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CAMPING LOCATION AND INTENSITY OF
PARK USE AT ROCKY MOUNTAIN NATIONAL PARK

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The activity patterns of visitors to recreational areas have significant consequences for both managers of publicly owned recreational resources and private entrepreneurs who are providing visitor attractions. On the one hand, visitor choices as to activity type and location can affect the intensity of use of public resources and, on the other hand, can determine the level of revenues realized in the private sector. Upon reflection, it is clear that visitor activity choice is a complex process which can be influenced by a wide range of factors, including the demographic and social characteristics of the visitors, economic considerations, individual activity orientations or biases, the spatial structure of the recreational area, the availability of information detailing activity opportunities, and visitor mobility, among others. A number of studies have explored individual and family recreational preferences and linked them to selected personal, social and demographic characteristics; however, few have explored the locational patterning that results from the engagement of such preference structures with local recreational settings. Yet it is this locational patterning, and the locational choice process that creates it, which has the greatest potential interest for both public and private recreational resource managers.



Because of its particular relevance for park facility planning and management, this study explores the association between intensity of park use and local place-of-stay of recreational visitors. Although, as noted, a variety of factors can affect visitor activity choices, it was felt that local place-of-stay, representing a temporarily fixed "base of operations" for a visitor party, was likely to exercise a particularly strong influence on the locational choices involved in activity selection. Specifically, this paper reports findings from a recent study which examined the activity patterns of sets of campers staying at different campgrounds within the Estes Park-Rocky Mountain National Park area of Colorado.

Hypotheses

Because it was expected that local place-of-stay would significantly influence the locational patterning of camper activity choice and participation, two hypotheses were constructed which would allow this expectation to be formally tested. The Estes Park-Rocky Mountain National Park area provides a broad and scattered array of alternative recreational opportunities, many inside the national park and many outside in the Estes Park area. Therefore, the hypotheses were structured to simplify the locational dimension and to focus on variations in intensity of use of the national park's facilities: levels of activity participation inside the national park were contrasted with levels outside the park for campers staying at several different places. First, it was hypothesized that campers staying inside the national park would spend a greater amount of their recreational time inside the park than those staying outside. Second, in order to determine whether a distance effect was

present in activity choices, it was hypothesized that park-based campers staying farther inside the national park would spend a greater amount of their recreational time within the park than those staying closer to the park's edge.

Methodology

Three campgrounds were selected as survey sites (Figure 1). Two of the campgrounds are within the national park and are operated by the National Park Service. The first of these, Moraine Park Campground, is located three miles from park headquarters (which demarcates the approximate eastern boundary of the park), while the second, Glacier Basin Campground, is found six and one half miles from park headquarters. The third survey site, Spruce Lake Campground, was a privately owned campground located outside the park, one mile from its headquarters. It was felt that the spatial patterning of these three campgrounds provided significant variation in camping locations which was likely to be reflected in campers' activity patterns.

Because there was a high degree of uniformity in the character of camping sites throughout all of the campgrounds and because there was no systematic attempt on the part of the campground operators to segregate camping parties in terms of equipment or demographic characteristics, it was assumed that the arrangement of campers within the campgrounds was approximately random. Therefore, to obtain a random sample, interviewers merely worked their way along the access lanes within the campgrounds, attempting to interview every party that was present at a campsite at that time. There was only one refusal in the national park campgrounds and two in the private campground.

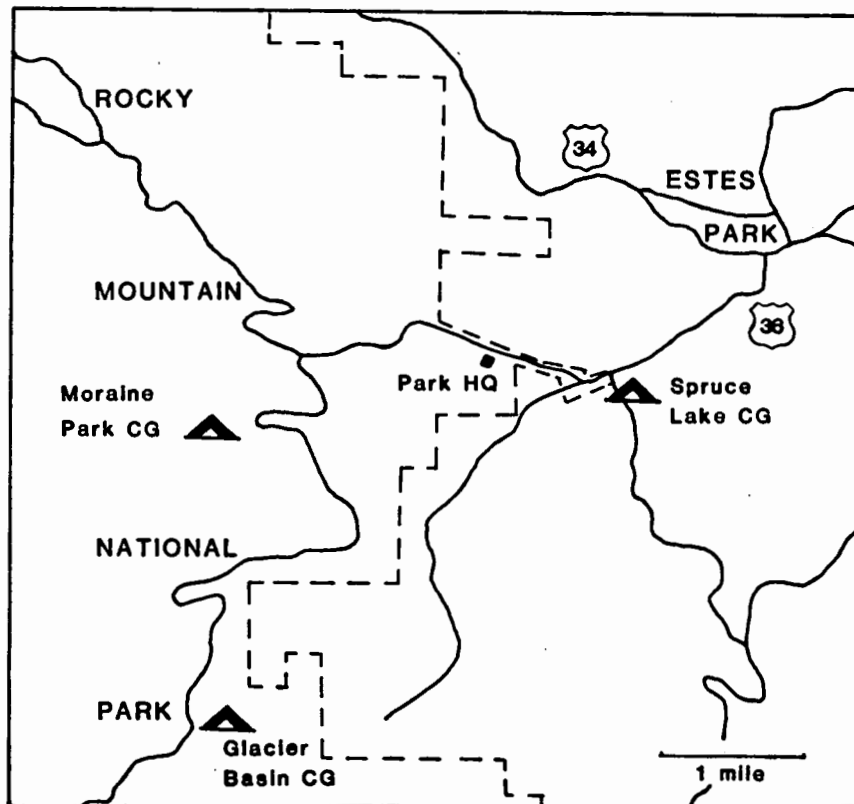


Figure 1.

Campers were asked to reconstruct their activity patterns for those days they had been present in the Estes Park-Rocky Mountain National Park area and their activities were coded as to type and location. Temporal patterning of activities was established by recording both the day-in-stay and the general time of day of each activity. Days were considered to consist of three time periods (morning, afternoon and evening), and up to three activities were coded for each time period. In most cases this schema was sufficient to capture the timing of activities; in problem cases, judgements were made as to which activities constituted the major recreational involvement during the time periods in question. All campground samples included camping parties that had been in the area both shorter and longer periods of time, thus controlling for possible length-of-stay effects on activity patterns.

Opportunities for activity involvement are abundantly available both inside and outside the national park. The park offers a large area of alpine mountain scenery, with hiking, automobile sightseeing, wildlife observation, visitor displays, ranger guided walks, ranger lectures, horseback riding, and fishing as available activities. The Estes Park area provides shopping, fishing, museums, amusement rides, horseback riding, restaurants, movies and chuckwagon dinners, among other possible activities. Campers' activities were coded as to type and place, and tabulated as to inside or outside park location.

A total of forty-four usable interviews were conducted, fifteen with Glacier Basin campers, sixteen with Moraine Park campers, and thirteen with campers in the outside campground (i.e., Spruce Lake). Six of the parties interviewed in national park campgrounds were found

to have stayed first outside the park and then to have shifted to inside campgrounds. These "movers" were removed from the ~~the~~^{individual} campground samples and aggregated as a separate sample set, leaving final campground sample sets of fourteen for Moraine Park, eleven for Glacier Basin, and, of course, thirteen for the outside campground.

Hypothesis Testing

Hypothesis number one, that campers staying inside the park would spend more of their activity time inside the park than outside campers, was statistically tested using the Mann-Whitney U test to compare the relative amounts of activity time the inside campers spent in the park to the amounts spent by the outside campers.* To conduct this test, the amount of activity time each party spent in the park was converted to a percentage of its total activity time and these percentages were used as the data to be compared. The two inside campground samples were merged, producing two sets of observations for comparison: thirteen outside camping parties and twenty-five inside camping parties. The outside campers had spent an average of 38.0% of their activity time inside the national park; the inside campers had spent an average of 82.9% of their activity time in the park. This contrast in activity patterning was found to be significantly different at a greater than .01 probability level, allowing acceptance of the first hypothesis.

*The Mann-Whitney U test is a nonparametric equivalent of the t-test for differences in independent samples. It allows an assessment of observed differences in measurements in two independent samples and reports the likelihood that those differences could have occurred by chance. If there is a sizeable likelihood that observed differences could have occurred by chance, it can be assumed that the patterning in the two samples is essentially the same.

Hypothesis number two, that campers staying farther inside the park would spend more activity time in the park than those staying closer to the entrance, was also statistically tested by means of the Mann-Whitney U test. Using data on percentage of total activity time spent inside the park, campers staying at Glacier Basin CG (farther inside) were compared to campers staying at Moraine Park CG (nearer the entrance) (see Figure 1). The Glacier Basin average was 77.4% of activity time spent in the park; the Moraine Park average was 87.3%--the opposite patterning of what the hypothesis would lead us to expect. The differences observed in activity patterning between campers staying at the two national park campgrounds were found not significantly different at the .05 probability level, indicating that for park-based campers distance to outside recreational opportunities had no important effect on inside versus outside activity choices. (prob. of diff. due to chance $> .10$)

Discussion of Findings

The fact that interior campers spent a significantly larger portion of their activity time inside the park than did the exterior campers, coupled with the fact that there was no significant difference in the activity patterns of campers based at different locations inside the park, indicates that a strong boundary effect associated with simple camping location inside or outside the park is present. That is, inside or outside camping location is a good predictor of levels of park use expected of area visitors, ~~but~~ DISTANCE SEPARATION IS NOT.

Although this study did not attempt to explain this difference in observed behavior, some further exploration of the dynamics of this situation is in order. One possible explanation for the differences

in levels of park use that comes readily to mind revolves around the self-selection that occurs as campers choose between an outside camping location and an inside location. When outside campers were asked whether they would rather be camping in the national park, most (85%) responded, "no". Based on this pattern of response, it might be argued that the recreational preferences and orientations of outside campers are not as strongly associated with the national park than inside campers and that any differences in level of park usage are merely a reflection of individual camper differences and not actually a function of local place-of-stay.

On the surface this appears to be a plausible explanation of the observed pattern; however, some limited data became available during the study which contradict this interpretation. As noted earlier, six of the camping parties interviewed in the two national park campgrounds indicated that they had initially stayed outside the park and then had later moved to inside campgrounds. All six of these parties preferred to be camping in the park, but had found all the park campgrounds full when they first arrived in the area. Therefore they were forced to camp outside for one, two or three nights before camping space became available inside the park. Thus, this sample set of six parties represents persons who were strongly oriented toward park recreational opportunities, yet who spent some of their stay camping outside the park. A comparison of their levels of park use shows a clear difference between those periods when they were staying outside the park and those periods when they were staying inside: when camping outside, they spent an average of 52.8% of their activity time inside the park; when camping inside, they spent an average of 95.1% of their activity time inside the park.

The differences in activity levels for these two different situations were compared statistically using the Mann-Whitney U test and were found to be significantly different at the .066 probability level. Although these results fail to show a statistically significant difference at the commonly used .05 probability level, it was felt that this failure was primarily due to the very small sample size (i.e., six cases).

In any case, the observed .066 probability level suggests that the observed differences did not occur by chance and the implication of the patterning found in these serendipitous data is that, in spite of an apparent preference for and orientation to park based activities, when these campers were staying outside its boundaries their levels of park usage were much lower than when they were staying within its boundaries. Thus, it appears that location of place-of-stay--and not just preexisting personal preferences--does play an important role in creating variations in levels of park usage.

Management Implications

Of course, these observations provide no explanations as to why significant differences in level of park use exist between inside campers and outside campers, or as to why there are no differences to speak of among campers staying at different locations within the park. At this point the genesis of the strong boundary effect revealed by this study can only be a matter of speculation. However, although the genesis of the pattern remains unclear, the evident behavioral association between camping location and park usage identified by this study has important management implications for park administrators: decisions to increase or decrease the number or availability of in-park campsites can directly affect both levels and intensity of park usage. The construction,

expansion or closing of park campgrounds is not just a matter that affects visitor convenience, but an action that directly influences the relative numbers of people using the park. This study shows that manipulation of in-park camping opportunities represents a potential tool for exercising some indirect control on park use levels--an important finding in the light of growing concerns with the overuse of park facilities and the degradation of park environments ^{—CONCERNS CREATED} ~~brought about~~ by the continuing increases in visitation rates experienced by Rocky Mountain National Park--and many other national parks.

Campers in Estes Park/Rocky Mountain National Park Area:

Percentage of Activity Time Spent in National Park.

Spruce Lake Campground (outside)	Moraine Park Campground (Inside)	Glacier Basin Campground (Inside)
31.8	86.4	70.0
30.0	83.3	95.0
9.1	82.4	80.0
0.0	84.6	75.0
27.3	84.6	76.7
60.0	60.0	100.0
30.4	100.0	50.0
81.8	85.7	60.0
66.7	100.0	86.4
55.6	100.0	100.0
0.0	100.0	58.3
9.5	80.0	sum = 851.4
52.6	75.0	
sum = 454.8	100.0	
n = 13	sum = 1222.0	
	n = 14	n = 11
$\bar{x} = 35.0$	$\bar{x} = 87.3$	$\bar{x} = 77.4$

Total Observations:

$$N = 38$$

$$\bar{X} = 66.5$$

ABSTRACT

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Daily activity information collected from a sample of campers at two Rocky Mountain National Park campgrounds and one nearby exterior campground indicates that camping location is strongly related to intensity of park usage. Interior campers spent a notably larger portion of their activity time inside the park than did the exterior campers, with the difference in patterning found to be statistically significant. The usage patterns reflect a strong boundary effect associated with simple camping presence inside or outside the park. The data further indicate that this effect was only weakly related to (1) activity biases linked to interior versus exterior campground preference and to (2) the relative accessibility to activity locations of the individual campgrounds. Although the genesis of the pattern remains unclear, the strong association between camping location and park usage identified by this study has important management implications for park administrators: decisions to increase or decrease the number of in-park campsites can directly affect both levels and intensity of park usage.