Integrating Quantitative and Qualitative Research Methods
to Inform Management of the Cadillac Mountain Summit, Acadia National Park

Steven David Bullock

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Master of Science
In
Forestry

_____
Steven R. Lawson, Chair

_____
Jeffrey L. Marion

_____
Joseph W. Roggenbuck

June 21, 2006
Blacksburg, VA

Keywords: Acadia National Park, stated choice analysis, qualitative interviews, visitor preferences, protected area management, visitor experiences, VERP

Integrating Quantitative and Qualitative Research Methods to Inform Management of the Cadillac Mountain Summit, Acadia National Park

Steven David Bullock

ABSTRACT

Included in this thesis are two papers describing companion studies which employed complementary methodologies to study the issue of how Acadia National Park might balance resource protection efforts and maintain quality visitor experiences on the summit of Cadillac Mountain. In the first study, stated choice analysis was used to assess visitors' preferences for alternative combinations of public access, resource protection, visitor regulation, and site hardening to manage the Cadillac Mountain summit. Results suggest that visitors consider resource protection to be a priority and are willing to accept regulation of their behavior onsite, reinforced with the use of moderately to highly intensive management structures, but generally don't support limiting public access to the summit to achieve resource protection objectives.

In the second study, qualitative interviews were conducted to provide an in-depth understanding of visitor experiences on the summit of Cadillac Mountain and how site management actions designed to achieve resource protection objectives might affect visitors' experiences. Respondents indicated that the summit of Cadillac Mountain is a centerpiece of Acadia National Park, and their experiences of the mountain summit are centered around the aesthetics and naturalness of Cadillac Mountain. Several factors emerged as influencing whether site management actions are deemed appropriate by visitors and perceived to affect visitors' experiences. In particular, site management structures that were perceived to blend in with the surroundings, be constructed of natural materials and protect vegetation were considered appropriate and of little consequence to visitors' experiences. Some study participants also suggested that site management structures that provide visitors with the opportunity to freely demonstrate their choice to help protect vegetation and soils can enhance visitors' experiences. In contrast, site management structures and actions perceived as being regulatory, confining, or limiting opportunities for visitors to choose to help protect vegetation resources were considered less appropriate and more likely to negatively affect visitors' experiences.

Acknowledgements

I am most grateful for the opportunities and experiences provided me while studying in the Department of Forestry at Virginia Tech. I am grateful for the experience gained and friendships made from associating with so many outstanding faculty and other graduate students. Especially, I am grateful for the guidance, and encouragement of Dr. Steve Lawson my advisor and committee chair, whose door was always open, whose ideas and direction are always gratefully received, and whose enthusiasm, attention, and confidence are always motivating. I am grateful for the other members of my committee Dr. Joseph Roggenbuck and Dr. Jeffrey Marion. Dr. Joseph Roggenbuck's enthusiasm for teaching and learning, and his lifetime of experiences provided me with a wealth of knowledge and experiences to remember and apply. Dr. Jeffrey Marion's experience, advice and encouragement was always willingly given and always welcome.

I am especially grateful to the support, encouragement, and love of my family. My parents, siblings, grandparents, and in-laws have all been very supportive and encouraging as I have gone through school, studied a field not always understood, and been too far away. Most of all, I have been blessed to have the love and support of my beautiful wife Andrea whose has encouraged me to fulfill my potential and been key in helping to see it. Her willingness to live so far from family and deal with the stresses associated with my last minute study habits are signs of her character, goodness, and love for me.

Table of Contents

List of Figures

List of Tables

Chapter 1- Introduction

The 1916 Organic Act established the National Park Service (NPS) and laid out Congress' direction regarding how the NPS would manage the treasures with which they were entrusted. The Organic Act states that the purpose of the national parks "is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 USC 1). The terms of this "dual mandate", to conserve park resources while at the same time providing for their use and enjoyment by the public, are frequently considered to be at odds with each other. Specifically, visitor use of any type and amount causes some degree of resource impairment, thus efforts to maintain completely unimpaired resource conditions are likely to require actions that limit opportunities for visitor use in some manner. Consequently, National Park managers often struggle with decisions about how to balance the conservation of national park resources with the use and enjoyment of the parks by the public.

Managers strive to protect resource conditions from high visitation and recreational use by using various management approaches that are intended to reduce impacts from visitor use. Alternative management actions or practices used to address impacts of visitor use are commonly classified along continua from direct to indirect actions, and obtrusive to unobtrusive (Manning, 1999). Previous research suggests that visitors prefer indirect, unobtrusive management approaches, such as those relying primarily on visitor education over more direct, obtrusive management practices, such as use limits, visitor regulations, and site management (Peterson & Lime, 1979; McCool & Christensen, 1996; Lucas, 1983; Hall, 2001). In many cases, the challenge for managers is that indirect management approaches may not be as effective in achieving management objectives (e.g., resource protection) as direct management actions (McAvoy & Dustin, 1983; Cole, 1993). Thus, a primary challenge for national park managers is to strike the "right" balance between direct and potentially obtrusive management approaches that may be particularly effective at protecting resources with indirect, unobtrusive approaches that may not be as effective but provide park visitors with greater freedom and enjoyment.

Striking a balance between protecting park resources and providing for quality visitor experiences may be especially difficult at national park "icon" sites. By definition, national park

icon sites such as Old Faithful in Yellowstone National Park, Delicate Arch in Arches National Park, and Yosemite Falls in Yosemite National Park are destinations for most park visitors, are easily accessible, represent the very best "must see" features of the park, and are symbols of the parks to which they belong. Consequently, social (e.g., crowding, conflict) and resource (e.g., trampling of vegetation and soils) impacts are often prevalent at national park icon sites. The research presented in this thesis was designed to help inform decisions about how to balance resource protection and visitor enjoyment on the summit of Cadillac Mountain, an icon attraction site in Acadia National Park.

At 1,532 feet, Cadillac Mountain in Acadia National Park is the highest point on the North Atlantic seaboard and offers magnificent views of the park's glaciated coast and island landscape. The winding, scenic 3.5 mile road that leads to the summit was built in 1931, and the 0.3 mile paved summit loop trail make the summit and its vistas easily accessible to all park visitors. A 1998 visitor use study reported that the summit of Cadillac Mountain was visited by 76% of Acadia National Park visitors (Littlejohn, 1999), and current peak season visitation to the summit is estimated to be as high as 4,000 to 6,000 visitors per day (Jacobi, 2003). Intensive summer visitation during the past fifty years, coupled with a management policy that allows visitors to roam freely and explore the summit, has resulted in a substantial loss of vegetation and soils on the mountain (Jacobi, 2001).

Recently, the park has applied a variety of indirect management approaches to address the diminishing resource conditions on the summit of Cadillac Mountain. The park's efforts center around the use of visitor education messages encouraging visitors to stay on durable surfaces and off of fragile mountain plants and soils, and the installation of low wooden barriers around selected areas to allow recover of trampled vegetation and soils. Despite these efforts, a substantial proportion of visitors walk off-trail, trampling vegetation and soils on the mountain summit. Consequently, park managers are faced with difficult decisions about the future management of Cadillac Mountain. On the one hand, park managers could choose to continue with the current indirect management approach, but it is likely that resource conditions will continue to degrade on the mountain summit. Alternatively, park managers could attempt to achieve a higher degree of resource protection on the summit of Cadillac Mountain, but this would likely require more direct and potentially obtrusive management actions. In either case,

park managers are faced with difficult choices that involve potential tradeoffs between resource protection and visitor enjoyment.

Included in this thesis are two papers describing companion studies which employed complementary methodologies to study the issue of how Acadia National Park might balance resource protection efforts and maintain quality visitor experiences on the summit of Cadillac Mountain. The first study was framed in the context of Hardin's (1968) Tragedy of the Commons and was designed to provide insight into difficult questions the National Park Service faces in making decisions about the future management of Cadillac Mountain. For example, would visitors support use limits or strict regulation of their behavior on the summit of Cadillac Mountain to minimize visitor-caused resource impacts? Alternatively, would visitors prefer the use of potentially obtrusive management structures to protect vegetation and soils on the mountain summit? Or, would visitors prefer a more "hands-off" approach to managing the summit of Cadillac Mountain, even if resource conditions would be degraded? These research questions were examined in this study using stated choice analysis. In particular, a sample of visitors was asked to make judgments about how to balance visitor management, site management, public access, and resource protection on the Cadillac Mountain summit.

In the second study, qualitative interviews were conducted to provide an in-depth understanding of visitors' experiences on the summit of Cadillac Mountain and how site management actions designed to achieve resource protection objectives might affect visitors' experiences. Within the study, visitors were asked a series of open-ended questions meant to draw out their personal perspectives of their experiences on the summit. Study participants were also shown a series of photographs of alternative site management structures and asked if they were appropriate to use on the summit of Cadillac and if they would affect their experience on the summit.

The companion studies presented in this thesis will help inform Acadia National Park managers' in their decisions about how to balance resource protection and visitor use on the summit of Cadillac Mountain. In particular, the findings from these two studies provide the National Park Service with an in-depth understanding of visitors' experiences on the summit of Cadillac Mountain, the probable effects of site management actions on those experiences, and visitors' preferences for managing the summit. In addition to the applied, site-specific insights these studies provide, the results of the program of research presented in this thesis provide new

insights into visitors' experiences of and preferences for managing national park icon sites like Cadillac Mountain, topics that have received relatively limited research attention to date.

References

Cole, D. N. (1993). Wilderness recreation management. *Journal of Forestry*, 91, 22-24.

Hall, T. E. (2001). Use limits in wilderness: assumptions and gaps in knowledge. In *Visitor use density and wilderness experience: proceedings*; (RMRS-P-20 pp. 39-48). Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243-1248.

Jacobi, C. (2001). *A census of vehicles and visitors to Cadillac Mountain, Acadia National Park, August 14, 2001*. (Acadia National Park Natural Resources Report 2001-11). Bar Harbor, ME.

Jacobi, C. (2003). *A census of vehicles and visitors to Cadillac Mountain, Acadia National Park, August 1, 2002*. (Acadia National Park Natural Resources Report 2002-05). Bar Harbor, ME.

Littlejohn, M. (1999). *Acadia National Park visitor study: Summer 1998*. Moscow: University of Idaho, Cooperative Park Studies Unit.

Lucas, R. C. (1983). The role of regulations in recreation management. *Western Wildlands*, 9, 6-10.

Manning, R. E. (1999). *Studies in outdoor recreation: search and research for satisfaction*. Corvallis, OR: Oregon State University Press.

McAvoy, L. H., & Dustin, D. L. (1983). Indirect versus direct regulation of recreation behavior. *Journal of Park and Recreation Administration*, 1(4), 12-17.

McCool, S. F., & Christensen, N. (1996). *Alleviating congestion in parks and recreation areas through direct management of visitor behavior.* (Publication 86-1996). St. Paul, MN : University of Minnesota Agriculture Experiment Station.

Peterson, G. L., & Lime, D. W. (1979). People and their behavior: A challenge for recreation management. *Journal of Forestry*, 77, 343-46.

National Park Service Organic Act, 16 U.S.C. 1 (1916).

Chapter 2- Journal Article Manuscript

Managing the "Commons" on Cadillac Mountain:
A Stated Choice Analysis of Acadia National Park Visitors' Preferences

Submitted for review to *Leisure Sciences*

Managing the "Commons" on Cadillac Mountain: A Stated Choice Analysis of Acadia National Park Visitors' Preferences

Steven D. Bullock and Steven R. Lawson
Department of Forestry
Virginia Polytechnic Institute and State University
Blacksburg, Virginia, USA

Address correspondence to:
Steven R. Lawson, 307-A Cheatham Hall (0324), Virginia Tech, Blacksburg, Virginia, 24061.
Phone: 540-231-8303. Fax: 540-231-3698. Email: lawsons@vt.edu

Author note: The research presented in this paper was part of a larger study of visitor use to support Visitor Experience and Resource Protection (VERP) planning in Acadia National Park, and is based on the first author's Masters Thesis at Virginia Tech. Financial support for this research was provided by the USDI National Park Service and the University of Vermont. The authors would like to thank Don Anderson of StatDesign Consulting in Evergreen, Colorado for his assistance developing the experimental design used in this study. The authors would also like to thank Aurora Moldovanyi and Brett Kiser for their assistance in administering the study questionnaire, Charlie Jacobi and other park staff at Acadia National Park for their contribution to this research, Dr. Robert Manning of the University of Vermont for his involvement in the study, and Drs. Joe Roggenbuck and Jeff Marion of Virginia Tech for their scholarly review of this manuscript.

Abstract

In this study, stated choice analysis was used to assess visitors' preferences for alternative combinations of public access, resource protection, visitor regulation, and site hardening to manage the Cadillac Mountain summit. Results provide insight into visitor preferences concerning the management of national park icon sites like the summit of Cadillac Mountain - areas that have received limited research attention. Results suggest that visitors consider resource protection to be a priority and are willing to accept regulation of visitors' behavior onsite reinforced with the use of moderately to highly intensive management structures, but generally don't support limiting the freedom to visit.

KEYWORDS: Acadia National Park, stated choice analysis, national park icon sites, Tragedy of the Commons, resource impacts, crowding

Introduction

In his influential paper, Hardin (1968) described the "Tragedy of the Commons" as a situation where the collective effect of individual decisions to maximize personal benefits in a public commons is a resultant negative effect, a depleted common resource resulting in diminished collective and individual value (Hardin, 1968). National parks, which are public lands open to all yet limited in extent, represent an example of a "commons", and crowding and visitor-caused resource impacts in national parks have been cited as examples of the Tragedy of the Commons (Hardin, 1968; Dustin & McAvoy, 1980; Dustin, McAvoy, & Schultz, 1982). The commons problem may be especially applicable to national park "icon" sites given that they are destinations for most park visitors, are easily accessible, represent the very best "must see" features of the park, and are symbols of the parks to which they belong.

Cadillac Mountain, in Acadia National Park, is an example of a national park icon site. At 1,532 feet, it is the highest point on the North Atlantic seaboard, and offers magnificent views of the park's glaciated coast and island landscape. The winding, scenic 3.5 mile road that leads to the summit was built in 1931, and the 0.3 mile paved summit loop trail make the summit and its vistas easily accessible to all park visitors. A 1998 visitor use study reported that the summit of Cadillac Mountain was visited by 76% of Acadia National Park visitors (Littlejohn, 1999), and current peak season visitation to the summit is estimated to be as high as 4,000 to 6,000 visitors per day (Jacobi, 2003). Intensive summer visitation during the past fifty years, coupled with a management policy that allows visitors to roam freely and explore the summit, has resulted in a substantial loss of vegetation and soils on the mountain (Jacobi, 2001).

Over the past several decades, the park has applied a variety of management approaches to address the diminishing resource conditions on the summit of Cadillac Mountain including paving the summit loop trail, installing wooden barriers around areas with trampled vegetation and soils, and placing wooden tripod signs along the summit loop trail with a message encouraging visitors to stay on the trail or rock surfaces. Thus, the summit of Cadillac Mountain, characterized by high levels of visitor use, depleting resource conditions, and increasing modification of the natural environment through site hardening might be thought of as an example of the Tragedy of the Commons.

The social, resource, and managerial conditions on the summit of Cadillac Mountain are typical of park icon sites. Consequently, decisions about how to manage visitor use of Cadillac

Mountain and similar icon sites may ultimately determine whether such areas continue to be subject to the Tragedy of the Commons. Visitor use and resource protection management strategies centered on education rather than regulation are often preferred by managers and visitors as such strategies are relatively unobtrusive to visitors' experiences (Lucas, 1983; Vander Stoep & Roggenbuck, 1996). However, according to Hardin (1968), education alone is not likely to be a suitable solution to the "commons problem", as only the conscientious will heed the message and non-compliance with the educational messages will ultimately result in the Tragedy of the Commons (McAvoy & Dustin, 1983; Cole, 1993). Technical solutions, such as site hardening to improve resource durability, may temporally alleviate the commons problem, but according to Hardin (1968), tend to be inadequate in the long term. Ultimately, Hardin would suggest the only way to avoid the Tragedy of the Commons at high use, icon sites is through regulatory approaches such as use limits and regulations on visitors' behavior (e.g., requiring visitors to stay on trails and fining those who hike off-trail onto vegetation and soils). Hardin refers to the regulatory solution to the commons problem as mutually agreed upon coercion, which he defines as acceptance of "social arrangements that produce responsibility" which are "agreed upon by the majority of the people affected" (Hardin, 1968, p.1248). This begs the question for managers of national park icon attraction sites, however, of what constitutes *mutually agreed upon* coercion. In particular, would visitors consent to use limits or strict regulation of their behavior on the summit of Cadillac Mountain in the interest of resource protection? Or, would visitors rather maintain unrestricted access to the summit of Cadillac Mountain and be allowed to explore the summit freely, irrespective of the resultant resource conditions? Alternatively, would visitors prefer that park managers rely on technical solutions such as site hardening, even if they may only delay resource degradation, rather than prevent it? The purpose of this study is to use stated choice analysis to examine these questions.

Stated Choice Analysis

Stated choice analysis was developed in the economics and marketing disciplines to study consumer preferences for multi-attribute goods (Louviere & Timmermans, 1990). Stated choice studies employ choice experiments, in which respondents are asked to make a series of discrete choices between competing configurations of multi-attribute goods, often referred to as profiles or scenarios (Louviere & Timmermans, 1990). Within a choice experiment, profiles or scenarios are defined by varying levels of each attribute of the good being studied (Mackenzie, 1993). For

example, respondents may be asked to choose between alternative recreation setting profiles, where each profile is described by varying levels of visitor use density, vegetation and soil conditions, and restrictions or regulations imposed on visitors. The choices made by respondents are aggregated and statistically analyzed to estimate preferences for the levels of each of the attributes and the relative importance of each attribute to respondents. Choice models are also used to predict public support for hypothetical policy or management scenarios, which are represented by varying combinations of the attribute levels (Opaluch, Swallow, Weaver, Wessells, & Wichelns, 1993; Dennis, 1998).

Recently, choice experiments have been applied in the field of outdoor recreation research and management as a tool to help determine visitors' preferences concerning recreation related issues. Choice experiments have been used to study visitor preferences for attributes of parks and forest preserves (Louviere & Timmermans, 1990; Schroeder, Dwyer, Louviere, & Anderson, 1990), hunting experiences (Bullock, Elston, & Chalmers, 1998; Boxall & Macnab, 2000), rock climbing (Hanley, Wright, & Koop, 2002), and mountain biking access and fees (Morey, Buchanan, & Waldman, 2002). In addition, stated choice methods have been used to study visitor preferences concerning tradeoffs between social, resource, and managerial conditions of backcountry campsites and trails (Lawson & Manning, 2002; Lawson & Manning, 2003; Newman, Manning, Dennis, & McKonly, 2005), as well as frontcountry trails (Cahill, Marion, & Lawson, in press). The study presented in this paper builds on existing applications of stated choice to outdoor recreation management by examining visitors' preferences for managing a national park icon site. Thus, this study may offer insights into solutions to manage the must see attractions of national parks in a manner that appeals to the public, while preventing degraded resource and social conditions characteristic of the Tragedy of the Commons.

Recent stated choice studies have taken advantage of digital image editing technology to portray more realistic descriptions of recreation settings by using photos to supplement the standard short narrative descriptions of setting profiles and to facilitate more effective communication between researchers and respondents (Manning & Freimund, 2004). For example, a stated choice analysis study of Yosemite National Park wilderness visitors depicted alternative levels of a campsite impact attribute in digitally edited photos as part of the profile descriptions presented to respondents (Newman et al., 2005). Similarly, a study of Acadia National Park visitors to a frontcountry trail included photos as part of the profile descriptions,

depicting the levels of both a trail impact attribute and a trail development attribute (Cahill et al., in press). The study presented in this paper extends the use of visual research techniques by including photos depicting varying levels of resource and social setting attributes within each profile description presented to respondents.

Study Methods

Selection of Attributes and Levels

As noted earlier in this paper, managers of Acadia National Park could adopt a number of different management strategies in their efforts to protect vegetation and soils on the summit of Cadillac Mountain from further degradation and to restore impacted areas to a more pristine condition. Potential management strategies for the summit of Cadillac Mountain were represented in this study by a set of three attributes, labeled "public access," "freedom of travel," and "structures to minimize off-trail hiking" (Table 2-1). These three attributes and their levels were selected to represent the range of management responses Hardin referred to in his discussion of the Tragedy of the Commons, including doing nothing, adopting an education approach, implementing technical solutions, and regulating through coercion. In addition, selection of the three management-oriented attributes was guided by discussions with park staff about management actions they considered to be important to evaluate.

In addition to the management-oriented attributes, three other attributes were selected to portray the range of potential resource and social conditions on the summit of Cadillac Mountain. In particular, resource conditions on the mountain summit were represented in the choice experiment profiles by an attribute labeled "visitor caused damage to vegetation and soils" (Table 2-1). Social conditions were represented by an attribute concerning the density of use on the paved summit trail labeled "people on trail" and an attribute concerning visitor behavior referred to as "people off-trail on vegetation and soils" (Table 2-1). The choice of attributes to represent resource and social conditions on the summit of Cadillac Mountain was based on consultation with park staff, as well as the results of research conducted on the summit of Cadillac Mountain the year prior to this study which suggested that at least some visitors consider the number of people on the summit trail and the amount of impact to vegetation and soils on the mountain summit to be problems (Manning & Valliere, 2004).

Table 2-1. Cadillac Mountain Summit Setting Attributes and Levels

Management conditions

[*]**Public access:** (3 levels)

No visitors are turned away from visiting the summit of Cadillac Mountain, even during busy times

A few visitors are turned away from visiting Cadillac Mountain during busy times.

Many visitors are turned away from visiting Cadillac Mountain during busy times.

[*]**Freedom of travel:** (3 levels)

Visitors are allowed to roam off-trail.

Visitors are encouraged to stay on the paved trail or rock surfaces.

Visitors are required to stay on the paved trail.

[**]**Structures to minimize off-trail hiking:** (4 levels)

No management structures are used to minimize off-trail hiking.

Signs are used to minimize off-trail hiking.

Rock borders are used to minimize off-trail hiking.

Fencing is used to minimize off-trail hiking.

Social conditions

[**]**People on trail:** (3 levels)

Few other visitors are on the paved trail.

Some other visitors are on the paved trail.

Many other visitors are on the paved trail.

[**]**People off-trail on vegetation and soils:** (3 levels)

No visitors are off-trail on vegetation and soils.

Some visitors are off-trail on vegetation and soils.

Many visitors are off-trail on vegetation and soils.

Resource conditions

[**]**Visitor caused damage to vegetation and soils:** (3 levels)

Little visitor-caused damage to vegetation and soils is present.

Some visitor-caused damage to vegetation and soils is present.

Extensive visitor-caused damage to vegetation and soils is present.

[*]Described narratively within scenarios.

[**]Described narratively and depicted in computer generated photographs within scenarios.

Experimental Design and Statistical Analysis

A fractional factorial design was used to combine the attributes and levels into eighteen paired comparisons blocked into three questionnaire versions, each containing six pairwise comparisons (Louviere, Hensher, & Swait, 2000). The pairwise comparisons included a choice of two scenarios, each of which included the six attributes with different combinations of their levels. The design was restricted to exclude scenarios in which there were "many visitors off-trail on vegetation and soils" and "little visitor caused damage to vegetation and soils." Further, in order to reduce model complexity and respondent burden (i.e., the number of pairwise comparisons respondents were required to evaluate), the experimental design used in the study did not allow for the estimation of interaction effects. Consequently, it is assumed that interaction effects among the attributes are not significantly different from zero.

Respondents' choices among the pairwise comparison questions were modeled using conditional logit regression, with the six study attributes entered into the model as independent variables using effects coding (McFadden, 1974; Lawson & Manning, 2002; Louviere et al., 2000). The relative importance of each attribute of the model was estimated using Wald tests, which quantified the relative effect of excluding each attribute from the empirical model, one at a time, on the overall fit of the model (Lawson, Roggenbuck, Hall, & Moldovanyi, in press). The attributes with larger Wald test chi-square values (i.e., those with a greater effect on model fit) were interpreted as being of greater relative importance than the attributes with smaller chi-squared values (i.e., those with less effect on model fit).

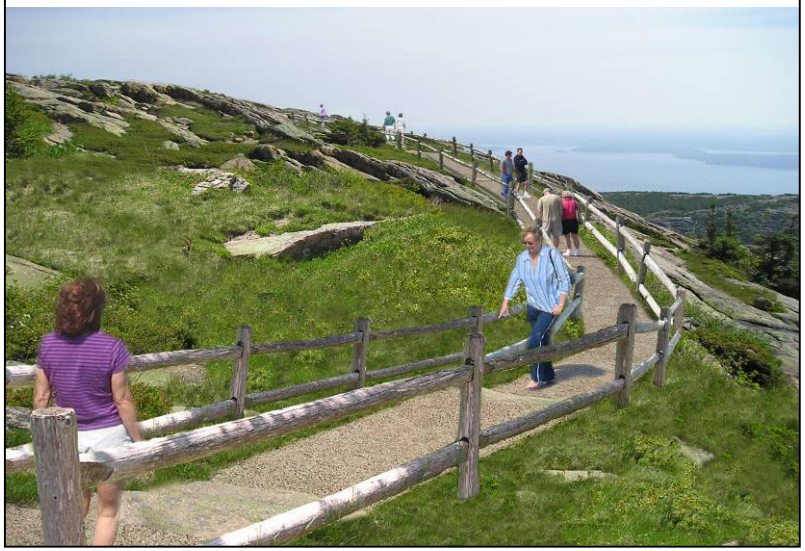
Survey Administration

Cadillac Mountain visitors were surveyed onsite after their visit to the summit, during a 10 day period of the peak visitor use season in August, 2005. Study participants were randomly assigned to complete one of three versions of the questionnaire that differed only in terms of the stated choice pairwise comparison questions (see Appendix A for a copy of the stated choice questionnaire). Within the stated choice section of the questionnaire, respondents were asked to evaluate six choice sets. The descriptions of the choice sets were contained in a separate binder; one for each questionnaire version. Within each choice set, respondents were presented with two alternative scenarios and asked to indicate which scenario they preferred. Figure 2-1 provides an example of a choice set included in the study design. Within each scenario, the levels of each of the six attributes were described narratively with bullet points. Each scenario also contained a

computer edited photo depicting the levels of four of the attributes— the “public access” and “freedom of travel” attributes did not lend themselves to visual representation and were not included in the photos.

Scenario A

- **Many visitors are turned away from visiting Cadillac Mountain during busy times.**
- **Visitors are encouraged to stay on the paved trail or rock surfaces.**
- **Fencing is used to minimize off-trail hiking.** *(see photo)*
- **Few other visitors are on the paved trail.** *(see photo)*
- **No visitors are off-trail on vegetation and soils.** *(see photo)*
- **Little visitor-caused damage to vegetation and soils is present.** *(see photo)*



Scenario B

- **A few visitors are turned away from visiting Cadillac Mountain during busy times.**
- **Visitors are allowed to roam off-trail.**
- **Signs are used to minimize off-trail hiking.** *(see photo)*
- **Some other visitors are on the paved trail.** *(see photo)*
- **Some visitors are off-trail on vegetation and soils.** *(see photo)*
- **Some visitor-caused damage to vegetation and soils is present.** *(see photo)*

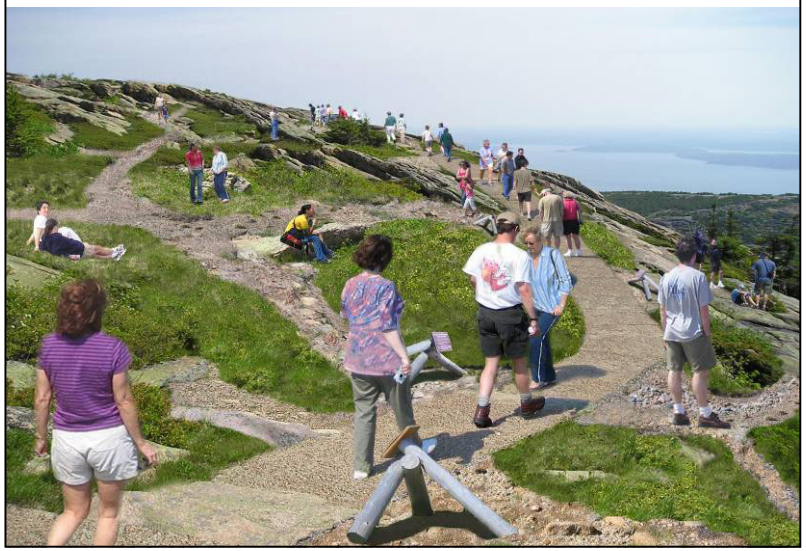


Figure 2-1. An example of one choice set included in the study design. (Visitors were asked to select their most preferred scenario of the pair.)

Results

Response Rates

Out of 602 visitors contacted, 450 completed the questionnaire, resulting in a 75% response rate. The number of respondents was evenly balanced across the three versions of the questionnaire and resulted in 2,636 pairwise comparisons after accounting for item non-response. The most frequently stated reasons for declining to participate in the study involved time constraints such as "others are waiting for me," "the commercial tour bus or trolley is leaving," and "we have whale watching or dining reservations." Results of statistical tests suggest that respondents and non-respondents are not significantly different with respect to their sex (Pearson χ^2= 0.021, p= 0.88) or group size (Pearson χ^2= 15.58, p= 0.21).

Stated Choice Model Coefficients and Relative Importance of Attributes

The coefficients of the stated choice model, along with their standard errors, and levels of statistical significance are presented in Table 2-2. The right column of Table 2-2 reports the rank order of importance, Wald test chi-square values, and p-values of the study attributes. All of the coefficients in the model are significantly different than zero except for the "encouraged to stay on paved trail or rock surfaces" level of the "freedom of travel" attribute, and the "some other visitors" and "many other visitors" levels of the "people on trail" attribute.

Table 2-2. Stated Choice Model Coefficients and Relative Importance of Attributes (n=2,636 choices).

Variable	Coefficient (S.E.)	Attribute relative importance (Wald test)
Public access:		
None turned away	0.436*** (0.04)	2^{nd} ($\chi^2 = 166.01$, p =0.024)
A few turned away	0.097* (0.04)	
Many turned away	-0.533*** (0.04)	
Freedom of travel:		
Allowed to roam off-trail.	-0.182*** (0.04)	5^{th} ($\chi^2 = 26.13$, p <0.001)
Encouraged to stay on paved trail or rock surfaces	-0.081 (0.04)	
Required to stay on paved trail	0.263*** (0.05)	
Structures to minimize off-trail hiking:		
No management structures	-0.267*** (0.05)	4^{th} ($\chi^2 = 57.20$, p <0.001)
Signs	0.142** (0.05)	
Rock borders	0.298*** (0.05)	
Fencing	-0.173** (0.05)	
People on trail:		
Few other visitors	0.118** (0.04)	6^{th} ($\chi^2 = 7.79$, p =0.02)
Some other visitors	-0.066 (0.04)	
Many other visitors	-0.052 (0.04)	
People off-trail on vegetation and soils:		
No visitors off-trail	0.240*** (0.04)	3^{rd} ($\chi^2 = 156.75$, p <0.001)
Some visitors off-trail	0.389*** (0.04)	
Many visitors off-trail	-0.629*** (0.05)	
Visitor-caused damage to vegetation and soils:		
Little	0.672*** (0.05)	1^{st} ($\chi^2 = 452.22$, p <0.001)
Some	0.242*** (0.05)	
Extensive	-0.913*** (0.04)	

*p < .05. **p < .01. ***p < .001.

As noted earlier, Wald test results reported in Table 2-2 suggest the relative importance of study attributes to current Cadillac Mountain visitors. The coefficients of the stated choice model presented in Table 2-2 indicate preferred levels within each attribute – levels with higher coefficient values are interpreted as being preferred to those with lower coefficient values. The magnitude of the chi-square value of "visitor-caused damage to vegetation and soils" suggests it is the most important of the study attributes to current Cadillac Mountain summit visitors. Coefficients of the levels of the "visitor-caused damage to vegetation and soils" attribute suggest that current visitors are particularly sensitive to and oppose extensive resource impacts, while they strongly prefer little resource degradation.

Based on results of the Wald tests, the importance to current visitors of the "public access" and "people off-trail on vegetation and soils" attributes is also high, relative to the other study attributes. The signs and magnitude of the coefficients of the "public access" attribute suggest that Cadillac Mountain visitors strongly prefer that no visitors be turned away from visiting Cadillac Mountain, even during busy times, and that respondents strongly oppose having many visitors turned away from visiting the summit during busy times. With respect to the "people off-trail on vegetation and soils" attribute, the coefficient estimates suggest respondents prefer some people off-trail more than no people off trail, but strongly oppose many visitors hiking off-trail onto vegetation and soils.

The chi-square values for the attributes representing "structures to minimize off-trail hiking" and "freedom of travel" suggest that these attributes are of moderate importance to respondents, relative to the other study attributes. The coefficient estimates for the "structures to minimize off-trail hiking" attribute suggest that current visitors prefer the use of some management structures, such as rock borders and tripod signs, to help keep visitors on the paved summit trail over using no management structures. However, respondents were indifferent between placing fencing along the trail and using no management structures at all to keep people on the trail, and were less supportive of using fencing than rock borders or tripod signs along the trail. With respect to the "freedom to travel" attribute, respondents prefer that visitors be required to stay on

the paved trail, rather than allowing them to roam freely off-trail on the mountain summit or simply encouraging them to stay on the paved trail or rock surfaces.

The results of the Wald tests suggest that, relative to the other study attributes, "people on trail" is the least important attribute. Coefficient estimates for the "people on trail" attribute suggest respondents prefer seeing few other visitors on the trail, but were indifferent between moderate and high visitor use densities on the trail.

Predicted Support for Potential Scenarios

As stated earlier, Hardin asserts that the key to a successful outcome for areas subject to the Tragedy of the Commons is mutually agreed upon coercion, which he defines as acceptance of "social arrangements that produce responsibility" which are "agreed upon by the majority of the people affected" (Hardin, 1968, p.1248). This implies solving the commons problem at Cadillac Mountain and other icon attraction sites requires that management strategies be selected that are not only *effective* (e.g., actions that prevent further vegetation and soils degradation), but *politically acceptable* as well. With this in mind, the stated choice model developed in this study was used to predict current visitors' relative support for four alternative approaches to managing the summit of Cadillac Mountain (Table 2-3; Opaluch et al., 1993). The four alternatives used in this analysis were selected to represent approaches considered as possible actions by the park and to cover the range of strategies that Hardin (1968) considered to manage the Tragedy of the Commons.

The first management scenario considered in this analysis, referred to as the "no management" alternative, constitutes a "hands off" approach to the management of the Cadillac Mountain summit and resembles Hardin's description of the Tragedy of the Commons (Table 2-3). Visitors' access to the mountain summit would be unlimited, visitors would be allowed to roam the summit freely, and the park would not use any management structures to try to keep visitors on the paved summit trail. It is assumed that as a result of these management policies, visitor use density on the paved summit trail would be relatively high and there would also be many people walking off-trail, trampling vegetation and soils. Consequently, there would be extensive visitor-caused damage to vegetation and soils. A companion study conducted on the summit of Cadillac Mountain during August, 2005 to examine the effectiveness of educational signs and

management structures at keeping visitors on the paved summit loop trail and off of vegetation and soils supports the assumptions underlying the "no management" scenario. In particular, preliminary results of the management efficacy study suggest that when visitors are allowed to roam freely on the summit and no management structures are placed along the trail, nearly three-quarters (71%) of visitors can be expected to walk off the paved summit trail onto vegetation and soils (Marion, Park, & Manning, 2005).

The second management scenario considered in this analysis, referred to as the "education" alternative, would attempt to protect vegetation and soils on the summit through indirect and unobtrusive means, and is the approach that most closely represents the current state of the commons on Cadillac Mountain (Table 2-3). Visitors would be encouraged to stay on the paved trail or rock surfaces, and this policy would be reinforced by placing signs along the trail. In addition, no visitors would be turned away from visiting the summit of Cadillac Mountain, thus it is assumed that visitor use density on the paved trail would be high. Results of the efficacy study described above suggest that signs with educational messages encouraging visitors to stay on the paved trail or rock surfaces have limited effectiveness, with 56% of visitors still venturing off-trail (Marion et al., 2005). Therefore, it is assumed that there would be somewhat fewer visitors off-trail than under the "no management" alternative and there would be a corresponding moderate reduction in the amount of visitor-caused damage to vegetation and soils.

The "site management" alternative would include a regulation requiring visitors to stay on the paved summit trail and fencing would be installed along the trail to discourage people from going off-trail. While this policy would result in relatively intensive regulation of visitor behavior on the Cadillac Mountain summit, there would be no limit on the number of people allowed to visit the summit (Table 2-3). Thus, it is assumed that there would be many visitors on the paved summit trail, but there would be no visitors walking off-trail and little visitor-caused damage to vegetation and soils. The assumptions of this scenario are supported by the results of the efficacy study, which suggest that fencing along the paved trail, combined with signs asking visitors to stay on the paved trail is highly effective at discouraging visitors from going off-trail (Marion et al., 2005).

Several authors have suggested that use limits are necessary to prevent national parks from becoming subject to the Tragedy of the Commons (Dustin & McAvoy, 1980; Feeny, Berkes, McCay, & Acheson, 1990; Hardin, 1968). Thus, the fourth management scenario considered in this analysis, referred to as the "limited use" alternative, includes a policy of turning many visitors away from visiting the Cadillac Mountain summit during busy times (Table 2-3). As a result of limited public access to the Cadillac Mountain summit, it is assumed that there would be few visitors on the paved summit trail and no visitors off-trail. Furthermore, central to this alternative is the assumption that with fewer people allowed on the mountain summit, visitor-caused impacts to vegetation and soils could be reduced without having to rely on intensive site manipulation (i.e., fencing) or regulation of visitors' behavior.

Estimates from the stated choice model suggest that the "site management" alternative would receive the greatest support from Cadillac Mountain visitors, followed by the "education" alternative and the "limited use" alternative (Table 2-3). In particular, the stated choice model predicts that 45% of current visitors would support the "site management" alternative while only 19.7% would support the "limited use" alternative, even though they both result in little visitor caused damage to vegetation and soils and the "limited use" alternative would result in lower use density along the paved summit trail. According to the results of the stated choice analysis, there is moderate support among current Cadillac Mountain visitors for an education-oriented management approach, with 33% of visitors estimated to support this alternative. By far, the least popular alternative considered in this analysis was the "no management" alternative which is estimated to receive support from only 2.3% of current visitors.

Table 2-3. Predicted Visitor Support for Four Potential Management Scenarios for the Summit of Cadillac Mountain

Attributes:	No Management	Education	Site Management	Limited Use
Public access:	None turned away	None turned away	None turned away	Many turned away
Freedom of travel:	Allowed to roam off-trail	Encouraged to stay on paved trail or rock surfaces	Required to stay on paved trail	Encouraged to stay on paved trail or rock surfaces
Structures to minimize off-trail hiking:	No management structures	Signs	Fencing	Signs
People on trail:	Many other visitors	Many other visitors	Many other visitors	Few other visitors
People off-trail:	Many visitors off-trail	Some visitors off-trail	No visitors off-trail	No visitors off-trail
Visitor caused damage to vegetation & soils:	Extensive	Some	Little	Little
Predicted proportion of support:	2.26%	33.05%	45.02%	19.67%

Discussion

Results of this study suggest that Cadillac Mountain visitors consider protecting vegetation and soils on the summit to be a high priority, and that they are willing to accept restrictions requiring visitors to stay on the trail and site management structures such as signs, rock borders, and even fencing if necessary to do so. These findings are consistent with previous research in which visitors have been found to be supportive of direct management practices when they are needed to control the impacts of recreation use (Anderson & Manfredo, 1986; Shindler & Shelby, 1993). Furthermore, while respondents were not opposed to relatively large numbers of visitors on the paved summit trail, they preferred not to see many visitors walking off-trail onto vegetation and soils. These results suggest that while crowding may not be an important issue for current visitors, even at high levels of visitor use on the Cadillac Mountain summit, they are sensitive to and concerned with visitor behavior that potentially damages the fragile mountain resources. Furthermore, in contrast to previous suggestions that limiting visitor access is necessary to resolve the commons problem in national parks (Hardin, 1968; Dustin & McAvoy, 1980; Feeny et al., 1990), the results of this study suggest Cadillac Mountain visitors prefer that no visitors be turned away from visiting the summit, even at busy times.

Analysis of the four management scenarios (Table 2-3) provides further insight into current visitors' preferences concerning management of the Cadillac Mountain summit. For example, if it is necessary for the park to adopt a "heavy handed" management approach to protect and restore resources on the summit of Cadillac Mountain, our results suggest that current visitors would prefer intensive site manipulation (i.e., fencing along the paved summit trail) and regulation of visitor behavior over limiting public access. The analysis results suggest this is the case, even if the "limited use" approach would be equally as effective as the "site management" approach at addressing resource impact concerns and would result in lower visitor use density on the trail. In fact, while resource conditions ranked highest among the six study attributes in terms of relative importance to respondents, analysis of the four management scenarios suggests that current visitors would tolerate somewhat less favorable resource conditions coupled with visitor education rather than accept use limits that would result

in many people being turned away during busy times. However, the stated choice model estimates that current visitors would prefer the park to adopt strict use limits over an education-oriented management approach, if the educational approach resulted in *extensive* damage to vegetation and soils. In either case, the stated choice model estimates that the "site management" alternative would be current visitors' preferred approach for managing the Cadillac Mountain summit, of the alternatives considered in the analysis. Furthermore, analysis of the four management scenarios suggests that while no management alternative is predicted to be supported by a majority of current visitors, all three forms of active management (i.e., the "education", "site management", and "limited use" alternatives) are much more likely to receive support from current visitors than doing nothing and allowing the resources of Cadillac Mountain to become extensively degraded (i.e., the "no management" alternative).

While there is an extensive body of research concerning outdoor recreationists' management attitudes and preferences, the predominant focus of past work has been on visitors to backcountry and wilderness areas. The findings from this study suggest that results from research on backcountry and wilderness visitors may be of limited help in informing management of national park icon sites such as the summit of Cadillac Mountain. In particular, the results of this study suggest that visitors to national park icon sites may be open to management actions that would generally not be supported in backcountry recreation environments, and less tolerant of other management actions commonly considered suitable for backcountry areas. For example, our study findings suggest that visitors to the summit of Cadillac Mountain support, and in fact prefer, the use of management structures such as signs and rock borders to reinforce efforts to keep visitors from walking off the summit loop trail onto vegetation and soils, whereas backcountry and wilderness visitors generally prefer low-standard, primitive trails with few or no management structures (Manning, 1999). Similarly, our study findings suggest that Cadillac Mountain summit visitors prefer regulations of visitor behavior to minimize visitor-caused impacts to resources, while backcountry and wilderness visitors generally prefer unconfined recreation free from management regulation (Hendee & Dawson, 2002; Lawson & Manning, 2003; Cole, 2001). In addition, our study findings suggest that visitors to the summit of Cadillac Mountain are strongly opposed to limiting public

access to the mountain summit, even during peak periods when visitor use levels are very high. In contrast, findings from studies of visitors' preferences and attitudes toward management in backcountry and wilderness areas suggest that use limits are generally supported in areas where there is "overcrowding" (Manning, 1999). However, our study results suggest that visitors to national park icon sites such as Cadillac Mountain are similar to backcountry and wilderness visitors regarding their strong support for protecting natural resource conditions, and while icon site visitors may differ from visitors to backcountry areas in terms of the preferred actions and strategies, they favor management to protect park resources (Lawson & Manning, 2002; Newman et al., 2005).

The results of this study suggest Cadillac Mountain visitors prefer that no visitors be turned away from visiting the summit of Cadillac Mountain, in contrast to previous suggestions that limiting visitor access is necessary to resolve the commons problem in national parks (Hardin, 1968; Dustin & McAvoy, 1980; Feeny et al., 1990). While this finding appears to contradict Hardin and other authors, it is consistent with recreation ecology principles, which suggest limiting use may ultimately not be a viable solution to managing the commons problem at high use icon sites like the summit of Cadillac Mountain. Specifically, studies of visitor-caused resource impacts have consistently found that the relationship between the amount of use and impact intensity for most common forms of trampling-related resource impacts is curvilinear (Cole, 1992; Leung & Marion, 1999; Hammitt & Cole, 1998). In particular, these studies have found that the majority of resource impact occurs at low to moderate levels of recreational use with only marginal increases in impact occurring at higher use densities. Consequently, in order to substantially reduce trampling impacts of up to 6,000 daily visits on Cadillac Mountain through use limits alone, park managers would have to institute draconian use limits. Further, the curvilinear relationship between vegetation trampling impact and use suggests that management methods that concentrate and contain use on durable surfaces may ultimately be more effective for high use icon sites, but may be less appealing in low use wilderness and backcountry sites (Leung & Marion, 1999). As noted earlier, findings from the study presented in this paper suggest that current visitors would prefer intensive site manipulation (i.e., fencing along the paved summit trail) and regulation of visitor behavior over limiting public access to protect and restore resources on the summit of

Cadillac Mountain. Given these findings, a potentially important focus of future research might be on assessing the extent to which visitors notice the use of management structures in icon sites and similar frontcountry recreation settings, and how site hardening and facilities designed for resource protection may alter the nature or quality of visitor experiences.

While the results of this study demonstrate the potential utility of information about visitors' management preferences to address the commons problem associated with managing national park icon sites, there are limitations to the study. For example, the stated choice model presented in this paper treats the full sample of respondents to our study as a single population with homogeneous preferences, when in fact it is likely that subgroups of Cadillac Mountain visitors with different preferences for social, resource and management conditions exist (Lawson et al., in press). Recognizing the possibility of distinct sub-groups of visitors to the Cadillac Mountain summit, we tested for differences in stated choice preferences among subgroups of visitors differentiated by their length of stay and number of previous visits to the Cadillac Mountain summit. The results of these analyses suggest that there are no significant differences in attribute preferences among these subgroups of visitors. While it is possible, perhaps even likely, that other subgroups of visitors exist who have meaningful differences with respect to preferences concerning the management of the Cadillac Mountain summit, we were limited in our ability to examine differences among other potential visitor subgroups by the data collected in this study. Additionally, the study was limited to peak season visitors on the summit of Cadillac Mountain, thus the results of the study do not include preferences of other groups or individuals who may hold strong and possibly different opinions about the management and condition of the summit of Cadillac Mountain (e.g., displaced visitors, those who intentionally visit the mountain summit only during non-peak periods of the year, non-visiting members of the public, etc.).

Another potential limitation of this study is that the experimental design used to develop the choice experiment included in our study questionnaire was a main effects-only design. Thus, the stated choice model estimated in this study is limited by the fact that we did not consider interactions among the study attributes, which may have explained additional variance in the model. However, we chose to limit our choice

experiment to a main effects-only design in order to reduce model complexity and respondent burden.

Finally, as noted earlier, digitally edited photos were used to depict some, but not all of the study attributes within the profiles of the choice experiment. Consequently, it is possible that the relative importance of the study attributes might be biased in favor of those attributes depicted in photographs and described narratively over those attributes that were just described narratively. However, the fact that the public access and freedom of travel attributes, both of which were only described narratively, were ranked second and fifth, respectively, in terms of relative importance to respondents suggests that the inclusion of only some attributes within the photos is not likely to have biased respondents' choices.

Conclusion

This study provides insights into visitor preferences concerning the management of national park icon sites like the summit of Cadillac Mountain, areas that have received relatively little attention in previous studies of outdoor recreationists' attitudes and preferences. Results of the study suggest that Cadillac Mountain visitors consider protecting vegetation and soils to be a priority, and indicate a willingness to accept restrictions requiring visitors to stay on the paved summit trail and management structures such as signs and rock borders placed along the trail. While respondents did support visitor regulations and the use of management structures to protect vegetation and soils on the mountain summit, respondents preferred that the park maintain unlimited public access to the summit. In summary, the results suggest that visitors to Cadillac Mountain are not willing to accept a degraded commons and that mutually agreed upon coercion may exist in the form of regulating visitors' behavior onsite reinforced with the use of moderately to highly intensive management structures, but not in limiting the freedom to visit.

References

Anderson, D. H., & Manfredo, M. J. (1986). Visitor preferences for management actions. In, *Proceedings—National Wilderness Research Conference: Current Research*. USDA Forest Service General Technical Report INT-212, 314-319.

Boxall, P. C., & Macnab, B. (2000). Exploring the preferences of wildlife recreationists for features of boreal forest management: A choice experiment approach. *Canadian Journal of Forest Resources*, 30, 1931-1941.

Bullock, C. H., Elston, D. A., & Chalmers, N. A. (1998). An application of economic choice experiments to a traditional land use: Deer hunting and landscape change in the Scottish Highlands. *Journal of Environmental Management*, 52, 335-351.

Cahill, K. L., Marion, J. L., & Lawson, S. R. (in press). Enhancing the interpretation of stated choice tradeoff analysis through the application of a verbal protocol assessment. *Journal of Park and Recreation Administration*.

Cole, D. N. (1992). Modeling wilderness campsites: Factors that influence amount of impact. *Environmental Management*, 16, 255-264.

Cole, D. N. (1993). Wilderness recreation management. *Journal of Forestry*, 91, 22-24.

Cole, D. N. (2001). *Day users in wilderness: How different are they?* (Res. Pap. RMRS-RP-31). Ogden, UT: USDA Forest Service, Rocky Mountain Research Station.

Dennis, D. F. (1998). Analyzing public inputs on national forests using conjoint analysis. *Forest Science*, 44(3), 421-429.

Dustin, D. L., & McAvoy, L. H. (1980). *Hardin*ing National Parks. *Environmental Ethics*, 2(1), 39-44.

Dustin, D. L., McAvoy, L. H., & Schultz, J. H. (1982). *Stewards of access custodians of choice: A philosophical foundation for the park and recreation profession*. Minneapolis, MN: Burgess Publishing Company.

Feeny, D., Berkes, F., McCay, B. J., & Acheson, J. M. (1990). The tragedy of the commons: twenty-two years later. *Human Ecology*, 18(1), 1-19.

Hammitt, W. E., & Cole, D. N. (1998). *Wildland recreation- ecology and management*. New York: John Wiley & Sons, Inc.

Hanley, N., Wright, R. E., & Koop, G. (2002). Modeling recreation demand using choice experiments: climbing in Scotland. *Environmental Resource Economics*, 22, 449-466.

Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243-1248.

Hendee, J. C., & Dawson, C. P. (2002). *Wilderness management, stewardship and protection of resources and values* (3rd ed.). Golden, Colorado: Fulcrum Publishing.

Jacobi, C. (2001). *A census of vehicles and visitors to Cadillac Mountain, Acadia National Park, August 14, 2001*. (Acadia National Park Natural Resources Report 2001-11). Bar Harbor, ME.

Jacobi, C. (2003). *A census of vehicles and visitors to Cadillac Mountain, Acadia National Park, August 1, 2002*. (Acadia National Park Natural Resources Report 2002-05). Bar Harbor, ME.

Lawson, S. R., & Manning, R. E. (2002). Tradeoffs among social, resource, and management attributes of the Denali Wilderness experience: A contextual approach to normative research. *Leisure Sciences*, 24, 297-312.

Lawson, S. R., & Manning, R. E. (2003). Research to guide management of backcountry camping at Isle Royale National Park: Part II- prescriptive research. *Journal of Park and Recreation Administration*, 21(3), 43-56.

Lawson, S. R., Roggenbuck, J. W., Hall, T. E., & Moldovanyi, A. (in press). A conjoint analysis of preference heterogeneity among day and overnight visitors to the Okefenokee Wilderness. *Journal of Leisure Research*.

Leung, Y.-F., & Marion, J. L. (1999). Spatial strategies for managing visitor impacts in national parks. *Journal of Park and Recreation Administration*, 17(4), 20-38.

Littlejohn, M. (1999). *Acadia National Park visitor study: Summer 1998*. Moscow: University of Idaho, Cooperative Park Studies Unit.

Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). *Stated choice methods: Analysis and application*. Cambridge, UK: Cambridge University Press.

Louviere, J. J., & Timmermans, H. (1990). Stated preference and choice models applied to recreation research: a review. *Leisure Sciences*, 12, 9-32.

Lucas, R. C. (1983). The role of regulations in recreation management. *Western Wildlands*, 9, 6-10.

Mackenzie, J. (1993). A comparison of contingent preference models. *American Journal of Agricultural Economics*, 75, 593-603.

Manning, R. E. (1999). *Studies in outdoor recreation: search and research for satisfaction*. Corvallis, OR: Oregon State University Press.

Manning, R. E., & Freimund, W. A. (2004). Use of visual research methods to measure standards of quality for parks and outdoor recreation. *Journal of Leisure Research*, 36(4), 557-579.

Manning, R. E., & Valliere, W. (2004). [Indicators of quality research for Acadia National Park]. Unpublished Raw Data.

Marion, J. L., Park, L., & Manning, R. E. (2005). [The efficacy of visitor education and site management: Dual means for achieving trail stewardship objectives]. Unpublished Raw Data.

McAvoy, L. H., & Dustin, D. L. (1983). Indirect versus direct regulation of recreation behavior. *Journal of Park and Recreation Administration*, 1(4), 12-17.

McFadden, D. (1974). *Conditional logit analysis of qualitative choice behaviour*. In P. Zarembka (Ed), Frontiers in Econometrics . New York: Academic Press.

Morey, E. R., Buchanan, T., & Waldman, D. M. (2002). Estimating the benefits and costs to mountain bikers of changes in trail characteristics, access fees, and site closures: choice experiments and benefits transfer. *Environmental Management*, 64, 411-422.

Newman, P., Manning, R. E., Dennis, D. F., & McKonly. (2005). Informing carrying capacity decision making in Yosemite National Park, USA using stated choice modeling. *Journal of Park and Recreation Administration*, 23(1), 75-89.

Opaluch, J. J., Swallow, S. K., Weaver, T., Wessells, C. W., & Wichelns, D. (1993). Evaluating impacts from noxious facilities: including public preferences in current siting mechanisms. *Journal of Environmental Economics and Management*, 24, 41-59.

Schroeder, H. W., Dwyer, J. F., Louviere, J. J., & Anderson, D. H. (1990). Monetary and nonmonetary trade-offs of urban forest site attributes in a logit model of recreation choice. In B. L. Driver & G. L. Peterson (Eds.), *Forest resource value and benefit measurement: Some cross-cultural perspectives*. (General Technical Report RM-197, pp. 41-51). Fort Collins, CO: Rocky Mountain Forest and Range Experiment Station.

Shindler, B., & Shelby, B. (1993). Regulating wilderness use: An investigation of user group support. *Journal of Forestry*, 91(41-44).

Vander Stoep, G. A., & Roggenbuck, J. W. (1996). *Is your park being "loved to death?": Using communication and other indirect techniques to battle the park "love bug"*. (Publication 86-1996). St. Paul, MN: University of Minnesota Agricultural Experiment Station.

Chapter 3- Journal Article Manuscript

Examining the Potential Effects of Management Actions on Visitor Experiences on Cadillac Mountain, Acadia National Park

In preparation to be submitted for review to *Leisure Sciences*

Examining the Potential Effects of Management Actions on Visitor Experiences on Cadillac Mountain, Acadia National Park

Steven D. Bullock and Steven R. Lawson
Department of Forestry
Virginia Polytechnic Institute and State University
Blacksburg, Virginia, USA

Abstract

In this study, qualitative interviews were used to understand visitors' experiences on the summit of Cadillac Mountain in Acadia National Park, and to understand the potential effects of alternative resource protection management actions on visitors' experiences. Respondents indicated that the summit of Cadillac Mountain is a centerpiece of Acadia National Park, and visitors' experiences of the mountain summit are centered around the aesthetics and naturalness of Cadillac Mountain. Site management structures (e.g., tripod signs, rock borders) that were perceived to blend in with the surroundings, be constructed of natural materials and protect vegetation were considered appropriate and of little consequence to visitors' experiences. Some study participants also suggested that site management structures that provide visitors with the opportunity to freely demonstrate their choice to help protect the park's natural resources can enhance visitors' experiences. In contrast, site management structures and actions perceived as being regulatory, confining, or limiting opportunities for visitors to choose to help protect vegetation and soils were considered less appropriate and more likely to negatively affect visitors' experiences. The results of this study provide new insights into the nature of visitors' experiences at national park "icon" attractions like Cadillac Mountain. Furthermore, the study findings provide managers with an in-depth understanding of the influences, both positive and negative, that resource protection efforts can have on visitors' experiences.

KEYWORDS: Acadia National Park, Cadillac Mountain, qualitative interviews, national park icon sites, visitor experience, recreation site management

Introduction

The 1916 Organic Act established the National Park Service (NPS) and laid out Congress' direction regarding how the NPS would manage the treasures with which they were entrusted. The Organic Act states that the purpose of the national parks "is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 USC 1). Consequently, national park managers often struggle with decisions about how to balance the conservation of national park resources with public use and enjoyment of the parks. At the center of this struggle are the difficult judgments managers must make to select what they consider to be the most effective and appropriate management action(s) intended to reduce or prevent social and ecological impacts of visitor use. Alternative management actions or practices used to address impacts of visitor use are commonly classified along continua from direct to indirect actions, and obtrusive to unobtrusive (Manning, 1999). Previous research suggests that visitors prefer indirect, unobtrusive management approaches, such as those relying primarily on visitor education over more direct, obtrusive management practices, such as use limits, visitor regulations, and site management (Peterson & Lime, 1979; McCool & Christensen, 1996; Lucas, 1983; Hall, 2001). At least in some situations, however, indirect management approaches may not be as effective in achieving management objectives (e.g., resource protection) as direct management actions (McAvoy & Dustin, 1983; Cole, 1993). Thus, a primary challenge for national park managers is to strike the "right" balance between direct and potentially obtrusive management approaches that may be particularly effective at protecting resources with indirect, unobtrusive approaches that may not be as effective but provide park visitors with greater freedom and enjoyment.

Striking a balance between protecting park resources and providing for quality visitor experiences may be especially difficult at national park "icon" sites. By definition, national park icon sites such as Old Faithful in Yellowstone National Park, Delicate Arch in Arches National Park, and Yosemite Falls in Yosemite National Park are destinations for most park visitors, are easily accessible, represent the very best "must see" features of the park, and are symbols of the parks to which they belong.

Consequently, social (e.g., crowding, conflict) and resource (e.g., trampling of vegetation and soils) impacts, as well as intensive site management features (e.g., fencing, boardwalks, signs, etc.) are often prevalent at national park icon sites. Yet for many national park visitors, icon sites are what draw them to the parks and are the most memorable part of their national park experiences. Thus, decisions about how to manage icon sites have great potential to shape visitors' experiences, impressions and memories.

Cadillac Mountain, in Acadia National Park, is an example of a national park icon site. At 1,532 feet, it is the highest point on the North Atlantic seaboard, and offers magnificent views of the park's glaciated coast and island landscape. The winding, scenic 3.5 mile road that leads to the summit was built in 1931, and the 0.3 mile paved summit loop trail make the summit and its vistas easily accessible to most park visitors. A 1998 visitor use study reported that the summit of Cadillac Mountain was visited by 76% of Acadia National Park visitors (Littlejohn, 1999), and current peak season visitation to the summit is estimated to be as high as 4,000 to 6,000 visitors per day (Jacobi, 2003). Intensive summer visitation during the past fifty years, coupled with a management policy that allows visitors to roam freely and explore the summit, has resulted in the loss of fragile sub-alpine vegetation and soils (Jacobi, 2001).

Recently, the park has applied a variety of indirect management approaches to address the diminishing resource conditions on the summit of Cadillac Mountain. The park's efforts center around the use of visitor education messages encouraging visitors to stay on durable surfaces and off of fragile mountain plants and soils, and the installation of low wooden barriers around selected areas to allow trampled vegetation and soils to recover. Despite these efforts, a substantial proportion of visitors walk off-trail, trampling vegetation and soils on the mountain summit. Consequently, park managers are faced with difficult decisions about the future management of Cadillac Mountain. On the one hand, park managers could choose to continue with the current indirect management approach, but it is likely that resource conditions will continue to degrade on the mountain summit. Alternatively, park managers could attempt to achieve a higher degree of resource protection on the summit of Cadillac Mountain, but this would likely require more direct and potentially obtrusive management actions. In either case, park

managers are faced with difficult choices that involve potential tradeoffs between resource protection and visitor enjoyment.

While decisions about how to balance resource protection and visitor enjoyment on the summit of Cadillac Mountain and in similar park and protected area settings are ultimately value judgments that managers must make, research can help inform such judgments (Manning & Lawson, 2002). For example, a number of studies have been conducted in national parks and related protected areas using stated preference techniques to examine visitors' preferences for balancing the social, resource and managerial conditions of outdoor recreation settings (Cahill, Marion, & Lawson, in press; Lawson & Manning, 2002; Lawson & Manning, 2003; Lawson, Roggenbuck, Hall, & Moldovanyi, in press; Newman, Manning, Dennis, & McKonly, 2005). In a companion study to the research presented in this paper, stated preference methods were used to examine visitors' preferences for managing visitor-caused damage to vegetation and soils on the summit of Cadillac Mountain (see Chapter 2). Results of the study suggest that Cadillac Mountain visitors consider protecting vegetation and soils on the summit to be a high priority, and that they are willing to accept restrictions requiring visitors to stay on formal trails and site management structures such as signs, rock borders, and even fencing if necessary to protect natural resources on the mountain summit. However, the study findings suggest that visitors to the summit of Cadillac Mountain are strongly opposed to limiting public access to the mountain summit as a means to achieve resource protection objectives.

The results of the stated preference study on Cadillac Mountain can help managers anticipate the extent to which visitors will support alternative resource protection and visitor use management strategies, however, the study, and other stated preference studies like it, provide little or no information about whether and how various management interventions alter the nature or quality of visitors' experiences on the summit of Cadillac Mountain. For example, do some management actions or interventions designed to protect vegetation and soils on the Cadillac Mountain summit, even those visitors generally support, interfere with visitors' ability to have the kinds of experiences they seek? How does the presence of management structures such as signs, rock borders or fencing placed along trails to keep people from going off-trail and

trampling vegetation and soils alter the nature of visitors' experiences on Cadillac Mountain? Do educational or regulatory messages designed to minimize off-trail hiking influence the type and quality of experiences visitors have? Why do some management actions enhance, while others detract from the quality of visitors' experiences? The purpose of this study is to develop an in-depth understanding of visitors' experiences on the summit of Cadillac Mountain in Acadia National Park, and to examine the potential effects of alternative resource protection management interventions on those experiences. Thus, this paper complements the findings from the companion study of Cadillac Mountain visitors' management preferences described above. In particular, the results of the stated preference study conducted at Cadillac Mountain provide managers with information about visitors' relative support for alternative strategies for protecting natural resources on the mountain summit. The research presented in this paper provides insight into the nature of visitors' experiences on the Cadillac Mountain summit and how those experiences may be altered by management actions designed to protect park resources.

Literature Review

Qualitative methods are useful for examining and developing an understanding of phenomena about which little is known, and allow for the discovery of in-depth information about the subject of study (Strauss & Corbin, 1990). Furthermore, qualitative research is inductive, allowing study participants to describe what is meaningful and salient to them without the researcher presupposing what the important dimensions of the phenomenon under study will be (Patton, 2002). Qualitative research is not designed to produce results that can be generalized to a larger population, rather a primary purpose of qualitative research is to provide a richness of detail about a smaller number of people and cases than is typically developed through quantitative research methods (Patton, 2002; Patterson, et al., 1998). For example, in recreation research, qualitative research methods, specifically interviews using open-ended questions, allow for the documentation of the subjective nature of visitors' experiences and discovery of unanticipated findings (Davenport & Anderson, 2005). The focus of study findings is on each individual's description of his/her experience, which provides in-depth information about a possible type of recreation experience in the context of the setting, rather than statistically generalizable findings about visitors' experiences (Patterson, et al., 1998).

Quantitative methods, in contrast, rely on the use of standardized scale items to measure and aggregate the perspectives and experiences of individuals for the purposes of developing statistically generalizable results.

This study is based on assumptions about visitors' experiences of a recreation setting associated with the concept of situated freedom (Patterson, et al., 1998). In particular, it is assumed that visitors to the summit of Cadillac Mountain, or any recreation area for that matter, experience the site in highly individual, unique and variable ways. Given these assumptions about the nature of visitors' experiences and the characteristics of qualitative research methods described above, we chose a qualitative research approach as the most suitable method for developing an in-depth understanding of visitors' experiences on the summit of Cadillac Mountain and how alternative resource protection interventions might affect those experiences.

A number of studies have employed qualitative research methods to understand visitors' experiences in national parks and related protected areas. Patterson, Watson, Williams and Roggenbuck (1998) used qualitative interviews to examine the dimensions of visitors' wilderness canoeing experiences in the Juniper Prairie Wilderness in the Ocala National Forest. A total of 30 open-ended interviews were conducted during July and August, 1994 with visitor groups at the canoe take-out after their wilderness trip. Within the interviews, study participants were asked to describe their experience in the Juniper Prairie Wilderness. The authors discovered that challenge, closeness to nature, and decisions not faced in everyday environments were important dimensions in determining whether or not visitors received a wilderness experience. In addition, results of the interviews suggest that the enjoyment of telling "nature stories" that emerged from the experience of focusing on and enjoying nature while in the Juniper Prairie Wilderness was an important element of visitors' experiences.

Davenport, Borrie, Freimund, and Manning (2002) interviewed Yellowstone National Park winter visitors to develop an understanding of the types of experiences visitors seek and the extent to which they support potential visitor use and wildlife protection management actions. Semi-structured interviews were conducted with 93 separate visitor groups during the winter of 1999 at six locations within the park. Within the interviews, visitors were asked to describe what is unique about the Yellowstone

experience and whether they would support various management actions designed to prevent recreation-related wildlife impacts. Results of the study suggest that natural scenery and the opportunity to see abundant and diverse wildlife were central to winter visitors' experiences in Yellowstone National Park. Visitors were generally not supportive of the management actions considered in the interview, and this lack of support centered around four main themes: 1) public access as a role of Yellowstone National Park, 2) lack of a credible problem of visitor-caused impacts to wildlife, 3) impacts of management actions on visitors' desired experiences, and 4) a perceived lack of scientific proof of a relationship between visitor use and wildlife impacts.

Vande Kamp and Seekamp (2005) used qualitative interviews to examine the types of experiences that visitors seek in the Dyea town site at Klondike Goldrush National Historical Park. Interviews were conducted during a five-day period in May, 2004 with 90 visitor groups at nine locations within the Dyea town site and the nearby town of Skagway, Alaska. Interviewees were asked questions concerning the activities they participated in during their visit, what they considered to be unique or special about the Dyea town site, the importance of the area's cultural and natural history to their visit, and the effects, if any, of encounters with other visitors on their experience. Results of the study suggest that the natural and historical features of the Dyea town site are important in shaping visitors' experiences, with some visitors oriented more toward the natural resources of the area and others more focused on the cultural history of the site. For the most part, study participants indicated that encounters with other groups had no effect on the experience of the Dyea town site.

In a study similar to the one conducted at Klondike Goldrush National Historical Park, Vande Kamp, Swanson, and Johnson (2004) examined the defining attributes of visitors' experiences at the Exit Glacier Fee Area in Kenai Fjords National Park. A total of 89 groups of visitors participated in semi-structured interviews which were conducted on-site after their visit to Exit Glacier. The authors found that the opportunity to get up-close to the glacier is the defining attribute of visitors' experiences at Exit Glacier. The surrounding natural environment, the glacier itself, as a rare natural feature, and the opportunity to learn about glaciers were also found to be important elements of visitors' experiences at Exit Glacier.

As part of a larger study to inform the design and construction of a visitor education center at Old Faithful in Yellowstone National Park, open-ended interviews were conducted to understand why visitors go to and what they expect while visiting Old Faithful geyser (Gyllenhaal, 2002). Interviews were conducted with 32 visitor groups on the board walk around Old Faithful as they were waiting for the geyser to erupt. In addition, 20 interviews were conducted with visitors 3 to 4 weeks after their visit to Old Faithful. Within the interviews, visitors were asked to discuss why they come to Old Faithful, how their visit to Old Faithful fit into their overall park experience, and what expectations they had about visiting Old Faithful geyser. While visitors' responses to the interview questions varied, the authors reported that many visitors regard Old Faithful as a place they "had to see", as their primary destination within the park, and as a symbol or icon of Yellowstone National Park. Many visitors reported that their experience at Old Faithful met and even exceeded their expectations regarding the height and timing of the geyser, and that the wait and crowds helped to create a sense of anticipation around the experience of watching the geyser erupt. Old Faithful failed to met the expectations of some visitors who felt that their memories of the wonder of Old Faithful exceeded what they experienced on their visit.

The study presented in this paper builds on the literature reviewed above by using qualitative interviews to develop an in-depth understanding of visitors' experiences at an intensively used national park icon site, and how resource protection management interventions shape or alter the nature of those experiences. Furthermore, this study demonstrates the potentially complementary nature of qualitative research methods and stated preference techniques for informing the difficult choices managers face in attempting to balance resource protection with public enjoyment in national parks and related protected areas.

Methods

Interview Guide

An interview guide of open-ended questions was developed to direct interviews with visitors to examine three main topics or themes: 1) the nature of visitors' experiences on the summit of Cadillac Mountain; 2) visitors' perceptions of current

resource and management conditions on the mountain summit; and 3) the potential effects of specific resource protection management interventions on visitors' experiences (see Appendix B for a copy of the interview guide). Participants were asked several open-ended questions related to each of the three topics and probed with follow-up questions when initial responses suggested a need for further explanation or detail.

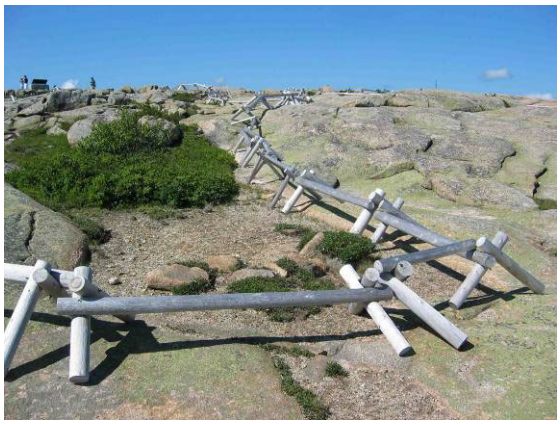
Questions related to the nature of visitors' experiences asked participants to discuss why they chose to visit Cadillac Mountain, their ideal experience on the mountain summit, what they enjoyed most and least about their time on the Cadillac Mountain summit, how their experiences on Cadillac differed from their experiences in other places in Acadia National Park, the importance of Cadillac in their overall park experience, and if they thought there was anything unique or special about the summit of Cadillac Mountain.

Several questions were included in the interview guide to ask participants to discuss their perceptions of current resource and management conditions. In particular, participants were asked to recall what, if any, visitor-caused resource impacts and park management actions they noticed while visiting the summit of Cadillac Mountain, and whether they noticed other visitors going off-trail and trampling vegetation and soils. Participants were also asked to describe how, if at all, the current resource conditions and management interventions on the mountain summit affected their experience of Cadillac Mountain.

The third interview topic discussed with study participants was designed to explore how specific site management interventions might affect visitors' experiences on the Cadillac Mountain summit. Study participants were shown pictures of six site and visitor use management interventions that might be used on the summit of Cadillac Mountain to reduce visitor-caused impacts to vegetation and soils (Figure 3-1). The six management approaches shown to study participants ranged from relatively indirect and unobtrusive interventions (i.e., education messages encouraging visitors to stay on the paved summit trail) to direct and potentially obtrusive site management (i.e., fencing along the paved summit trail). The six pictures included two site management structures currently in place on the summit of Cadillac Mountain – wooden barriers placed around selected areas of trampled vegetation and soil, and wooden tripod signs placed along the

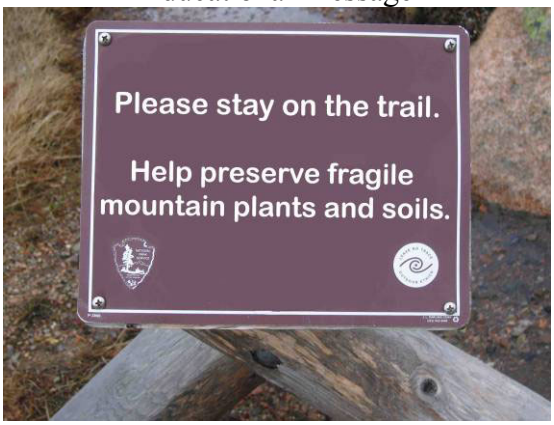
paved summit loop trail. In addition, a photo of a sign with an educational message and a photo of a sign with a message indicating that visitors are required to stay on the paved summit trail were shown to participants. Finally, two photos were shown to respondents depicting site management structures not currently in place on the mountain summit, but being considered for use by the NPS –a low rock border and a low wooden rail fence. For each of the six management interventions shown, study participants were asked if they thought it was appropriate to use on the summit of Cadillac Mountain, if it affected or would affect their experience on the summit of Cadillac Mountain, and whether it would be effective in helping visitors to stay on the paved summit loop trail to protect vegetation and soils.

Wooden Barriers

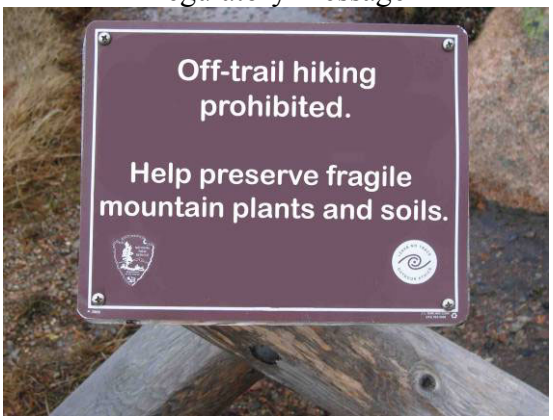


Tripod Signs

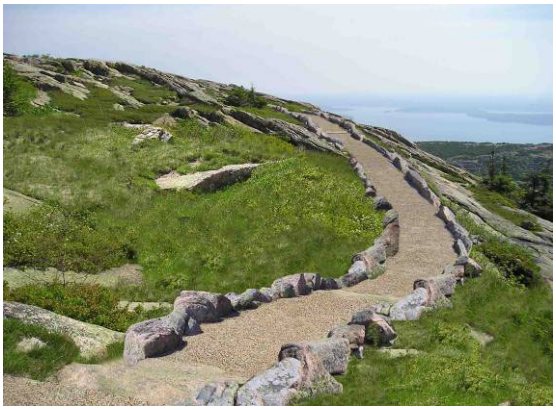
Educational Message



Regulatory Message



Rock Border



Wooden Rail Fence

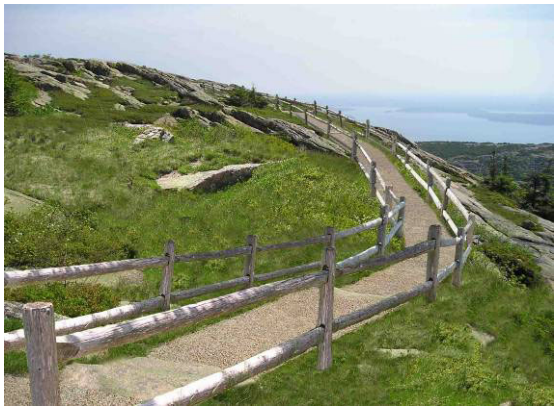


Figure 3-1. Photos of potential management interventions.

Interview Sampling

A total of 30 semi-structured interviews were conducted with Cadillac Mountain visitors during August, 2005. Study participants were selected using purposeful random sampling (Patton, 2002). The goal of purposeful random sampling is to provide a range of visitor perspectives. Interview participants are selected randomly with no assumptions regarding what perspectives and views they may hold. Random selection of study participants is used to increase the credibility of study results, but not to generate results that are statistically generalizable to the larger population of Cadillac Mountain visitors.

Visitors were approached as they were completing their visit to the Cadillac Mountain summit, and interviews were conducted at a shaded table in the corner of the summit parking lot. All individuals in each participating visitor group were invited to participate in the interview to encourage a comfortable and conversational atmosphere. A tape recorder was used to record the interviews verbatim. In addition, the interviewer recorded hand-written notes to identify, summarize and organize major points that emerged during the interviews. Hand-written notes were also made to document interviewer insights related to individual responses and to common responses to questions across interviews that emerged. Following each interview, the interviewer recorded additional hand-written notes concerning respondents' reactions to the questions and the level of rapport developed between the participants and interviewer during the interview. The tapes were checked for proper recording after each interview, and the interview notes were reviewed to see if they were clear and made sense to the interviewer. Ideas for improving the interview process were adopted in each subsequent interview. Interviews ranged from 11 to 35 minutes in length and averaged 22 minutes overall.

The number of interviews conducted was determined based on the criterion of information redundancy or saturation (Lincoln & Guba, 1985; Glaser & Strauss, 1967). Information saturation is defined as the point when the researcher concludes that additional interviews are not providing new insights or information, but rather repeat information already discovered in previous interviews (Henderson, 1991). Based on the researcher's judgment that informational saturation had been reached with respect to understanding visitors' experiences of the summit of Cadillac Mountain and the potential

effects of resource protection interventions on those experiences, interviewing was stopped after the 30th interview.

Data Content and Analysis

Recorded interviews were transcribed verbatim and the accuracy of the transcripts was verified by a second person who reviewed the transcripts while listening to the tape recordings and made corrections to the transcripts as necessary. The techniques for analyzing the interviews of Cadillac Mountain summit visitors were adapted from Strauss and Corbin's (1990) grounded theory analysis procedures and are described in the following paragraphs. Since the questions asked in each interview were fairly structured and generally followed the interview guide, responses were analyzed by question. For example, all visitors were asked the question "Why did you choose to visit the summit of Cadillac Mountain?". From participant responses to each question, main points and ideas were identified, tentatively named, and grouped together into conceptual categories by the researcher. This process is often referred to as "open coding" because it emphasizes the importance of the researcher being "open" to the data and inductively discovering patterns and themes (Strauss & Corbin, 1990). Responses that portrayed similar ideas, or used similar words and phrases, were placed into the same conceptual category and given a code. For example, several participants answered the question, "Why did you choose to visit the summit of Cadillac Mountain?" with answers such as: "M: In the expectation of getting some fantastic far-reaching views. F: The view, yeah" (Interview 17), "M: Well, we wanted to see the view" (Interview 9), and "F: The view. B: Yeah, the huge view" (Interview 3). Each of these responses portrayed a similar idea or concept and were assigned the code "the view".

A process commonly referred to as "axial" coding (Strauss & Corbin, 1990) was used to compare and combine similar codes into themes that emerged from various responses to questions within each topic area of the interview. For example, the code entitled "the views" was common among many of the responses to questions asking about visitors' experiences; the commonality of this code was used to link multiple responses to reveal a larger theme throughout the interviews that captured the importance and role of the views and scenery in shaping visitors' experiences. The process of axial coding was facilitated with the use of qualitative research computer software to help

organize, categorize, and link common responses or codes within and across questions. In particular, the software was used to create tables reporting the frequency of occurrences of researcher-assigned codes in responses to each question (see Appendix C for an example of a table of researcher-assigned codes). This information helped to identify the predominant themes and patterns within the data. In addition, the software was used to generate model diagrams of researcher-assigned codes for each question (see Appendix D for an example of a model diagram of researcher-assigned codes). The model diagrams were used to visualize relationships between researcher-assigned codes and to group common codes into themes by organizing all the codes assigned to a question into a bubble-type diagram. Codes that represented similar ideas were grouped together in the diagram by the researcher. For example, the codes "lay of the land", "oceans, mountains, lakes", and "the views" were three of the codes used to describe visitor responses to the question "Why did you choose to visit Cadillac Mountain?". These three codes were grouped next to each other in the model diagram by the researcher because they seemed to described similar ideas about the importance of scenery to visitors' experiences. This method of visually grouping similar codes in the diagram helped the researcher to organize groups of similar codes into themes.

Study Findings

The results of the qualitative interviews with visitors to the summit of Cadillac Mountain are presented below and are organized according to the three main topics or themes examined within the interviews. In particular, results related to visitors' experiences on the summit of Cadillac Mountain are presented first, followed by a presentation of visitors' perceptions concerning current resource and management conditions on the mountain summit. Finally, results concerning the potential effects of resource protection management interventions on visitors' experiences on the summit of Cadillac Mountain are presented. Excerpts of visitors' comments are presented throughout the results to demonstrate, characterize, and support the primary themes that emerged during analysis of the interview transcripts.

Visitor Experiences on the Summit of Cadillac Mountain

Visitors' comments regarding their experience on the summit of Cadillac Mountain centered around two broad topics. First, several visitors described the role of Cadillac Mountain in their overall experience of Acadia National Park. Second, visitors described and discussed the defining elements of their experience on the summit of Cadillac Mountain. The following subsections present study results related to each of these two topics.

Cadillac's Role in the Park Experience

Visitors' comments suggest that they think of Cadillac Mountain as a symbol or icon of Acadia National Park and that their visit to Cadillac Mountain plays an important role in shaping their overall experience of the park. Respondents described the summit of Cadillac Mountain as a "must see", as the "centerpiece" of the park, and as easily accessible for all.

Must see. The summit of Cadillac Mountain is a must see for visitors who come to Acadia. Two women explained: "F2: Oh, it's a must. Like I say every time we come down, that's what we do, we come up here. We never get tired of it. Would you ever get tired of it? F1: I wouldn't think, no. F2: Its just awesome" (Interview 14). Other comments further characterized the summit of Cadillac Mountain as a "must see" feature of Acadia National Park. One man stated: "M: If you're going, you gotta go to Cadillac. If you're going anywhere near Acadia" (Interview 10). Another woman commented: "F: Well, we're staying in Bar Harbor, so if you're near Acadia you have to see Cadillac Mountain. You can't come all this way and not see it" (Interview 24). Yet another respondent expressed the idea that Cadillac Mountain is a must see park site: "M: I think that you can't come to Acadia National Park without coming to the summit of Cadillac Mountain. It really, you get to view the entire island and area, and just take in how beautiful and vast the area is" (Interview 11).

Centerpiece of the park. Interview participants described the summit of Cadillac Mountain as a centerpiece of Acadia National Park. For example, one woman stated: "F: I think it's the centerpiece" (Interview 22). Another couple described the summit of Cadillac Mountain this way: "M: It plays a big part. F: It's like the biggest, it's the most

important thing. I don't know, I think Cadillac Mountain is like the center point of, M: One of the sights you have to see, F: Acadia National Park, it's something that you have to see the top of before you leave Bar Harbor" (Interview 15).

Easily accessible. The relatively easy access to the top of Cadillac Mountain provided by the summit road is an important feature in determining the role and significance that visitors place on the summit of Cadillac Mountain in the overall picture and experience of Acadia National Park. One individual on his first visit to the park noted that he would return to visit Cadillac in the future because "the access is rather easy" (Interview 4). One couple noted the importance of access in determining the significance of Cadillac Mountain as part of the park: "M: I'd say it's the center point. F: Yeah. M: The centerpiece of the park. It's you know, it's probably the most accessible, F: Then all the little things are kind of like extras, you know … like Bubble Rock. This would be the center" (Interview 5). A park visitor from Germany who suggested he would have preferred hiking in the park if he had more time, appreciated the easy access to the summit of Cadillac Mountain: "M: And especially for us who didn't have time, who don't have that much time, it was totally OK that we were able to just go up by car" (Interview 30).

Respondents' narratives describe and support Cadillac Mountain as an icon site in Acadia National Park. This park icon site is easily accessible, represents the very best "must see" features of the park, and is a centerpiece of the park.

Contrary view. However, a contrary view was offered by a few visitors who considered the summit of Cadillac Mountain as only a small part of Acadia National Park, but worthy of a short stop to see the offered views. One woman described it this way, "F: If I knew somebody else that was coming here, I would say drive to the top, take a quick look and then get back into your car and find another beautiful place to go" (Interview 31). For another couple, opportunities for recreation in the park painted their picture of the park:

> M: Small part. It's not my idea of what the park really is. Park's more of the trails and the hiking and all the water,
>
> F: The canoeing.
>
> M: The canoeing, the ponds and the lakes.

F: And the fresh water and the sea water,

M: Yeah. No, this is just a, to me it's a small part of it, I mean it's just like yeah, it's fun to visit and see the view and everything, but the park is too immense, this is just a tiny part of it. (Interview 28)

Defining Elements of Visitors' Experiences of the Summit of Cadillac Mountain

At 1,532 feet, the summit of Cadillac Mountain is the highest point on the North Atlantic seaboard offering magnificent views of the park's glaciated coast and island landscape. Visitors' comments suggest they come to Cadillac Mountain to experience the far reaching, panoramic views of the ocean and island landscape. Other important parts of visitors' experiences of the Cadillac Mountain summit include being on a mountain top, the calming and peaceful effect of the beauty of nature on the mountain summit, and the presence of other people on Cadillac Mountain.

Views/scenery. As the highest point in Acadia National Park, visitors come to the Cadillac Mountain summit to experience the views. One woman commented: "F1: Just the panoramic view is just incredible. I mean that amazed me, really" (Interview 16). Another offers her thoughts about the experience: "F: I think the view is the main thing, you really can see just a beautiful kind of surrounding view of the ocean and the island" (Interview 6). Another visitor said, "M: The nicest thing in a way maybe about Cadillac Mountain is that it's a 360 degree thing, you know. You can, you feel like you're literally on top of the world" (Interview 7).

Height/mountain top. The feeling of being "on top of the world" and experiencing the height of Cadillac Mountain was discussed by several visitors as they described their experience on the summit of Cadillac Mountain. One man said: "M: Yeah. I like being up, I like being on top of mountains. But probably I'd say I enjoy being up here better than Thunder Hole, and those are all right, but just, I don't know, being up on top of a mountain's not something you get to do every day" (Interview 23). One couple contrasted their experience on the summit of Cadillac Mountain with other places they have visited:

M: Heights and view.

F: Well, we have been to the Colorado Rockies and we've been to the Canadian Rockies, so this is a little mountain in height compared to that,
M: But the view is great.
F: But it's here, I wanted to come and see it, and I just said to him, this really feels like I'm in Colorado. Because it's up there. It looks a lot higher than it's, but I tell you in the book, when you compare it to Colorado at 17,000 feet. It doesn't sound like it's very big, but when you come here it's really, it's spectacular. It's a whole different thing, it's, you see all this water. (Interview 13)

Beauty of nature is calming and peaceful. Within the interviews, some visitors described how the beauty of the Cadillac Mountain summit gives them a sense of being close to nature, and others explained that the natural beauty creates a relaxing, calming and peaceful experience. Most visitors interviewed indicated that taking pictures of the scenery was an important activity while on the Cadillac Mountain summit. One man indicated he was taking pictures to share the experience with others: "M: Yeah, I'm taping the video to show my brothers and my family. I have family in Greenville and also in Columbia and I want them to watch the video and enjoy it because it's so beautiful" (Interview 8). One woman described how the beauty she experienced from the summit of Cadillac Mountain affected her relationship with nature, she said: "F: It's a good place to bond with nature. It is. It's just so beautiful it makes you realize how small you are" (Interview 28). Another couple said: "M: It's peaceful, F: It's beautiful, and it makes you appreciate things, M: Yeah, the environment" (Interview 15). Several participants described the summit of Cadillac Mountain as: "F: Relaxing. Calm and peaceful" (Interview 5), as "M2: Just sort of relaxation and reinvigoration, I'd say, for me" (Interview 16), and "M: I liked it up here. It was like easy, relaxed atmosphere" (Interview 30). One woman who hiked a trail to the top of Cadillac Mountain described her experience on the summit: "F: To me, it's a very, spiritual for me to be outdoors, especially hiking, and it's just very peaceful to me, even though you have a lot of people up here, it's just, I don't know, it's nature. It's a very calming effect for me, and it, you know, I can do a lot of thinking" (Interview 12).

People as part of the experience. As stated earlier, as many as 4,000 to 6,000 people visit the summit of Cadillac Mountain each day during the peak summer use season. Thus, it is not surprising that the presence of other people on the summit of Cadillac Mountain emerged from the interviews as an important element of visitors' experience. For some of the visitors interviewed, the number of other people on Cadillac Mountain made them feel crowded. One man stated: "M: Jordan Pond was calm, there were not so many people. I think there are too many people here" (Interview 33). Most visitors interviewed, however, indicated that while they would prefer there to be fewer people on the mountain summit, the large number of people on the summit was okay. One man said:

> M2: Well, the ideal for me would be just me. Or my wife and I. Or just my party, let's put it that way. But I mean, that's sort of unrealistic. There's always gonna be more people here. But actually today was pretty good, because I didn't feel crowded or, you know, like we were, it was, you know, it can handle or accommodate a fair number of people without, you know, making it imposing. (Interview 16)

One visitor described the crowds as part of what Cadillac is: "M: Well, it's obviously just more of a tourist-type area, whereas over on the trails it's more peaceful cause there's not as many people, you don't run into as many people on the trails. So this is, we knew we'd run into crowds, but it was like, it's OK, it's part of what Cadillac is" (Interview 28).

Those who expected the summit to be crowded were often surprised: "F: We were surprised at the lack of people. (laughs) There's always parking. You know, no matter where you go there's always parking. That's so funny. We figured it must be really, really crowded, and it's not" (Interview 20). Another couple offered this insight into why the summit doesn't feel crowded:

> M1: I think because of the vista, even though you've got 5- 600 people here, they seem minuscule compared to when you were in a cove, where those same number of people seem like a Super Bowl crowd, simply because, you know to scale, there we were all crowded and here we're not.
>
> F2: More open, you get a wider view of the area, more picturesque. (Interview 16)

Some visitors comments suggested they enjoyed the presence of other visitors on Cadillac Mountain. For example, one frequent visitor who typically chooses to visit the summit of Cadillac Mountain at other times of the year to avoid crowds expressed enjoyment in her interaction with other people on the summit the day she was interviewed:

> F: I always prefer in the spring when there aren't so many people up here, but it's colder then of course too.
>
> M: But like, now, it just didn't bother that there was so many people on here.
>
> F: Yeah, it didn't. And it's also nice when the other people ask you to take their picture, it's kind of charming. (Interview 30)

Visitor Perceptions of Current Resource and Management Conditions

Respondents were generally unaware of resource impacts on the summit of Cadillac Mountain, tended to notice site management interventions currently being used on the mountain summit, and reported that neither the current resource impacts or management interventions affected their experiences. Most visitors reported that they did not notice any visitor-caused impacts with statements like: "F: I wasn't paying attention to that cause we were mostly trying to enjoy the experience" (Interview 19), and "M: I guess I really wasn't looking. What I did notice, it looked fine, I don't see anyone walking on it or anything" (Interview 23). Another acknowledged his lack of expertise to recognize visitor-caused impacts, and the "distracting" role of the views:

> M: No, I'm not probably a good person for that because I was, you know, just very self-indulgently enjoying the aesthetics, you know, I wasn't, I'm not a biologist or geologist or anything so, if I had a trained eye I might be noticing that, and if I were a really committed environmentalist I might have picked up on that, but no. I'm just a sort of a bozo in wonderland, you know, I'm not really knowledgeable. (Interview 7)

Respondents who reported having noticed impacts on the summit of Cadillac Mountain noted erosion along the paved trail, informal trails, worn areas, and seeing people off the paved trail. For example, one man said: "M: I think it was basically also

run off next to the walkways too" (Interview 11). While another stated: "M: There was also quite a lot of worn little pathways which looked like they were maybe shortcuts or just different routes that people have used over time" (Interview 17).

For those people who did notice vegetation and soil impacts, they indicated that the impacts had no effect on their experience on the summit of Cadillac Mountain. One father pointed out that: "M: Yeah, there were a couple of worn areas" (Interview 32). When asked if it affected his experience on Cadillac Mountain he and his daughter stated: "M: No. Not at all. G1: No, it was still really, really nice" (Interview 32). While visitors did not report that resource impacts affected their experiences on the summit of Cadillac Mountain, some visitors described being frustrated and irritated with visitors who walked off the paved trail. One couple reported: "F: Only in that they were irritating that people weren't following the rules. M: Right. No adverse visual impact, you know, but you see people walk right by those markers and you say, what are you thinking? Come on. Hello, you're sitting on the marker that says don't walk here" (Interview 22).

Interview participants generally reported having noticed existing signs, wooden barriers, and the paved trail as things that the National Park Service was doing to protect vegetation and soils on the summit of Cadillac Mountain. When asked if these management interventions affected their experience, most visitors stated: "F: Not at all. No" (Interview 28), or "F: I don't think so. M: It just made you want to stay on the trail" (Interview 26). Some visitors' comments suggested that they recognized the management interventions on the summit of Cadillac Mountain as efforts to protect the park's natural resources. For example, one man stated: "M: It's more than just the vistas and the views from the top, it's what's naturally growing here, and what's preserved so that we can come back in 10 years from now and see the same plants and things that are growing here" (Interview 11). Other comments suggested that the park's management interventions could diminish the natural feel and aesthetics of the summit of Cadillac Mountain. One man said: "M: make it too controlled thing you will take away the natural part of it, so it's a question of striking the right balance. Educating people as much as anything I guess" (Interview 17).

Potential Effects of Management on Visitors' Experiences

Results related to the potential effects of alternative resource protection management interventions on visitors' experiences on the summit of Cadillac Mountain are presented in the following three subsections. First, visitor evaluations of the wooden barriers, tripod signs and rock borders are presented together because they all evoked similar responses from visitors. Second, visitors responses to the educational and regulatory messages are presented. Lastly, visitor evaluations of the wooden rail fence are presented.

Wooden Barriers, Tripod Signs, & Rock Border

Common themes emerged from visitors' evaluations concerning the appropriateness of using wooden barriers, tripod signs, and rocks to border the paved trail on the summit of Cadillac Mountain and their potential effects on visitors' experiences. In particular, most visitors interviewed considered wooden barriers, tripod signs, and a rock border along the paved trail to be appropriate to use on the summit of Cadillac Mountain because they are made of natural materials, fit in with the setting, and are not visually obtrusive. Furthermore, most visitors indicated that these three management interventions would have no effects on their experiences, while a few suggested that they would enhance their experiences on the summit of Cadillac Mountain.

Natural materials & fit with setting. The wooden barriers, placed around patches of vegetation on the mountain summit, were accepted as appropriate to use on the summit of Cadillac Mountain by the interviewed visitors because they are made of natural materials and fit in with the setting. A man visiting with his family stated: "M: I think they're kind of natural, with the aged and bleached look, I don't know what they call it. And I don't think it distracts from the landscape at all" (Interview 9). Another couple said, "F: They fit in with the setting, and it's not like, M: A chicken wire fence, F: Right, or like some kind of plastic that doesn't look like it goes with the scenery, it blends right in, it's not something un-nature-lee" (Interview 5). Similarly, one couple described the wooden tripod signs: "F: Yeah. I think it looks natural, yeah, it's nice. M: Its not bad. F: It's better than a metal sign, post" (Interview 6). Responding to the photo of a rock border along the paved summit trail, one group said: "M2: Looks pretty nice to me.

Actually that does look sort of appealing. M1: What's nice about it is that you use the natural rocks" (Interview 16). Two brothers commented on how the rocks blend in with the landscape: "M1: Well, the rocks really blend in even more than the tripods and all the rest. M2: Yeah, if the rocks could replace the wooden barriers then that would be ideal. Cause I personally found the wooden barriers, although they blend in, they're still kind of imposing, right, and this just kind of blends in even more" (Interview 27).

Not visually intrusive, provide visual cues. Some visitors responded favorably to the wooden barriers, tripod signs, and rock border because they perceived the structures as not only visually unobtrusive, but also as helpful visual cues suggesting to visitors where they should walk. One family described the wooden barriers as "not intrusive" and "unobtrusive": "M: They're visually neutral. F: Yeah. They're natural B: They're not intrusive. F: Right. They're low, they're natural materials. B: They're not painted fluorescent yellow or anything. M: Or some garish orange probably wouldn't work so well, but you know, they're just a pretty unobtrusive structure" (Interview 22). One woman commented on the rock border as follows: "F: I think that's a good idea, myself, cause it really gives you a boundary" (Interview 13). Other visitors' comments about the rock border included: "F: It looks more like a border, it doesn't look like something that's, you know, put there to prevent you from going to the other side" (Interview 28), "F: It's clearly marked exactly where to go" (Interview 5), and "F: Well, it would certainly mark out the, where they wanted you to stay better" (Interview 29).

Affect experience- "not at all", enhanced experience, & more informative. Most visitors indicated that the wooden barriers, tripod signs and rock borders would not affect their experience or enjoyment of the Cadillac Mountain summit at all. However, for some visitors, the use of wooden barriers and tripod signs on the mountain summit enhanced their experience because they symbolize the National Park Service's efforts to protect the park's natural resources. For example, one man said: "M: It's nice to have some areas fenced off… to preserve the place" (Interview 4). Another stated: "M: I don't know how many people you have come up here in a year, but if everybody walks just everywheres and tramples everything, then eventually you won't have any, and, then it's, yeah it's a rock pile, and it's the plants and stuff I think that help make it so pretty" (Interview 29).

Another visitor felt the wooden barriers, tripod signs, and rock border would enhance her experience on the summit of Cadillac Mountain because they would better define the trail, "F2: It makes it much more clear where the trail is and where the trail is not" (Interview 30).

While most visitors had a neutral or positive response to the wooden barriers, tripod signs, and rock border, a few of the visitors interviewed felt they were inappropriate for the summit of Cadillac Mountain and that they would have a negative effect on their experience. One couple found the wooden barriers out of place: "F: I don't think it, M: It's not natural. F: It's not natural. M: Takes away from the view" (Interview 19). Other respondents indicated that the rock border "makes it look more like a landscaper's got hold of it" (Interview 10), "is going to ruin the natural feel of it " (Interview 26), and makes the summit "more commercial" (Interview 31). One family stated: "F: It looks like it's landscaped. B: Doesn't look natural. M: Follow the yellow brick road" (Interview 3).

Educational & Regulatory Sign Messages

Generally, interview participants reacted more favorably to the photograph of the sign with the educational message than the one with the regulatory message they were shown during the interviews. The following subsections present several themes that emerged to characterize visitors' responses to these two messages.

Educational message explains why & is to the point. Some visitors responded favorably to the educational message because it explained why the National Park Service wanted people to stay on the trail. For example, one couple stated: "F: It's telling you the way it is. M: I mean, the point is, you're actually telling people why they need to stay on the trail, F: Yeah. M: You use the words 'preserve' and 'fragile,' you'll get through to most people. If you just said, 'Please stay on the trail,' people take less notice of it" (Interview 17).

Other visitors reacted positively to the educational message: "M1: Cause it's short, sweet, and to the point" (Interview 16). The message was characterized as "a friendly reminder" (32), "courteous" (3), "pretty low-key" (20), and "polite" (5).

Educational message enhance experience & makes you part of the team. Visitors consistently stated that the educational message would not negatively affect their experience on the summit of Cadillac Mountain. A few respondents indicated that the educational message would enhance their experience because: "F: It would probably make me feel good. Shows that you're caring about the park" (Interview 31). Other visitors interpreted the sign as portraying a spirit of ownership and being part of a team. One man stated: "M: That's more in the spirit of hey, join us in trying to preserve this. . . it's more pleasant, more, you know, this belongs to all of us, let's take care of it" (Interview 10). These friends stated: "F: It's good marketing. Like, it makes you part of the team. Help us. F2: You're a hero" (Interview 30).

Regulatory message implies a consequence. The regulatory message was evaluated by some visitors as being direct, having teeth, and implying a consequence. One couple stated: "M: It's a little more, there might be some teeth to that one. If there's a prohibition there might be a fine, or some sort of consequence for that. F: Yeah. It sort of implies a consequence" (Interview 25). Another couple remarked:

> F: Well, it gives them a law, like, when you say prohibited, you're actually saying something's negative. The other one's just asking, please. It's probably not as, M: Direct. F: Emphatic, right. Now it's like you're going against something, you're going against the park, it says prohibited. So maybe people are just seeing that one, please stay off of it, and well, you know it's no big deal. Whereas this may be a little bit more, where they're gonna enforce it. (Interview 20)

"Off-trail hiking" is confusing. The regulatory message was unclear and confusing to many interview participants: "F: I think it's appropriate but I don't think it sends the message as clear as the other one" (Interview 29). The use of the phrase "off-trail hiking" in the text of the message was especially confusing to many participants. One visitor stated that visitors to the summit of Cadillac Mountain are not hiking: "F: I just don't think that people are hiking up here, you know. I mean, they're not hiking, they're just sort of like trying to get a good picture or something" (Interview 30). Another woman explained:

F: No, no. When you're talking hiking, a lot of people don't consider themselves hiking, because they're just kind of moseying along, you know what I mean? And when you think of a hiker you think of someone with the L.L. Bean boots on, and, you know, that you're actually gonna climb Mt. Katahdin, you know, that type of thing. . . . Yeah. I think that terminology, I don't think people would think they were actually hiking. (Interview 3)

Prefer educational over regulatory message. Most visitors preferred the educational message over the regulatory message because it was friendly, gentler, and more direct. One woman said: "F: I don't know. I like 'please stay on the trail', not 'off-trail hiking prohibited.' I just think 'please stay on the trails' is more like friendly" (Interview 15). Another couple stated: "F1: I like the other one [educational message], it's more direct. M1: And it's gentler" (Interview 16).

Contrary view. As described above, most visitors indicated that the messages on the signs would not affect their experiences on the summit of Cadillac Mountain, or that the educational sign would enhance their experience. However, one couple who enjoyed hiking off of the paved trail to explore the summit expressed dislike for signs or other management actions that would limit their experience of exploring the summit to the paved summit loop trail:

M: That would be unfortunate,

F: Yeah, I would probably, then we would,

M: That's kind of what I'm talking about back in Hawaii where it's already got to the extreme of completely stay out of certain areas.

F: Cause the trail doesn't go very far, yeah? . . .

M: Actually we were just, I was telling [her] when we were walking down there, I wonder what happens if we came back in 10 years and if there will be signs everywhere saying, 'Stay off of here'.

F: Yeah, we were just talking about that. We were talking about the park police, were the park police going to come and tell us we're not supposed to be on the rocks. (Interview 6)

Wooden Rail Fence

Visitor responses to the image of a wooden rail fence along the paved summit loop trail prompted quick outcries of rejection: "M&F: No, no, no. F: Don't like it" (Interview 30). Themes that characterize and help explain visitors' reactions to the wooden rail fence are presented in the following subsections.

Not natural, a farm landscape. Most visitors indicated that the wooden rail fence looked like a corral and made the summit of Cadillac Mountain look unnatural and like a farm landscape. One man who described the fencing along the trail as artificial said:

> M: I don't think I like that as much, though. Cause that seems to me like it's artificial, I just don't, it seems like a farm, something you might walk animals through to get to the barn or out to the field or something, I just don't like it, I think it obstructs the view, it's not as nice, it's not as natural. (Interview 5)

Other visitors described the effect of the fence on the aesthetics of the summit: "M: It takes away from the nature aesthetics, it's just not natural" (Interview 20), and "it takes away from the natural beauty of the area" (Interview 9). Another woman reacted to the wooden fence by stating: "F: And it doesn't belong, it looks like it's a farmland. It looks like it's a country side" (Interview 20).

Out of place on a mountain, not Acadia. Several visitors indicated that the use of a wooden rail fence along the trail would look out of place on a mountain: "M: But I don't like the way it looks. F: But it doesn't, it doesn't blend in with the topography, and it just doesn't. M: Right. That would be on the farm, actually, it would look good, or in my back yard, but that's about it. Not up here on the mountain" (Interview 28). Another said: "M: Yeah. I mean, you wouldn't expect to find a fence up on a mountain. I mean, cause I guess the whole point is to preserve the mountain the way that it looks in its natural state, and probably make it look the least amount like a tourist, you know, area, as possible" (Interview 23). For one visitor, a fence was inappropriate, especially on Cadillac Mountain: "F: I don't think it's gonna look appropriate for.. especially this place" (Interview 26).

Two groups of visitors suggested that the wooden rail fence would look out of place in Acadia National Park. The first group with this sentiment stated: "M&F: Nope.

M: That's not part of the park … because the fence is ostentatious" (Interview 19). A second group said: "F: It doesn't look like Acadia, it's not Acadia. M: No, it's not appropriate" (Interview 28).

Prefer rock border over fencing. Interview respondents commonly stated a preference for the use of a rock border over the use of a wooden rail fence along the paved summit loop trail on Cadillac Mountain. This preference is clearly articulated in the following responses: "G: I like the rock better. F1: I do too" (Interview 14), "M: Yeah, the rocks are by far the best. F: Yeah, it's much more natural" (Interview 20), and "F: I like the, the rocks in my mind because it really shows you confined areas, and it doesn't take away from the beauty of the terrain" (Interview 25).

Some conditional acceptance of fencing. Some visitors stated that the wooden rail fence would be appropriate to use on the summit of Cadillac Mountain, but only temporarily or as a last resort if necessary to protect or restore vegetation and soils on the summit. One man stated: "M: The only way any, I would support something like that is if you're not having any luck with the other signs and people were still walking . . . I think I would go to this only if everything else failed" (Interview 31). Another supported the fence as a temporary solution to restore vegetation conditions on the summit of Cadillac Mountain: "M: If you put a sign here that said, these fences are up temporarily so that we can grow back the vegetation, that type of thing" (Interview 20).

Constraining, unnatural, & people as farm animals. Most of the visitors interviewed indicated that the wooden rail fence would have a negative effect on their experiences on the summit of Cadillac Mountain. Respondents characterized the effects of the fence as constraining or restrictive, as unnatural or diminishing the natural landscape, and that it would make people feel like farm animals. One man stated: "M: Yes. I think it's, it looks a lot more constraining and, it's less natural, it looks kind of you're more penned in" (Interview 4). Another said: "M: It would have a negative impact on the experience, it just doesn't because it doesn't give the beauty of the vista, you know, having fences up all around the place" (Interview 26). Two other visitors described how the fence makes people feel like animals: "F2: Looks like you're horses (laughs)" (Interview 30), and "M: Yeah. I mean, I understand that you have to do things

to protect to a certain extent, it appears to me now that the people have become like farm animals, people are being herded around the area" (Interview 5).

Fencing elicits an emotional reaction. The effect of the fence on visitors' experiences was frequently expressed in terms of how it made them feel, in contrast to how respondents described other site management actions more in terms of the way they look. For example, respondents commonly described the wooden barriers as "M: They're wood, they're natural looking wood, so that's fine" (Interview 28). Similarly, the rock border was described as, "F: It looks pretty. It looks beautiful" (Interview 8). The fence, however, elicited affective responses from visitors, such as: "it just feels restrictive" (Interview 16), "you'd feel like cattle" (Interview 6), "this feels a little maybe confining" (Interview 7), "it feels like a barrier" (Interview 16), "it just feels less… open" (Interview 22), and "people might feel that they're being shuttled" (Interview 25). Another visitor described the effect of the fence on her Cadillac Mountain experience: "F: This changes the whole sensation of being up here, it corrals you in" (Interview 31). Similarly, one woman explained: "F1: I don't know, I always feel like, now I'm restricted and you've taken away the naturalness of it and you have to do this for people who are just so ignorant that you have to put them in a little cage" (Interview 16). Another man explained: "M: They want to feel in the scenery, not divided from the scenery. And this is a division" (Interview 32).

Barriers keep out, fence keeps in. Respondents compared the received message and perceived intent of the wooden barriers with the intent and message of the wooden rail fence. In essence, the barriers keep people out of patches of vegetation and the fence keeps people within the trail. One couple commented:

> M: You might think these [wooden rail fence] were there for a different reason as opposed to that [wooden barrier]. F: Yeah, yeah. I mean, that [fence] sort of is telling people, this is our very nice guided tour, and this is the way you should go. And that one [barriers] gives a message . . . M: I think this [barriers], actually, to my mind certainly blends in with the landscape more and perhaps is there for a different reason rather than this herding instinct. Lets get the cattle along the trail. (Interview 17)

Another couple discussed the difference between the wooden barriers and the wooden rail fence:

> F: Well, they're kind of off, they're not right next to you, those low wooden ones [barriers]. This [fence] is higher and more M: This one [fence] feels more like you got off a tour bus and you've gotta stay, even though they all want to keep you on the path, this one feels like you're being corralled through because of course it looks like corral fencing. (Interview 22)

Freedom to choose to help protect resources- part of the experience. As visitors discussed their reactions to the wooden rail fence, the concept of visitor freedom, specifically visitors' freedom of choice, emerged as an important aspect of the experience on the summit of Cadillac Mountain. For example, one group's comments about the fence illustrate the importance of freedom to them: "F2: It doesn't look good at all. F1: Yeah. The other one looks more free. F2: It intrudes upon the beauty. F1&2: More free, yeah, more open" (Interview 21). One woman further identifies the importance of having the freedom to choose to help protect the summit:

> F: It's just too I mean, this is more like a suggestion, the rocks. The rocks are more like a suggestion that you can choose to follow and this one [fence] is, you know, we don't trust you . . . I want to believe that people are essentially good and have this desire to preserve the [vegetation], and this is really just giving you a clear, the rocks are giving you a clear suggestion how to stay off the parts that you're not supposed to go on, and this one [fence] just seems you know, very, it seems overkill or something. (Interview 30)

Similarly, several other interview respondents expressed a preference to be free to choose to help protect vegetation and soils on Cadillac Mountain, rather than being restricted and confined like animals without a choice and opportunity to exercise their commitment to care for the environment. For example, one man stated:

> M: At a, you know, this [rock border] allows a person to respect the area. This one here [fence] kind of puts them in a chute, like, you know, forces them to stay inside there or they're gonna go out on either side of it, so, some people don't like

> the queue aspect of it. A lot of it depends on people's, you know, consciousness of the environment and their voluntariness, . . . It might affect mine. I would go more with the rocks on either side and be a little bit more responsible person with the environment. (Interview 25)

Contrary view. While visitors reactions and responses to the wooden rail fence were generally unfavorable, a few visitors stated that the wooden rail fence would not diminish their primary experience of looking at the views. One visitor explained that exploring the summit with their feet was secondary to exploring the summit with their eyes, stating: "M: I think for me the most important thing is not to like climb around here on top but to enjoy the view and as long as I can do that I wouldn't mind it" (Interview 30). Another visitor said: "F: And as long as there's lots of opportunity in that walkway for me to look out and take pictures or to enjoy the view, cause you know, what I'm walking on, as long as it's safe for the environment I'm happy" (Interview 25). Another man said:

> M1: No. I don't think so, because in essence if you stay on the trail there's a subliminal message that says, this is the area you're supposed to explore with your feet. The rest of it is with your eyes and your imagination. So this just defines to a greater level where your feet are supposed to go, but your eyes and your mind can still go anyplace it wants to go. (Interview 16)

Discussion

The results of the in-depth interviews conducted in this study indicate that the summit of Cadillac Mountain has a central role in visitors' experiences of Acadia National Park. Thus, for many of the visitors interviewed, the experiences they have on the summit of Cadillac Mountain are likely to shape their overall experience, impression and memory of the park. As one woman stated: "F: This is one of the places I remember most, though, for me" (Interview 6).

Aesthetics and natural surroundings are central to visitors' experiences on the summit of Cadillac Mountain. The views and scenery, the height and opportunity to be on a mountain top, and the calming and relaxing effects of the beauty of nature emerged

from these interviews as important themes of visitors' experiences. Many visitors reported having a relaxing and peaceful experience in spite of the large numbers of other visitors on the summit and, in general, tend to consider the social conditions on the summit loop trail to be acceptable and a part of the Cadillac Mountain experience. However, some visitors stated that the non-compliant behavior of other visitors who disregard current management messages and structures diminished the quality of their experiences on the mountain summit.

Aesthetics and naturalness are also central to visitor evaluations of the appropriateness and effect of potential resource protection management actions on their experiences. Potential management actions, such as the use of wooden barriers, tripod signs, educational messages, and rock borders tend to be evaluated by visitors as appropriate to use on the summit of Cadillac Mountain. Visitors report that these site management actions would have little or no negative effect on their experiences as they are made of natural materials, blend in with the setting, and are used to protect vegetation and soil resources. Visitors also reported that some resource protection management actions would enhance their experience by better protecting the naturalness of the summit for future generations, by providing more information about were they should be, and by providing opportunities to participate in resource stewardship.

Aesthetics and the naturalness of the summit were also used as the criteria in visitors' evaluations of the appropriateness of the wooden rail fence. Visitors described the wooden rail fence as inappropriate for use on the summit of Cadillac Mountain, as not natural, a farm landscape, and out of place on the summit. However, while visitors' evaluations of the other management interventions centered around aesthetic concerns, visitors' demonstrated more affective responses to the wooden rail fence. Visitors described the negative effect of the fence on their experiences by the way that it made them feel (e.g. constrained, like farm animals). Visitors' statements about the confining nature of the fence revealed that an important aspect of the visitor experience is to have the freedom to choose to participate in resource stewardship efforts.

Visitors prefer less intrusive management structures for the setting that provided visual cues and chances for the visitor to freely demonstrate their choice to help protect vegetation and soils. This is evident in visitor support for the low rock border along the

trail which guides visitors and allows them to choose to stay on the trail as opposed to the wooden rail fence which corrals visitors, takes away their choice to be responsible, and causes them to feel like animals.

Beyond evaluations based on aesthetics and feelings, the perceived intent and purpose of the management approach is important in visitors' evaluations of the appropriateness and effects on their experiences. Whether the purpose of the management action is to protect vegetation by keeping visitors out, or to restrict visitor freedoms by keeping them in is an important message that visitors receive when comparing resource protection management interventions. The message received by visitors, as to the intent and purpose of various site management actions, influences visitors' responses to the management interventions.

The findings of this qualitative study support the findings of the companion quantitative study which used stated preference methods to examine visitor preferences for social, managerial and resource conditions (Chapter 2). The quantitative companion study findings suggest that protecting vegetation conditions on the summit is a high priority and that visitors preferred site management actions on the summit of Cadillac Mountain over other management approaches, including a "hands-off" approach and a resource protection approach based on use limits. Findings from the qualitative study presented in the current paper indicate that aesthetics and the natural condition are important to visitors' experiences and in their evaluations of appropriate resource protection management actions. Visitors' preferences for a site management approach in the quantitative study is explained more fully by findings in the qualitative study where visitors evaluated management structures which provide visual cues, are natural and fit in with the setting, and don't constrain freedom to choose to participate in resource stewardship to be appropriate for use on the summit of Cadillac Mountain. These two studies, using different methodological approaches, provide managers with insights into visitors' preferences for the management of the summit of Cadillac Mountain, and in-depth understanding of visitors' experiences and the potential effects of resource protection management interventions on visitors' experiences. The use of these mixed methods provides complimentary information and adds confidence in study findings.

Conclusion

Findings from this study provide insights into the nature of visitors' experiences at a national park icon site. While not generalizable to a larger population of park visitors, the understanding of visitors' experiences on the summit of Cadillac Mountain that emerged from the interviews conducted in this study provide information to better understand the important aspects of the icon site experience in other national parks. This study suggests that, for visitors of icon sites, the conditions of the resources of these areas are important, even if the resource impacts aren't easily noticed by visitors who are focused on the main attraction. Site management actions at national park icon sites have the potential to protect vegetation and soil resources, allow visitors to feel that they are helping to protect important park resources for the future, while still allowing opportunities for visitors to enjoy their experience. Findings from this study suggest that visitors to icon sites value resource protection and find site management actions to be appropriate to protect resources with little effect on their experiences. Thus, the results of this study suggest that there is potential for managers of national park icon sites to fulfill the dual mandate of protecting resources and providing visitors with quality experiences through the use of appropriate site management actions.

References

Bullock, S. D., & Lawson, S. R. (2006). Managing the "Commons" on Cadillac Mountain: a stated choice analysis of Acadia National Park visitors' preferences. Manuscript submitted for publication.

Cahill, K. L., Marion, J. L., & Lawson, S. R. (in press). Enhancing the interpretation of stated choice tradeoff analysis through the application of a verbal protocol assessment. *Journal of Park and Recreation Administration*.

Cole, D. N. (1993). Wilderness recreation management. *Journal of Forestry*, 91, 22-24.

Davenport, M. A., Borrie, W. T., Freimund, W. A. , & Manning, R. E. (2002). Assessing the relationship between desired experiences and support for management actions at Yellowstone National Park using multiple methods. *Journal of Park and Recreation Administration*, 20(3), 51-64.

Davenport, M.A., & Anderson, D.H. (2005). Getting from sense of place to place-based management: an interpretive investigation of place meanings and perceptions of landscape change. *Society and Natural Resources*, 18, 625-641.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago, IL: Aldine Publishing, Co.

Gyllenhaal, E. D. (2002). *Old Faithful Visitor Center Yellowstone National Park front-end evaluation final report*. Chicago, IL: Selinda Research Associates.

Hall, T. E. (2001). Use limits in wilderness: assumptions and gaps in knowledge. In *Visitor use density and wilderness experience: proceedings*; (RMRS-P-20 pp. 39-48). Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Henderson, K. A. (1991). *Dimensions of choice: a qualitative approach to recreation, parks, and leisure research*. State College, PS: Venture Publishing, Inc.

Jacobi, C. (2001). *A census of vehicles and visitors to Cadillac Mountain, Acadia National Park, August 14, 2001*. (Acadia National Park Natural Resources Report 2001-11). Bar Harbor, ME.

Jacobi, C. (2003). *A census of vehicles and visitors to Cadillac Mountain, Acadia National Park, August 1, 2002*. (Acadia National Park Natural Resources Report 2002-05). Bar Harbor, ME.

Lawson, S. R., & Manning, R. E. (2002). Tradeoffs among social, resource, and management attributes of the Denali Wilderness experience: A contextual approach to normative research. *Leisure Sciences*, 24, 297-312.

Lawson, S. R., & Manning, R. E. (2003). Research to guide management of backcountry camping at Isle Royale National Park: Part II- prescriptive research. *Journal of Park and Recreation Administration*, 21(3), 43-56.

Lawson, S. R., Roggenbuck, J. W., Hall, T. E., & Moldovanyi, A. (in press). A conjoint analysis of preference heterogeneity among day and overnight visitors to the Okefenokee Wilderness. *Journal of Leisure Research*.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications.

Littlejohn, M. (1999). *Acadia National Park visitor study: Summer 1998*. Moscow: University of Idaho, Cooperative Park Studies Unit.

Lucas, R. C. (1983). The role of regulations in recreation management. *Western Wildlands*, 9, 6-10.

Manning, R. E. (1999). *Studies in outdoor recreation: search and research for satisfaction*. Corvallis, OR: Oregon State University Press.

Manning, R. E., & Lawson, S. R. (2002). Carrying capacity as "informed judgment": the values of science and the science of values. *Environmental Management*, 30(2), 157-168.

McAvoy, L. H., & Dustin, D. L. (1983). Indirect versus direct regulation of recreation behavior. *Journal of Park and Recreation Administration*, 1(4), 12-17.

McCool, S. F., & Christensen, N. (1996). *Alleviating congestion in parks and recreation areas through direct management of visitor behavior.* (Publication 86-1996). St. Paul, MN : University of Minnesota Agriculture Experiment Station.

Newman, P., Manning, R. E., Dennis, D. F., & McKonly. (2005). Informing carrying capacity decision making in Yosemite National Park, USA using stated choice modeling. *Journal of Park and Recreation Administration*, 23(1), 75-89.

Patterson, M.E., Watson, A.E., Williams, D.R., & Roggenbuck, J.R. (1998). An hermeneutic approach to studying the nature of wilderness experiences. *Journal of Leisure Research*, 30(4), 423-452.

Patton, M. Q. (2002). *Qualitative Research & Evaluation Methods* (3rd ed.). Thousand Oaks, CA: Sage.

Peterson, G. L., & Lime, D. W. (1979). People and their behavior: A challenge for recreation management. *Journal of Forestry*, 77, 343-46.

Strauss, A. L., & Corbin, J. (1990). *Basics of qualitative research: grounded theory procedures and techniques*. Newbury Park, California: Sage Publications, Inc.

National Park Service Organic Act, 16 U.S.C. 1 (1916).

Vande Kamp, M. E., & Seekamp, E. (2005). *Visitor experiences and visitor use levels at the Dyea Area of Klondike Gold Rush National Historical Park.* Seattle, WA: University of Washington, College of Forest Resources, Protected Area Social Research Unit.

Vande Kamp, M. E., Swanson, J. E., & Johnson, D. R. (2004). *Social science research for managing the Exit Glacier Fee Area of Kenai Fjords National Park.* (Technical Report NPS/CCSOUW/NRTR-2003-05 NPS D-3). Seattle, WA: University of Washington, College of Forest Resources, Protected Area Social Research Unit.

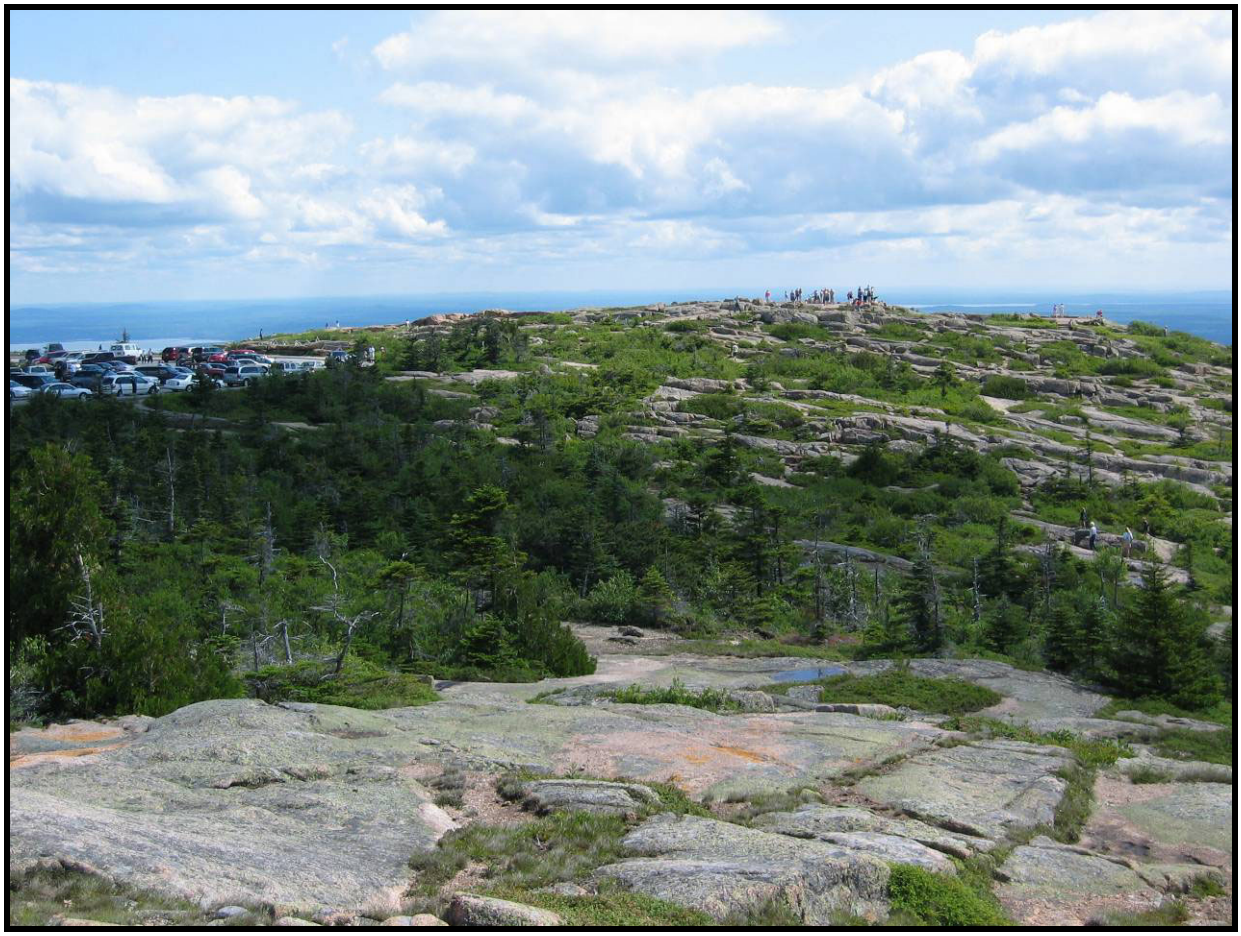
Appendix A - Stated Choice Study Questionnaire

OMB Approval # 1024-0224
NPS# 05-050
Expiration Date 03/31/2006

Acadia National Park

Cadillac Mountain Visitor Survey

2005



Date: _____ ID: _____

Time: _____ AM / PM

VERSION 1

A. Trip Description

The following questions pertain to your visit to the summit of Cadillac Mountain today.

1. Including yourself, how many people are in your personal group today?

Number of people: ____

2. How would you describe your personal group? (Circle one number.)

1. Alone
2. Family
3. Friends
4. Family and friends
5. Organized group/club
6. School/educational group
7. Other (Please specify): _____

3. Is your personal group part of a commercial tour in the park today? (Circle one number.)

1. Yes
2. No

4. Have you ever previously visited the summit of Cadillac Mountain? (Circle one number.)

1. Yes
2. No (SKIP TO QUESTION 6)

5. If you have previously visited the summit of Cadillac Mountain, approximately how many times have you visited the summit of Cadillac Mountain including this trip? (Circle one number.)

1. 2-5 times
2. 6-10 times
3. 11-20 times
4. more than 20 times

6. **Approximately how long did you stay on the summit of Cadillac Mountain today? (Circle <u>one</u> number.)**

    1. Less than 30 minutes
    2. 30 minutes to 1 hour
    3. 1 to 2 hours
    4. more than 2 hours

7. **Which of the following modes of transportation did you use to get to the summit of Cadillac Mountain? (Circle <u>one</u> number.)**

    1. Personal vehicle (including rental vehicle)
    2. Tour bus
    3. On foot
    4. Bicycle
    5. Other (Please specify): _____

8. **There are many reasons people have for visiting the summit of Cadillac Mountain. We would like to know what motivated you to visit the summit of Cadillac Mountain today. Please indicate how important each of the experiences listed below was to you as a reason to visit the summit of Cadillac Mountain today (Circle <u>one</u> number for each experience.)**

	IMPORTANCE				
	Not at all Important		Somewhat important		Very Important
To be free to explore	1	2	3	4	5
To be close to nature	1	2	3	4	5
To view the scenery	1	2	3	4	5
To do something with my family	1	2	3	4	5
To visit a special place	1	2	3	4	5
To experience solitude	1	2	3	4	5
To learn about this place	1	2	3	4	5
To enjoy the sounds of nature	1	2	3	4	5

In this section, we are interested in your attitudes about the management of the summit of Cadillac Mountain.

9. How important to you personally is the way that the summit of Cadillac Mountain is managed? (Circle <u>one</u> number.)

1. Not at all important
2. Somewhat important
3. Very important
4. Don't know/not sure

10. Please indicate the extent to which you agree or disagree with each of the following statements about the summit of Cadillac Mountain. (Circle <u>one</u> number for each item.)

	Strongly Disagree		**Neutral**		**Strongly Agree**	**Don't Know**
Visitors walking off-trail damages the vegetation and soils on the summit of Cadillac Mountain	1	2	3	4	5	DK
The number of visitors on the paved summit trail of Cadillac Mountain makes me feel crowded	1	2	3	4	5	DK
Everyone should have a right to visit Cadillac Mountain, even if it means there is often a large number of people on the summit	1	2	3	4	5	DK
The summit of Cadillac Mountain is so beautiful that I would want to come again in spite of large numbers of people on the summit	1	2	3	4	5	DK
Freedom to roam off-trail to explore the summit of Cadillac Mountain is important to me	1	2	3	4	5	DK

Continued on next page

	Strongly Disagree		Neutral		Strongly Agree	Don't Know
The signs and wooden barriers on the summit of Cadillac Mountain detract from the natural landscape	1	2	3	4	5	DK
The signs and wooden barriers on the summit of Cadillac Mountain interfere with visitors' ability to take good photos	1	2	3	4	5	DK
There are too many rules or regulations on the summit of Cadillac Mountain	1	2	3	4	5	DK
Visitors should be allowed to roam off-trail on the summit of Cadillac Mountain, even if it impacts vegetation and soils	1	2	3	4	5	DK
The National Park Service should use signs and fencing to protect vegetation and soils on the summit of Cadillac Mountain	1	2	3	4	5	DK
Visitors should be required to stay on paved trails to protect vegetation and soils on the summit of Cadillac Mountain	1	2	3	4	5	DK

C. Balancing Management of the Cadillac Mountain Summit

Please read the following information about Cadillac Mountain.

When people hike-off trail on the summit of Cadillac Mountain they can cause impacts to resources such as vegetation and soils (e.g. vegetation may get trampled, soil may get eroded). In addition, large numbers of people on the paved summit trails on Cadillac Mountain can make people feel crowded. The National Park Service could minimize the impacts of off-trail hiking on the summit of Cadillac Mountain with different management practices (e.g. placing signs, barriers, or fences along the paved summit trails) and could manage crowding by limiting the number of people allowed to visit the summit.

We would like to know what mix of visitor use, resource protection, and visitor regulation you find acceptable for the summit of Cadillac Mountain. To help judge this, we have several pairs of scenarios that depict and describe differing numbers of visitors, vegetation and soil conditions, and related management and regulation options. The scenarios are contained in a binder that will be provided to you by the survey attendant.

For each pair of scenarios in the binder, we would like you to:

1. Indicate which scenario you would prefer.

2. Rate the acceptability of <u>each</u> scenario on a scale from "-4" (Very Unacceptable) to "+4" (Very Acceptable).

Please ask the survey attendant for the binder

needed to complete Questions 11-16.

11.

a. Please choose which scenario you prefer. (Circle <u>one</u> number.)

1. I prefer Scenario A
2. I prefer Scenario B

b. Please rate how acceptable you find <u>Scenario A</u>. (Circle <u>one</u> number.)

Scenario A

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

c. Please rate how acceptable you find <u>Scenario B</u>. (Circle <u>one</u> number.)

Scenario B

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

12.

a. Please choose which scenario you prefer. (Circle <u>one</u> number.)

1. I prefer Scenario A
2. I prefer Scenario B

b. Please rate how acceptable you find <u>Scenario A</u>. (Circle <u>one</u> number.)

Scenario A

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

c. Please rate how acceptable you find <u>Scenario B</u>. (Circle <u>one</u> number.)

Scenario B

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

13.

a. Please choose which scenario you prefer. (Circle <u>one</u> number.)

1. I prefer Scenario A
2. I prefer Scenario B

b. Please rate how acceptable you find <u>Scenario A</u>. (Circle <u>one</u> number.)

Scenario A

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

c. Please rate how acceptable you find <u>Scenario B</u>. (Circle <u>one</u> number.)

Scenario B

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

14.

a. Please choose which scenario you prefer. (Circle <u>one</u> number.)

1. I prefer Scenario A
2. I prefer Scenario B

b. Please rate how acceptable you find <u>Scenario A</u>. (Circle <u>one</u> number.)

Scenario A

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

c. Please rate how acceptable you find <u>Scenario B</u>. (Circle <u>one</u> number.)

Scenario B

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

15.

a. Please choose which scenario you prefer. (Circle <u>one</u> number.)

1. I prefer Scenario A
2. I prefer Scenario B

b. Please rate how acceptable you find <u>Scenario A</u>. (Circle <u>one</u> number.)

Scenario A

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

c. Please rate how acceptable you find <u>Scenario B</u>. (Circle <u>one</u> number.)

Scenario B

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

16.

a. Please choose which scenario you prefer. (Circle <u>one</u> number.)

1. I prefer Scenario A
2. I prefer Scenario B

b. Please rate how acceptable you find <u>Scenario A</u>. (Circle <u>one</u> number.)

Scenario A

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

c. Please rate how acceptable you find <u>Scenario B</u>. (Circle <u>one</u> number.)

Scenario B

Very Unacceptable								Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

D. Background Information

17. What is your sex? (Circle <u>one</u> number.)

1. Male
2. Female

18. In what year where you born?

Year born (YYYY): _____

19. If you live in the United States, what is your state and zip code of residence?

State of residence: _____

Zip code of residence: _____

} SKIP TO QUESTION 21

20. If you do not live in the United States, what country do you live in?

Country of residence: _____

21. What is the highest level of formal education you have completed? (Circle <u>one</u> number.)

1. Some high school
2. High school graduate or GED
3. Some college, business or trade school
4. College, business or trade school graduate
5. Some graduate school
6. Master's, doctoral or professional degree

Thank you for your help with this survey!

Please return this completed questionnaire to the survey administrator.

Please address correspondence regarding the survey to:

Dr. Steven R. Lawson
307 Cheatham Hall (0324)
Department of Forestry
Virginia Polytechnic Institute and State University
Blacksburg, VA 24060

PRIVACY ACT and PAPERWORK REDUCTION ACT statement: 16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. The permanent data will be anonymous. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. BURDEN ESTIMATE statement: Public reporting burden for this form is estimated to average 15 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, WASO Administration Program Center, National Park Service, 1849 C Street, N.W., Washington, D.C. 20240.

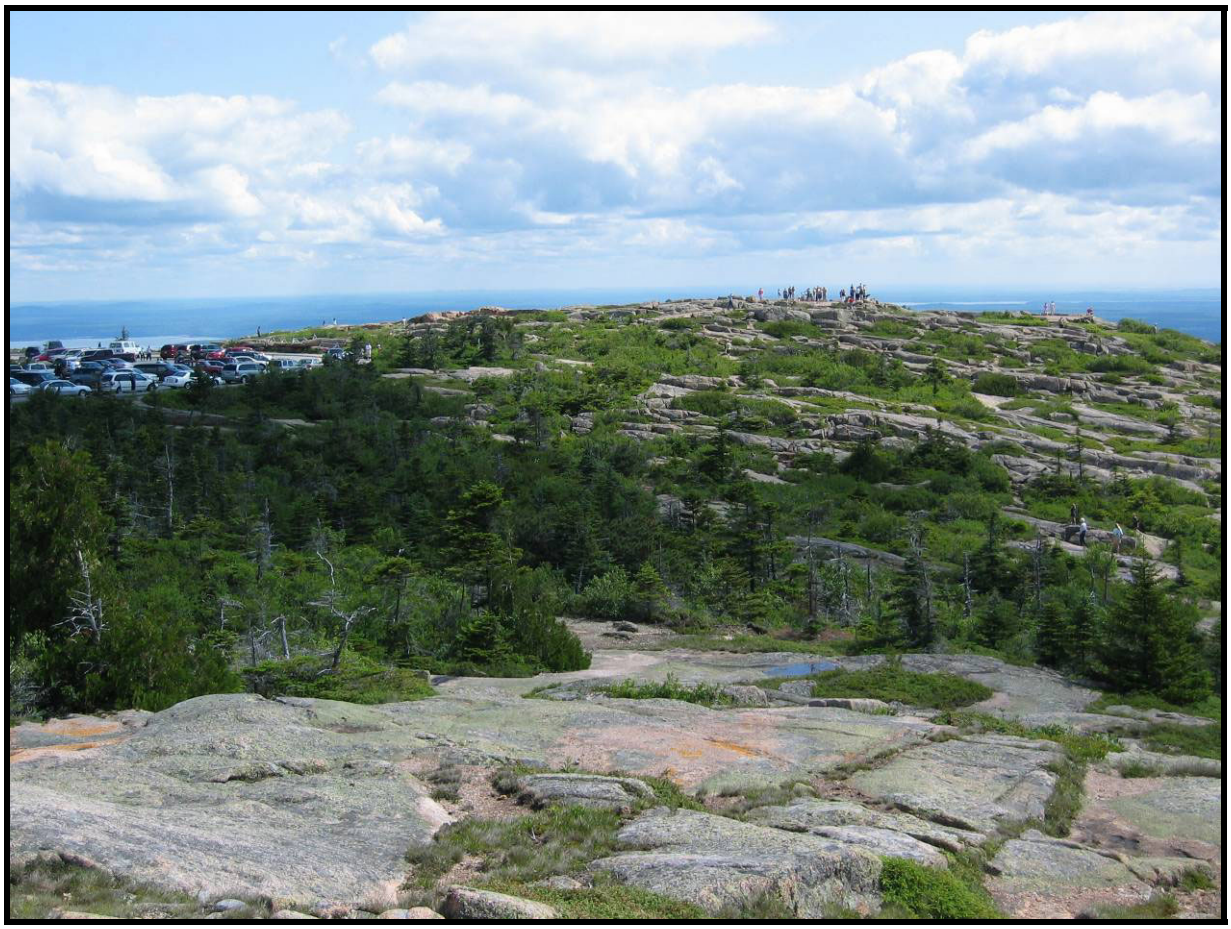
Appendix B - Qualitative Interview Guide

OMB Approval #1024-0224
NPS #05-076
Expiration Date: 03/31/2006

Acadia National Park

Guiding Questions for Semi-Structured Interviews of Cadillac Mountain Visitors

2005



Date: _____ ID Number: _____

Time: Start_____ End_____ Interviewer: _____

Number of Interviewees: _____

Interviewer Script (italicized text):

"Excuse me sir/ma'am. My name is _____. I am conducting a study for Acadia National Park to better understand the types of experiences visitors seek while visiting the summit of Cadillac Mountain and how alternative management actions on the summit of Cadillac Mountain affect visitors' experiences. Participation is voluntary and your responses will be anonymous. It will take about 20 minutes to complete. Would you be willing to participate?"

If YES: "I'd like to tape record our conversation so I can remember it later on. Is this OK with you?"

If NO:"I understand. Enjoy the rest of your visit."

Here is a statement about the confidentiality of your responses. (The card will contain text concerning the Privacy Act and Paperwork Reduction Act compliance, and also a burden estimate statement—see below.)

PRIVACY ACT and PAPERWORK REDUCTION ACT statement:
16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. Your name is requested for follow-up mailing purposes only. When analysis of the questionnaire is completed, all name and address files will be destroyed. Thus the permanent data will be anonymous. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number.

Burden estimate statement:
Public reporting burden for this form is estimated to average 20 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to the Office of Information and Regulatory Affairs of OMB, Attention Desk Officer for the Interior Department, Office of Management and Budget, Washington, D.C. 20503; and to the Information Collection Clearance Officer, Audits and Accountability Team, National Park Service, 1849 C Street, N.W., Washington, D.C. 20240.

First I'd like to ask you some background questions, then some questions about your experience today, and then your opinions about the management of the summit of Cadillac Mountain.

1. Including yourself, how many people are in your personal group today?

   Number of people: ____

2. How would you describe your personal group?

   1. Alone
   2. Family
   3. Friends
   4. Family and friends
   5. Organized group/club/school/educational group
   6. Other: _____

3. Have you ever previously visited the summit of Cadillac Mountain?

   3. Yes
   4. No (Skip to question 5)

4. Including this trip, approximately how many times have you visited the summit of Cadillac Mountain?

   Number of previous visits: _____

5. Approximately how long did you stay on the summit of Cadillac Mountain today?

   Length of stay: _____

6. What activities did you participate in while visiting the summit of Cadillac Mountain?

7. What type of outdoor recreational activities do you most frequently participate in?

8. What other places have you previously visited in Acadia National Park?

Part B- Meaning and Experiences

9. There are many places to visit in Acadia National Park and there are many different reasons people choose to visit those places. Why did you choose to visit the summit of Cadillac Mountain?

    a. What kind of experience were you looking for (on the summit of Cadillac Mountain)?

10. How did your experience on the summit of Cadillac Mountain today differ as compared to the other places you have visited in the park?

11. Describe your ideal experience on the summit of Cadillac Mountain. For example – What are you doing? What are other people doing? What is the physical setting on the summit like?

12. When you think of Acadia National Park, how does the summit of Cadillac Mountain fit into that picture?

    a. In other words, how important or unimportant is visiting the summit of Cadillac Mountain to your experience at Acadia National Park?

13. What is unique or special about the summit of Cadillac Mountain?

14. What did you enjoy most about your visit to the summit of Cadillac Mountain?

15. What did you enjoy least about your visit to the summit of Cadillac Mountain?

16. If you could ask the National Park Service to change some things about the way they manage the summit of Cadillac Mountain or how visitors experience this area, what would you ask them to do?

Part C- Management actions affecting meanings and experiences

Part of the National Park Service's mission is to protect and preserve the natural resources of Acadia National Park for future generations. Due to its popularity, the summit of Cadillac Mountain has been visited by high numbers of visitors over the last several decades resulting in impacts to vegetation and soils on the summit of the mountain. Visitors walking off-trail is one cause of the impacts to vegetation and soils on the summit of Cadillac Mountain.

The National Park Service would like visitors to stay on the paved summit trails or rock surfaces, and to avoid stepping on vegetation and soils while on the summit.

17. Did you notice any visitor-caused impacts to the vegetation and soils while you were visiting the summit of Cadillac Mountain? If so, did these impacts affect your experience/enjoyment of the summit?

18. Did you see anything the National Park Service has done to keep visitors from going off-trail and stepping on vegetation and soils?
(management structures, visitor information, posted rules/regulations)

    a. If so, how did these things affect your experience/enjoyment of the summit?

    b. Did you notice anyone walking off the paved summit trails?
    c. Did you go off the paved summit trails?
        i) Why or why not?

Several management options are available to the National Park Service to try to protect vegetation and soils on the summit of Cadillac Mountain including the placement of barriers, educational signs and regulatory signs around the summit of the mountain. I am now going to show you some photos of potential management actions and ask you what you think about them.

19. Do you think it is appropriate to place wooden barriers around the summit of Cadillac Mountain? Why or why not?

    a. Affect your experience?

    b. Make you more likely to stay on the trail?

20. Do you think it is appropriate to place signs like this along the paved trails on the summit of Cadillac Mountain? Why or why not?

    a. Affect your experience?

    b. Make you more likely to stay on the trail?

21. Do you think signs with this message are appropriate to use on the summit of Cadillac Mountain? Why or why not?

    a. Affect your experience?

    b. Make you more likely to stay on the trail?

22. Do you think signs with this message are appropriate to use on the summit of Cadillac Mountain? Why or why not?

    a. Affect your experience?

    b. Make you more likely to stay on the trail?

23. Do you think it is appropriate to place a low rock border along the paved trails on the summit of Cadillac Mountain? Why or why not?

    c. Affect your experience?

    d. Make you more likely to stay on the trail?

24. Do you think it is appropriate to place fencing along the paved trails on the summit of Cadillac Mountain? Why or why not?

    e. Affect your experience?

    f. Make you more likely to stay on the trail?

Throughout this interview, we have talked about and looked at pictures of several management actions the National Park Service could use to minimize the amount of off-trail hiking that occurs on the summit of Cadillac Mountain in order to protect vegetation and soils.

25. Would any of the management actions we discussed/looked at diminish your **sense of freedom to explore** the summit of Cadillac Mountain?

26. Would any of the management actions we discussed detract from **your enjoyment of the scenery** on the summit of Cadillac Mountain?

27. Would any of the management actions we discussed detract **from your ability to have privacy** on the summit of Cadillac Mountain?

28. Would any of the management actions we discussed make the summit of Cadillac Mountain **appear unnatural or artificial** to you?

Before we end, is there anything else that you would like to tell me or any other comments you would like to add regarding what we talked about today?

Well, that's all! Thank you very much for your time today!

Appendix C - Example Table of Researcher-Assigned Codes

The following is an example of a table that identifies the codes assigned to responses to the question, "Why did you choose to visit the summit of Cadillac Mountain?". The table below displays the name of the code, the number of interviews that contain that code, and the number of passages that are designated with that code. The number of passages designated with a particular code may be larger than the number of interviews with the same code because the codes may have been used more than once in the same interview.

Code	Interviews Coded	Passages Coded
Why Visit Cadillac	29	29
The View	15	16
Highest point	4	4
Ocean, Mountains, Lakes	1	1
Read about it	4	4
the views	1	1
Volunteers	1	1
Must do	1	1
Lay of the land	1	1
Part of Loop Road	3	3
Great weather, visibility	8	8
Gift shop	2	2
Memories	1	1
Introduce Maine to others	2	2
Must visit Cadillac	3	3
Goal to hike to the summit	1	1
Never been before	2	2
Nice Drive	2	2
Peaceful	1	1
To pass time	1	1
Highest point on east coast	3	3
Sunrise	4	4
Only a hill	1	1
Recommended by others	4	4
Crowded	1	1
To take pictures	1	1
Saw a sign	1	1
Tradition	1	1

Appendix D - Example Model Diagram of Researcher-Assigned Codes

The following is an example of a model diagram of the codes assigned to responses to the question, "Why did you choose to visit the summit of Cadillac Mountain?". The model diagram below was created by the researcher to visualize relationships between codes and to further group common codes into larger categories of ideas or themes. The location and placement of the codes in relation to each other and to the centerpoint have no significance other than to help the researcher identify like categories and ideas.