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Norm Stability: A Longitudinal Analysis of Crowding and Related Norms in the Wilderness of Denali National Park & Preserve

Visitor use of parks, wilderness, and related areas can cause impacts that degrade the quality of natural and cultural resources and the visitor experience (Hammitt and Cole 1998; Manning 1999). For example, visitors can compact and erode soils, reduce ground cover vegetation, pollute surface waters, disturb wildlife, and remove artifacts, as well as cause crowding and conflicts among alternative types of visitors.

A growing body of research on these issues has explored the degree to which visitors perceive and are sensitive to such impacts (Shelby and Heberlein 1986; Vaske et al. 1986; Manning et al. 1996; Manning et al. 1999). Recent research has focused on developing data that might be used to help develop standards of quality (minimum acceptable conditions) for relevant indicators of quality (measurable, manageable variables that help define desired future resource and social conditions). Indicators and standards of quality are vital elements of contemporary park and wilderness management frameworks, including limits of acceptable change (LAC; Stankey et al. 1985) and visitor experience and resource

protection (VERP; National Park Service 1997). Research has increasingly focused on “norms” or standards by which visitors might judge the acceptability of resource and social conditions found in parks, wilderness, and related areas.

A largely unexplored element of this body of research is the stability of visitor norms or standards over time. Generally, research on visitor norms or standards has simply not been conducted for a long enough time to examine this issue empirically. However, this issue is potentially important. If visitor norms or standards are relatively stable, then indicators and standards of quality and related park management may need only minor revisions over time.

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However, if visitor norms and standards fluctuate or evolve, then how should parks be managed? Should park management similarly evolve to keep pace with changing societal conditions? Or should park management strive to maintain a relatively constant set of indicators and standards of quality despite (and perhaps to counteract) a changing society? These questions have a strong philosophical component. However, they are predicated on the empirical question of whether or not park-related norms or standards of visitors *do* change over time.

A recent opportunity arose to explore the empirical element of this issue at Denali National Park and Preserve in Alaska. An early and important study of backcountry use and users was conducted at Denali in 1978 to support formulation of the park's original wilderness management plan (Womble et al. 1979). The park is currently engaged in developing a new wilderness management plan, and a similar study of wilderness use and users was commissioned and conducted in the summer of 2000. These two studies allow us to explore the stability of visitor norms and standards over a twenty-two year period.

The Studies

Study area. Denali National Park and Preserve was originally established as Mount McKinley National Park in 1917. The park is lo-

cated in central Alaska and includes the tallest mountain in North America, Mount McKinley (now known as Denali) at 20,320 feet. In 1980, as a provision of the Alaska National Interest Lands Conservation Act (ANILCA), the park was expanded to over 6 million acres, 2 million of which were designated as wilderness. The research described in this paper focuses on overnight recreational use of the wilderness portion of the park.

1978 study. The study by Womble and associates in 1978 attempted to conduct a census of visitors receiving a mandatory permit for overnight use of what is now the wilderness portion of the park. Respondents were given a mailback questionnaire addressing selected aspects of themselves and their visit, including visitor characteristics, conditions encountered, perceived resource and social impacts, norms or standards (minimum acceptable levels) for recreation-related impacts, and attitudes toward alternative recreation management practices. Over 3,000 completed questionnaires were returned, representing a response rate of 79%.

2000 study. The 2000 study conducted a sampling rather than a census of those visitors receiving a mandatory permit for overnight use of the wilderness. Respondents were given both diary and mailback questionnaires addressing most of the issues included in the study by Womble and associates, replicating their question format and wording in

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most cases. A final sample size of 411 was obtained, representing a response rate of 79% for diary questionnaires and 59% for mailback questionnaires.

Data analysis. The data analysis presented in this paper is focused on comparisons between the 1978 and 2000 studies. However, this analysis is complicated by the fact that raw data for the 1978 study are no longer available (the data tape on which they were stored is no longer readable). However, the study completion report, along with associated published papers, include summary statistics (means, medians, etc.) for most variables. Unfortunately standard deviations or other measures of variance were generally not reported. In order to conduct tests of statistically significant differences between the two studies, variances associated with the 2000 study were assumed and adopted for the 1978 study. We believe this is a conservative assumption given the relatively large sample size of the 1978 study (2,829) compared with the 2000 study (411), and the relatively low variance that therefore would be expected in data from the 1978 study compared with those from the 2000 study.

Study Findings

A comparison of all study variables is presented in Table 1 and is briefly described in the following subject categories.

Visitor characteristics. Selected visitor characteristics for the two studies are compared in the first section of Table 1. While most of the differences are statistically significant, they tend to be substantively small. The relatively large sample sizes associated with these studies result in very small differences being statistically significant. However, visitors in both studies average between 25 and 30 years of age, most are male, most are well-educated and -employed, between a quarter and a third are students, and the vast majority are U.S. residents.

Visitor use. Only one variable in Table 1 relates directly to visitor use: length of trip. While wilderness trips have gotten longer to a statistically significant degree over the 22-year period spanned by these studies, the difference is not substantively large (2.7 nights versus 3.2 nights). In both cases, trip length would be rounded to "about 3 nights." Data on visitor use are also available from park records of the number of visitor-use nights for the wilderness portion of the park (Figure 1). While this number fluctuates some from year-to-year from 1978 through 2000, use levels are nearly identical for the two study years.

Conditions experienced. Social and resource conditions experienced by visitors appear to have changed little or not at all. The average number of hiking parties seen per day increased slightly (from 0.7 to 1.1),

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Table 1. Comparisons between 1978 and 2000 studies.

Variable	1978	2000	Prob.
<i>Visitor characteristics</i>			
Age	25	30	0.00
Gender	70% male	66% male	0.00
Education	15.3 years	16.6 years	0.00
<i>Occupation</i>			
Employed	58%	60%	0.00
Student	35%	27%	0.00
<i>Residence</i>			
U.S.	93%	88%	0.50
<i>Visitor use</i>			
Length of trip	2.7 nights	3.2 nights	0.01
<i>Conditions experienced</i>			
Average number of hiking parties seen per day	0.7	1.1	0.00
Total number of hiking parties seen on trip	2.6	2.9	0.06
Largest number of hiking parties seen on any one day	1.6	1.9	0.06
Average number of campsites seen per day	0.3	0.2	0.16
Average number of nights camped where evidence of human use	0.4	0.2	0.00
<i>Standards of quality</i>			
Preference for number of hiking parties seen ¹	2.7	2.8	0.93
Expectation for number of hiking parties seen ²	2.6	2.7	0.21
Perceived crowding ³	1.4	1.3	0.01
<i>Degree to which respondents were "bothered" by selected resource impacts ⁴</i>			
Hiker-made trails	0.3	0.5	0.00
Hiker-made campsites	0.5	0.5	1.00
Campfire rings	0.7	0.8	0.48
Cut bushes or trees	0.8	0.7	0.42
Human waste	1.1	1.6	0.00
Toilet paper	1.3	1.4	0.48
Litter	1.5	1.4	0.27
<i>Attitudes toward management practices ⁵</i>			
All overnight hiking parties must obtain a backcountry travel permit	1.1	1.4	0.00
Backcountry travel permits only may be obtained in the Park	1.4	1.2	0.00

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Backcountry travel permits only may be obtained 24 hours in advance of one's trip	1.7	1.4	0.00
Overnight hikers only may camp in the backcountry zones specified by their permit	1.3	1.1	0.00
Overnight hikers only may camp in the backcountry on the nights specified by their permit	1.3	1.4	0.00
Overnight hikers may hike in zones other than those specified by their permit	1.3	1.1	0.00
Day hikers do not need travel permits	1.4	1.0	0.00
Hiking parties may camp most anywhere within their scheduled backcountry zones	1.1	1.7	0.00
Backcountry campsites must not be visible from the park road	1.1	1.2	0.00
Campfires are not allowed in the backcountry	1.4	1.2	0.00
Some areas of the backcountry are permanently closed to overnight hikers in order to protect fragile wildlife habitats	1.1	1.0	0.00
Some backcountry zones are temporarily closed to hikers in order to protect hikers from unpredictable wildlife	1.1	1.1	1.00
Capacities for backcountry zones are determined on the basis of individual hikers rather than by hiking parties	1.4	1.1	0.00
<i>Facility development⁵</i>			
Developed hiking trails	2.4	2.5	0.02
Designated campsites	2.6	2.8	0.00
Tables	2.9	2.3	0.00
Shelters	2.7	2.5	0.00
Toilets	2.7	2.5	0.00
Fire rings	2.6	2.7	0.00
Bridges over rivers	2.4	2.9	0.00
Interpretive signs	2.5	2.7	0.00
Food caches for bear protection	2.3	2.7	0.00

¹ 1 = Saw too many, preferred seeing none; 5 = saw too few, preferred seeing many more

² 1 = A lot less; 5 = A lot more

³ 1 = Not at all crowded; 7 = Extremely crowded

⁴ 0 = Not bothered; 3 = Very bothered

⁵ 1 = Support; 3 = Oppose

but the total number of hiking parties seen per trip and the largest number of hiking parties seen on any one day were nearly identical. There was no

statistically significant difference in the average number of campsites seen per day, and the average number of nights camped where there

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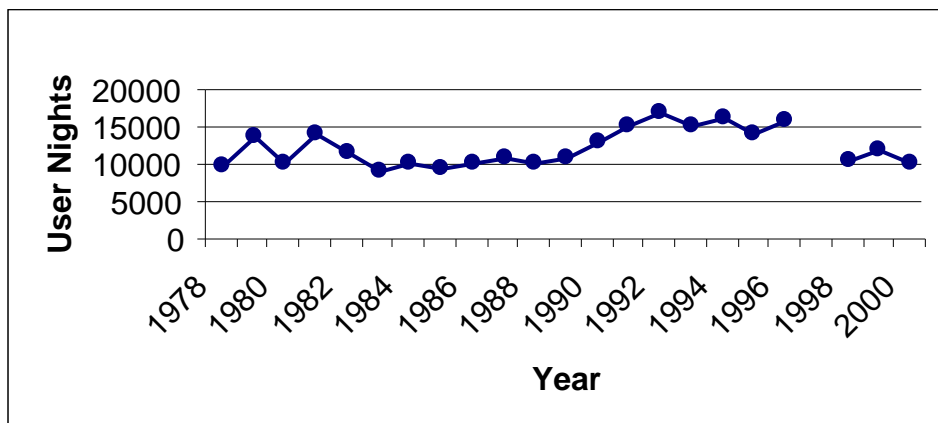


Figure 1. Wilderness use in Denali National Park and Preserve, 1978-2000.

was evidence of human use dropped from 0.4 to 0.2.

Standards of quality. There were very few differences in the ways in which visitors evaluated the conditions they experienced, suggesting that standards of quality have changed very little over the 22 years spanned by these studies. Respondents generally preferred and expected to see about the same number of hiking parties they actually saw. While average scores on the perceived crowding scale were different to a statistically significant degree, this difference is not substantive. There was no statistically significant difference in the degree to which respondents were “bothered” by five of the seven resource impacts studied. However, respondents in the 2000 study were significantly more bothered than respondents in the 1978 study by hiker-made trails and human waste.

Attitudes toward management.

Two batteries of questions explored visitor attitudes toward management. The questions first asked visitors the extent to which they supported or opposed a series of wilderness management practices. Although there are statistically significant differences between the two studies, these differences are generally small and unsubstantive. An exception may be attitudes toward the issue of camping within a backcountry zone; attitudes of visitors in the 2000 study were more restrictive. The second battery of questions asked visitors the extent to which they supported or opposed development of selected facilities in the wilderness. Again, there are statistically significant differences between the two studies, but most of these differences are small and unsubstantive. Visitors in the 2000 study were less favorable than visitors in the 1978 study toward six of

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the nine facilities included in the questionnaire.

Discussion

Only recently have studies of visitor use and users been conducted for a long enough period to begin to explore the degree to which visitor norms and standards are stable. The two studies of the wilderness portion of Denali described in this paper, conducted over a span of 22 years, suggest that there may be substantial stability in such evaluative measures. Visitors in 2000 appear to be quite similar to visitors in 1978, experienced a similar set of resource and social conditions, evaluated those conditions in a similar manner, and reported similar attitudes toward park management practices. Thus, this paper begins to bring some empirical evidence to bear on the issue of the stability of visitor norms and standards over time.

However, the management context at Denali may have influenced these findings. The wilderness portion of the park is explicitly managed for a relatively well-defined recreation experience characterized by a natural, undeveloped environment and opportunities for solitude and self-reliance. The park's wilderness management plan specifies that overnight visitors must obtain a permit, and the number of permits is limited by wilderness zone. Moreover, there are no maintained trails, campsites, or other visitor facilities. The explicit

character of these management objectives may contribute to the fact that the wilderness portion of the park maintains a relatively consistent set of resource and social conditions, continues to attract a relatively specific and defined type of visitor, and that crowding and related visitor norms and standards appear to be relatively stable over time.

These findings are similar to the limited research that has been conducted on this issue. For example, a 1977 study of crowding norms of boaters on the Rogue River, Oregon, was replicated in 1984 (Shelby et al. 1988). No statistically significant difference was found for the number of acceptable river encounters. However, camp encounter norms were found to be significantly higher, or more tolerant, in the latter study. A similar study conducted in three wilderness areas over a longer time found few clear, consistent trends in tolerance for inter-group contacts, but concluded: "Little evidence supports the idea that the visitors of today or the trips they take are substantially different from those of a decade or two ago" (Cole et al. 1995).

As suggested above, the relatively consistent pattern of norm stability found in the Denali studies may be enhanced by the park's explicit management objectives and associated management program. Use levels and recreation-related resource and social conditions have remained

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Figure 2. Trail (l) and campsite (r) encounter norms have remained relatively stable over time at Denali National Park and Preserve.

relatively consistent over the past 22 years. This suggests there has been little reason for visitors to be displaced or adopt other “coping” mechanisms in response to changing use conditions (Robertson and Regula 1994; Kuentzel and Heberlein 1992; Manning and Valliere, in press). Displacement is a widely hypothesized coping mechanism whereby some visitors may become dissatisfied with increasing use levels and the resource and social impacts that result, and alter their use pattern, perhaps ultimately moving on to other, less-used areas. Displaced visitors may be replaced by visitors who are more tolerant of higher use levels and associated impacts. Displacement and other coping mechanisms may contribute to evolving crowding and other recreation-related norms and standards. However, the mandatory permit system and other management practices at Denali may minimize displacement and other coping mechanisms,

thereby contributing to the stability of crowding and other recreation-related norms and standards.

Despite the relative consistency or stability of the data reported in Table 1, there are some statistically significant (and potentially substantive) differences between 1978 and 2000. For instance, the average number of hiking parties seen per day has increased from 0.7 in 1978 to 1.1 in 2000. While this is a very small increase in absolute terms, it represents more than a 50% increase over this 22-year period. The degree to which hikers are “bothered” by hiker-made trails and human waste has also risen to a statistically significant and perhaps substantive degree. The types of longitudinal data collected in studies such as these can be useful in monitoring resource and social conditions and suggesting where management attention might most appropriately be directed.

While data from the Denali studies may help shed light on the

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issue of the stability of recreation-related norms, they offer less advice on whether or not indicators and standards of quality should be revised in concert with evolving visitor norms. However, they may help to render this issue less cogent and urgent. If visitor norms are relatively stable, as suggested in this study, then there may be little need to revise indicators and standards of quality, at least not frequently and not substantively. Some may argue that standards of quality for resource and social conditions in parks and wilderness should be absolute and unchanging in order to preserve such areas and the experiences they offer. Others would argue that parks, wilderness, and related areas are ultimately "social constructions," concepts created and defined by society, and that they should be managed in concert with contemporary norms and social standards (Cronon 1995). However, if such norms and social

standards are relatively stable over time, then this issue may be less polarized and contentious than it first appears.

Conclusion

Studies conducted at a 22-year interval in the wilderness portion of Denali suggest that crowding and related norms and standards of visitors are relatively stable over time. The explicit wilderness management objectives developed for the park, and the associated program of management, may contribute to this stability by offering a distinctive, well-defined visitor opportunity and attracting a particular and consistent type of visitor. Development of management objectives and an associated program of management may be an effective strategy to maximize the stability of crowding and related norms and standards and minimize the need to revise indicators and standards of quality.

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