to observe wildlife, the wind, and natural changes, loaded onto the second factor. Because all of these items pertained to nature and observation, this factor was named Observing Nature. It explained 14.1% of the variance and had a mean score of -0.0279. This factor was followed by four items that described benefits of sensation, such as the view from the dune and the opportunity to play. This factor was named Sensational Benefits and explained 10.5% of the variance. It had a mean score of 0.0372.
The fourth factor included all four items pertaining to flight-related activities (flying kites and model aircraft, hang gliding) as well as the item about ranger-led programs. This was called the Structured Activities factor and explained 8.6% of the variance. It had a mean score of -0.0572. The last factor included the two items that directly concerned solitude – being away from crowds, and away from the family. This factor, Solitude, explained 6.1% of the variance and had a mean score of 0.0104.

Table 2. Maximum Likelihood Factor Analysis Rotated Factor Matrix of Visitor Benefits at Jockey’s Ridge

<table>
<thead>
<tr>
<th>Item</th>
<th>Personal Benefits</th>
<th>Observing nature</th>
<th>Sensational Benefits</th>
<th>Structured Activities</th>
<th>Solitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>To get exercise</td>
<td>.807</td>
<td>.198</td>
<td>.195</td>
<td>.138</td>
<td>.149</td>
</tr>
<tr>
<td>To keep physically fit</td>
<td>.777</td>
<td>.105</td>
<td>.132</td>
<td>.182</td>
<td>.215</td>
</tr>
<tr>
<td>To be in touch with nature</td>
<td>.603</td>
<td>.422</td>
<td>.186</td>
<td>.212</td>
<td>.138</td>
</tr>
<tr>
<td>To develop spiritually</td>
<td>.594</td>
<td>.381</td>
<td>.105</td>
<td>.165</td>
<td>.041</td>
</tr>
<tr>
<td>To bring back pleasant memories</td>
<td>.576</td>
<td>.155</td>
<td>.226</td>
<td>.082</td>
<td>.122</td>
</tr>
<tr>
<td>To see a place untouched by humans</td>
<td>.564</td>
<td>.299</td>
<td>.232</td>
<td>.146</td>
<td>.188</td>
</tr>
<tr>
<td>To understand how nature changes the dune</td>
<td>.222</td>
<td>.906</td>
<td>.208</td>
<td>.142</td>
<td>-.045</td>
</tr>
<tr>
<td>To learn about nature</td>
<td>.315</td>
<td>.801</td>
<td>.238</td>
<td>.230</td>
<td>-.050</td>
</tr>
<tr>
<td>To watch birds or wildlife</td>
<td>.354</td>
<td>.590</td>
<td>.229</td>
<td>.243</td>
<td>.047</td>
</tr>
<tr>
<td>To go someplace different</td>
<td>.251</td>
<td>.464</td>
<td>.284</td>
<td>-.088</td>
<td>.111</td>
</tr>
<tr>
<td>To observe the wind shaping the dune</td>
<td>.127</td>
<td>.460</td>
<td>.412</td>
<td>.174</td>
<td>.129</td>
</tr>
<tr>
<td>To enjoy the scenery</td>
<td>.168</td>
<td>.115</td>
<td>.840</td>
<td>-.080</td>
<td>.010</td>
</tr>
<tr>
<td>To see such an unusually large dune</td>
<td>.100</td>
<td>.272</td>
<td>.676</td>
<td>-.021</td>
<td>-.038</td>
</tr>
<tr>
<td>To look at the pretty view from the dune</td>
<td>.193</td>
<td>.227</td>
<td>.582</td>
<td>-.034</td>
<td>.153</td>
</tr>
<tr>
<td>To play in the sand</td>
<td>.268</td>
<td>.108</td>
<td>.500</td>
<td>.119</td>
<td>-.035</td>
</tr>
<tr>
<td>To enjoy ranger-led park programs</td>
<td>.236</td>
<td>.286</td>
<td>.071</td>
<td>.605</td>
<td>-.027</td>
</tr>
<tr>
<td>To fly kites</td>
<td>.077</td>
<td>.024</td>
<td>-.003</td>
<td>.571</td>
<td>.009</td>
</tr>
<tr>
<td>To watch hang gliders</td>
<td>.108</td>
<td>.127</td>
<td>.117</td>
<td>.504</td>
<td>.116</td>
</tr>
<tr>
<td>To learn to hang glide</td>
<td>.076</td>
<td>-.002</td>
<td>-.205</td>
<td>.441</td>
<td>.059</td>
</tr>
<tr>
<td>To be away from crowds of people</td>
<td>.235</td>
<td>.240</td>
<td>.131</td>
<td>.041</td>
<td>.931</td>
</tr>
<tr>
<td>To be away from the family for a while</td>
<td>.231</td>
<td>-.136</td>
<td>-.047</td>
<td>.123</td>
<td>.499</td>
</tr>
</tbody>
</table>

Note. Factor loadings in **bold** indicate to which factor each item loaded.
Together, these factors explain 53.8% of the variance in the visitor experience preference items (Table 3) and form a useful categorization of benefits that visitors seek in their motivation to visit Jockey’s Ridge. Factor scores were calculated for each respondent to each of the five factors as part of the analysis, setting up a body of data for analysis of relationships between visitor motivations and behavior.

Table 3. Variance Explained by Factor Analysis of Jockey’s Ridge Visitor Benefits

<table>
<thead>
<tr>
<th>Factors</th>
<th>Rotation sums of squared loadings</th>
<th>% Variance explained</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Benefits</td>
<td>3.313</td>
<td>15.057</td>
<td>15.057</td>
</tr>
<tr>
<td>Observing Nature</td>
<td>3.055</td>
<td>13.888</td>
<td>28.945</td>
</tr>
<tr>
<td>Sensational Benefits</td>
<td>2.442</td>
<td>11.101</td>
<td>40.046</td>
</tr>
<tr>
<td>Structured Activities</td>
<td>1.989</td>
<td>9.040</td>
<td>49.086</td>
</tr>
<tr>
<td>Solitude</td>
<td>1.336</td>
<td>6.072</td>
<td>55.158</td>
</tr>
</tbody>
</table>

Relationships Between Visitor Behavior, Benefits, and Perceptions

Stepwise linear regressions of scores for the five factors were carried out with distance traveled, time spent in the park, and stated importance of dune height as the dependent variables. These three linear regressions addressed study objectives 3-5 concerning the relationships of benefits factors to distance traveled, time spent in park, and stated importance of dune height, respectively. Each of the regressions resulted in a linear model significant at a level of 0.05 or higher.

Research objectives 6 and 7 concerned the relationships of the benefits factors to repeat visitation and stated awareness of natural processes at the park. Because repeat visitation and stated awareness of natural processes were both operationalized as dichotomous variables, their relationships to factors of visitor benefits were analyzed by logistic regressions, which are better suited to predicting values of dichotomous dependent variables than linear regressions.

Only one factor, Structured Activities, was significantly related to distance traveled to the park (Table 4). The relationship was negative and weak relative to the other regressions.
(p-value = 0.041). This finding indicates that visitors who rated Structured Activities as important were likely to have made shorter trips than visitors who did not rate Structured Activities to be as important.

Table 4. Coefficients for Stepwise Linear Regression Model of Distance Traveled to Jockey’s Ridge

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>360.472</td>
<td>27.212</td>
<td></td>
<td>13.247</td>
<td>.000</td>
</tr>
<tr>
<td>Structured Activities</td>
<td>-67.210</td>
<td>32.700</td>
<td>-.155</td>
<td>-2.055</td>
<td>.041</td>
</tr>
</tbody>
</table>

The only factor significant to time spent in park was the third, Sensational Benefits (Table 5). As with the previous regression, the relationship was significantly negative, in this case at a p-value of <0.001. A higher score on Sensational Benefits sought such as enjoying the view and playing in the sand was related to a shorter time of stay in the park.

Table 5. Coefficients for Stepwise Linear Regression Model of Time Spent at Jockey’s Ridge

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>77.262</td>
<td>3.306</td>
<td></td>
<td>23.371</td>
<td>.000</td>
</tr>
<tr>
<td>Sensational Benefits</td>
<td>-13.912</td>
<td>3.631</td>
<td>-.280</td>
<td>-3.831</td>
<td>.000</td>
</tr>
</tbody>
</table>

Three factors were found to be significant to the stated importance of the height of Jockey’s Ridge (Table 6). The three factors were Personal Benefits, Sensational Benefits, and Structured Activities. All three of the coefficients were significantly positive. This finding demonstrates relatively greater importance of dune height for visitors who reported Personal Benefits, Sensational Benefits, and Structured Activities as important to them.
Table 6. Coefficients for Stepwise Linear Regression Model of Stated Importance of Height of Jockey’s Ridge Dune

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th></th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>3.896</td>
<td>.081</td>
<td></td>
<td>47.852</td>
<td>.000</td>
</tr>
<tr>
<td>Personal Benefits</td>
<td>.243</td>
<td>.087</td>
<td>.198</td>
<td>2.797</td>
<td>.006</td>
</tr>
<tr>
<td>Sensational Benefits</td>
<td>273</td>
<td>.090</td>
<td>.215</td>
<td>3.043</td>
<td>.003</td>
</tr>
<tr>
<td>Structured Activities</td>
<td>.199</td>
<td>.098</td>
<td>.142</td>
<td>2.018</td>
<td>.045</td>
</tr>
</tbody>
</table>

Two factors, Personal Benefits and Observing Nature, were significantly related to respondents’ stated awareness of natural processes at Jockey’s Ridge (Table 7). The relationships were positive at significance levels $p < 0.01$ and $p < 0.005$, respectively. This finding implies that higher scores on items of Personal Benefits and Observing Nature can predict a greater likelihood of respondents answering “yes” to the dichotomous-choice question that asked if they were aware of the natural processes changing Jockey’s Ridge. The logistic regression model predicted stated awareness of natural processes correctly 67% of the time.

Table 7. Logistic Regression Model of Stated Understanding of Natural Processes at Jockey’s Ridge

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald Statistic</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Benefits</td>
<td>.441</td>
<td>.168</td>
<td>6.871</td>
<td>1</td>
<td>.009</td>
<td>1.555</td>
</tr>
<tr>
<td>Observing Nature</td>
<td>.532</td>
<td>.168</td>
<td>10.058</td>
<td>1</td>
<td>.002</td>
<td>1.702</td>
</tr>
<tr>
<td>Constant</td>
<td>.105</td>
<td>.158</td>
<td>.443</td>
<td>1</td>
<td>.506</td>
<td>1.111</td>
</tr>
</tbody>
</table>

The only factor that was significantly associated with first-time visitation was Personal Benefits ($p < 0.001$, see Table 8). The logistic regression model correctly predicted
whether the respondent was a repeat visitor 62.1% of the time. The relationship was negative, so that repeat visitors were more likely to rate Personal Benefits as important. The linear regression analysis of years since first visit for repeat visitors did not result in any significant factors.

Table 8. Logistic Regression Model of First Time Visitation to Jockey’s Ridge

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald Statistic</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Benefits</td>
<td>-.607</td>
<td>.172</td>
<td>12.397</td>
<td>1</td>
<td>.000</td>
<td>.545</td>
</tr>
<tr>
<td>Constant</td>
<td>-.098</td>
<td>.154</td>
<td>.407</td>
<td>1</td>
<td>.524</td>
<td>.906</td>
</tr>
</tbody>
</table>

Meanings of Jockey’s Ridge as a Unique Attraction

The visitor responses to open-ended questions revealed a variety of themes in the experience of the dynamic landscape of Jockey’s Ridge in the context of Outer Banks tourism. The first research objective directly addressed by the qualitative data was objective #7, to determine what attributes of Jockey’s Ridge set it apart from its geographical and cultural context, making it a unique attraction in the area. By far the most frequently expressed asset of the park was nature, as stated by 57 of the 225 respondents to the open-ended questions. During the first stage of coding, occurrences of the word “nature” and “natural” were grouped under a single code. These occurrences were then investigated to determine which question they were addressing and how the word referring to nature was being used. Occurrences of “nature” and “natural” that were directly referring to attributes that make the park unique were then coded as such. Occurrences of these words that associated nature with the changes to the dune were similarly recoded. These two categories of meanings usually, but not always, corresponded to the first two open-ended questions respectively.

Among the occurrences of the nature theme as one of (and often the only mentioned) unique attributes of the park in its context, respondents wrote:

“Untouched by humans…pure nature”
“Natural processes at work. Unaffected by humans!! (original emphasis)
“It is a natural feature”
“…the natural beauty, etc. are unique for us”
“It is a completely natural phenomenon…”
“It is a natural experience…”
“Made by Nature”
“It’s entirely a product of nature”
“Natural attraction that reflects true beauty and is what you make it.”

Even in these brief quotes the theme of contrast to surrounding development was suggested. The question was intentionally worded to prompt responses about contrasts between Jockey’s Ridge and its context. A significant element of this contrast was the level of human development and manipulation of the landscape in the Northern Outer Banks area.

The following responses provided explicit statements of this theme:

“You can see the natural beauty of the Outer Banks (or what’s left of it!)”
“Least developed – most natural”
“This is a natural setting not a ‘man-made’ attraction”
“It is just so extremely unique that it is not something man-made.”

Rather than credit the origins of the park’s features to an abstract concept of nature, a few respondents took the opportunity to explain the natural setting of Jockey’s Ridge in monotheistic religious terms:

“Everything else we visited was made by man. Taking time to enjoy God’s wonders is very important to our well being.”
“The sheer [sic] magnitude of the dunes + how neat they are given God created them + not man.”

While no other park attribute or benefit of the experience was mentioned more than half as often as its naturalistic character, several secondary themes emerged. Many respondents answered that the dune features and their size, also expressed as amount of sand, were unique and valuable assets to the experience. A variety of activities were also mentioned ranging from play such as “freeform dune sliding” and “fun coming down [the dune face]” to the hang gliding school.

Visitors appeared to come to Jockey’s Ridge in family groups. The importance of family to the experience was evident in the responses. Clearly the value of Jockey’s Ridge was increased by the manner in which benefits are spread across the entire family group. Several respondents also mentioned the specific motivation of using Jockey’s Ridge as an
ideal naturalistic setting for family bonding and interaction. Many of the respondents were grateful for activity opportunities for children:

“…the kids can run up + down + run some energy out”
“Each year our children have grown and we believe the visit is an important experience that they get something new from each time. Plus they sleep well after our visit.”

Reactions to Dynamic Landscape

As with the unique qualities of Jockey’s Ridge, nature was also the central theme of responses pertaining to changes to the park’s landscape over time. The second research objective directly addressed by the qualitative data, objective #8, was to determine visitors’ emotional assessments of the dynamic geomorphology of Jockey’s Ridge. In their attributions of the changes, a few respondents thought that the erosion and movement of the dune were caused by surrounding development. The overwhelming consensus, however, was that the changes were caused by natural processes. Responses that attributed changes to wind or storms were coded together with the words “nature” and “natural” in direct reference to the geomorphological changes at the park. These quotes were then verified by the researcher to confirm that respondents’ references to nature were intended as the supposed cause of the changes. The following quotes illustrated the range of nature-themed responses to the question, “How do you think time has changed Jockey’s Ridge?”

“The wind has caused much movement of the sand.”
“Wind + storms decrease height over time – natural”
“The changes are natural.”
“Constantly changing w/wind.”
“It is ever changing + this is just a part of nature.”

This perception is more accurate, according to previous geomorphological research on the park as explained in Chapter 2, than worries about development affecting the dune’s shape and height. The interpretive displays in the park’s Visitor Center explain some of the natural processes affecting the dune in detail. However, a small display about the history of the park may be misinterpreted as suggesting continuing danger to the dune area from bordering development. The display tells the compelling story of residents facing bulldozers
to start the process of protecting the area, eventually leading to its designation as a State Park. A substantial number of visitors also expressed a lack of or desire for knowledge. The open-ended question about changes to Jockey’s Ridge was answered “not sure” or “don’t know” eight times.

Almost all of the respondents who expressed their feelings on bordering development wrote that they felt badly about the changes. The affective response to the more common and accurate supposition that changes were natural, however, varied widely. Respondents’ stated feelings about the changes at Jockey’s Ridge fell into three general categories: positive feelings about the changes, negative feelings about the changes, and passive approval of changes. Together, respondents who felt good about or approved of the changes substantially outnumbered respondents who were upset by the changes. The following quotes express some of the visitors’ affective responses to the dynamic nature of Jockey’s Ridge.

“The ridge is always changing – that’s one of the many interesting things about it.”
“More spectacular with natural changes”
“I think it makes it more special that it changes over time and never stays the same.”
“I feel fine about the changes.”
“We feel sad about the decrease in size over the years from wind erosion.”
“Made dunes smaller. Sad. We need to protect our dunes.”

Much of the passive approval of the changes, interestingly, was contingent upon the changes actually being natural or pertained only to natural components of the changes.

“As long as it’s nature that is changing it then OK. But we should not tolerate human effects.”
“If the forces are natural, I’m OK with them. I hope man-made, commercial forces are forever kept to a minimum.”

Instead of reporting feelings about the changes, many visitors also stated simply that because they are natural the changes were inevitable. These responses suggested the viewpoint that attempting to manage or manipulate such natural changes would be futile.

“Change is a natural occurrence which people have no control over even if they think they do.”
“The wind has blown sand in different directions. The changes are inevitable.”
“It’s all natural, it’ll happen anyway.”

The data suggested that visitors usually perceived the changes accurately and most often approved of them to some degree, sometimes contingent upon the natural causes of the changes. A small minority of visitors felt badly about the changes, representing many of
those who believe development is causing change, and a few who believe the changes are natural.

Conceptual Model of the Visitor Experience

It is possible to group the qualitative data that addressed the two main qualitative research objectives into a single coherent model (Figure 3) based especially on the frequent occurrences of the nature theme. The importance of nature as communicated in the qualitative responses suggests that, for many visitors, nature was in fact at the center of the Jockey’s Ridge experience. The nature-oriented management of Jockey’s Ridge as a State Park and the natural character of its landscape offered visitors a relief or contrast from the highly developed touristic environs of the Northern Outer Banks. The experience of nature with the dune feature as its chief attraction provided opportunities for family time and bonding, peace and quiet, and visual enjoyment of a spectacular natural scene. Family interactions and activities in the natural setting often had an educational component with visitors wishing to teach their children about nature. Enjoyment of the view and other activities such as exercise, play, and hang gliding were also facilitated by the large and unique size of the dune.

Experience of Jockey’s Ridge as a natural setting led to the predominant perception that the ever-changing size and shape of the dune are caused by natural processes. As a result, many visitors experienced the changes as enjoyable or simply inevitable. In the same vein, feelings towards management emphasized mitigating development impacts.
Figure 3. Conceptual Model of Jockey’s Ridge Visitor Experience.
CHAPTER 5
Conclusions

Introduction

The present study produced results that describe the visitor experience at Jockey’s Ridge from perspectives of benefits, behavior, and perceptions of landscape. Key findings of the study are summarized. Management implications for Jockey’s Ridge are discussed in detail to offer a framework of guidelines for the management of the visitor experience. Theoretical contributions of this study are discussed alongside management implications for dynamic, naturalistic landscapes similar to the study area. Finally, limitations of this study and possibilities for future research are presented.

Summary of Key Findings

The first research objective, to describe demographics and tourism-related behavior of Jockey’s Ridge visitors, was addressed with descriptive measures of survey data. Median group size of respondents’ parties was four members, and they intended to stay at the park a mean of 77 minutes. Average age of respondents was 41 years and they traveled a median of 243 miles to reach the Northern Outer Banks area.

The second research objective was to determine the factors underlying benefits sought by visitors in coming to Jockey’s Ridge. The factor analysis of multiple-choice questionnaire items revealed categories of visitor benefits. These categories include Personal Benefits, Observing Nature, Sensational Benefits, Structured Activities, and Solitude. Of individual questionnaire items pertaining to benefits sought, visitors rated scenery, the unusually large dune, and the view as most important. All of these items belong to the Sensational Benefits factor, which had the highest mean score.

Research objectives 3 through 7 concerned the relationships between benefits to visitors and behavioral as well as perceptual variables. Several significant relationships were found. Time spent by visitors in the park was found to depend significantly on the importance they placed on Sensational Benefits. Distance traveled by visitors had a weak but significant negative relationship to importance of Structured Activities. Stated importance of
the height of the dune depended significantly on Personal Benefits, Sensational Benefits, and Structured Activities. Lower scores on the Personal Benefits factors were significantly associated with first-time visitation. High scores on Personal Benefits as well as Observing Nature were significantly associated with respondents’ answering that they were aware of natural processes occurring at the park.

Research objectives 8 and 9 were addressed by qualitative data. Objective 8 concerned the meaning of Jockey’s Ridge as a unique attraction in its context. Nature was found to be central to respondents’ experiences of Jockey’s Ridge. Viewing the height and size of the dune were also mentioned frequently as unique attributes of the park experience. Objective 9 concerned the visitors’ perceptions of and reactions to the dynamic park landscape. The data showed substantial variation but an overall positive evaluation of the natural processes changing the park landscape was found.

Implications for Jockey’s Ridge

The results of this study provide important information to address the long-term management needs of Jockey’s Ridge State Park with empirical research based on measurable beneficial outcomes. Information about visitor demographics and attraction visitation behavior can be used by park managers in answering future amenity and marketing issues. For example, the geographic distribution of respondents suggests that many visitors to Jockey’s Ridge live too far away to have a sense of the area’s history and geography, especially if they are first-time visitors.

The finding that about half of visitors to Jockey’s Ridge are first-time visitors is also valuable. Lodging at the Outer Banks has shifted towards condos and timeshares that may attract repeat visitors consistently. However, the even split of repeat and first-time visitors to Jockey’s Ridge suggests that overall visitation to the area may be shifting to a different tourist segment or growing overall. The first-time visitors to Jockey’s Ridge may also be repeat visitors to the Northern Outer Banks area tired of the predominantly commercial tourist experience there. Indeed, respondents to the qualitative portion of the present study indicated that the nature-based, uncommodified character of Jockey’s Ridge made it unique
in the Northern Outer Banks context. This finding is important for understanding change and growth in the region and how cultural and commercial changes will affect visitor preferences.

The significant negative relationship between time spent in park and the Sensational Benefits factor may be explained by the rapidly gratifying nature of some of the Sensational Benefits, as it does not take a relatively long stay to take in a beautiful view or play in the dune sand. The relationship between distance traveled by visitors and Structured Activities may be due to regional distribution of marketing pertaining to these activities or may otherwise be related to information distribution. The high percentage of visitors who found out about Jockey’s Ridge by seeing signs or the dune itself from the street suggests, along the same lines, that a substantial proportion of Jockey’s Ridge visitors may not know about park activities when they arrive, or that park activities were not a priority in their decision to visit the Northern Outer Banks Area.

Stated importance of the height of the dune was significantly positively related to Personal Benefits, Sensational Benefits, and Structured activities. The visitor experience at Jockey’s Ridge, therefore, may be affected by dune height when the visitor seeks benefits that are themselves related to dune height. For example, the height of the dune is anecdotally related to the choices available to hang gliders. Similarly, a higher dune affords a higher vantage point for viewing surroundings and a more physically intense climb. The factors of Observing Nature and Solitude were not significantly related to how important respondents said dune height was to them. The height of the dune probably does not affect the experience of solitude for visitors. The natural processes that are currently reducing the size of the dune may themselves be observed as natural phenomena, and the multiple-choice item pertaining to the importance of observing the dune change loaded onto the Observing Nature factor. Other natural phenomena, like vegetation and animal life, are not physically tied to the height of the dune. On a biological level, the tall active dune areas of the park create a harsh environment inhospitable to animal and plant life, which tends to concentrate in more stable low-lying areas around the perimeter of the park. Stratigraphic analyses by Havholm et al. (2004) have shown that this duality at Jockey’s Ridge is temporal as well as spatial.

The significant negative relationship between first-time visitation and Personal Benefits implies that repeat visitors tended to put more importance on Personal Benefits. Elements of
Personal Benefits, such as creation of memories, spiritual fulfillment, and exercise may require familiarity to appreciate and enjoy. A first-time visitor to Jockey’s Ridge, for example, will not be able to reflect on memories of having visited before and may not know of the spiritual and physical health benefits the setting can offer. None of the five factors were significantly related to the number of years since first visit for repeat visitors. This analysis had a lower statistical power than the others because it included only repeat visitors (n=101). The non-significant result also suggests that visitors who return to the park currently seek a relatively uniform set of benefits regardless of when their first visit may have been.

There could be a variety of reasons for the significant relationships between awareness of natural processes at the park and the Personal Benefits and Observing Nature factors. Respondents who rated Personal Benefits highly were more likely to be repeat visitors and to place importance on the height of the dune. The familiarity with the dune and concern about its height could incline visitors who rate Personal Benefits as important to learn more about the natural processes at work, or to simply feel that they understand the processes by way of observation. Based on their 1996 study of visitors to Donana National Park is Spain, Mugica and De Lucio state that generally “a more experienced visitor tends to be more sensitive toward the particular features of the place in question” (p. 238).

The qualitative data suggest that many visitors interpret nature as central to their experience of the park, both as a factor of benefits and as the source of landscape formation processes. Respondents who rated items of Observing Nature highly may place sufficient importance on the natural aspect of the park to be interested in the process. The qualitative data also revealed a theme of education about nature that was important to some visitors. Activities of Observing Nature and learning about natural processes may both satisfy the priority of educating family and selves for visitors. While all State Parks offer naturalistic landscapes or attributes, the naturalistic character of the entire Jockey’s Ridge landscape contrasts to its developed surroundings in a manner noticed by visitors. The qualitative data showed that many visitors are interested in experiencing nature in general in the park, as opposed to a particular nature-based activity.
The qualitative portion of the present study also provided useful information to park management. The importance of nature to the Jockey’s Ridge experience shows that the active dune should be managed with the minimum visible interference that is necessary. Stabilizing the dune or interrupting the dune’s movement would not only endanger the area’s status as a State Park from a philosophical standpoint (Ellis, 1996) but would also significantly diminish its meaning to visitors as a landscape changing under visible natural pressures. Even a small intervention such as a sand fence would visually disrupt the park’s central asset of a large dune that is natural in character. Human intervention with the natural process of dune migration at the core of the park would also interfere in principle with the naturalistic character of the landscape.

The results of the study also point out that education and interpretation could be improved to help visitors understand change at the park and appreciate it as a positive aspect of their experience. Educational materials presented at the park as well as visitors’ own efforts to learn about dune geomorphology may play a part in shaping their reactions to the park’s dynamic landscape. Kuitel (2001) points out that educational material can support a preservationist management strategy:

“Explaining a variety of issues to the public will reduce damage to coastal areas. It will also strengthen the public’s perception of the value of the landscape. Public opinion is very important to achieve the aim of conservation and management of the sandy areas in the coastal plains [of Israel] that are, unfortunately, disappearing from the landscape” (p. 190).

The overall message of the benefits sought by visitors, as measured by the quantitative portion of the study, differs from the apparent suggestions of the qualitative portion. On the open-ended responses, visitors wrote that above all, nature made Jockey’s Ridge unique. However, the factor of Observing Nature had a lower mean (-0.0279) than the Sensational Benefits factor (0.0372), and the three highest-averaging individual items loaded onto the Sensational Benefits factor.

There are several possible explanations for this apparent discrepancy. One has to do with the nature of qualitative research, which produces information-rich descriptions and patterns of respondents rather than generalizeable facts. Sensational attributes such as the enormity of the dune and the amount of sand came up often in the qualitative responses, just not as often as nature. However, it is impossible to generalize from these proportions to all
visitors to Jockey’s Ridge. It is also possible that visitors who felt strongly about the benefits of nature did not think the content and wording of the quantitative scale items sufficiently captured the importance of nature to the Jockey’s Ridge experience. Finally, it is possible that the different domains examined by the quantitative and qualitative portions of the study do not overlap very much, and nature is far more important as a distinguishing characteristic of the park experience than a specific benefit that visitors seek.

The generally positive reaction to the natural processes that cause dune deflation corresponded to the findings of the quantitative portion of this study. The stated importance of the height of the dune was not significantly related to the opportunity to observe nature. The lack of relationship suggests that visitors who found natural elements important may have a variety of individual feelings towards the natural deflation of the Ridge over the last 30 years. The qualitative responses contain some of this variety, as well as filling in the picture of visitor feelings towards the dynamic landscape with negative reactions to development perceived to threaten the dune.

The present study answers the call made by Hochtl et al. in their 2005 study of rewilding in the Italian Alps to base management decisions at parks on locally-collected “concrete data” (p. 94). The uniqueness of Jockey’s Ridge in its context was affirmed by the qualitative responses as well as high rankings of dune-specific activities. A more generic approach may have missed these important attributes. Hochtl et al. also stressed the importance of involving a variety of stakeholders in the decision process. This approach proved useful towards the researcher’s understanding of key issues during the design phase of the present study.

Other Applications

The present study demonstrates the validity of a mixed-methods approach for measuring benefits sought by visitors to a dynamic protected landscape. The results suggest that in a densely developed tourism context, visitors enjoy many nature-based attractions as a relief from or contrast to commercial and crowded activity options. In general, the management of destinations like the Northern Outer Banks for a diversity of experiences gives visitors more choices for their limited time and money per visit. When an attraction
such as Jockey’s Ridge offers a significant area for free movement, natural and cultural significance, and interpretive facilities, visitors gain a variety of benefits that can facilitate social and familial cohesion as well as environmental education. Visitors to naturally dynamic attractions may prefer the educational and emotional value of observing natural processes at work to any momentary state of the feature. This preference is especially salient when preserving the dynamic feature in a static state would require substantial human disruption. The results of the study suggest that experiential variables must be considered when contemplating such a disruption.

The use of Recreation Experience Preference (REP) scale items in the present study provides additional testing of some items that may be included in future meta-analyses or summaries of REP research (such as Manfredo et al., 2004). The additional items specific to attributes of Jockey’s Ridge and activities available to visitors form a precedent for more specific, management-oriented items to be added to the scales in the future or used in addition to the general scale items, much as Frauman and Cunningham (2001) suggested. The conceptually sound results of the factor analysis are encouraging in this regard.

The present study satisfies the condition of understanding the value placed on the park resource on a qualitative level that is necessary for implementing the ethical framework laid out by Harman and Arbogast (2004). The value placed by visitors on natural features as well as processes at Jockey’s Ridge justifies the conservationist approach of the park’s management to date. This finding adds a dimension of complexity to the issues of environmental ethics surrounding dunes as discussed by Harman and Arbogast that, beyond preservation, the value placed by the public on dunes may reside as much in the processes that shape the dune than in any momentary state. Harman and Arbogast addressed the issue of sand mining at Michigan dune sites, which essentially destroys affected dunes. The management issues facing Jockey’s Ridge – if the dune’s movement should be altered or stabilized – are more subtle. The findings of the present study suggest that even lesser alterations to the dune environment may affect the visitor experience and therefore be ethically debatable under the framework laid out by Harman and Arbogast.
Limitations

The present study is limited by a number of shortcomings that could be addressed in future research pertaining to Jockey’s Ridge or similar dynamic landscapes. More data were collected than could be analyzed within the scope of the present study’s research objectives. Length and time limitations prevented a more complete analysis of quantitative data within the bounds of this study. Logistical limitations prevented visitors who entered the park through the south parking lot or by crossing the highway on foot from being surveyed. Finally, in-depth interviews with local stakeholders were carried out in an exploratory manner to help in developing the instrument. If they had been recorded and content analyzed, the interviews could have offered another important perspective on the landscape, history, and management of Jockey’s Ridge.

Suggestions for Future Research

The present study fills the gap in knowledge about visitor benefits and preferences raised by Ellis (1996) in his summary of the Jockey’s Ridge Research Symposium. When combined with the 3-dimensional GIS analyses of the dune field’s movements (Mitasova, Overton, and Harmon, 2005), the results of this study fulfill the majority of the information that Symposium participants (academic researchers and local stakeholders) demanded. A biological survey of plants and animals within the park remains to be done, however. The themes revealed in the qualitative portion of the present study suggest that animal and plant life in the park is important to the visitor experience. There may also be ethical reasons for holding it in high regard as a valuable feature of the park. Over the long term, management policies for Jockey’s Ridge will have to take its biological value into account.

Likewise, information about the cultural history of the park is fragmented. Recent improvements to the visitor center contain substantial interpretive displays about early Northern Outer Banks History, but leave many questions unanswered. As the City of Nags Head examines options for cultural tourism, the overall cultural value of the area would benefit from a comprehensive historiography of Jockey’s Ridge.

More can be learned about visitor behavior at Jockey’s Ridge. Using data from the current study, simple inferential analyses could test for differences in factor scores or
behavioral variables based on timing of visit or weather. Testing for differences between visitor demographics and preferences based on weather, date and time of visit, and responses to dune height and natural process awareness questions could provide park managers valuable perspectives on differences among visitors.

Perhaps even more valuable would be an analysis that linked the occurrences of certain themes within the qualitative responses with factor scores, demographics, or previous visitation history. According to Henderson (in press), “linking can often enhance the reliability, validity, and theoretical importance of a research project.” There are also other theoretical approaches besides benefits sought to studying the visitor experience, such as place attachment and visual experience, which could produce valuable information. The cited study by Mugica and De Lucio (2005) used a visual experience approach to uncover valuable information about the visitor experience at a national park in Spain, demonstrating the usefulness of a visual approach for understanding park landscapes. A visual experience approach at a rapidly changing landscape like Jockey’s Ridge could enrich existing information about the visitor experience of dynamic natural settings.

Over the long term, a growing understanding of dynamic landscapes will allow park managers to face unforeseen challenges with a sound ethical basis and empirical information about the visitor experience. Understanding the visitor experience of rapidly changing outdoor recreation settings will also form a substantial theoretical contribution to the existing research on visitor motivations and benefits.
References


Driver, B. L. (1977). Item Pool For Scales Designed To Quantify The Psychological Outcomes Desired And Expected From Recreation Participation. USDA Forest Service Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.


More, T. A. (2002). "The parks are being loved to death" and other frauds and deceits in


APPENDICES
Mission Statement: North Carolina State Parks

The North Carolina State Parks System exists for the enjoyment, education, health and inspiration of all our citizens and visitors. The mission of the state parks system is to conserve and protect representative examples of the natural beauty, ecological features and recreational resources of statewide significance; to provide outdoor recreational opportunities in a safe and healthy environment; and to provide environmental education opportunities that promote stewardship of the state's natural heritage (Division of State Parks, 2006).
Appendix B

Jockey’s Ridge 2005 Visitor Survey

Thank you very much for participating in this survey about Jockey’s Ridge State Park. This study will help managers learn what activities visitors to Jockey’s Ridge enjoy and what aspects of the park, such as the natural surroundings and the height of the dune, are most important to those activities.

Your participation in the survey is voluntary and your responses will remain confidential. It is not necessary to answer all questions but the study will be better served the more information you can give us. Estimated time to fully complete this survey is 8 minutes.

A. Please tell us about your visit

1. Is this your first visit to Jockey’s Ridge?
   [ ] Yes  [ ] No

2. If no, what was the year (date) of your first visit?_____

3. How many times have you visited since (# of visits)?_____

4. Which other attractions (state and national parks, museums, historic sites, aquariums, outdoor dramas, gardens) have you visited on this trip to the Outer Banks? Please consider only the area between Cape Hatteras and Corolla, including Roanoke Island / Manteo.

5. Which attraction motivated you the most to visit this area? ____________________________

6. How many people are in your party today? _____

7. How long do you intend to stay at the park today? ____ hours ____ minutes

8. How did you find out about Jockey’s Ridge? ____________________________

9. Did you participate in any of the ranger-led park programs?

   [ ] Yes (please list)
   [ ] No, the ones I wanted were full when I asked
   [ ] No because of other reason
10. Circle the number that best describes how important each reason to visit Jockey’s Ridge is to you.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Not at all important</th>
<th>Somewhat Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>To learn to hang glide</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To fly kites</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To fly other model aircraft</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To watch hang gliders</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To enjoy ranger-led park programs</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To observe the wind shaping the dune</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To play in the sand</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To enjoy the scenery</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To see such an unusually large dune</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To watch birds or wildlife</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To go someplace different</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To understand how nature changes the dune</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To learn about nature</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To look at the pretty view from the dune</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To develop spiritually</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To be in touch with nature</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To bring back pleasant memories</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To get exercise</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To see a place untouched by humans</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To keep physically fit</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To be away from the family for a while</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To be away from crowds of people</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>To do something for free</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Please list other reasons that may have been important to you.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Not at all important</th>
<th>Somewhat Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
11. How important is the height of Jockey’s Ridge to your experience here?

Not important  1  2  3  4  5  Very important

12. What about Jockey’s Ridge makes it unique or different from the other attractions you’ve visited in the area?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

13. Are you aware of the natural processes that have changed Jockey’s Ridge over the years?  __Yes  __No

11. How do you think time has changed Jockey’s Ridge? How do you feel about these changes?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

14. Please take the opportunity to comment on other issues regarding Jockey’s Ridge, which may not have been discussed above.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
C. Please tell us about yourself
We’d like to ask some questions about your household. This information will
remain in the strictest confidence and will only be used to understand the character-
istics of Jockey’s Ridge visitors. All answers will be reported only as overall aver-
age.

1. What is your home zip code? ________

2. What is your age? ____ (years)  3. Are you [ ] male [ ] female?

4. What is your occupation?
[ ] Managerial or professional speciality [ ] Operator, fabricator, or laborer
[ ] Service occupation [ ] Homemaker
[ ] Farming, forestry, or fishing [ ] Student
[ ] Technical, sales support [ ] Retired
[ ] Precision production, craft, or repair occupation [ ] Other ____________

5. Please circle the last year of school you completed.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21+
(grade school) (high school) (college) (graduate school)

6. What was your household income in 2005?

$ _____,000

Thank you!
Your thoughts are very valuable to us.

Project coordinators:

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Gene Brothers, Ph.D gene_brothers@ncsu.edu

Please return the completed survey to the research assistant who gave it to you. Thank you!

This survey is printed on recycled paper with 30% post-consumer content.