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## Crossing Experiential Boundaries: Visitor Preferences Regarding Tradeoffs among Social, Resource, and Managerial Attributes of the Denali Wilderness Experience

**W**ilderness management researchers and practitioners have long recognized that wilderness experiences are influenced by the social conditions experienced (e.g., the number of other groups encountered), the resource conditions experienced (e.g., the amount of human impact at camping sites), and the management conditions imposed (e.g., the number of backcountry permits issued; Hendee et al. 1990). Decisions about how to manage wilderness involve potential tradeoffs among these conditions. For example, the number of permits issued for recreational use of a wilderness area could be increased to allow more public access, but this might result in more resource impacts and encounters among groups within the wilderness area. Conversely, reducing the number of recreational-use permits issued might reduce resource impacts and encounters among groups, but would allow fewer people to enjoy the wilderness area.

The normative approach to recreation research has been used to study a broad range of wilderness management issues, including crowding, ecological impacts, and management practices (Manning 1999a). Normative research suggests that wilderness visitors have standards by which to judge recreation-related behavior and associated impacts (Shelby et al. 1996; Vaske et al. 1986; Vaske et al. 1993; Lewis et al. 1996; Manning et al. 1996; Manning et al. 1999). However, normative studies have conventionally been designed to provide information

upon which to define standards of quality related to a single management issue, without explicit consideration of related and potentially competing issues (Manning 1999a). Recent studies in outdoor recreation have suggested that normative research should more explicitly consider the tradeoffs inherent in park and wilderness management decision-making (Hall, in press; Lawson and Manning 2000; Manning et al. 1999).

This study takes an integrative approach to wilderness research by developing a decision-making model

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that considers the social, resource, and managerial attributes of the wilderness experience together. Specifically, stated choice analysis is used to evaluate the choices overnight wilderness visitors in Denali National Park and Preserve make when faced with hypothetical tradeoffs among the conditions of social, resource, and management attributes of the wilderness portion of the park.

#### **Denali National Park & Preserve**

Alaska's first national park, Mount McKinley National Park, was established in 1917. In 1980, with the passage of the Alaska National Interest Lands Conservation Act, the park was expanded from 2 million to 6 million acres, and renamed Denali National Park and Preserve. At the same time, the original 2 million acres of the park was designated wilderness. Today, this wilderness forms the core of Denali.

Visitor use of the Denali wilderness is managed through a permit system to maintain the area's primitive, undeveloped character. Through the permit system, the park administers strict quotas on the number of overnight visitors who are issued a permit for each of 43 wilderness management units. The quotas exist to prevent resource degradation and to provide visitors with opportunities to experience solitude. During the busy summer months, quotas for many of the management units are regularly reached and some

visitors interested in an overnight trip in the wilderness are turned away or forced to hike and camp in less-preferred management units.

The primitive character of Denali's wilderness is maintained through other management techniques as well. For example, traditional backcountry facilities such as bridges and trails are not provided in the Denali wilderness. Instead, visitors must navigate by map and compass, and visitors are frequently challenged with technical stream-crossings. There are no established campsites in the Denali wilderness, either. Visitors may camp anywhere within the management unit for which they were issued an overnight permit. As a result, visitors are often able to camp out of sight and sound of other groups, in places with little or no evidence of previous human use.

Park managers and planners are currently working on updating the wilderness management plan for Denali. Revision of the wilderness management plan will include making decisions to maintain, reduce, or increase the number of permits issued for each of the wilderness management units. Previous research conducted by Bultena et al. (1981) studied the extent to which wilderness visitors to Denali supported use limitations. The authors conclude that future decisions concerning use limitations will have to weigh the importance of protecting park resources

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and the quality of visitors' experiences against the benefit of granting more visitors access to the wilderness. This study uses stated choice analysis to provide Denali managers with information about overnight wilderness visitors' attitudes and preferences regarding these tradeoffs.

### Stated Choice Analysis

Stated choice analysis models have been developed in the fields of psychometrics, econometrics, and consumer marketing to evaluate public preferences or attitudes (Green and Srinivasan 1978). In stated choice analysis, respondents are asked to make choices among alternative configurations of a multi-attribute good (Louviere and Timmermans 1990a). Stated choice analysis is based on the decision-making framework of random utility theory, and is the basis of the analytical model used in this study (refer to Hanemann 1984 for a comprehensive presentation of the random utility framework). Each alternative configuration is called a profile, and is defined by varying levels of selected attributes of the good (Mackenzie 1993). For example, respondents may be asked to choose between alternative recreation settings that vary in the number of other groups encountered, the degree of impact to the natural environment, and the intensity of management regulations imposed on visitors. Respondents' choices among the alter-

natives are evaluated to estimate the relative importance of each attribute to the overall utility derived from the recreational setting. Further, stated choice analysis models are used to estimate public preferences or support for alternative combinations of the attribute levels (Dennis 1998). Stated preference methods, including conjoint analysis, are related to stated choice methods, and are also used to evaluate public preferences for multiple-attribute goods. Respondents to conjoint analysis studies are asked to rate or rank alternatives, rather than choose among alternatives. For a detailed discussion of conjoint ranking see Dennis (1998) and Mackenzie (1993); for conjoint rating, see Mackenzie (1993), Stevens et al. (2000), and Teisl et al. (1996).

Stated choice analysis has been applied to study public preferences and attitudes concerning a range of recreation-related issues. Louviere and Timmermans (1990a) suggest ways in which stated choice models can be used to evaluate alternative recreation policies. Specifically, the authors state that one of the strengths of choice models is their predictive ability. That is, choice models provide recreation managers with foresight about how the public is likely to respond to various policy alternatives. Further, choice models provide managers with information about people's preferences for arrangements of resources, facilities, and

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services that may not currently exist.

There is a growing body of literature describing the application of stated choice analysis to outdoor recreation management issues in parks (Louviere and Timmermans 1990b; Louviere and Woodworth 1985; Schroeder et al. 1990). Other natural resource-related applications of stated choice analysis include studies of river flow management (Adamowicz et al. 1994), tourism (Haider and Ewing 1990), recreational hunting (Boxall et al. 1996; Bullock et al. 1998; Mackenzie 1993), siting of hazardous waste facilities (Opaluch et al. 1993; Swallow et al. 1994), watershed management (Johnston et al. 1999), and wildlife management (Adamowicz et al. 1998).

### Study Methods

**Selection of attributes and levels.** Wilderness areas are managed, in general, to provide visitors with opportunities to experience solitude in a relatively unmodified natural environment with few management restrictions and facilities (Merigliano 1990). Substantial research has been conducted to identify social, resource, and managerial setting attributes that reflect these general management objectives and contribute to or detract from the quality of the wilderness recreation experience (Merigliano 1990; Roggenbuck et al. 1993; Shindler and Shelby 1992; Whittaker 1992). These attributes

are commonly referred to in the recreation literature as “indicators of quality.”

Manning (1999b) summarizes the results of a number of studies that have focused on identifying potential indicators of quality. Based on review of this literature, six wilderness-setting attributes were selected for this study to define the social, resource, and management conditions of the Denali wilderness setting profiles. Three levels were defined for each of the six attributes, based on recommendations from park staff. Table 1 lists the attributes and levels used to define alternative Denali wilderness settings in the study.

Pairs of hypothetical Denali backcountry settings were generated by combining the six wilderness-setting attributes at varying levels, based on an experimental design. The experimental design resulted in four questionnaire versions, each containing nine pairwise comparisons (Seiden 1954). An example of a typical Denali wilderness setting comparison is presented in Table 2.

### Results

**Survey administration.** Overnight wilderness visitors in Denali are required to obtain a permit and a bear-resistant food container from the visitor center prior to their backpacking trip. The stated choice analysis survey was administered to overnight wilderness visitors at the visitor center when they returned the food container at the end of their

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|   |
|---|
| <p><b>Social conditions</b></p> <p><i>Number of other groups encountered per day while hiking:</i></p> <ul style="list-style-type: none"> <li>• Encounter 0 other groups per day while hiking</li> <li>• Encounter up to 2 other groups per day while hiking</li> <li>• Encounter up to 4 other groups per day while hiking</li> </ul> <p><i>Opportunity to camp out of sight and sound of other groups:</i></p> <ul style="list-style-type: none"> <li>• Able to camp out of sight and sound of other groups all nights</li> <li>• Able to camp out of sight and sound of other groups most nights</li> <li>• Able to camp out of sight and sound of other groups a minority of nights</li> </ul>  |
| <p><b>Resource conditions</b></p> <p><i>Extent and character of hiking trails:</i></p> <ul style="list-style-type: none"> <li>• Hiking is along intermittent, animal-like trails</li> <li>• Hiking is along continuous single-track trails developed from prior human use</li> <li>• Hiking is along continuous trails with multiple tracks developed from prior human use</li> </ul> <p><i>Signs of human use at camping sites:</i></p> <ul style="list-style-type: none"> <li>• Camping sites have little or no signs of human use</li> <li>• Camping sites have some signs of human use — light vegetation damage, a few moved rocks</li> <li>• Camping sites have extensive signs of human use — bare soil, many rocks moved for wind protection and cooking</li> </ul> |
| <p><b>Management conditions</b></p> <p><i>Regulation of camping:</i></p> <ul style="list-style-type: none"> <li>• Allowed to camp in any zone on any night</li> <li>• Required to camp in specified zones</li> <li>• Required to camp in designated sites</li> </ul> <p><i>Chance of receiving an overnight backcountry permit:</i></p> <ul style="list-style-type: none"> <li>• Most visitors are able to get a permit for their preferred trip</li> <li>• Most visitors are able to get a permit for at least their second-choice trip</li> <li>• Only a minority of visitors are able to get a backcountry permit</li> </ul>   |

Table 1. Denali wilderness-setting attributes and levels.

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| <b>Backcountry Setting A</b>  | <b>Backcountry Setting B</b>  |
|---|---|
| <ul style="list-style-type: none"> <li>• Encounter up to 2 other groups per day while hiking.</li> </ul>  | <ul style="list-style-type: none"> <li>• Encounter up to 4 other groups per day while hiking.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Able to camp out of sight and sound of other groups <i>all</i> nights.</li> </ul>                          | <ul style="list-style-type: none"> <li>• Able to camp out of sight and sound of other groups <i>most</i> nights.</li> </ul>                         |
| <ul style="list-style-type: none"> <li>• Hiking is along continuous, <i>single-track</i> trails developed from prior human use.</li> </ul>          | <ul style="list-style-type: none"> <li>• Hiking is along intermittent, animal-like trails.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Camping sites have <i>some</i> signs of human use — light vegetation damage, a few moved rocks.</li> </ul> | <ul style="list-style-type: none"> <li>• Camping sites have <i>some</i> signs of human use — light vegetation damage, a few moved rocks.</li> </ul> |
| <ul style="list-style-type: none"> <li>• Required to camp at <i>designated</i> sites.</li> </ul>  | <ul style="list-style-type: none"> <li>• Required to camp at <i>designated</i> sites.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Only a minority of visitors are able to get a backcountry permit.</li> </ul>                               | <ul style="list-style-type: none"> <li>• Most visitors are able to get a backcountry permit for their <i>preferred</i> trip.</li> </ul>             |

**Table 2.** Example of Denali wilderness-setting comparisons.

backpacking trip. The survey was administered from July 24 through September 2, 2000. The choice experiment was conducted as part of a larger study of Denali overnight wilderness visitors. Individuals who did not participate in other parts of the larger study were recruited for the stated choice experiment. Study participants were asked to complete one of four versions of the questionnaire on a laptop computer. In each of the nine choice questions, respondents were asked to read through each setting description (A and B) and indicate which they preferred. The response rate for the stated

choice analysis survey was 81.2%, resulting in a total of 311 completed questionnaires (approximately 78 respondents for each version of the questionnaire) and 2,799 pairwise comparisons.

**Study findings.** The responses to the stated choice questions were analyzed using logistic regression analysis. The regression coefficients for the Denali wilderness setting attributes, together with their standard errors, Wald chi-square values, and P values are presented in Table 3. All coefficients are significantly different than zero at <.001% level, except the coefficients on “Up to 2 other

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groups” and “Intermittent animal-like trails.” The overall fit of the model is supported by the results of the Hosmer and Lemeshow (2000)

| <b>Variable</b>  | <b>Coefficient</b> | <b>Standard Error</b> | <b>Wald Chi-Square</b> | <b>P Value</b> |
|--|--------------------|-----------------------|------------------------|----------------|
| <b><i>Encounters with other groups per day while hiking:</i></b>   |                    |                       |                        |                |
| 0  | —                  | —                     | —                      | —              |
| Up to 2  | 0.0649             | 0.0433                | 2.2458                 | 0.1340         |
| Up to 4  | -0.5044            | 0.0438                | 132.8263               | 0.0001         |
| <b><i>Able to camp out of sight and sound of other groups:</i></b> |                    |                       |                        |                |
| All nights   | —                  | —                     | —                      | —              |
| Most nights  | 0.1452             | 0.0435                | 11.1482                | 0.0008         |
| A minority of nights   | -0.4404            | 0.0452                | 94.8138                | 0.0001         |
| <b><i>Hiking is along:</i></b>                                     |                    |                       |                        |                |
| Intermittent, animal-like trails                                   | —                  | —                     | —                      | —              |
| Single-track trails developed from human use                       | -0.0281            | 0.0443                | 0.4028                 | 0.5256         |
| Multiple-track trails developed from human use                     | -0.2912            | 0.0428                | 46.3399                | 0.0001         |
| <b><i>Camping sites have:</i></b>                                  |                    |                       |                        |                |
| Little or no signs of human use                                    | —                  | —                     | —                      | —              |
| Some signs of human use  | 0.2073             | 0.0440                | 22.1506                | 0.0001         |
| Extensive signs of human use                                       | -0.7896            | 0.0485                | 264.9717               | 0.0001         |
| <b><i>Regulation of camping:</i></b>                               |                    |                       |                        |                |
| Allowed to camp in any zone on any night                           | —                  | —                     | —                      | —              |
| Required to camp in specified zones                                | 0.1398             | 0.0476                | 8.6202                 | 0.0033         |
| Required to camp in designated sites                               | -0.2117            | 0.0452                | 21.9484                | 0.0001         |
| <b><i>Chance visitors have of receiving a permit:</i></b>          |                    |                       |                        |                |
| Most get a permit for their preferred trip                         | —                  | —                     | —                      | —              |
| Most get a permit for at least their second choice                 | 0.1430             | 0.0443                | 10.4236                | 0.0012         |
| Only a minority get a permit                                       | -0.2157            | 0.0434                | 24.6555                | 0.0001         |

Table 3. Coefficient estimates for wilderness-setting attributes

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goodness of fit test ( $\chi^2 = 3.492$ ,  $p = 0.836$ ).

The magnitude of significant coefficients reflects the relative importance of the corresponding level of the attribute to Denali overnight wilderness visitors. The values of the coefficients in Table 3 imply that signs of human use at campsites influence Denali overnight wilderness visitors' utility or satisfaction more than any other wilderness-setting attribute considered in this study. Specifically, camping site conditions characterized as having "Extensive signs of human use" are evaluated less favorably than any other level. Additionally, camping site conditions characterized by "Little or no signs of human use" are preferred more than any level of any other wilderness-setting attribute.

The magnitude of the coefficient estimates in Table 3 indicate that solitude related attributes represent a second tier of importance to Denali overnight wilderness visitors. That is, while the number of encounters with other groups per day while hiking and opportunities to camp out of sight and sound of other groups are less important wilderness setting attributes relative to campsite impacts, they demonstrate a relatively large influence on Denali overnight wilderness visitors' utility. The extent and character of trails, regulations concerning where visitors are allowed to camp in the Denali wilderness, and the availability of back-

country permits are less important, relative to campsite impacts and solitude-related attributes.

The relationship between the levels of each wilderness-setting attribute and the average utility associated with all possible combinations of the six attributes are plotted in Figures 1a-1f. The values on the x-axis of each plot represent the level of the corresponding wilderness-setting attribute, and the values on the y-axis represent the amount by which the utility of the corresponding level of the attribute deviates from average utility or satisfaction. The values on the y-axis are expressed in units of utility, which is a measure of relative preference. Levels of attributes with high utility values are preferred to levels of attributes with lower utility values. The plots provide further insight into the relative importance of the attributes to Denali overnight wilderness visitors. For example, utility drops sharply as campsites change from having "Some signs of human use" (+0.2073) to "Extensive signs of human use" (-0.7896) (Figure 1d), whereas the loss of utility is less dramatic as the opportunity to camp out of sight and sound of other groups changes from "All nights" (0.2952) to "Most nights" (0.1452) (Figure 1b).

To test whether differences in utility associated with changes in the level of an attribute are significantly different than zero, two additional logistic regression analyses were



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performed. In them, the attributes were represented in the statistical model using *dummy* coding rather than *effects* coding. Results of the additional analyses indicate that the difference in utility associated with being “Allowed to camp in any zone on any night” versus being “Required to camp in specified zones”, and the difference in utility associated with “Most visitors are able to get a permit for their preferred trip” versus “Most visitors are able to get a permit for at least their second choice trip,” are not significantly different than zero. All other utility differences associated with different levels of the attributes were found to be significantly different than zero.

The results of the stated choice experiment suggest that Denali wilderness visitors support some level of management over where visitors may camp and a certain degree of visitor-use limits. Utility remains unchanged as regulations over where visitors may camp increases from “Allowed to camp in any zone on any night” to “Required to camp in specified zones” (Figure 1e). However, utility decreases to its lowest point with respect to camping regulations when visitors are “Required to camp in designated sites.” A similar trend is observed concerning overnight wilderness-use limits. Utility associated with this attribute is statistically the same whether use limits are at their least restrictive level (“Most get a permit for their preferred trip”) or at

the intermediate level (“Most get a permit for at least their second choice trip”) (Figure 1e). Use limits that result in only a minority of visitors receiving a permit lead to the lowest utility (i.e., the chance visitors have of receiving a permit). A possible explanation for these results is that visitors may realize that without certain management restrictions, the resource- and social-setting attributes of the Denali wilderness are likely to deteriorate beyond acceptable conditions.

An additional use of the model is to predict the preferences of visitors for alternative wilderness management scenarios. As an example, two hypothetical Denali wilderness management alternatives will be considered. The first will be referred to as the “Solitude Alternative” and the second as the “Freedom Alternative” (Table 4). Under the Solitude Alternative, overnight wilderness visitors would encounter no other groups per day while hiking and be able to camp out of sight and sound of other groups every night. However, the two management attributes would be at their most restrictive levels. That is, visitors would be required to camp in designated sites and only a minority of visitors would be able to get a backcountry permit. Under the Freedom Alternative, overnight wilderness visitors would be able to camp in any zone on any night, and most visitors would be able to get a permit for their preferred trip. How-

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Figure 1a

Figure 1b

Figure 1c

Figure 1a-1c. Denali wilderness-setting attribute levels and corresponding utility.  
See text for explanation. [continued on the next page]

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Figure 1d

Figure 1e

Figure 1f

Figure 1d-1f. Denali wilderness-setting attribute levels and corresponding utility.  
See text for explanation. [continued from the previous page]

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|                          | <b>Solitude Alternative</b>                  | <b>Freedom Alternative</b>                 |
|--------------------------|--|--|
| Hiking Encounters:       | 0 other groups per day                       | Up to 4 other groups per day               |
| Campsite Solitude:       | All nights                                   | A minority of nights                       |
| Hiking Trails:           | Single track trails                          | Single track trails                        |
| Campsite Impacts:        | Some signs of human use                      | Some signs of human use                    |
| Camping Regulations:     | Designated sites                             | Any zone on any night                      |
| Availability of permits: | Only a minority of visitors receive a permit | Most get a permit for their preferred trip |
| Voting Proportion        | 75%  | 25%  |

**Table 4. Scores for two hypothetical Denali wilderness management alternatives.**

ever, visitors would encounter up to four other groups per day while hiking, and they would be able to camp out of sight and sound of other groups only on a minority of nights. In both alternatives, the extent of social trails, and the amount of impact to campsites, would be fixed at the intermediate level.

At the heart of the comparison between the Solitude Alternative and the Freedom Alternative are visitors' evaluations of the tradeoff between freedom of access to the wilderness and the opportunity to experience solitude. The model predicts that in a hypothetical referendum, 75% of Denali overnight wilderness visitors would choose the Solitude Alternative and only 25% would choose the Freedom Alternative (Table 4; see Opaluch et al. 1993 for a demonstration of the methods used to calculate estimated voting proportions for management alternatives). This re-

sult implies that, in general, Denali overnight wilderness visitors would prefer to forgo some freedom from management to improve opportunities to experience solitude.

### Conclusions

In this study, stated choice analysis has been used to integrate consideration of the conditions of social, resource, and managerial attributes of the Denali wilderness into decisions about how to manage it. The results of the stated choice analysis presented in this paper have several important implications for wilderness management in Denali National Park and Preserve.

First, consistent with the findings of previous wilderness research, Denali overnight wilderness visitors place particular importance on the extent of impacts at camping sites (Roggenbuck et al. 1993). Management actions that provide visitors

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with places to camp that have no more than some signs of human use will make substantial positive contributions to the quality of their wilderness experience, while those that result in sites with extensive signs of human use will greatly detract from the experience. Further, visitors place relatively high importance on having limited contact with other groups while hiking and camping.

Several aspects of the study's findings suggest that visitors would be willing to tolerate, and in fact support, management restrictions, including use limits, to achieve desired social- and resource-setting attribute conditions. For example, the results suggest that it makes no difference to visitors whether they are required to camp in specified zones (as current park regulations demand) as opposed to being allowed to camp in any zone on any night. Additionally, the results suggest that visitors' utility does not diminish if limits on the number of backcountry permits issued are increased from the least restrictive level considered in this study to the intermediate level, even though their chances of receiving a permit for their preferred trip would be reduced. As noted above, a possible explanation for these findings is that visitors might consider a certain degree of management regulation to be necessary to achieve desirable social and resource conditions in the Denali wilderness.

On a more general level, the

model allows managers to evaluate visitor attitudes toward alternative management scenarios. This allows managers to consider combinations of setting attributes that are not currently in place, but which may offer a better alternative than the status quo. Additionally, alternatives being considered under the new wilderness management plan can be generalized to the model, and managers can predict public response to each alternative. The results of the hypothetical application of the choice model provide further evidence that visitors are willing to trade off freedom from management restrictions for desired social conditions. Specifically, the results demonstrate that in a hypothetical referendum, visitors would prefer (by a margin of three to one) a wilderness setting that emphasizes solitude through relatively restrictive management actions over a more congested wilderness setting with limited management restrictions.

From a management perspective, these results suggest that the majority of overnight wilderness visitors support backcountry permit quotas to protect the primitive character of the park. A moderately restrictive quota system that is designed to enhance visitors' opportunities to experience solitude and to maintain relatively undisturbed campsite and trail conditions will receive the greatest support. However, the results of the hypothetical application of the choice model indicate that there is

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also a substantial proportion of visitors (25%) that places high importance on freedom from management restrictions despite reduced opportunities to experience limited contact with other groups while hiking and camping. This finding suggests that Denali overnight visitors are at least somewhat diverse in their attitudes concerning the management of the park's wilderness. Managers could address this diversity based on the concept of zoning to provide a spectrum of opportunities for visitors. For example, the system could be designed in such a way that quotas for most zones within the wilderness are set at levels that emphasize opportunities for visitors to experience solitude, while quotas for a few zones are set at levels that provide greater visitor access.

The results of this study indicate that certain conditions of each of the six Denali wilderness-setting attributes provide a greater-than-average level of utility to visitors. However, Figure 1 illustrates that when the conditions of the attributes deteriorate beyond "threshold" levels, they provide less-than-average levels of utility (e.g., when camping sites deteriorate from having some signs of human use to having extensive signs of human use). These findings imply that the wilderness experience in Denali can be substantially improved by restoring the social and resource conditions in the wilderness to levels higher than the threshold. Likewise,

the wilderness experience can be protected from substantial decline by keeping conditions from falling below the threshold.

The threshold levels for each of the six Denali wilderness-setting attributes, illustrated in Figure 1, could be used by park managers to help formulate standards of quality. For example, Figure 1a demonstrates that fewer than two encounters with other groups per day while hiking provides a greater-than-average level of utility to visitors, while encounters with more than two other groups per day provides a less-than-average level of utility. Therefore, a potential standard of quality for this attribute might be set at "up to two encounters with other groups per day while hiking." The use of stated choice analysis data to help formulate standards of quality for wilderness-setting conditions represents a potential improvement to the conventional normative approach in recreation research, in that resulting data reflect the tradeoffs visitors are willing to make.

A potential limitation of this study is that the relative importance of the Denali wilderness-setting attributes considered here are influenced by the levels of the attributes selected. Our findings may have varied if we had used different levels to represent the range of conditions for each attribute. For example, we may have found the relative importance visitors place on the chance of receiving an

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overnight backcountry permit to be greater if we had used the phrase "Visitors have a 5% chance of receiving a backcountry permit" rather than "Only a minority of visitors are able to get a backcountry permit." However, the levels of the attributes were selected to represent a realistic range of conditions for each, based on current conditions in the park. As a result, it seems reasonable to conclude that the results of this study realistically represent overnight wilderness visitors' attitudes and preferences concerning the conditions of social, resource, and managerial attributes of the Denali wilderness experience.

Previous recreation research indicates that attitudes and preferences concerning indicators of quality may be influenced by personal characteristics of visitors, such as the level of experience an individual has (Bryan 1977; Ditton et al. 1983; Graefe et al. 1986; Munley and Smith 1976). Further research could be conducted to examine differences in the way novice and experienced overnight visitors evaluate tradeoffs among the attributes of the Denali wilderness. This information would provide managers with a better understanding of the preferences of different

types of visitors and could be used to identify wilderness-setting conditions that are most suitable for each type.

The findings of this study reflect the attitudes and preferences of overnight wilderness visitors in Denali National Park and Preserve concerning management of the park's wilderness. The use of stated choice analysis should be considered for studies of visitors' preferences in other wilderness areas. Results of such studies would provide a basis for comparison of users' preferences for conditions across different types of wilderness areas. Further, while much attention has been focused on the preferences and attitudes of overnight visitors to wilderness areas, the amount of research focused on day-use visitors is more limited (Roggenbuck et al. 1994). However, day use constitutes a substantial proportion of visitor use in many wilderness areas (Lucas 1980; Manning et al. 1996; Roggenbuck and Lucas 1987). Stated choice analysis can further inform wilderness management decisions through studies of day-use visitors' preferences for the conditions of social, resource, and managerial attributes of the wilderness experience.

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