Journal for Nature Conservation 18 (2010) 224–229

Contents lists available at ScienceDirect

Journal for Nature Conservation

journal homepage: www.elsevier.de/jnc

Visits to national parks: Effects of park characteristics and spatial demand

Marjo Neuvonen [a,*], Eija Pouta [b], Jenni Puustinen [a,1], Tuija Sievänen [a]

[a] Finnish Forest Research Institute, Vantaa Research Centre, PL18, FI-01301 Vantaa, Finland
[b] MTT Agrifood Research Finland, Luutnantintie 13, 00410 Helsinki, Finland

ARTICLE INFO

Article history:
Received 6 April 2009
Accepted 12 October 2009

Keywords:
Demand factors
Nature tourism
Protected areas
Supply factors
Visitor model
Visit prediction

ABSTRACT

Understanding the relationship between the number of visits to national parks and their characteristics is crucial for park planning and management. Visitation has a key role in existing national parks, but also in assessing the social and economic impacts of new parks. This study examined how the natural characteristics of a park, the recreation facilities and services inside a park and tourist services in surrounding communities, as well as the park's location in relation to the population, are associated with the number of visits. Regression modelling was used to analyse the visitation to thirty-five national parks in Finland. The results demonstrated that recreation opportunities, the number of biotopes, the provision of trails and the park's age increase the number of visits, while the park location in relation to the population only has a significant effect in southern Finland. The results imply the dual role of national parks as resource-based destinations if the natural characteristics are outstanding, but also as more user-oriented areas fulfilling recreation needs in the most populated parts of the country.

Introduction

Nature conservation and tourism based on protected areas are seen as an alternative source of livelihood in rural areas where primary production is decreasing (Place 1991; Slee et al. 1997; Vail & Hultkrantz 2000). The development of recreation services, the increasing numbers of visitors, and the consequent economic opportunities and increased employment on the local level have partly eased the resistance to nature protection among locals and justified the protection (e.g., Turnock 2002). For a natural area, designation as a national park can be considered as a means to support the potential growth of visitor flow (Fredman et al. 2007), and the establishment of a national park is taken as a starting point in the surrounding communities for expectations and speculation concerning income from tourism. For these communities, a crucial question is what the future magnitude of visitor flow to the national park will be.

The magnitude of the economic impacts of tourism depends on the number of visitors and their expenditure on local and regional services and products. This study defined the park characteristics and demand factors that determine visitor numbers and analysed their association. Modelling visitation provides the first step in predicting the effect of management decisions on the number of visits, as well as the regional economic and social impacts. This information is essential in both the planning and management of existing national parks and in the establishment of new parks. In studies modelling the number of park visits, the focus has been on the services inside parks (Hanink & White 1999) or their natural characteristics (Loomis 2004), but less attention has been paid to the tourist attractions and services in regions where parks are located.

The numbers of visits to national parks has been found to be linked to park characteristics and their quality as parks, with better qualities attracting visitors from a wider area and parks with poorer qualities having a narrower spatial demand (Hanink & Stutts 2002; Hanink & White 1999). The basic assumption of the spatial demand model by Hanink and Stutts (2002) is that the critical factor concerning the level of recreational use of a site is its location relative to the population of potential users. The location and distance of a population in relation to a park is essential because the cost of travel to a park reflects the limits of potential demand. In most cases, the spatial market of a park can be enlarged by improving its quality. In addition to quality, the age of a park also affects the association between distance to the park and visitation (e.g. Hanink & White 1999).

An appropriate approach to determining which factors affect visits to parks is to explain the visits using statistical models, typically with regression analysis. There are several widely used approaches to model individual visitor choices and behaviour (for a review, see Phaneuf & Smith 2004). However, the focus of this study was not on recreation choices and behaviour on the individual level. Instead, our aim was to determine which factors

* Corresponding author. Tel.: +358 10 211 2234; fax: +358 10 211 2202.
E-mail address: marjo.neuvonen@metla.fi (M. Neuvonen).
[1] Present address: Espoo City Planning Department, P.O. Box 43, FIN 02070 Espoo, Finland.

1617-1381/$ - see front matter © 2009 Elsevier GmbH. All rights reserved.
doi:10.1016/j.jnc.2009.10.003

underlie the recreational use of a park, i.e. the total annual number of visits. Only a few studies have used protected areas as observations in order to model how the attributes of a park affect the annual number of visits (Ejstrud 2007; Hanink & Stutts 2002; Hanink & White 1999; Loomis et al. 1999; Loomis 2004; Mills & Westover 1987). In most of these studies, the focus has been either on demand factors (Hanink & White, 1999) or on the supply of services inside the park (Mills & Westover 1987). Very few studies have attempted to include both types of variables and to analyse their relative importance (Ejstrud 2007; Hanink & Stutts 2002). The method allows, for example, assessment of the interconnection between park infrastructure and visitation (Mills & Westover 1987) or forecasting of the future recreational use of a park with various facilities and natural conditions (Loomis et al. 1999).

The aim of this study was to examine the number of visits to Finnish national parks and to analyse the contributory factors. The volume of recreational use was explained in regression models with supply factors and indicators of demand. The data included all Finnish national parks as observations. The centralised administration of national parks and standardised visitor monitoring methods provided a multifaceted opportunity to investigate the determinants of visits to parks. The use of the models to predict the future volume of recreation in national parks is illustrated, and the relative importance of supply and demand factors in predicting park visitation is discussed.

Methods and data

Case study Finnish national parks

There are thirty five national parks in Finland, which are characterised by their diverse and unique natural features (Figure 1). The oldest parks are almost 70 years old, while the newest ones were established in 2003. The combined surface area of all the national parks in Finland in 2003, the year of this study, was 8,731 square kilometres and the individual size of parks varied from 4.3 to 2,850 square kilometres (Table 1). The national parks are managed by Metsähallitus (the Finnish Forest and Park Service), a state enterprise. In the period from 2002 to 2007, the annual number of visits to national parks increased from 1.0 to 1.6 million (Metsähallitus 2008).

Although the primary purpose of the national parks is the protection of biotic and abiotic original features of the natural environment, including heritage landscapes, the management principles of national parks emphasise the importance of creating opportunities for recreation and contact with nature. Nature trails, cooking facilities, camping sites, visitor centres or other recreational facilities are therefore provided in many parks. The size, biotopes and extent of human development differ greatly between the parks. In northern Finland, a diverse tourism infrastructure is located close to the national parks and the tourist sites are a combination of natural areas with adjacent tourist services such as hotels, camping sites, restaurants and shops (Saarinen et al. 1996). In southern Finland, the tourism infrastructure of parks is less developed.

Data and variables

Each of the 35 national parks formed one observation in the data set. Data on the parks included information on the number of annual visits per park and information characterising both the supply of recreation services and the spatial demand for recreation. Metsähallitus (the Finnish Forest and Park Service) provided the data for each park, including the number of visits, characteristics of the natural resources and information concerning recreation services.

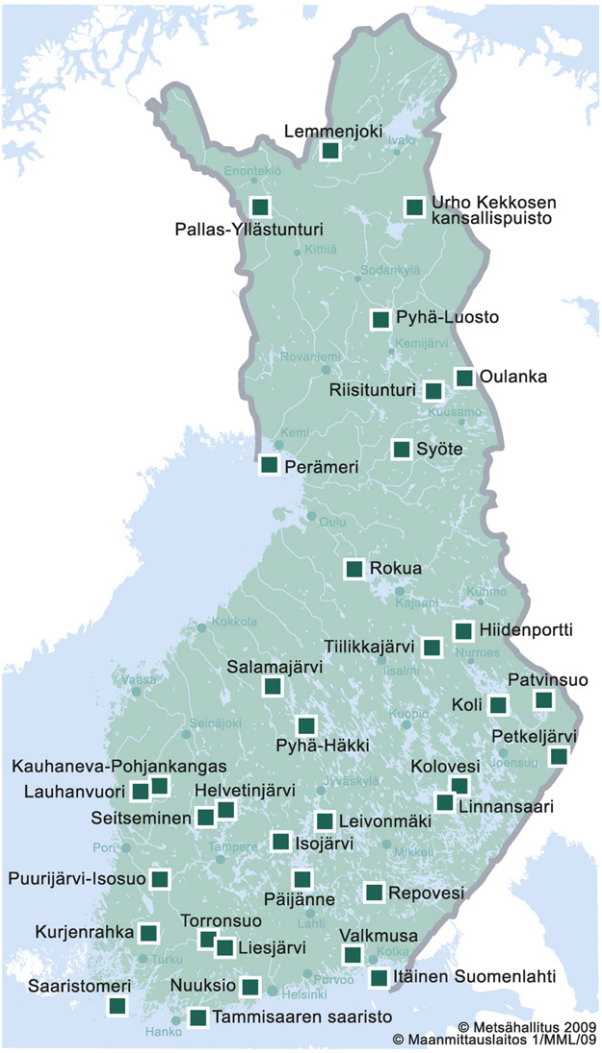

Figure 1. The location of national parks in Finland.
Source: Metsähallitus.

Metsähallitus has systematically counted the numbers of visits to national parks since 1995. The present study utilised information concerning the number of visits in 2003, which ranged from 4,500 to 217,000 (Table 1). A larger number of visits was particularly associated with the national parks in northern Finland. The data also included the year of establishment and total area as well as quality characteristics of the park, such as the natural characteristics, recreation services inside a national park and tourist services outside the park. The natural characteristics included the dominant natural features of a park (water areas, mires, fells or forests), the number of biotopes and presence of outstanding national landscapes. The recreation services inside the park included information about all structures such as shelters, viewing towers and campfire sites, as well as buildings within the parks. Information on hiking trails was obtained from the managers of individual parks. Opportunities for various recreation activities were coded into the data set based on information on each park provided on the Internet for park visitors by Metsähallitus. Information on the tourism services in the surrounding communities (Table 2) was collected from Internet sources. This data included the tourism infrastructure,

Table 1
Finnish National Parks.
Source: Metsähallitus.

National Parks	Area km^2	Year of establishment	Visits 2003
Helvetinjärvi	50	1982	32 000
Hiidenportti	45	1982	7 500
Isojärvi	22	1982	8 000
Itäinen Suomenlahti	7	1982	15 000
Kauhaneva-Pohjankangas	57	1982	6 000
Koli	30	1991	12 0000
Kolovesi	23	1990	6 000
Kurjenrahka	29	1998	20 000
Lauhanvuori	53	1982	25 000
Leivonmäki	29	2003	4 500
Lemmenjoki	2850	1956	10 000
Liesjärvi	22	1956	15 000
Linnansaari	38	1956	28 000
Nuuksio	39	1994	100 000
Oulanka	270	1956	165 000
Pallas-Yllästunturi[1]	1020	1938	217 000
Patvinsuo	105	1982	15 000
Perämeri	157	1991	7 200
Petkeljärvi	6	1956	17 000
Puurijärvi-Isosuo	27	1993	15 000
Pyhä-Häkki	13	1956	11 000
Pyhä-Luosto[1]	142	1938	95 000
Päijänne	14	1993	8 000
Repovesi	15	2003	65 000
Riisitunturi	77	1982	7 000
Rokua	4	1956	24 000
Saaristomeri	500	1983	80 000
Salamajärvi	62	1982	7 000
Seitseminen	46	1982	40 000
Syöte	299	2000	24 000
Tammisaaren saaristo	52	1989	20 000
Tiilikkajärvi	34	1982	6 000
Torronsuo	27	1990	20 000
Urho Kekkosen kansallispuisto	2550	1982	160 000
Valkmusa	17	1996	5 000

[1] Pallas-Yllästunturi and Pyhä-Luosto national parks were enlarged in 2005. The data on visits to the joined areas was also available and was added to the number of park visitors in 2003.

such as the number of beds in hotels and other types of commercial accommodation enterprises, nationally important cultural and/or historical environments, and enterprises providing recreation programme services (detailed description in Selby et al. 2007). To describe the possible substitutes, the number of other national parks that were located within 100 km of an individual park was identified.

Variables describing the demand for the recreational use of a national park were selected with a focus on the spatial aspects of demand. The demand data included variables related to the population characteristics in surrounding municipalities and the park's location in relation to potential users. The distance to the nearest city of more than 50,000 and 100,000 inhabitants and the number of people living within 50 and 100 km radius of a national park represented the potential park users.

The categorical variables, such as the importance of the water elements of a park, were recoded as binary (dummy) variables. Some of the variables were constructed as the sum of several items, such as the variable describing recreational activities, which was the sum of those activities that correlated most strongly with the number of visits.

Statistical methods

Multiple regression analysis was used to model the annual number of park visits (v) in relation to the natural park characteristics, recreation and tourism services, spatial demand and socio-economic characteristics of surrounding municipalities. Table 2 presents the variables tested in the model. A logarithm transformation for visits $\ln v$ was used to obtain a better fit to the requirements of regression analysis, i.e. linearity and constant variance (Weisberg 1985, 147–152). Consider the base model:

$$\ln v = \alpha + \boldsymbol{\beta}_i \mathbf{s}_i + \boldsymbol{\beta}_j \mathbf{s}_j + \boldsymbol{\beta}_k \mathbf{s}_k + \boldsymbol{\beta}_z \mathbf{s}_z + \boldsymbol{\beta}_w \mathbf{s}_w + \boldsymbol{\varepsilon},$$

where α is a constant and vector $\boldsymbol{\beta}_i$ includes those parameters that describe the natural characteristics of the park, including its age, vector $\boldsymbol{\beta}_j$ represents recreation services inside the park, $\boldsymbol{\beta}_k$ refers to tourism services outside the park, $\boldsymbol{\beta}_z$ consists of spatial demand factors, vector $\boldsymbol{\beta}_w$ of socio-economic characteristics related to the surrounding municipalities and $\boldsymbol{\varepsilon}$ represents a vector for random variables (Table 2).

There were a large number of potential independent variables that correlated with the number of visits to a park. Table 2 presents the correlations between visitor numbers and the potential independent variables. The variables for the model were selected on the basis of their high correlation with visitation and their low correlation with other independent variables in the model. First, the model was estimated using a stepwise technique in which explanatory variables were entered and/or removed from the model depending on the overall significance of the model based on F-statistics. Before selecting the final model, each step was separately analysed and some variables that were dropped out from the earlier steps were once again tested in the model.

Several demand variables, such as the number of people living within a 50 or 100 km radius of a national park, were not statistically significant and were therefore dropped from the model. As the variable 'distance to the nearest city of more than 100 000 inhabitants' was only significant in southern parts of the country but not in the whole country, a dummy variable SOUTH was constructed, where the most northerly and at the same time most sparsely inhabited provinces (population per km^2 less than 10.5) were recoded as 0 and the rest of the provinces as 1. After that, a spatial demand interaction factor was constructed from the product of the distance variable and the new dummy variable SOUTH. The interaction variable (SOUTH x DISTANCE) correlated significantly with the number of visits (Pearson correlation -0.411, $p=0.014$).

Several of the supply factors, such as the dominance of water and culturally or historically significant objects in a park, also failed to significantly explain visitor numbers. Of the variables significantly associated with the number of visits, the length of the trail network in a national park was correlated with the park age, indicating that as parks age the supply of services increases. To avoid multicollinearity we ended up with two separate models, the first including trails and second park age. However, many variables that correlated strongly with the number of visits, such as the number of huts or ski trails, could not be included in the model due to strong multicollinearity with other explanatory variables.

Although better services in national parks may encourage more and new types of visitors, increasing visitation also creates a need for new services to preserve natural values. Thus, the cause and effect in visitation and the supply of services may not be clear. This problem of possible endogeneity of recreation services particularly relates to facilities such as new trails. As the number of visitors increases, more recreation services are constructed by managers, which further increases the number of visitors. The possible endogeneity of the variable TRAILS raises a question of the endogeneity problem in using ordinary least squares regression (OLS). The Hausman test for endogeneity was used to assess the possible endogeneity of the variable TRAILS

Table 2
Variables available for models and their correlation with visitation.

Type	Variable	Explanation	Pearson correlation coefficient	p-value
Dependent variable	ln(visits)	Annual number of visits/park, natural logarithm[1]		
Natural characteristics and age, i=1,…,7	water	Is water a predominant feature in a park, yes/no (dummy)	−0.049	0.780
	peatland	Is peatland a dominant element in a park, yes/no (dummy)	−0.231	0.181
	fells	Are fells a dominant element in a park, yes/no (dummy)	0.424	0.011
	scenery	Are there outstanding national landscapes in a park, yes/no (dummy)	0.412	0.014
	diversity	Number of biotopes existing	0.489	0.003
	area	Park area in km[2]	0.270	0.117
	age	Park age	0.310	0.070
Recreation services, j=1,…,6	trails	Number of trails in kilometres	0.604	<0.001
	campfire	Campfire sites and cooking shelters	0.498	0.002
	huts	Day trip, open and reservable wilderness huts	0.634	0.001
	activities	Number of available recreational activities[2]	0.686	<0.001
	guidance services	Visitor services, customer service points and other services	0.567	<0.001
Tourism services[3], k=1,…,7	beds	Number of beds in accommodation service	0.471	0.004
	program services	Program service enterprises	0.593	<0.001
	outside trails	Outstanding hiking trails (other than those in a national park)	0.494	0.003
	restaurant	Number of enterprises offering restaurant and bar services	0.130	0.457
	culture history	Number of nationally significant cultural history sites	0.293	0.088
	events	Number of continual events	0.425	0.011
	substitutes	Number of other national parks within 100 km radius from a national park[4]	−0.604	0.604
Spatial demand[4], z=1,2,3,4	people50	Number of people living within 50 km radius from a national park	0.175	0.314
	people100	Number of people living within 100 km radius from a national park	−0.060	0.731
	distance	Distance to the nearest city of more than 100 000 inhabitants	0.148	0.345
	distanceS	Distance to the nearest city of more than 100 000 inhabitants (in southern Finland)	−0.411	0.014
Socioeconomic characteristics in surrounding municipalities[2], w=1,…,7	income	Mean income	0.257	0.137
	education	Proportion of highly-educated people	0.290	0.091
	unemployment	Unemployment rate	0.073	0.678
	ageyoung	Age structure: proportion of young people	0.235	0.174
	agemiddle	Age structure: proportion of middle-aged people	0.278	0.105
	ageolder	Age structure: proportion of senior citizens	−0.329	0.054
	service	Tourism services as a proportion of total employment	0.477	0.004

[1] Other transformations such as inverse, square or cubic root were examined in relation to the normal distribution, but the results of the Kolmogorov-Smirnov Test supported log-transformation.
[2] Sum of activities that correlated strongly with the number of visits were walking on nature trails, cross-country skiing on maintained trails, fishing, horseback riding, cycling, rock or ice climbing, wilderness trekking or snowshoeing. The possibility for sailing or motor boating was also added.
[3] The municipalities in which parks are located were identified in order to collect data on tourism services outside the park. If the national park was located inside more than one municipality, the statistics for all these municipalities were combined. Data were gathered from Statistics Finland, tourism guide books and also the web sites of tourism organisations.
[4] MapInfo 12.0 software was used to identify both substituting national parks and spatial demand.

(Wooldridge 2002, 118–122). The test was conducted by performing a first stage regression for the TRAILS variable with the exogenous variable PARK AGE. The second step was to calculate the residuals from this equation and include them as an additional regressor in the original estimation equation. After running OLS on this new equation the T-test was performed for the coefficient on the first stage residuals. In our case the coefficient was not significant, implying that there was no significant endogeneity problem in our data, and we therefore used OLS regression.

Results

The two models with variables of interest and the best fit are presented in Table 3. Model 1 places emphasis on services, including a variable concerning the density of trails in the park. Model 2 tests the significance of park age as a predictor of the number of visits.

The spatial demand factor SOUTH x DISTANCE was significant in both models and significantly increased their total fit (R^2). The interpretation of the variable suggests that in southern Finland an increase of 10 km in the distance from a park to the nearest bigger city decreases the number of visits by 3 or 4%, depending on the

Table 3
Multiple regression models for visits to Finnish national parks.

	Model 1		Model 2	
	B	p-value	β	p-value
Constant	8.687	0.000	8.397	0.000
Distance to the nearest city of more than 100 000 inhabitants X southern Finland	−0.003	0.062	−0.004	0.021
Recreation activities	0.273	0.000	0.328	0.000
Number of biotopes	0.037	0.039	0.037	0.037
Trails (km)	0.004	0.073		
Park age			0.013	0.053
R^2	0.676		0.682	
F-test	15.637	0.000	16.058	0.000
N	35		35	

model. Spatial demand variables had no significant effect on visits to parks in northern Finland, as the majority of demand comes from the mostly populated areas of southern Finland.

The models indicate that the variables representing park facilities, such as trails and opportunities for recreation activities, were significant determinants of a park's popularity ($p < 0.01$). An addition of 10 km of trails in a national park increased the visits by 4%. The sum of opportunities for recreation activities was a highly significant variable ($p < 0.001$). An increase in the opportunity for one more recreation activities increased visits by about 30%.

The number of biotopes had a significant and positive influence on visits ($p=0.039$). This finding could indicate that the diversity of natural features in a park is experienced as a positive characteristic among visitors. However, the effect was weaker than the effect of the supply of opportunities for recreational activities.

The age of a park was significantly correlated with the density of its trails, and these variables could not therefore be included in the same model. In model 2 the substitution of park age for trail density and was found to slightly increase the R^2. The significance of park age could indicate either a more developed service structure or a higher level of the public knowledge of the older parks. Both of these factors probably have a positive effect on the number of visits.

Based on model 1, Figure 2 further illustrates the effect of the distance between a national park and a population centre of 0.1 million inhabitants in southern Finland. In Figure 2 the prediction of visitation was compared with the observed number of visits. In the prediction the supply factors were assumed to have the mean level. The greatest difference between the observed and expected number of visits was recorded for those parks that were located very close to major population centres (Nuuksio and Seitseminen) or were established in regions with outstanding lake areas or sea (Saaristomeri, Linnansaari, Repovesi).

Both models revealed the relative importance of supply and demand factors. In the case of national parks in northern Finland, none of the demand variables were significant in explaining visits. In southern Finland, the demand variable in the model, i.e. the distance to the nearest bigger city, was significant, but its relative importance compared to supply variables appeared to be minor. Figure 3 and Table 4 further illustrate the relative effect of the demand and supply variables and the use of the model in predicting visitation. In these illustrations the number of visits was calculated by varying either the opportunity supply, i.e. trails, activities and biotopes, between lower, moderate and higher levels, or varying the distance variable. The results demonstrated the considerably greater effect of the supply of recreation opportunities on park visitation. In southern Finland, where distance had a significant effect, the supply factors also had a stronger effect. Increasing the level of supply factors almost tripled the visitation, while the effect of providing parks at a minimum distance was to less than double the number of visits.

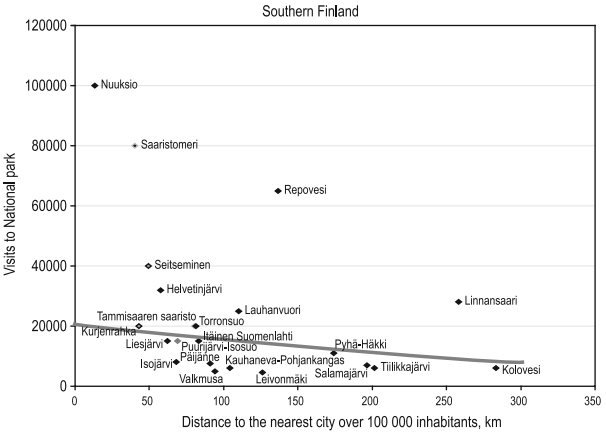

Figure 2. Observed number of visits to national parks in southern Finland in 2003 in relation to distance to the nearest large city, and the predicted number of visits (trend line) based on model 1.

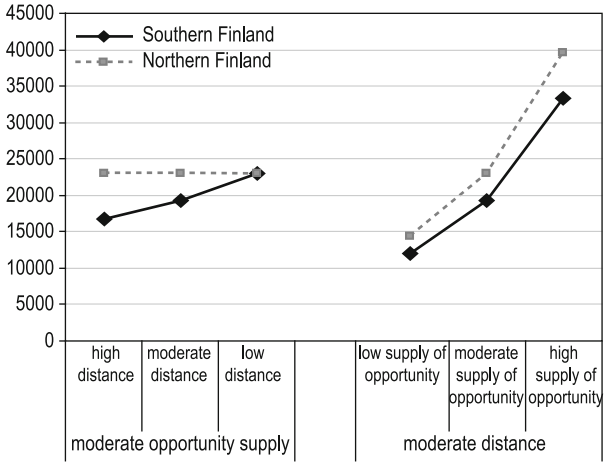

Figure 3. The effect of demand and supply variables in predicting visitation.

Table 4
Predicted visitation to national parks in southern and northern Finland in relation to distance to the nearest city of more than 100 000 inhabitants and opportunity supply (trails, activities, biotopes).

	Visitation	
	Southern Finland	Northern Finland
Moderate opportunity supply		
high distance	16 800	23 000
moderate distance	19 300	23 000
low distance	23 000	23 000
Moderate distance		
low supply of opportunity	12 000	14 300
moderate supply of opportunity	19 300	23 000
high supply of opportunity	33 300	39 600

Discussion and conclusions

This study specified the determinants of visits to 35 national parks in Finland with two regression models based on five independent variables. Although the regression analysis was sensitive to the accumulation of mutually correlating variables, it allowed the examination and evaluation of the relative importance of factors affecting visits, and the results demonstrated the importance of supply variables. The regression analysis revealed that opportunities for recreation activities, the number of biotopes and the extent of the trail network increased the number of visits. The results suggested that parks providing a wide range of recreation opportunities are better placed to attract potential visitors (cf. Cocklin et al. 1990). The relationship between increasing visits and park services was also similar to that identified by Mills and Westover (1987) for US state parks. The positive influence of park age on visits was consistent with the results of previous studies. Park age can be seen to relate to popularity because of the greater public awareness of older parks

(Hanink & White 1999; Mills & Westover 1987). Another reason for the positive effect of park age resides in the history of national parks. It is often the case that the most spectacular destinations have been protected first, and their services might also be better developed over the course of time.

The regression model of visits revealed the minor but significant effect of demand factors on visits to national parks. The analysis provided new information on the distinct role of national parks in different parts of the country. Only in southern Finland, with its greater population density, did the location of the park in relation to a large city have any significance in explaining visits. This can be understood on the basis of the traditional classification of areas into user-oriented, resource-based and intermediate areas (Clawson & Knetsch 1966). The parks in northern Finland containing fells, large natural areas and diverse biotopes could be classified as resource-based parks. This also relates to the pattern of use of these areas, as national park visits in northern Finland are often combined with a longer stay in neighbouring tourist resorts (Huhtala et al. 2004). On the other hand, parks in southern Finland could be classified as intermediate areas because demand factors had some significance, along with supply factors, in explaining visits. A greater proportion of day visits is characteristic of southern Finland, and so the distance to a population centre gains more significance as an explanatory variable.

The data for Finnish national parks was comprehensive and adequate for this type of analysis. However, the analysis was limited to variables that were easily measured. Attributes such as the uniqueness, image and reputation of a park are difficult to measure and to represent in this type of study. Such characteristics can be assumed to have some influence on attracting visitors. The present study focused on national parks, which limits the approach to studying the effect of a varied recreation service structure on visitation. More research is needed to improve our understanding of how different standards of recreation services may influence visitation. It can be assumed that there is a certain optimal level of recreation services in each recreational area, national park or protected area that is related to the sustainable number of visits and type of use of that particular area.

This study provided a useful tool for predicting visitor numbers in assessing the effects of management when establishing new parks. This information is also in the interest of the communities surrounding protected areas, since adequate visitor flows provide a basis for tourism entrepreneurship (Page & Getz 1997; Selby & Petäjistö 2008). On the other hand, from the perspective of nature protection, a low standard of recreation service provision, meaning a low number of visits, might sometimes be justified.

Increasing the number of visits to national parks can form an essential element in creating regional economic activity and subsequent support for rural vitality. However, increased visitor flows are only one indicator of the positive impacts of improved park management and tourism service development around national parks. Another interesting research topic is how visitor spending is affected by recreation services in the park and tourism services in the region. This information is essential to adjust the expectations towards protected areas in enhancing the economic vitality and livelihood in rural communities to a realistic level.

References

Clawson, M., & Knetsch, J. L. (1966). *The economics of outdoor recreation*. Washington DC: RFF.

Cocklin, C., Harte, M., & Hay, J. (1990). Resource assessment for recreation and tourism: A New Zealand example. *Landscape and Urban Planning*, *19*, 202–291.

Ejstrud, B. (2007). Visitor numbers and feasibility studies. Predicting visitor numbers to Danish open-air museums using GIS and multivariate statistics. *Scandinavian Journal of Hospitality and Tourism*, *6*, 327–355.

Fredman, P., Hörnsten Friberg, L., & Emmelin, L. (2007). Increased visitation from national park designation. *Current Issues in Tourism*, *10*, 87–95.

Hanink, D. M., & Stutts, M. (2002). Spatial demand for national battlefield parks. *Annals of Tourism Research*, *29*, 707–719.

Hanink, D. M., & White, K. (1999). Distance effects in the demand for wildland recreational services: the case of national parks in the United States. *Environment and Planning A*, *31*, 477–492.

Huhtala, M., Takku, A., Pouta, E., & Ovaskainen, V. (2004). Matkakohteen valintaan vaikuttavat tekijät Pohjois-Suomen retkeily- ja hiihtomatkoilla. [Factors affecting the choice of hiking and skiing resorts in Northern Finland]. *Terra*, *116*, 241–253.

Loomis, J. (2004). How bison and elk populations impact park visitation: A comparison of results from a survey and a historic visitation regression model. *Society and Natural Resources*, *17*, 941–949.

Loomis, J., Bonetti, K., & Echohawk, C. (1999). Demand for and supply of wilderness. In K. H. Cordell (Ed.), *Outdoor recreation in American life. A national assessment of demand and supply trends* (pp. 351–376). United States: Sagamore Publishing.

Metsähallitus. (2008). Metsähallituksen kansallispuistojen käyntimäärät 2001–2007. 〈http://www.metsa.fi/sivustot/metsa/fi/Eraasiatjaretkeily/Asiakastieto/Kayntimaarat/Kansallispuistotyhteensa/Sivut/Kansallispuistotyhteensa.aspx〉 [25.2.2009].

Mills, A. S., & Westover, T. N. (1987). Structural differentiation. A determinant of park popularity. *Annals of Tourism Research*, *14*, 486–498.

Page, S., & Getz, D. (1997). The business if rural tourism. international perspectives. In S. Page, & D. Getz (Eds.), *The business of rural tourism. International perspectives* (pp. 3–37). London: International Thomson Business Press.

Phaneuf, D. J., & Smith, V. K. (2004). Recreation demand models. In K. Mäler, & J. Vincent (Eds.), *Handbook of environmental economics*.

Place, S. E. (1991). Nature tourism and rural development in Tortuguero. *Annals of Tourism Research*, *18*, 186–201.

Saarinen, J., Keränen, A., & Sepponen,P. (1996). Luonnon vetovoimaisuuteen perustuvan matkailun taloudelliset vaikutukset paikallistasolla: esimerkkinä Saariselän matkailu. In J. Saarinen, & J. Järviluoma (Eds.), *Luonto virkistys- ja matkailuympäaristöonä*. Metsäntutkimuslaitoksen tiedonantoja, 619, 79–92.

Selby, A., & Petäjistö, L. (2008). *Entrepreneurial activity adjacent to small national parks in Southern Finland: Are business opportunities being realised*? Working Papers of the Finnish Forest Research Institute 96. 〈http://www.metla.fi/julkaisut/workingpapers/2008/mwp096.html〉.

Selby, A., Sievänen, T., Neuvonen, M., Petäjistö, L., Pouta, E., & Puustinen, J. (2007). Kansallispuistoverkoston matkailullinen luokittelu. *Metlan työraportteja*, *61*.

Slee, B., Farr, H., & Snowdon, P. (1997). The economic impact of alternative types of rural tourism. *Journal of Agricultural Economics*, *48*, 179–192.

Turnock, D. (2002). Ecoregion-based conservation in the Carpathians and the land-use implications. *Land Use Policy*, *19*, 47–63.

Vail, D., & Hultkrantz, L. (2000). Property rights and sustainable nature tourism: Adaptation and mal-adaptation in Dalarna (Sweden) and Maine (USA). *Ecological Economics*, *35*, 223–242.

Weisberg, S. (1985). *Applied linear regression*. New York: John Wiley & Sons, Inc.

Wooldridge, J. (2002). *Econometric analysis of cross section and panel data*. London: MIT Press.