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Source: *Ecology and Society*, Mar 2010, Vol. 15, No. 1 (Mar 2010)

Published by: Resilience Alliance Inc.

Stable URL: <http://www.jstor.com/stable/26268103>

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**National Parks and Protected Areas and the Role for Employment in
Tourism and Forest Sectors: a Swedish Case**

[Linda J. T. Lundmark](#)¹, [Peter Fredman](#)^{2,3}, and [Klas Sandell](#)^{4,5}

ABSTRACT. The development of national parks and other protected areas has been widely promoted because of its potential for regional development in peripheral and sparsely populated areas. The argument is that the economic and social benefits seen in national parks in the USA and UK will also occur in the Swedish context in the form of an increased tourism-related labor market. Our aim was to analyze the possibility of such a development both in light of the policy visions of positive regional and local development and from the adversary point of view that protection of land is making it more difficult for 15 sparsely populated mountain municipalities in Sweden to prosper. We used a database covering the entire population of the area for 1991 to 2001. Our results show that factors other than the protected areas are connected to the development of a tourism labor market. The most positively correlated variables for change in tourism employment are population growth and proximity to ski lifts. Positive population development is also correlated to a positive change in the number of people employed in forest sectors. Thus, one of the main outcomes is that the assumed and almost automatic positive relation between nature conservation and tourism can be questionable.

Key Words: *employment; forest sector; forestry; GIS; restructuring in peripheral areas; tourism*

INTRODUCTION

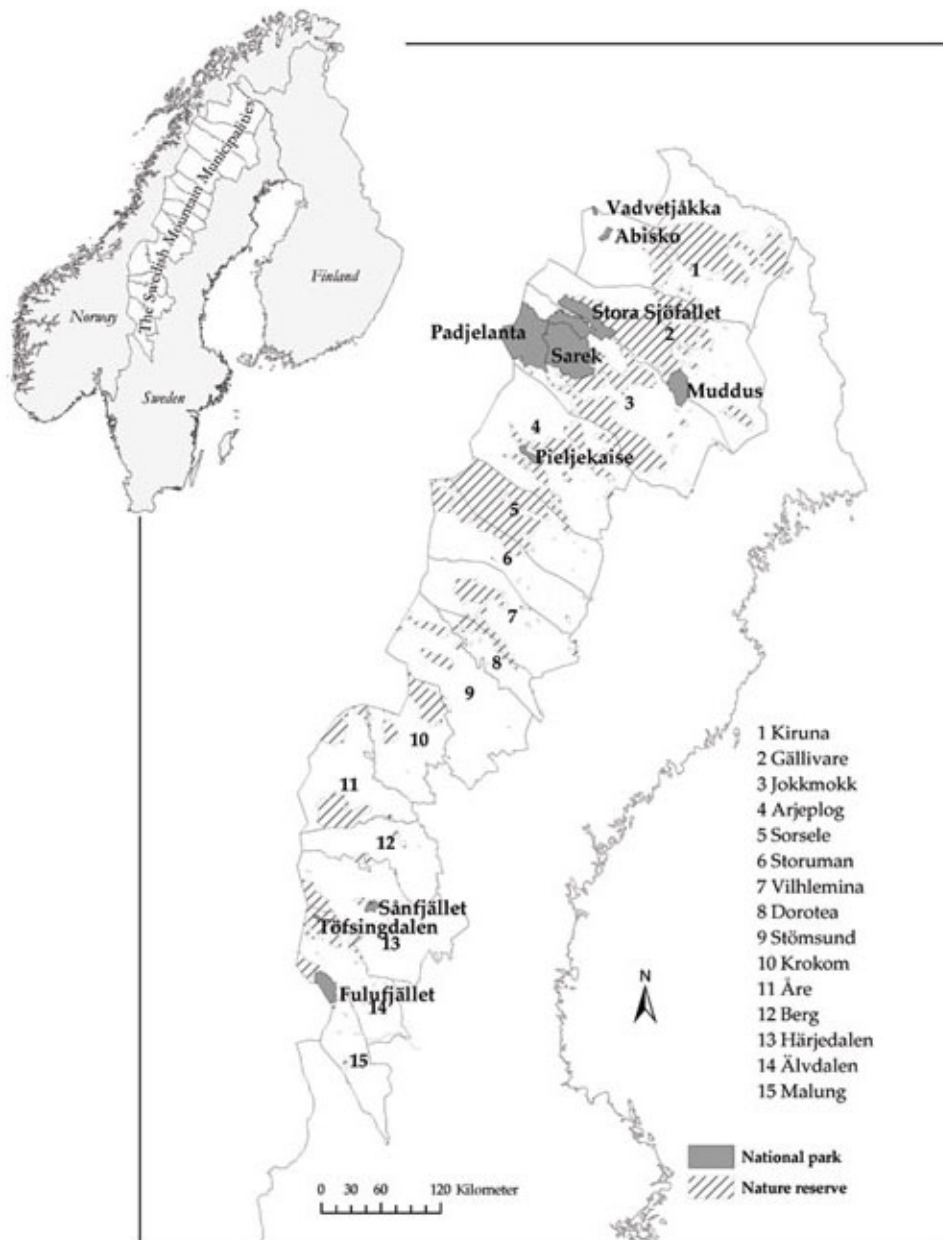
Since the 1960s, successive depopulation has become a serious and complicated problem in northern Sweden. Serious social and economic implications for communities there arise as they face population decline and distorted age compositions. Regional, national, and European Union policy measures aim to counteract these processes of negative change and restructuring. In this context, tourism is often seen as a relatively cheap and fast method of support. This is a result of the claim that the tourism industry has the potential to absorb the workforce that was formerly occupied in sectors now in decline (Wanhill 1997, Wilson et al. 2001, Ribeiro and Marques 2002). Although tourism development does not automatically bring regional development, evidence from other contexts suggests that decreasing out-migration of rural population is an effect of tourism development, achieved through job and income generation for the local population. Additionally, tourism could present an attraction to in-migrants, offering employment and self-employment opportunities in

the service industry (Gill 1991, Findlay et al. 2000, Paniagua 2002, Müller 2006).

In general, the positive effect of tourism on population and economy in the mountain municipalities of Sweden is small or nonexistent (Lundmark 2005). One explanation for this is the claim of the tourism industry that it absorbs the local labor force. Other studies have shown that this claim in turn is likely to follow from two factors: the characteristics of the work, which demands seasonal employees with flexible working hours (Montanari and Williams 1995, Townsend 1997, Lafferty and van Fossen 2001); and the characteristics of the work force, which does not have the proper skills or human capital sought in the service-oriented and international tourist industries (Stynes and Pigozzi 1983, Hartmann 1986, Ball 1989, Shaw and Williams 1994). Nevertheless, the Swedish mountain range (Fig. 1) shows many signs of economic restructuring toward the tourism industry (Heberlein and Vuorio 1999, Fredman et al. 2001, Nilsson 2001, Heberlein et al. 2002, Müller 2002, Lundmark 2005).

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Fig. 1. Map of the Swedish mountain municipalities and protected areas.



Tourism in and near protected areas in particular has been promoted in the sparsely populated areas as a way to ensure sustainable development (Swedish Environmental Protection Agency 2004). The protection of land is thus motivated not only by environmental concerns, but also by the positive effects for rural development seen in other countries. This idea draws on experiences from the

USA and UK, where positive regional development has been observed in direct relation to national parks (Moisey 2002, Johnson et al. 2003, Lorah and Southwick 2003, Frentz et al. 2004). Aside from environmental considerations, these observations motivated the Swedish government to suggest that approximately 400,000 ha of productive forestland be set aside for protection between 1999 and 2010,

a goal which will be reached no later than 2020 (Government of Sweden 2008).

The Nordic context regarding national parks and protected areas is different from that of other countries in several ways. The right of public access is a fundamental aspect of outdoor recreation, nature-based tourism, and conservation in northern Europe (Sandell 2006). In Sweden, this tradition means that everyone has the right, within certain restrictions, to move freely across private land holdings and to pick mushrooms, flowers, and berries provided that one does not disturb or damage the property of the local inhabitants. Today, with a wide range of management methods used for outdoor recreation and nature conservation, the right of public access still holds a strong position in Sweden (Fredman and Sandell 2005), both culturally and in practice, making the role of protected areas somewhat different compared with the situation further south in Europe or in the United States. The right of public access gives people the right to experience natural environments without necessarily visiting protected areas. Because of the vast, sparsely populated areas, the level of land development and degradation is restricted, allowing people to enjoy comparatively unspoiled nature. Furthermore, entry to national parks is free. Consequently, employment is not attached to local management in the same way as it is in North America, for example.

The first national parks in Europe were established in Sweden as early as 1909. This historic designation has meant that protected areas in the mountain range are almost always extreme, unpopulated, and “wild” in character, and their role for employment and regional development was not a reason for their establishment (Fredman and Sandell 2009). However, in parallel with an international debate about the need for more of a development-friendly and less “fortress conservation” policy (Brockington 2002), the role of protected areas has in recent decades been much more complex and has been linked, at least verbally, to local needs (Government of Sweden 2002, Sandell 2005, Zachrisson et al. 2006, Lundgren 2009). If there has been a close linkage between employment opportunities and protected areas as magnets for tourism for a long time, even though it has not been an important element of conservation policy in Sweden until recently, it should be clearly visible in an investigation of historical data. Alternatively, the benefits of this change in policy, perhaps

underpinned with a change in tourism characteristics such as involving more local services, should begin to be observed in terms of employment and local development.

In Sweden today, there is an ongoing debate about the protection of land versus the benefits from forestry, with both sides claiming that the economic benefits are greater from their point of view. However, the evidence for either argument is scarce. Based on the differences between these views of natural resources, we analyzed the possibility that protected land in the form of national parks and nature reserves encourages regional and local development in sparsely populated areas through increased tourism employment. The analysis was done in light of both the policy visions of positive regional and local development and from the adversary point of view that national parks are making it more difficult for these areas to prosper. Furthermore, it is unknown whether job losses in the forest industry are replaced by employment in the tourism industry. Out of past discussions concerning protected areas, land use, and local development, we developed the following questions. How do the areas close to national parks differ from other mountain municipalities in population development and in tourism and forest industry labor market development? Is there a relationship between protected land and an increase in tourism employment and a decrease in forest sector employment?

The environment and regional development

The overall economic development in Sweden and many other countries has moved from the extraction of raw materials to service-related industries (Pettersson 2002). Although the transition has taken place on a macro scale, there are many communities where extractive industries like agriculture, mining, and forestry still play an important part in the social and economic life of the inhabitants. Rural tourism has long been considered a means of achieving economic and social development and regeneration (Fleisher and Felsenstein 2000). More specifically, it has been widely promoted as an effective source of income and employment, particularly in peripheral rural areas where traditional agrarian industries have declined. This is partly because tourism creates new demand in the local economy, and the political aim of tourism business development is to attract visitors from other places,

creating a redistribution channel for capital from richer to poorer areas (Christaller 1963). Although the negative side of a tourism-oriented labor market might be that tourism causes a financial burden in many small, rural communities, resulting in a drain on the local service base, it is also possible to claim that tourism provides new revenue sources for rural activities (Hall and Jenkins 1998, Wilson et al. 2001).

Having noted that the transition from traditional to service industries is important in western societies, it is critical to consider that it has also been important for the development of a variety of views on the environment (Halfacree 1995). This entails the acceptance of space and place as socially constructed and continuously changing in meaning (Pritchard and Morgan 2000). There are other views regarding the effects of protected land besides the view of positive development from the tourism perspective. One of these views draws on the idea of a “dead hand” over the area (Skonhoft and Solem 2001, Hiedanpää 2002, Sandell 2005). This view comes from the primary industries, of which the most severe critics are the forest sector stakeholders, who have debated insistently the possible job losses caused by the conservation of land (Keskitalo and Lundmark 2010). We next consider the aspects of the viewpoints of the environment as a warehouse of raw material and of the environment as an attraction for residents, tourists, and businesses.

The idea that the environment is a warehouse of raw materials is often expressed in resource-based communities where the extraction of resources is important, or perceived as important, for the economy (Hiedanpää 2002, Lorah and Southwick 2003). It is in these resource-based communities that concerns about the prioritization of the environment over the economic and social well-being of the local community are articulated (Argent 2002, McCarthy et al. 2002). The reaction of landowners in Finland to the protection plans outlined in Natura 2000 are an example of resistance to conservation (Hiedanpää 2002). Another example is Sandell’s (2005) case study of the local rejection of a proposed national park in the mountains of northern Sweden. The main obstacle was resistance from local groups, principally in the nearby township of Kiruna, who were afraid that their use of the area would be curtailed because of restrictions on outdoor activities such as fishing, hunting, and the use of snowmobiles. In this case, the right of public access was also an important theme. This fear is a reflection

of the traditional perception that land must be subjected to conservation, rather than promoting social and economic activities in relation to the environment (Powell et al. 2002). However, recent years have brought attempts to increase the possibility of conducting economic activities in and near protected areas in Sweden and elsewhere (Eagles and McCool 2002, McCarthy et al. 2002, Zachrisson et al. 2006, Fredman and Sandell 2009).

The tourism industry’s view of environmental protection is not clear-cut. It also has examples of the view representing the environment as a provider of raw material, or what Newby (1988) calls “cash crop.” For example, the issue of whether or not helicopter flights in the mountain region should be allowed has given insight into the different views represented by the locals, who are trying to make a living in the region, and the policy makers, who want to protect the serene mountain environment, effectively preventing economic activity in the region.

In contrast to the view of the environment as a provider of raw material, another view is represented by those who see it as an attraction for inhabitants, tourists, and businesses, sometimes referred to as an amenity (Holmes 2002, Johnson et al. 2003, Lorah and Southwick 2003, Müller 1999, 2005). State agencies and regional planning agencies have expressed a hope that this will also be the case in Sweden.

An important theme concerning the current interest for a wider context with regard to protected areas is the international engagement for more of a bottom-up, local perspective. For example, Kaltenborn et al. (1999:51) write, “One of the paramount issues [while the total area of protected areas increases] is how to facilitate improved public involvement in conservation tasks.” Some important linkages to a broader discussion concerning sustainable development are present in this debate. This involves the frameworks of ecotourism or alternative tourism (Holden 2000) and a need for “decolonizing [the concept of] nature” (Adams and Mulligan 2003), compared with traditional protection strategies coming from outside and from above, as seen from the local perspective (Zachrisson et al. 2006). An influential illustration of this interest for a broader and more integrated and local approach with regard to conservation and protected areas in Sweden is a recent policy declaration by the government (Government of Sweden 2002).

There is disagreement presented in the evidence regarding economic development in the context of protected areas. Jonsson (2004) and Lundgren (2005) conclude that there is no visible negative effect of the larger amount of protected areas in northern Sweden on the economic growth in the forest economies. However, they also do not show a positive connection between tourism employment and protected areas. Lorah and Southwick (2003) found that protection of the natural environment correlates with income and employment growth in the western United States and has a positive outcome on in-migration and tourism (Johnson et al. 2003). On a micro scale, initial research in Swedish mountain municipalities shows that in areas adjacent to national parks (i.e., within 15 km), a higher than average proportion of the population is employed in the tourism industry (Lundmark 2009). However, there is no evidence that this is related mainly to proximity to national parks.

Based on the amenity view, the argument used in many official statements is that protection of land will benefit the tourism industry (Government of Sweden 2002, 2004). Recent changes in Swedish environmental policy imply an increased recognition of social and economic values in and around protected areas. Key components in this process are local participation, regional development, and recognition of outdoor recreation benefits like public health and environmental education. This has been implemented to some extent in Fulufjället National Park, which was inaugurated in 2002. The designation process included a Recreation Opportunity Spectrum zoning of the park, a tourism development project in the gateway region, in-depth visitor surveys, and an “inside-out” planning process that involved the local population (Wallsten 2003, Fredman et al. 2005). Data from visitor surveys show that the number of visitors has increased by 40% since the national park designation (Fredman et al. 2007). The importance of the national park context has also been shown by Saarinen and Vaara (2002) in relation to second-home purchases in Finland.

However, apart from protection itself, tourism characteristics and motivations for people to visit protected areas contribute to economic development and employment in tourism. Researching different visitor segments has a long tradition in tourism research, and diversity in tourists’ activities features multiple dimensions with respect to preferences, motives, attitudes, socioeconomic characteristics,

and other factors (e.g., Weaver and Lawton 2002, Dolnicar 2008). Understanding visitor categories will provide valuable input for management, e.g., infrastructure development, interpretation, risk, and conflict mitigation; marketing, e.g., commercial tourism supply and target communication; policy decisions, e.g., national and regional planning and long-term development; resource allocation decisions, e.g., finance and economic support; and understanding long-term structural changes in outdoor recreation participation.

The economic dimension is a major aspect of segment research. Studies of expenditure patterns help to describe the size of each travel market in economic terms, and destinations can better benefit from marketing efforts (Regan and Damonte 1999). These studies also lead to the identification of attributes influencing travel expenditure characteristics among market segments. One illustration of different economic potential among visitor segments is a study of expenditures among downhill skiers, backpackers, snowmobilers, and general visitors to the Swedish mountain region (Fredman 2008). Among the groups studied, downhill skiers are identified as those who have the largest direct effect on the local economy. Their spending is on average three times higher than that of backpackers, and one-half times higher than that of snowmobilers.

The possibilities of increased local income and local employment are connected to an increasing number of visitors with money to spend. If there is such an increase and a general shift in the mountain area of Sweden toward amenity-driven tourism and in-migration to peripheral areas in and near national parks or nature reserves, it should be detectable as an increase in the number of people employed in tourism in relation to national parks and nature reserves.

METHODS

Our quantitative study explores some of the different arguments presented in the employment and environment debate. Quantification is made by examining the connections among the presence of protected areas, the development of the tourism industry, the development of forest sectors, and the demographic and economic changes in nearby communities in mountain municipalities in Sweden. We derived the relevant information from a

database compiled by Statistics Sweden and stored in the comprehensive database ASTRID (ASTRID 2003). The database is part of a project to develop a geographical micro simulation population model, undertaken by the Department of Social and Economic Geography at Umeå University and the Spatial Modelling Centre in Kiruna. Our analyses contribute to the development of the model in terms of the effect of tourism on regional economic and demographic development on a geographical scale. The database contains micro-level information on all individuals, so that one row in the spreadsheet represents one person. Most useful for our purpose is that the data are geo-referenced, meaning that every person's specific characteristics, place of residence, and place of work are pinpointed with a set of coordinates, accurate to 100×100 m (Lundmark 2005, Lundmark and Marjavaara 2005). This means that persons who do not have coordinates cannot be included in the study; however, the number of missing cases is small and therefore does not affect the results. We used the Swedish Standards Industrial Classification codes (SNI) to distinguish tourism-related sectors (Appendix 1) and forestry-related sectors (Appendix 2) from other sectors (Statistics Sweden 1992).

We do not analyze the reasons for tourism, but rather the labor market connected to it. Therefore, we defined the concept of tourism as widely as possible. Tourism employment occurs in a number of industry sectors such as accommodation, food services (e.g., cafes and restaurants), retail trade, transport, and personal services. Tourism employment can be direct, that is, employment resulting from visitor expenditure in tourist services, or it can be indirect, not resulting directly from visitor expenditure. Furthermore, induced employment is a result of the effects of the tourism multiplier, which estimates the total output, labor earnings, and employment gained through linkages between industries associated to tourism in a region as a result of tourism expenditures. We used both direct and indirect employment and defined tourism businesses to include both those that primarily rely on tourist business income and those that serve a local market but benefit to a high extent from the extra income from tourism.

The SNI were used to distinguish the tourism industry sectors from other sectors; however, the traditional sector classification does not distinguish between other service-oriented sectors and work

places exclusively devoted to tourism. Furthermore, many companies have several orientations. This causes problems because the material does not supply a detailed labor description for each worker, only the type of firm where each person works. In practice, this means that a sector that is fully based on tourism demand will be difficult to find, even with the five-digit SNI codes in the database. The total effect of increasing tourism in terms of direct, indirect, and induced employment cannot be accounted for because the material does not show the importance of tourism for some businesses. This is the case, for instance, for petrol stations and small local stores. Despite these limitations, the statistical data available do allow for the selection and calculation of direct and indirect employment on a detailed level. Also, considering the quality and quantity of data at hand, our analysis is based on all individuals, not a sample, using the highest quality data available.

The nature of the forestry industry is also complex and highly integrated in economic networks beyond the forest itself. Transportation, processing, accounting, marketing, and technological development provide some examples of activities that can be associated with the industry. Forestry involves logging, timber evaluation, reforestation, and forest conservation, and includes other forestry- and logging-related service activities. Furthermore, the sawmilling industry, the chemical and mechanical wood processing industries, and wholesale trade of wood products are included.

The study is delimited in both time and geographical scale, and the time frame considered is the 10-year period between 1991 and 2001. The overall geographical limitation is 15 mountain municipalities in Sweden (Fig. 1). For the national parks, the buffer radius is set to 15 km to exclude the largest population centers, thereby avoiding difficulties in the interpretation of results. Alternative employment in many areas in and near national parks cannot come from basic service or public employment because this part of the labor market is located in population centers with higher population density. Therefore, tourism could provide the employment opportunities needed. The buffer radius was used to include the population living close to a national park while excluding larger population centers. Also, we included only populations in the mountain municipalities (i.e., nighttime population), rather than those working in the area. This means that the local effect is more isolated, but also that not all

Table 1. List of variables used in the regression analysis.

Type	Variable	Definition
Aggregate	TOURCH	Change in number of people employed in tourism on a 10 × 10 km grid for 1991–2001
	POPCH	Change in the population on a 10 × 10 km grid for 1991–2001
	FORESTSCH	Change in number of people employed in forest sectors [†] on a 10 × 10 km grid for 1991–2001
Distance	DISSKI	Distance from a ski lift on a 10 × 10 km grid
	DISNATRES	Distance from a nature reserve on a 10 × 10 km grid
	DISPARK	Distance from a national park on a 10 × 10 km grid

[†]Swedish Standard Industrial Classification codes from Statistics Sweden (1992).

employed are accounted for. This choice is based on the findings of Lundmark (2005), who concluded that as much as 25% of those employed in tourism in some areas are seasonal in-migrants who do not permanently live or pay taxes in the municipality where they work.

Apart from using descriptive statistics derived from selections based on the buffers from the national parks, we examine whether there is a relationship between protected land and an increase in tourism employment and a decrease in forest sector employment through the application of ordinary least squares (OLS) regression (Table 1). The factors affecting the change in employment were chosen based on theoretical and empirical findings. Skiing in various forms is important in the mountain area (Heberlein et al. 2002, Fredman and Heberlein 2003). For the development of ski resorts, downhill skiing facilities in the form of ski lifts are important. Tourist activities in the mountain range are mainly performed adjacent to a national park, nature reserve, or ski lift, and these distance variables were therefore used in the regression analysis. Distance to ski lifts has been shown to be correlated to the number of second homes such that when the distance to a ski lift increases by 5 km, the number of second homes decreases (Lundmark and Marjavaara 2005). Distance to national parks and nature reserves is useful in determining whether there is a relationship between the protection of land and the change in tourism and forest sector

employment. Population change was used as an overall indicator for general development in the area.

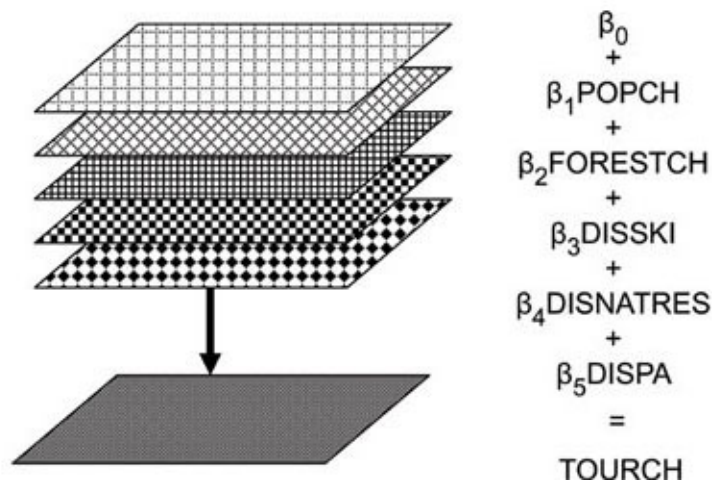
Two multivariate linear regression models were selected:

$$\begin{aligned} \text{TOURCH} &= \beta_0 + \beta_1 \text{POPCH} + \beta_2 \text{FORESTCH} + \beta_3 \text{DISSKI} + \beta_4 \text{DISNATRES} + \beta_5 \text{DISPARK} \\ \text{FORESTCH} &= \beta_0 + \beta_1 \text{POPCH} + \beta_2 \text{TOURCH} + \beta_3 \text{DISSKI} + \beta_4 \text{DISNATRES} + \beta_5 \text{DISPARK} \end{aligned}$$

To view the multivariate linear regression in a spatial context, it was run in a geographical information system. A GIS-based statistical approach makes it possible to perform more localized analyses independent of administrative borders within the research area. The geographical scale operated in the GIS is a 10 × 10 km grid within which the variables are calculated and aggregated. The GIS allows us to combine the statistical regression analysis with analytical methods and visual techniques. The multivariate linear regression model was chosen based on the assumption that the variables are normally distributed. The sample size was 520. Cells without values in both years were omitted from the regression.

The GIS methodology was based on a principle whereby geographical attributes are created as geographical layers that can be statistically analyzed

Fig. 2. Illustration of GIS layering.



in a spatial context (Fig. 2). Each layer represents a variable or an output in the regression.

We next describe the population development and characteristics of the mountain municipalities in relation to development in and near national parks. We then describe employment development in the tourism and forest industries. Finally, we present the results of the regression analysis.

RESULTS

The research area has characteristics that are prominent in rural areas: It is sparsely populated and has a higher share of older people than do other parts of Sweden. During the period 1991–2001, the population in the municipalities has decreased by almost 15,000, with the largest drop in the age cohort 25–34. Population development has been negative for all municipalities in the area. Some municipalities, for example, Dorotea and Storuman, have lost up to 12% of their population over 10 years. The least negative development is observed in the municipalities of Åre and Krokoms, which had 4% population loss.

Few people live close to national parks in the mountain area (Table 2). Approximately 3460 people lived in and around national parks in 1991, and this number had decreased to 3250 in 2001.

Most live near Sånfjället National Park, but population had also decreased from approximately 1900 in 1991 to 1650 in 2001. Approximately 2% of the population in the entire mountain area lives in or near national parks. The average age of the population in and near the national parks increased during the 10 years investigated in all but one park, Töfsingdalen, where it decreased in two years. In the Stora Sjöfallet, Sarek, and Padjelanta areas, the average age increased by 10 years over the 10-year period.

Because of the population characteristics and the decrease in population, the proportion of people employed in the various sectors is best used to describe the process of employment change. The change in proportion and number of people employed in forest sectors is negative in the mountain area as a whole. The development of tourism sector employment was positive. Some municipalities show this development, e.g., the Älvdalen municipality, whereas others do not. For example, in the Berg municipality, the number of people employed in forest sectors had increased by the end of the study period, whereas tourism sector employment decreased from 1999 to 2001. In the Härjedalen municipality, where tourism employment development increased, employment in forest sectors decreased to a level below that of tourism employment.

Table 2. Changes in various segments of the population in northern Sweden for 1991–2001.

Population segment	1991	1994	1997	2000	2001
All 15 municipalities	163,949	162,756	157,707	151,098	148,689
In and near national parks	3459	3296	3158	3254	3254
Percentage of mountain population living in or near national parks	2.1	2	2	2.2	2.2

Source: ASTRID (2003).

The employment development in tourism in and near all national parks was more positive than in the mountain municipalities in general (Table 3). For example, Abisko and Vadvetjåkka municipalities had a low proportion of people working in tourism-related lines of work in 1991 at 5.3%; this increased to approximately 17% in 2001. The most negative development was observed in the Stora Sjöfallet, Sarek, and Padjelanta areas, where the proportion employed in tourism sectors diminished from approximately 18% to just 10%.

In areas in and near national parks, few people are employed in the forest industry (Table 4). This makes it difficult to make general comments about development. However, the development follows the common trend observed across the entire area. In general, the proportion of people employed in forest sectors in and near national parks decreased from 9% in 1991 to approximately 5% in 2001. The employment development in forest sectors in the mountain municipalities as a whole decreased from almost 10% in 1991 to just over 6% in 2001.

Regarding the results in and near national parks, it is important to note that the overall number of people is very small; therefore, the proportions are affected greatly by changes of a small number of individuals. The proportion is also dependent on the size of the population that is of working age. This means that if the number of tourism workers does not change, the proportion could be increasing because of a smaller working population.

Regression model results

We performed multivariate regression analyses to determine the importance of specific factors on employment development in tourism (Table 5). The variables omitted by stepwise regression are: distance to national parks, distance to nature reserves, and employment change in forestry. The regression performed using the ENTER alternative, a procedure in which all variables in the analysis are entered in a single step, produced a similar result. An adjusted R^2 of 0.3 suggests that the independent variables explain some, but far from all, of the variation in the change in tourism employment. According to the regression, the most important variables in the development of tourism employment are population change ($p < 0.0001$) and distance to ski lifts ($p = 0.06$). The most positive relationship is between population development and tourism employment. This means that an increase in population between 1991 and 2001 is positive for employment development in tourism. The regression also shows that the greater the distance to ski lifts, the more negative employment development in tourism is. However, this result is not significant ($p > 0.01$).

We also examined the importance of factors on employment development in the forest industry (Table 6). The variables omitted by stepwise regression are: distance to national parks, distance to ski lifts, and employment change in tourism. This means that all variables except population change between 1991 and 2001 and the distance from nature reserves are insignificant. The interpretation of the relationship is that a decrease in population is

Table 3. Number and percentage of the population aged 16–64 employed in tourism for 1991–2001.

Area	1991		1994		1997		2000		2001	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Abisko, Vadvetjåkka	8	5.3	14	36.8	23	32.9	59	21.6	55	17.5
Fulufjället	33	8.6	35	8.7	37	10.2	20	5.7	39	11.1
Muddus	16	3.4	16	3.4	15	3.3	17	4	14	3.5
Pieljekaise	16	11.2	21	15.3	15	12.8	22	15	16	11.7
Sånfjället	78	5.1	67	4.4	57	3.9	68	4.8	76	5.5
Sarek, Stora Sjöfallet, Padjelanta	10	18.2	9	18.4	5	11.6	3	6.5	5	9.8
Töfsingdalen	36	29.5	37	31.4	39	33.1	17	16.5	32	32.3
All national parks	197	5.7	199	6.0	191	6.0	206	6.3	237	7.3
All 15 municipalities	4704	4.7	5344	5.5	5262	5.6	5513	6.1	5262	5.9

Source: ASTRID (2003).

correlated with a decrease in forest sector employment. The adjusted R^2 of 0.137 implies that the remaining independent variable explains some 14% of the variation in the employment change in forest sectors. Although the distance from nature reserves was kept in the stepwise regression, it is not significant ($p > 0.01$). Nevertheless, it contributes to some degree to the model explanation of the change in forest industry employment.

A Moran's I test for global spatial autocorrelation shows that there is spatial autocorrelation among the residuals ($I = 0.11$, $p = 0.01$). The incidence of spatial autocorrelation among residuals could be explained partly by the spatial resolution of the raster points. Nonetheless, the OLS regression coefficient estimates are unbiased and thus usable (Anselin 2001). Instead, the effect of spatial autocorrelation on the estimation results is primarily connected to the inability to produce valid t -values in the OLS regression. This could indicate that it

would be more useful to use a spatial regression model that adjusts for spatial autocorrelation. However, according to tests made by Li et al. (2009), the estimates of the spatial regression models are close to the OLS estimates; the same sign of coefficients are shown throughout the covariates, and the parameter estimates indicate little variation between models.

The plotted predicted values against the dependent variables (TOURCH and FORESTSCH) graphically show the model's predictive capacity (Fig. 3). Tourism employment is underestimated in two categories of places: ski resorts and municipal centers. In the north, there is an underestimation in relation to the municipal centers of Kiruna, Gällivare, Jokkmokk, Arjeplog, and Vilhelmina. In the south, most notable is the underestimation in Malung. Although the model suggests a high correlation between population increase and employment increase in the towns, which have a

Table 4. Number and percentage of the population aged 16–64 employed in forest sectors for 1991–2001.

Area	1991		1994		1997		2000		2001	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Abisko, Vadvetjåkka	1	0.7	0	0	0	0	1	0.4	4	1.3
Fulufjället	55	14.4	39	9.7	26	7.2	24	6.8	22	6.3
Muddus	5	1.1	6	1.3	6	1.3	3	0.7	4	1
Pieljekaise	8	5.6	4	2.9	2	1.7	5	3.4	3	2.2
Sånfjället	237	15.4	169	11.1	136	9.4	115	8.1	119	8.6
Sarek, Stora Sjöfallet, Padjelanta	2	3.6	1	2	0	0	0	0	0	0
Töfsingdalen	7	5.7	4	3.4	4	3.4	4	3.9	3	3
All national parks	315	9.1	223	6.8	174	5.5	152	4.7	155	4.8
All 15 municipalities	9877	9.9	6903	7	6024	6.4	5702	6.3	5549	6.2

Source: ASTRID (2003).

more positive population development, an underestimation occurred. An explanation for this is most likely that apart from increasing population, there has also been a concentration of workplaces (Lundmark 2005) and population (Håkansson 2000) to the municipal centers. The positive development around some of the ski resorts is also unexpected in the model. This is the case, for example, with the Sälen area in the Malung municipality, and the Funäsdalen and Vemdalen areas in the Härjedalen municipality. There are also examples in the north of the mountain range, for example the Riksgränsen area, including Vadvetjåkka and Abisko national parks.

Concerning the underestimation of employment change in the forest industry, it is within the population concentrations that the underestimation is highest, with few exceptions, and this too can be explained by the concentration tendencies of population and businesses.

DISCUSSION

The view of nature as an amenity that will attract tourism, businesses, and in-migration has been associated with the increasing will to protect the environment as national parks and nature reserves (Johnson et al. 2003). Commercial recreation like tourism (Müller 2006) is one way to gain economic benefit from the natural environment in the form of employment. Therefore, we analyzed the possibility that the protection of land enforces regional and local development in sparsely populated areas in Sweden through increased tourism employment.

Alongside the shift toward a service-based economy, other changes occur in relation to land use and views on the landscape. In recent research, this development has been described in terms of a shift from a production landscape to a consumption landscape (Ilbery and Bowler 1998). This view is discernable, for example, in studies in which lifestyle-oriented migration and second-home

Table 5. Effects of the variables selected by the statistical analysis on the change in tourism employment.

Variable	Unstandardized coefficient β	<i>t</i>	<i>p</i>
Constant	5.129	1.870	0.062
Population change for 1991–2001	0.603	14.51	< 0.0001
Distance to a ski lift	-1.497	-1.826	0.068

The dependent variable was the change in the number of people employed in tourism for 1991–2001; *N* (number of 10 × 10 km grid cells) = 520, adjusted $R^2 = 0.30$, *df* = 2, Durbin-Watson = 2.003, method: stepwise.

tourism are seen as motivated by amenity considerations (Müller 2002, Johnson et al. 2003).

Research on the effects of national parks on socioeconomic development in Norway and Sweden indicates that there are differences in the development seen in the UK, USA, and northern Europe (Skonhoft and Solem 2001, Jonsson 2004, Lundgren 2005). Our analysis indicates that national parks have a positive effect on tourism employment, with an increase in the proportion of people employed in tourism in the areas in and near national parks. At the same time, forest sector employment decreases, further underlining the importance of alternative employment. The lack of a significant relationship between the positive development in tourism employment and the negative development in forest industry employment indicates that tourism employment does not automatically follow from unemployment in forest sectors. This also means that even though the economic base of an area changes, those taken out of employment are not by default available for tourism employment. In general, local labor markets in sparsely populated areas cannot support the expansion of tourism without relying on imported, temporary labor (Lundmark 2005).

The evidence from the multivariate regression analysis does not lend much support for a connection between protected areas and tourism employment. Both variables of distance from protected areas and distance from national parks were omitted from the stepwise regression model when the change in tourism employment was used as the dependent variable. Instead, the results show

that, other than population change, the distance to ski lifts could be positive for development toward more tourism employment. The positive regional development seen in the USA and UK in relation to amenities and lifestyle values, with in-migration to areas in and near national parks and high economic benefits from the protected environment, is not obvious in the Swedish mountain area. Instead, there are other factors that are more important for positive development in tourism employment, for instance, positive population change. This has to do with the nature of tourism sectors, which in many cases do not cater exclusively to tourists, but are also used by the local population. With a larger local population, more people are employed in restaurants, bars, and other tourism-related infrastructures such as local airports, which are more frequented because of higher local demand. This could also help to explain why an underestimation of positive change in tourism employment occurs in the municipal centers.

Many of the ski resorts that had a much more positive employment development than expected have specific qualities that were not included in the model. For example, historical factors play an important role in the continuing popularity of a resort (Nilsson 2001). There are also infrastructural reasons that some resorts become more popular than others. The southern part of the mountain range has good access from the more populated parts of Sweden, making it possible to visit that part of the mountain range for a weekend or a shorter vacation. This is important in a society that has an increasing individuality of vacation patterns.

Table 6. Effects of the variables selected by the statistical analysis on the change in forest sector employment.

Variable	Unstandardized coefficient β	<i>t</i>	<i>p</i>
Constant	-0.262	-0.297	0.766
Population change for 1991–2001	-0.138	-9.023	< 0.0001
Distance to a nature reserve	0.509	2.104	0.029

The dependent variable was the change in the number of people employed in forest sectors for 1991–2001; *N* (number of 10 × 10 km grid cells) = 520, adjusted $R^2 = 0.137$, *df* = 2, Durbin-Watson = 2.009, method: stepwise.

Although our results do not significantly support the occurrence of positive development in tourism employment in direct relation to protected areas, we do not suggest that tourism development close to protected areas does not contribute to economic development or restructuring in the mountain municipalities. Instead, we argue that although tourism motivated by amenity considerations is increasing in the area, as indicated by Saarinen and Vaara (2002) and Fredman and Sandell (2005), this does not necessarily mean a higher number of jobs in tourism in nearby locations. There are two main reasons for this. First, amenities found in the natural environment in Sweden and other Nordic countries are often free of charge, and for jobs to exist in a local economy, money needs to circulate. Also, this “free of charge” situation based upon the right of public access does not bind tourism activities to protected areas the same way it would if public access were more limited to nature areas. Second, a low population density with diminishing local service makes it hard to create viable (self-) employment opportunities. Instead, it is in the population centers where the hotels, restaurants, and camping sites are located that money is accumulated. Consequently, the number of jobs increases there, despite efforts in recent years to allow more economic activity in national parks.

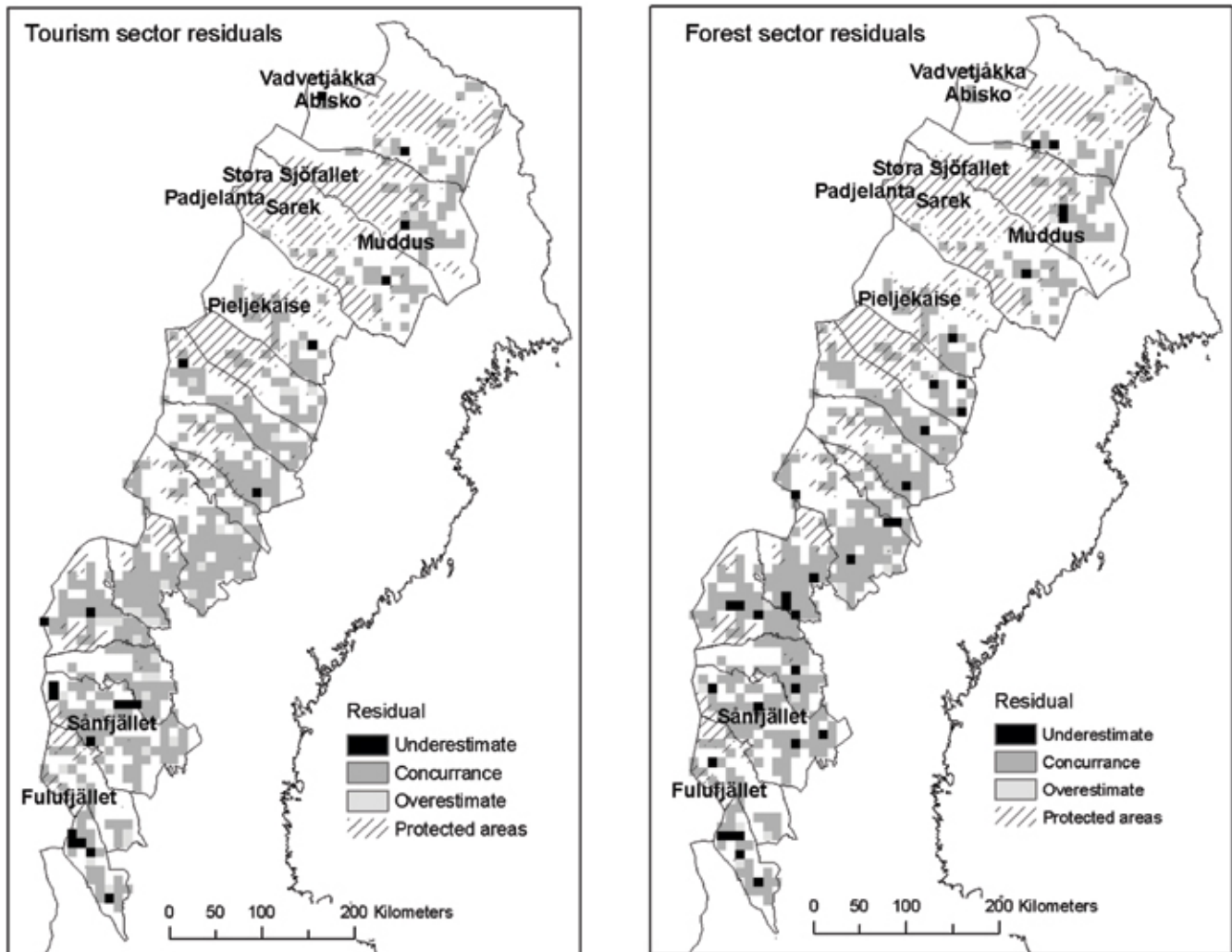
CONCLUSION

The views of the environment as being either an amenity that attracts visitors and in-migrants, creating local and regional development, or a resource from which to extract raw materials has

thus far not proven to be connected to employment change in relation to protected areas. The common idea is that people, as they have more money and free time, will consume more of the amenities in the landscape. However, as seen from a perspective of tourism employment in the mountain municipalities of Sweden, this does not necessarily translate into local increases in tourism employment. It must be noted that the shift with regard to conservation policy in line with more local development is a recent one; our results do not support the initial assumption that a shorter distance to a national park or protected area creates better conditions for tourism employment and related development. Nor do our results indicate that there is negative employment development in forest sectors because of the proximity to national parks or nature reserves, as some have argued. However, although there is no strong relationship between change in tourism employment and proximity to ski lifts, it could be argued that our results provide some support for encouraging investments in ski resorts. This underlines the continued importance of winter destinations and individualized mass tourism during the winter.

Tourism development and regional development are naturally more complex than they may appear in statistical models. This means that some important issues have not been highlighted here. Our statistical models explain far from all of the variation in employment change, raising future research questions. For example, we did not calculate the multiplier effects of tourism whereby there are in fact more jobs connected to each sector than those included in the analysis. This might

Fig. 3. Residuals of the statistical analyses, plotted on the map of Swedish mountain municipalities. Cell size is 10×10 km; concurrence = 1 standard deviation.



further explain some of the unexpected positive employment change in places with positive population development. There might also be linkages between forest sector employment and tourism employment; for example, if there is positive change in tourism in an area, it potentially could stimulate the construction of hotels and cottages.

Local diversity through place-dependent activities like tourism and resource-based recreation, as well as resource extraction, might offer opportunities for

regional development and restructuring. However, with an unbalanced population, the structural problems remain. Powell et al. (2002) suggest that the most critical issue in maintaining a demographically balanced population is a vivacious economic diversification and restructuring. Furthermore, a reduced population base diminishes the ability to hold on to the already weakened basic services (Powell et al. 2002). However, we argue the reverse relationship: if the population structure is unbalanced and diminishing, there will be difficulties in pursuing economic restructuring and

diversification. From a local and regional development perspective, this has implications for the outcome of many policy measures aimed at encouraging tourism development and stimulating regional development. The reason for this is simply that tourism development is not equal to regional development, nor can it be an overarching goal for all areas and regions. Tourism must be considered carefully on a local basis, something which is not being done currently.

Responses to this article can be read online at:
<http://www.ecologyandsociety.org/vol15/iss1/art19/responses/>

Acknowledgments:

This study was partially financed by FjällMISTRA. We thank Associate Professor Bruno Jansson, Department of Social and Economic Geography, Umeå University, for valuable comments.

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APPENDIX 1. The Swedish Standards Industrial Classification codes for tourism.

SNI92 Key

55111 Hotels with restaurant, except conference centres

55112 Conference centres, with lodging

55120 Hotels and motels without restaurant

55210 Youth hostels, etc.

55220 Camping sites, etc., including Caravan sites

55230 Other short-stay lodging facilities

55300 Restaurants

55400 Bars

55521 Catering for the transport sector

61200 Inland water transport

62100 Scheduled air transport

62200 Nonscheduled air transport

63210 Other supporting land transport activities

63301 Activities of tour operators

63302 Activities of travel agencies

63303 Tourist assistance

92320 Operation of arts facilities

(con'd)

- 92330 Fair and amusement park activities
 - 92340 Other entertainment activities
 - 92520 Museum activities and preservation of historical sites and buildings
 - 92530 Botanical and zoological gardens and nature reserves activities
 - 92611 Operation of ski facilities
 - 92612 Operation of golf courses
 - 92722 Operation of recreational fishing waters
 - 92729 Various other recreational activities
 - 52485 Retail sale of sports and leisure goods
 - 05021 Fish farming
-

APPENDIX 2. The Swedish Standards Industrial Classification codes for forestry and forest-related activities.

SNI92 Key

Forestry

02011 Growing of standing forest and standing timber

02012 Reforestation and forest conservation

02013 Logging

02014 Production of forest plants and seeds

02019 Other forestry activities

02021 Timber evaluation

02029 Other forestry and logging related service activities

Sawmill industry

20101 Sawmilling

20102 Planing of wood

20103 Impregnation of wood

Wood processing industry

20201 Manufacture of veneer sheets, plywood, and laminboard

20203 Manufacture of fibreboard

20301 Manufacture of prefabricated wooden buildings

20302 Manufacture of other builders' carpentry and joinery

(con'd)

20400	Manufacture of wooden containers
20510	Manufacture of other wood products
36110	Manufacture of chairs and seats
36120	Manufacture of other office and shop furniture
36130	Manufacture of other kitchen furniture
36140	Manufacture of other furniture
45211	General construction of buildings
Pulp and paper industry	
21111	Manufacture of mechanical or semi-chemical pulp
21112	Manufacture of sulphate pulp
21113	Manufacture of sulphite pulp
21121	Manufacture of newsprint
21122	Manufacture of other printing paper
21123	Manufacture of kraft paper and paperboard
21211	Manufacture of corrugated paper and paperboard and corrugated board containers
21129	Manufacture of other paper and paperboard
21219	Manufacture of other containers of paper and paperboard
21220	Manufacture of household and sanitary goods and toilet requisites
21230	Manufacture of paper stationary
21250	Manufacture of other articles of paper and paperboard n.e.c.

(con'd)

Wholesale trade with wood products

- 51130 Agents involved in the sale of timber and building materials
- 51150 Agents involved in the sale of furniture, household goods, hardware, and ironmongery
- 51471 Wholesale of furniture and interior fittings
- 51473 Wholesale of stationery and other office supplies
- 51530 Wholesale of wood, construction materials, and sanitary equipment
- 51562 Wholesale of packaging materials

Nature reserves and national parks

- 92530 Botanical and zoological gardens and nature reserves activities
-