CAMPSITE USE LEVELS COMPARED TO CAMPSITE ATTRIBUTES IN EMILY PROVINCIAL PARK, ONTARIO

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SUMMARY
This study used GIS and statistical analysis to examine the relationship between campsite and campground attributes and campsite use level. The hypothesis of the study was that campers choose campsites because of certain desirable attributes of the site and of its location within the campground. Emily Provincial Park in Ontario was the case study site.

A database connected to a GIS contained data on 15 predetermined campsite attributes. The GIS also enabled the calculation of campground spatial attributes. The campsite use data, the number of nights the campsite was used in 1999, were used as the dependent variable to which all other variables were compared.

The analysis found that campers utilise some campsite and campground amenities and attributes more than others when selecting their campsite. The statistical analysis of the campsite attributes revealed that campsite use level, as measured by the average number of camper nights per campsite, is significantly higher ($p<.05$) for each of the following characteristics: 1) availability of electricity, 2) higher levels of site privacy, 3) greater size of site, 4) the ability of site to allow vehicle pull through, 5) partial levels of shade, 6) ground slope less than 20%, and 7) overall quality of site. Camper use level is not significantly different with the following characteristics: 1) the number of cars allowed per site, 2) full shade or no shade, 3) slopes greater than 20%, or 4) the size of the camping equipment allowed.

Statistical analysis of campground spatial attributes revealed that the camper use level of a campsite within a campground is positively correlated ($p<.05$) with the following characteristics: 1) closeness to lake access points, 2) closeness to playgrounds and 3) closeness to vault toilets. Interestingly, the closeness to the comfort station, which contains showers, flush toilets and hot and cold running water is not correlated with campsite use. Campsite use level is also not correlated with the following spatial characteristics: 1) distance to the water tap, 2) distance to the gatehouse, 3) distance to extra vehicle parking, and 4) distance to the park store.

The findings of this study show that certain campsite attributes are attractive to Ontario Provincial Park campers. The attributes shown to lead to higher use levels are not surprising, but this study is one of only a very few studies to use GIS and statistical analysis to investigate the attractiveness of various campsite attributes.

1. INTRODUCTION

The majority of camping occurs in front-country campgrounds. For example, in 1999 Ontario Provincial Parks provided 4,551,150 visitor nights of camping in front-country campgrounds and 492,045 visitor nights of camping in back-country campgrounds (1).

The objective of campground development is to create a 'total' environment (physical, social and psychological) wherein the user may achieve a satisfying recreational experience (2). The desires of campers to experience the most satisfying recreation experience are important to Ontario Provincial Parks. In the 1998-99 fiscal year Ontario Parks earned 58% of all its income from camping fees (3). In recent years the demand for camping in Ontario Provincial Parks

started to exceed supply. As a result Ontario Parks built new campgrounds, something that has not occurred for over 30 years in this park system.

Individuals choose campsites from those available in a campground. What campsite attributes and what campground attributes are most desirable to front country campers?

Brunson and Shelby (4) reviewed nine studies and noted the campsite and campground characteristics studied (Table 1). Clearly there are many campsite attributes potentially used by campers for campsite selection. Brunson and Shelby noted that only seven of the 21 attributes (33%) identified in Table 1 were studied at least half of the time.

1.1 Case Study Example

Emily Provincial Park is in the Kawartha Lakes Region of Ontario (Figure 1). The park has 301 campsites and three group camping areas. During the 1999 operating season, Emily provided 15,060 total camper nights of use. Only data from the campsites were used in this research.

Emily was chosen for this research for two important reasons. First, it is the only Ontario Provincial Park with an existing GIS database of the park and the campground. Second, the campground operates at below maximum capacity. This is important because the availability of sites provides choices to campers; i.e., it allows campers to discriminate amongst the various campsites.

Figure 1: Location of Emily Provincial Park.

Emily is one of 71 recreation class parks in the Ontario Parks' system. Recreation class parks "typically contain beaches, picnic tables, camp grounds and other facilities for outdoor family enjoyment. Almost all of them are staffed, and most have washroom facilities, interpretative programs, playgrounds, hiking trails, boat launches and other amenities" (5). Priddle[6] said:

> Recreation parks probably represent the most common public perception of what provincial parks are really all about. These (they) are open-space lands that provide recreational opportunities for Ontario residents and visitors. Their total number and geographic location reflects the leisure needs of Ontario residents as well as the vacation trends of tourists.

Table 1: Campsite Attributes Studied (From Brunson and Shelby, 1990).

	Zuckert 1980	Harris 1982	Minnesota	Clark et al. 1984	Lime 1971	Wyoming	Brown and Schomaker 1974	Pfister 1977	Bumgardner et al. 1988	Totals:
Level ground	X	X	X	X	X	X	X		X	8
Shade/shelter	X	X	X	X	X		X	X	X	8
Near water	X	X	X	X		X	X		X	7
Scenic Beauty	X	X	X	X		X	X		X	7
Screened from others	X	X	X				X	X	X	6
Distance from others	X	X		X		X			X	5
Size of campsite	X	X			X		X	X		5
Rustic improvements	X	X			X	X				4
Near trail	X	X					X			3
Ease of access	X			X	X				X	4
Litter not										
Litter not present				X	X	X				3
Little bare ground	X	X				X				3
Presence of trees			X	X	X					3
Firewood nearby			X	X	X					3
Boat landing area					X			X	X	3
Near fishing						X	X			2
Near toilets					X					1
Island			X							1
Few insects						X				1
Size of stream								X		1
Good breeze									X	1
Totals:	11	10	8	9	10	9	8	5	9	

Recreation class parks play an important role in the Ontario Parks' system. However, there are five other classes of parks, with each playing a unique role in the Ontario Parks' system. In 1999 there were 272 parks regulated under the Provincial Parks Act covering 7,102,703 ha of the province. There were 107 operating parks and 165 non-operating parks. During the 1999 season there were 9,415,175 reported visitor days to the entire system, of which 54% occurred with camping.

Despite the importance of camping and campers to the Ontario Provincial Park system, this research is the first attempt to quantitatively determine what attributes park visitors desire during campsite selection.

2. METHODS

2.1 Use Level Data

Bluewater Parklands Management is the private company responsible for the Ontario Provincial Parks campsite registration system. This company provided use level data for each site in Emily Provincial Park consisting of site number, type (hydro or non-hydro), regular, senior, disabled and total use levels. The 1999 use level statistics were utilised for this research. In 1999, 15,060 camper nights occurred in Emily. This figure consists of 13,222 regular camper nights, 1,118 senior camper nights and 720 disabled camper nights. For this research, the total number of camper nights per site in 1999 was the dependent variable and was correlated statistically with the categorical variables.

2.2 Campsite Attributes

Park staff categorized each campsite in Emily Provincial Park for the use of the campsite registration system. Table 2 shows the categories of information available and the information for each category. These data were used as the independent variables in this study.

Table 2: Campsite Variables

Category:	Number of variables:
Reservation	True or False.
Hydro	True or False.
Quality	Good, Average, Poor.
Privacy	Good, Average, Poor.
Equipment (measures size)	Small, Medium, Large, Extra Large, Extra, Extra Large
Pull through	True or False.
Shade	None, Partial, Full, Total.
Slope	<15%, 15-20%, >20%.
Distance to comfort station	Close, Medium, Far.
Distance to beach	Close, Medium, Far.
Distance to watertap	Close, Medium, Far.
Number of cars per site	0, 1, 2.

The GIS system calculated campground spatial variables (Table 3). These data were used as independent variables in the study.

Table 3: Campground Spatial Attributes

Distance to comfort station
Distance to the gatehouse
Distance to lake access points
Distance to parking for second car.\
Distance to playground
Distance to store
Distance to vault toilets
Distance to water taps (drinking water)

3. RESULTS

The statistical analysis involved the use of the ANOVA or T-Test functions in SPSS 10.0. This was performed using the total number of camper nights per site in 1999 as a dependent variable and compared with the categorical variables. The 0.05 level of significance was used as a measure of statistical significance. Results for each of the campsite variables are discussed in turn below.

3.1 Availability of Hydro

In 1999 the average number of camper nights for an electrical site (an average of 61.1 camper nights per site) was 45.5% higher, than the average number of camp nights for a non-electrical site (an average of 42.0 camper nights per site) ($p<.05$). Campers show a strong desire to have an electrical outlet on the campsite.

3.2 Privacy of the Site

Statistical analysis showed that the level of use was strongly correlated ($p<.001$) with the site ranking for privacy. Campers strongly preferred the sites with higher privacy.

3.3 Size of the Site

Statistical analysis showed that the level of use was strongly correlated ($p<.001$) with the size of the site. Campers strongly preferred the larger sites.

3.4 Ability to Pull Through the Site

The average use level on a pull-through site in 1999 was 60.3 camper nights per site, while the average use level on a non-pull through site was 48.4 camper nights per site. ($p < 0.05$). The campers preferred the pull-through sites.

3.5 Level of Shade

All campsites were categorized by park staff into one of four categories of shade: none, partial, full and total shade. The data showed that the campers strongly chose the partially shaded sites ($p>05$). The sites with no shade were used at very low levels. Full and total shade sites were used more than sunny sites, but less that partial shade sites.

3.6 Slope of the Site

All campsites were categorized by park staff into four categories of slope: flat, slopped up to 15% slope, sloped between 15 and 20%, sloped greater than 20%. The level of use was strongly correlated ($p<.001$) with the slope of the site. Campers strongly preferred the flat sites. Sites with slopes greater that 15% had very low use.

3.7 Quality of the Site

Ontario Parks evaluates each campsite for the overall quality of the site and assigns it a rating of good, average or poor. The level of use was strongly correlated ($p<.001$) with agency's overall ranking of the quality of the ranking. Campers strongly preferred the sites with higher quality.

3.8 Summary of Site Attribute Analysis

The analysis shows that campers are much more likely to use sites with the following site attributes: 1) availability of electricity, 2) higher levels of site privacy, 3) greater size of site, 4) the ability of site to allow vehicle pull through, 5) partial levels of shade, 6) ground slope less than 20% and 7) higher overall quality of site.

3.9 Analysis of Variance

An analysis of variance was used to test for between-subjects effects. Table 5 shows this analysis for the campsite attributes. Table 4 shows that the variation in the 1999 total use levels can be attributed to the availability of hydro, site quality, level of privacy, site size, and site slope ($p <0.05$). The ability to reserve the site and the level of shade on the site are not significant, and thus do not attribute to the variation in the 1999 total use levels.

Table 4: Categorical Analysis: Tests Between-Subjects Effects

Categorical Analysis: Tests of Between-Subjects Effects	
Source	Significance
Reservation	0.204
Hydro	0.000
Quality	0.000
Privacy	0.000
Size	0.006
Shade	0.291
Slope	0.001

Table 5 shows this analysis for the calculated spatial attributes, where the attributes are a calculated distance of a feature from the campsite.The variation in the 1999 total use levels can be attributed to 1) distance from a campsite to the closest lake access, 2) distance from a campsite to the playground, and 3) distance from the vault toilets ($p < 0.05$). Distances from the comfort station, the gatehouse, parking areas, the store, and watertaps do not contribute to the variation of the 1999 total use levels.

Table 5: Linear Analysis: Test of Between-Subjects Effects

Linear Analysis: Tests of Between-Subjects Effects	
Distance to:	Significance
Comfort Station	0.157
Gatehouse	0.278
Lake	0.000
Parking	0.088
Playground	0.000
Store	0.350
Toilet	0.001
Watertap	0.109

Table 6 , column 2, shows a merger of the significant attributes from Tables 5 and 6. This shows similarity between the tests for most variables. But a discrepancy in the significance level of some variables occurs between the different tests. Therefore, there is a difference between analysing the categorical and linear variables individually and together. The largest discrepancy in significance occurred with the toilets. In the linear test, toilets had a significance level of .001, but when a test was performed with both the categorical and linear variables the significance level was .780. This is indicative of other underlying, unknown interactions that are occurring. More testing ideally in the form of personal surveys and questionnaires is necessary if an attempt to determine the underlying variables.

Table 6: Combined Analysis

Combined Analysis of the Previous Two Tests: Tests of Between-Subjects Effects	
Source	Significance
Reservation	0.258
Hydro	0.000
Quality	0.000
Privacy	0.000
Size	0.000
Shade	0.551
Slope	0.608
Comfort Station	0.001
Gatehouse	0.545
Lake	0.000
Parking	0.308
Playground	0.160
Store	0.421
Toilet	0.780
Watertap	0.007

4. CONCLUSIONS

The study found some inconsistencies in the campsite attribute data. We recommend that Ontario Parks carefully review the standards used and ensure that the attribute data found in the database are accurate and up-to-date.

This study demonstrated that a GIS is a useful tool for campground planning and management. A GIS adds a valuable spatial element to use level analysis. Through the use of the GIS and statistical analysis in conjunction with new and existing data, it was determined that campers utilise various campsite and campground amenities and attributes when selecting their campsite. Such a finding is important for Ontario Parks, and probably to other campground managers in Canada, in both the operation of the existing campgrounds and in the design of new ones.

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