

INDICATORS AND STANDARDS OF QUALITY FOR THE SCHOODIC PENINSULA SECTION OF ACADIA NATIONAL PARK, MAINE

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Abstract: A multi-year research initiative was undertaken to inform park planning and management efforts at the Schoodic Peninsula Section of Acadia National Park, Maine. This research focused on developing information that will enable formulation of indicators and standards of quality. The first phase of research in the summer of 2000 obtained descriptive information on visitor use and users through an initial visitor survey and identified several potential indicators of quality for park resources and the visitor experience. The second phase of research in the summer of 2001 obtained descriptive information through a second visitor survey and gathered data on normative standards of quality for selected indicator variables. Indicators and standards of quality addressed in this study span both park resources and the visitor experience and include the number of cars on the park loop road, the number of visitors at selected park attractions, and resource impacts on hiking trails. Results indicate that visitors are able to provide information necessary to help determine indicators of quality pertinent to their experience at the Schoodic Peninsula. Further, visitors are able to make normative judgments about a variety of evaluative

dimensions across a diversity of indicator variables. Research findings and their management implications are presented.

Introduction

A portion of the Schoodic Peninsula is contained within Acadia National Park. The Schoodic Peninsula includes lands owned and managed by the U. S. Navy, including lands at Schoodic Point (Big Moose Island) within the boundaries of Acadia National Park. The Navy Base at Schoodic Point is scheduled to close in 2002. The base property at Schoodic Point, including its infrastructure, will be transferred to the National Park Service as a result of the closure. Closure of the base, a major employer and contributor to the economy and community life, will have a significant impact on the region. State and local interest in and concern about the future of the base facilities and their use is high. The National Park Service, through Acadia National Park, has a great interest in the future of the property as well, considering its mission of preserving resources and providing high quality visitor experiences. The park General Management Plan (GMP) states that opportunities for low-density recreation should be retained on Schoodic Point. It says that Schoodic Point should not be promoted and the park should not provide additional facilities there. The National Park Service has begun to plan for the future of the base property and the entire Schoodic Point section of the park. An amendment to the GMP will be prepared that encompasses both of these issues.

A two-year research initiative was undertaken in order to inform park planning and management efforts. Study objectives were: 1) gather baseline information about current visitors including demographic and socioeconomic characteristics, and recreation activities and use patterns, 2) measure recreation use levels at selected sites, 3) determine indicators and standards of quality for the recreation experience, and 4) measure the attitudes of park visitors and Navy Base personnel concerning the future of the Navy Base property. This paper focuses on the determination and evaluation of indicators and standards of quality for the Schoodic Peninsula section of Acadia National Park.

Indicators and Standards of Quality

Contemporary park and outdoor recreation planning frameworks, such as Limits of Acceptable Change (Stankey et al. 1985) and Visitor Experience and Resource Protection (National Park Service 1997) rely on baseline information about park users and formulation of indicators and standards of quality of the visitor experience. Indicators of quality are measurable, manageable variables that help define the quality of the visitor experience. Standards of quality define the minimum acceptable condition of indicator variables.

Normative theory and empirical techniques have been applied to determine standards of quality and this approach is described by Shelby and Heberlein (1986), Vaske et al. (1986), and Manning (1999). These applications have built upon the work of Jackson (1965) who developed a

methodology to measure norms. Using these methods, the personal norms of individuals can be aggregated to derive social or societal norms. Normative research in outdoor recreation has focused largely on the issue of crowding (e.g., Vaske et al. 1986; Shelby 1981; Heberlein et al. 1986; Patterson and Hammitt 1990; Williams et al. 1991; Whittaker and Shelby 1988), but has also been expanded to include other potential indicators of quality, including ecological impacts to wilderness campsites (Shelby et al. 1988), wildlife management practices (Vaske and Donnelly 1988), and minimum stream flows (Shelby and Whittaker 1990).

As noted above, standards of quality define the minimum acceptable condition of indicator variables. Research on visitor-based standards of quality has increasingly focused on personal and social norms. Developed in the fields of sociology and social psychology, norms have attracted considerable attention as an organizing concept in outdoor recreation research and management. In particular, normative theory and techniques have special application to setting standards of quality for the recreation experience. Norms are generally defined as standards that individuals and groups use for evaluating behavior and social and environmental conditions (Vaske et al. 1986; Donnelly et al. 1992; Shelby and Vaske 1991). If visitors have normative standards concerning relevant aspects of recreation experiences, then such norms can be studied and used as a basis for formulating standards of quality.

Traditionally, norms have been measured through a numerical approach. For example, respondents are asked to evaluate the acceptability of alternative use levels, such as 0, 5, or 10 encounters with other groups per day along trails. Resulting data are aggregated to derive social norms. More recently, visual approaches to measuring norms have been developed (Hof et al. 1994; Manning et al. 1995; Manning et al. 1996a; Manning et al. 1996b; Manning et al. 1999). In the technique, computer software is used to manipulate photographs to depict alternative use levels and/or alternative levels of visitor-caused impact. This study used the visual approach to measuring crowding norms at three study sites (Schoodic Point, Frazer Point, and the park's scenic drive) and norms for visitor-caused environmental impacts to hiking trails.

Methods

An initial visitor survey was conducted in the summer of 2000. The purpose of this survey was to gather baseline information on demographic and socioeconomic characteristics of visitors to the Schoodic Peninsula section of Acadia National Park, recreation activities and use patterns, indicators of the quality of the recreation experience at the Schoodic Peninsula section of the park,

and visitor attitudes toward future use of Navy Base property. The survey was administered on ten randomly selected days in July and August. Trained surveyors were stationed at an automobile pullout near the park exit. At the beginning of each sampling day, an interviewer pulled over the first vehicle to exit the park and asked the occupants if they would be willing to participate in the survey. Respondents were given a copy of the self-administered questionnaire and asked to complete it before leaving the park. At the completion of this process, the next vehicle was pulled over and this process continued throughout the sampling day. Over the ten sampling days, 740 vehicles were pulled over and asked to participate in the survey. A 79% response rate was attained yielding 581 completed questionnaires.

A second visitor survey was administered in the summer of 2001. The purpose of this survey was to measure standards of quality for selected indicator variables identified in the initial visitor survey. The survey was administered on ten randomly selected days in July and August, 2001. The same sampling procedures were used as described for the initial visitor survey in 2000. Over the ten sampling days, 918 vehicles were pulled over and asked to participate in the survey. A 70% response rate was attained yielding 640 completed questionnaires.

Study Findings

Indicators of Quality

Respondents were asked several questions in order to determine potential indicators of quality of the recreation experience at the Schoodic Peninsula section of the park. Questions addressed issues such as what visitors enjoyed most/least; the most important or desirable qualities of Schoodic; perceived resource and social impacts of visitor use; and evaluation of problems or issues at Schoodic. Upon completion of this research, four indicator variables were identified. These were, 1) number of cars at one time along the park loop road, 2) number of people at one time at Schoodic Point, 3) number of people at one time at Frazer Point, and 4) level of ecological impacts on hiking trails.

Standards of Quality

As outlined above, the second phase of research focused primarily on establishing standards of quality for these indicator variables. For each of these indicator variables, a series of five computer-generated photographs were prepared showing a range of use levels or resource impact. Study photographs are shown in Figure 1.

Figure 1 Study Photographs

Park Loop Road



Photo 1 (0 cars)



Photo 2 (4 cars)

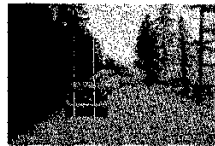


Photo 3 (8 cars)



Photo 4 (12 cars)



Photo 5 (16 cars)

Schoodic Point



Photo 1 (0 people)

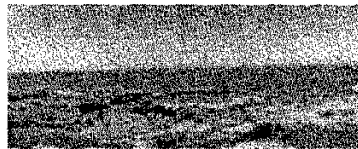


Photo 2 (33 people)



Photo 3 (66 people)



Photo 4 (99 people)



Photo 5 (132 people)

Frazer Point



Photo 1 (0 people)

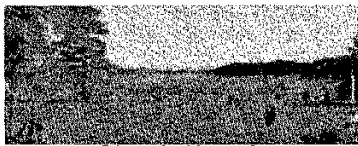


Photo 2 (41 people)

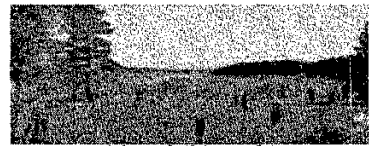


Photo 3 (81 people)



Photo 4 (122 people)



Photo 5 (162 people)

Hiking Trails



*Photo 1
(Least Impact)*



*Photo 5
(Most Impact)*

For each series of photographs, respondents were asked a standard battery of evaluative questions. First, respondents were asked if they had visited the sites in question. If respondents had visited the site in question, then the remaining questions were administered. In the case of the park loop road, it was assumed that all respondents had used this facility since it is the primary form of access to the park. The second question asked respondents to evaluate the acceptability of the five photographs showing increasing levels of visitor use or resource impacts at that particular site. Acceptability was measured using a nine-point Likert-type scale ranging from -4 ("Very Unacceptable") to 4 ("Very Acceptable"). The third question in the series asked respondents to indicate the photograph that showed the condition they would prefer to see. A fourth question asked visitors to indicate which photograph showed the condition that would be so unacceptable that they would not longer visit the Schoodic Peninsula section of Acadia National Park. Respondents were given the opportunity to indicate that, "none of the photographs are so unacceptable that I would no longer visit this area." The fifth question asked visitors to select the photograph representing the highest level of visitor use/resource impact they thought the National Park Service should allow, or the point at which visitor use should be restricted. Respondents were given the opportunity to indicate that none of the photographs showed a high enough level of visitor use/resource impact to restrict use or that use should not be restricted at all. The sixth and seventh questions referred to existing conditions and visitor expectations. Respondents were asked to indicate the photograph that most represented the condition they "typically saw today". The last question asked respondents to indicate the photograph that looked most like the conditions they expected to see. If they did not know what to expect, they were given the opportunity to indicate that. Findings from this series of questions are presented below for each of the four indicator variables.

Park Loop Road

A summary of visitor responses to the battery of questions referring to the number of cars along a generic section of the park loop road is shown in Table 1. Results indicate that mean acceptability declines as the number of cars increases. This is presented graphically by the norm curve shown in Figure 2. Respondents reported that an average of 7.5 cars at one time is the maximum acceptable condition for traffic along the park loop road. However, visitors reported that they prefer to see an average of 2.5 cars at one time. Displacement or absolute tolerance levels were reported at an average of 12.7 cars. Visitors felt the NPS should allow no more than an average of 8.5 cars before limiting automobile use. Respondents reported seeing an average of 2.8 cars on the day they were contacted for this study, but indicated that they expected to see an average of 4.1 cars. Finally, perceived crowding along the park loop road was measured on a Likert-type scale ranging from 1 ("Not at all crowded") to 9 ("Extremely crowded"). Visitors reported an average crowding rating of 2.5. In other words, crowding levels appear quite low while driving the park loop road.

Table 1 Study findings for the number of cars at one time along park loop road.

Evaluative Dimension	N	Mean (cars)
Acceptability	606 - 619 ¹	7.5
Preference	608	2.5
Displacement/ tolerance	563	12.7
Management action	551	8.5
Typically seen	576	2.8
Expectation	478	4.1
Perceived crowding	594 ²	2.0

¹Based on line represented by multiple data points each having different N values

²Scale: 1 = Not at all crowded; 9 = Extremely crowded

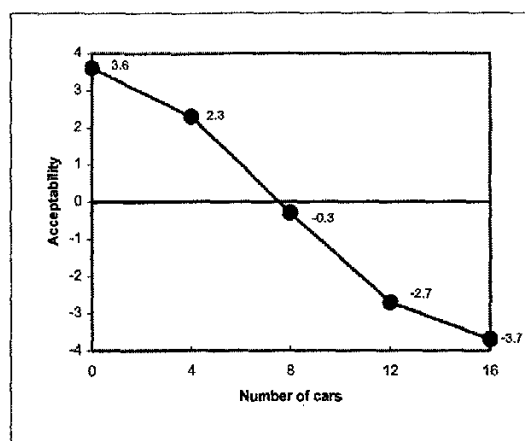


Figure 2 Park Loop Road Norm Curve

Schoodic Point

Table 2 presents a summary of findings at Schoodic Point. Again, results indicate that mean acceptability declines as the number of people at one time at Schoodic Point increases. This relationship is exhibited by the norm curve in Figure 3. Respondents reported an average maximum acceptable condition of 70.1 people at one time. Visitors prefer to see an average of 22.6 people, while their absolute tolerance is an average of 102 people. Respondents reported that the NPS should allow an average of 71.2 people to visit Schoodic Point at one time before use should be restricted. Respondents indicated that they typically saw an average of 30.2 people, while they expected to see an average of 38.1 people. Perceived crowding at Schoodic Point averaged 2.5 on the 9-point crowding scale.

Frazer Point

Findings from Frazer point are shown in Table 3. The same relationship exists here as in the previous indicator variables and is shown in the norm curve in Figure 4. As the number of people to Frazer point increases, the level of acceptability decreases. Visitor responses indicate that the level of use falls into the unacceptable range at 85.0 people. Visitors to Frazer Point prefer to see an average of 35.3

people at one time; have an average absolute tolerance of 120.8 people; feel the NPS should manage for an average of 89.0 people before restricting use; typically saw an average of 34.7 people; and expected to see an average of 38.1 people at one time. Respondents were not asked to rate their level of perceived crowding at Frazer Point.

Table 2 Study findings for the number of people at one time at Schoodic Point

Evaluative Dimension	N	Mean (people)
Acceptability	544 - 557 ¹	70.1
Preference	575	22.6
Displacement/ tolerance	450	102.0
Management action	439	71.2
Typically seen	555	30.2
Expectation	436	38.1
Perceived crowding	565 ²	2.5

¹ Based on line represented by multiple data points each having different N values

² Scale: 1 = Not at all crowded; 9 = Extremely crowded

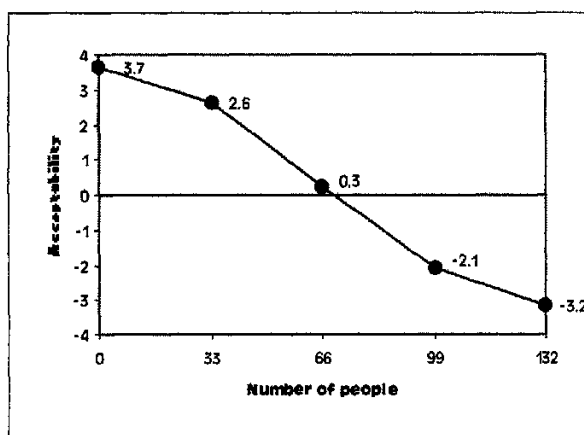


Figure 3 Schoodic Point Norm Curve

Table 3 Study findings for the number of people at one time at Frazer Point

Evaluative Dimension	N	Mean (people)
Acceptability	221 - 227 ¹	85.0
Preference	227	35.3
Displacement/ tolerance	188	120.8
Management action	192	89.0
Typically seen	220	34.7
Expectation	171	46.5
Perceived crowding ²	-	-

¹ Based on line represented by multiple data points each having different N values

² Scale: 1 = Not at all crowded; 9 = Extremely crowded

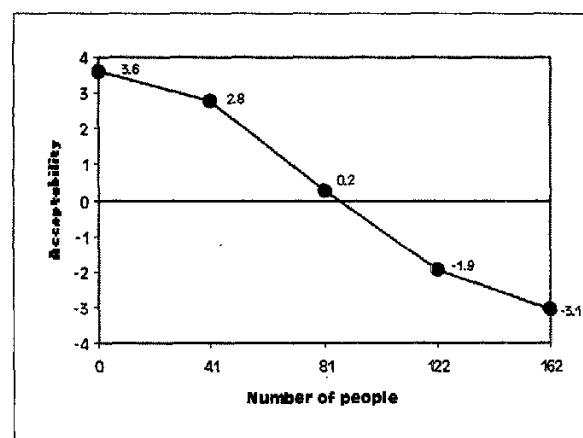


Figure 4 Frazer Point Norm Curve

Hiking Trails

The last indicator variable addressed ecological impacts on a generic section of hiking trail. A summary of findings is presented in Table 4 and the norm curve for trail impacts is shown in Figure 5. Again, as the level of impacts increase, the level of acceptability decreases. Visitors reported that the level of trail impacts falls into the unacceptable range at approximately the conditions represented by photo 4. Visitors prefer to see conditions as represented by approximately photo 1. Absolute tolerance was reported at approximately photo 4. Respondents felt that the NPS should manage for conditions represented by photo 3 before limiting use of the trails. Existing conditions were, on average, most like the conditions shown in approximately photo 2. Visitors expected to see conditions such as those shown approximately in photo 2 as well. Finally, perceived crowding along hiking trails at Schoodic is low with an average of 1.6 on the 9-point crowding scale.

Table 4 Study findings for ecological impacts on hiking trails

Evaluative Dimension	N	Mean (photo number)
Acceptability	117 - 124 ¹	3.6
Preference	132	1.3
Displacement/ tolerance	104	3.7
Management action	113	2.7
Typically seen	87	1.8
Expectation	93	1.7
Perceived crowding	139 ²	1.6

¹ Based on line represented by multiple data points each having different N values

² Scale: 1 = Not at all crowded; 9 = Extremely crowded

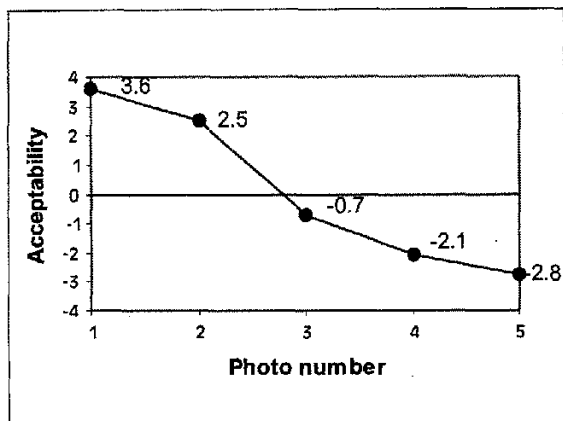


Figure 5 Trail Impact Norm Curve

Conclusions and Implications

Findings reported in this paper suggest that visitors are receiving a relatively high quality of recreation experience at the Schoodic Peninsula Section of Acadia National Park. In general, visitors are encountering social and resource conditions that are much lower than their minimum acceptable condition and their absolute tolerance for such conditions. Moreover, in most cases the conditions encountered are very close to those they would prefer to see and often less than what they expected to see.

In addition, this research provides empirical evidence to suggest that visitors are able to provide information necessary to determine indicators of quality pertinent to the experiences provided at the Schoodic Peninsula section of Acadia National Park. Further, visitors are able to make normative judgments about a variety of evaluative dimensions across a diversity of indicator variables. This research provides planners and managers with a rich set of indicators and standards that are useful in defining the quality of the visitor experience at the Schoodic Peninsula section of Acadia National Park. This information will be used to help planners and managers make more informed decisions about the future of this portion of the park.

This study focused on helping to develop standards of quality across a diversity of indicator variables and incorporated several evaluative dimensions of standards of quality. As has been found elsewhere, our findings indicate that standards vary across evaluative context. Standards appear to be relatively consistent and organized in a hierarchical manner across evaluative dimensions such that preferences exhibit the highest standards (lowest level of impact) and absolute tolerance exhibits the lowest standards (highest level of impact), with expectations and management-related standards falling in the middle of the range. This study suggests that this hierarchical organization holds true across different types of indicator variables, including the number of cars at one time on the tour road, the number of people at one time at park attraction sites, and the level of ecological impact on hiking trails.

Finally, in this study data on standards of quality were collected using a visual approach where photographs represented quantifiable variables such as the number of cars or the number of people. However, ecological impact photos did not have quantifiable units associated with them (e.g., percent vegetation loss), although this approach is in keeping with "impact class" assessment procedures often used in ecological monitoring and management (Brewer and Berrier 1984; Cole 1989). Resulting data represent mean photo numbers and therefore, may seem somewhat ambiguous and potentially less useful in a management context. Future research may improve upon this study by developing photographs based on quantifiable ecological data.

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