

Analysis of Nature-Based Tourism in the Sumava National Park, Czech Republic: 1997-2004

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Introduction

The past decades have seen a pronounced increase in tourism, both domestically and internationally. Tourism is primarily based on mobility and the consumption of distances, places and visual images. Therefore, it has traditionally been regarded as an environmentally benign sector, with a positive economic impact on local, regional and national economies. However, since the mid-1970s, evidence of tourism's negative environmental, economic and social impacts has accumulated. Natural areas and protected areas are the most vulnerable. They are visited by a growing number of visitors, both in the Czech Republic and abroad. Travel defined by its principle aim – visiting natural areas – is called nature-based tourism.

On a global scale, nature-based tourism accounts for about 10% of international tourism and is often regarded as the fastest growing tourist sector, with annual growth rates of 15% (Gössling 1999). Official indicators of nature-based tourism's volume in the Czech Republic are not available; the only published expert study found nature-based destinations to have a 17% share among the "126 top tourist areas in the Czech Republic".

As tourism is probably the world's largest industry and nature-based tourism is becoming an increasingly important sector, the direct and indirect impacts on protected areas are on the rise (Gössling 1999). Therefore, a systematic research and monitoring of nature-based tourism

in protected areas is needed. In the Czech Republic, Sumava National Park was chosen as a study area for monitoring and assessing nature-based tourism development over a longer (eight year) period. It is the country's largest national park, visited by 1.1 to 1.3 million visitors annually.

Methods

Results are based on annual surveys that were carried out in the high summer season over a nine day period at four monitoring points in the central part of the park, from 1997 to 2004. The survey's methods include interviewing a random sample of visitors, via an extensive questionnaire. The following number of questionnaires were collected:

$N_{1997} = 1,274$, $N_{1998} = 1,020$, $N_{1999} = 1126$, $N_{2000} = 665$, $N_{2001} = 959$, $N_{2002} = 648$, $N_{2003} = 900$, $N_{2004} = 911$.

The questionnaire was split into nine sections with 42 questions in total:

- Tourist socio-demographic characteristics (7 questions)
- Itineraries (5 questions)
- Modes of transport and types of accommodation (5 questions)
- Purpose of visit and role of the national park (5 questions)
- Environmental awareness of visitors (6 questions)

- Evaluation of conservation and tourism management in the park (4 questions)
- The park's carrying capacity in terms of visitor numbers (3 questions)
- Tourist activities and spending in the national park (7 questions)

Over the eight years of monitoring, 7,503 completed questionnaires were collected. The total number of records derived from these questionnaires was 450,000. The primary data were entered into an MS Access database and statistically processed in the NCSS program (Hintze 2001). In the next stage, the primary data were statistically treated using the χ^2 test for evaluating cases where results differed between different years of monitoring. In such cases, a modifier pair test, based on the Bonferroni Difference was used for identification of the particular year and sub-question where the difference occurred.

Further, the χ^2 test and Kruskal-Wallis one-way ANOVA were employed to determine differences between visitors' socio-demographic characteristics and their attitudes and opinions towards management of the park. CO₂ emissions related to the three tourism sub-sectors (travel to and from the park, travel within the park and visitor accommodation) were calculated for the years 2000-2004. Regarding transport, calculations were based on emission factors, occupancy (load) rates and travel distances both to the park and within the park. For accommodation, calculations were based on an estimation of energy use associated with various types of accommodation, as well as relevant emission factors.

Finally, total individual CO₂ emissions for each park visitor were calculated by adding up emissions from transport to/from the park, transport within the park and accommodation. Regression analyses were carried out to investigate the extent to which different factors determine the total emissions of CO₂ per person. Kruskal-Wallis one-way ANOVA was used to determine differences between visitor characteristics with regard to total emissions of CO₂.

The calculation of CO₂ emissions was limited by several uncertainties and simplifications, e.g. the calculation of emission factors, the use of the na-

tional average load factors for busses and trains, the estimation of average distances travelled within the national park, the use of New Zealand's data on accommodation energy intensity and the omission of CO₂ produced by tourists' internal metabolisms. Combined, these errors and uncertainties may amount to 20-30% of the total results. The total margin of error is therefore 20-45% (a tentative and indicative estimate).

Results

Comparing Sumava National Park's visitors with the population of the Czech Republic, we learned that the first group is better educated, higher in social status and more often male than female. Further, park visitors tend to be in the middle (25-39 years) and upper-middle (40-59 years) age groups. These findings correspond with many authors and institutions dealing with nature-based tourism and eco-tourism (e.g. Wight 1996).

Positive trends

The results of monitoring show that nature-based tourism in Sumava National Park went through significant change over the eight years of study. From the point of view of regional sustainable development, some positive trends can be named, i.e. the regional, semi-autarkic character of tourism in the park; the fact that the distances travelled by tourists within the park have not increased; the fact that the costs of recreation have not grown faster than inflation; and the positive attitudes towards conservation management in the park.

The regional, semi-autarkic character of tourism in the park can be illustrated by two findings. Firstly, in the national make-up of respondents, there is a prevailing domination of Czech tourists. Over the eight-year period, an average of 93% of park visi-

Table 1: Travel distances to SNP (in km).

Year	1997	2000	2004
<i>N (number of respondents)</i>	1,122	557	795
Average distance	198	196	204
Median distance	160	160	170
Minimum	40	40	40
Maximum	625	676	626

tors were Czech. The share of foreign visitors has never exceeded 10%. If we focus in more detail on the Czech visitors, the highest proportion of tourists came from nearby districts. Prague and nine other nearby districts accounted for 55% of the Czech visitors.

The median travel distance by Czech tourists to the park increased only 10 km over the eight years. Average distances increased by 8 km (table 1). First-time visitors are mostly younger people and students, mostly from distant larger cities. Repeated visits to the park are mainly from nearby regions.

The distance travelled to the national park is an important indicator from the point of view of associated CO₂ emissions (see below) and for the estimation of the recreational value of the park using the travel costs method.

The median recreational costs per visit (costs spent by tourists for accommodation and food in the park) rose from 2,100 CZK (82 USD) in 1997 to 2,800 CZK (109 USD) in 2004. This represents an increase of 33%, which corresponds with inflation over the same period. Multiplying

the median recreation costs per tourist stay with the lower estimate of total annual visits to a broader region of Sumava (1.1 million) reveals a rough approximation of the total gross annual expenditures on recreation in Sumava National Park. For the year 2004, the result is 1.65-2.20 billion CZK (64-86 million USD), which is 9-12% of the total domestic expenditures on recreation.

Finally, tourists' attitudes towards conservation management can be regarded as positive. For example, if we use the eight-year average, 57% of those visitors polled declared their unwillingness to enter the forbidden Zone 1 of the park; 65% of visitors were able to cite specific ecological problems in the park; and only 17% suggested that the environmental quality in the park has declined over the past years. However, this was the highest share among the Czech national parks.

Negative trends

On the other hand, significant negative trends were also identified, i.e. a growing dependence on car use, a reaching of the park's carrying capaci-

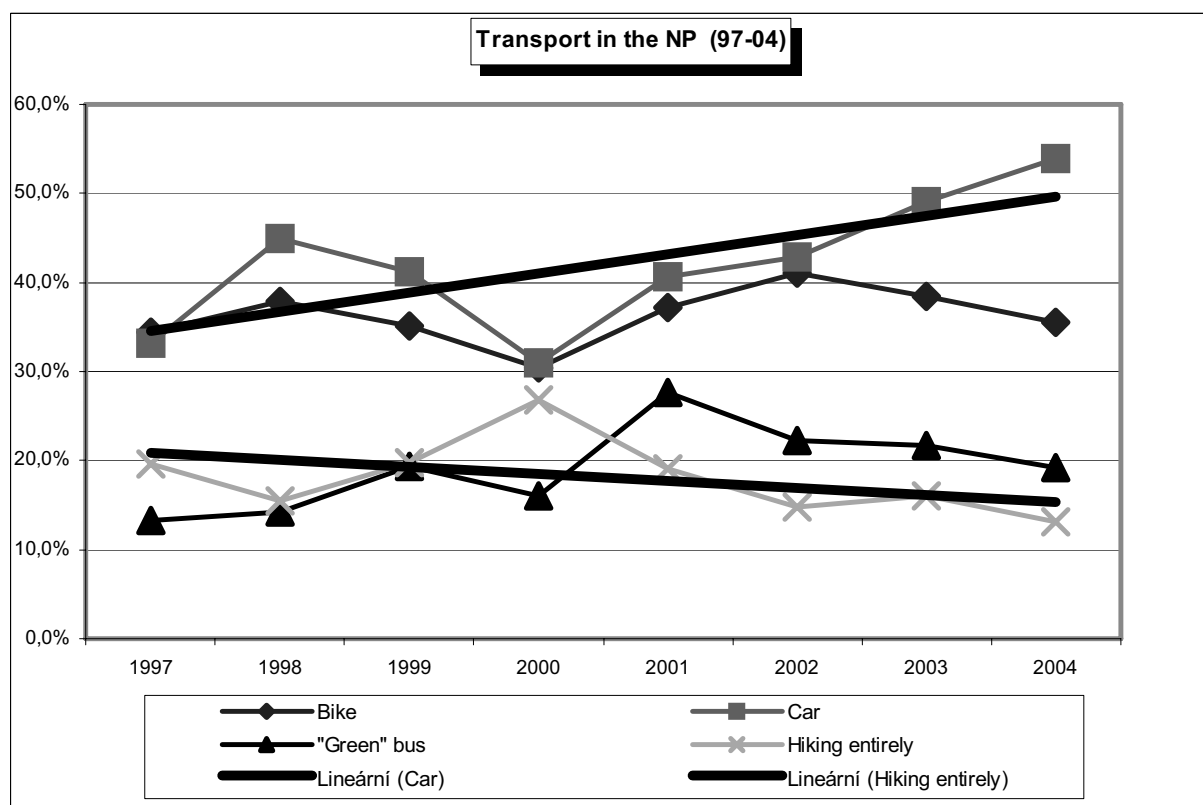


Figure 1: Transport modal split in the Sumava National Park (1997-2004).

ty in terms of visitor numbers, an increasing level of consumption among visitors, a passive form of tourism developing and a very small share of active ecotourists among park visitors.

The car dependence of travelling to and within the park increased over the monitoring period. On average, 82% of visitors travelled by car to the park. This share increased from 78% in 1997 to 85% in 2004. The bus was the second most popular travel mode, but its share of modal split was 10 times smaller. While travelling within the park, most visitors combine different travel modes. However, several important trends were identified, such as a decreasing share of people using entirely non-polluting modes of transport (walking or walking/cycling). From 2000 to 2004, their number decreased from 48% to 31%. Secondly, the share of car use in combination with other transport modes has grown proportionally (from 33% to 54% – see figure 1).

According to several authors (e.g. Hall 1999), transport for tourists is not just a means of getting from A to B, but can be an end in itself. Experience while in transport is then an essential part of the tourist experience (Hall 1999). In this context, transport to/from the Sumava National Park and

especially transport within the park is an important part of the nature-based tourism experience. To meet the objective of CO₂ emissions reduction associated with passenger transport, a modal shift away from cars is necessary. As our results illustrate, nevertheless, most of the people associate their nature-based tourism experience with using a car. Paradoxically, the nature-based tourism experience is to some extent a car-based experience and changing the modal choice of visitors would therefore require altering the way they experience nature. It is not surprising that policies aimed to reduce car dependence have so far had only minor influences on behaviour.

The carrying capacity of visitor numbers in the central areas of the park has nearly been reached. Only a small percentage of visitors (less than 5%) would not mind if the number of visitors increased further. The feeling that tourism is too concentrated is more widely held by tourists in the park's central areas than in the more peripheral areas (in 2004, 53% of visitors stated that the intensity of tourism is too high). The carrying capacity of visitor numbers has been reached or even exceeded in many protected areas worldwide (Gössling 1999).

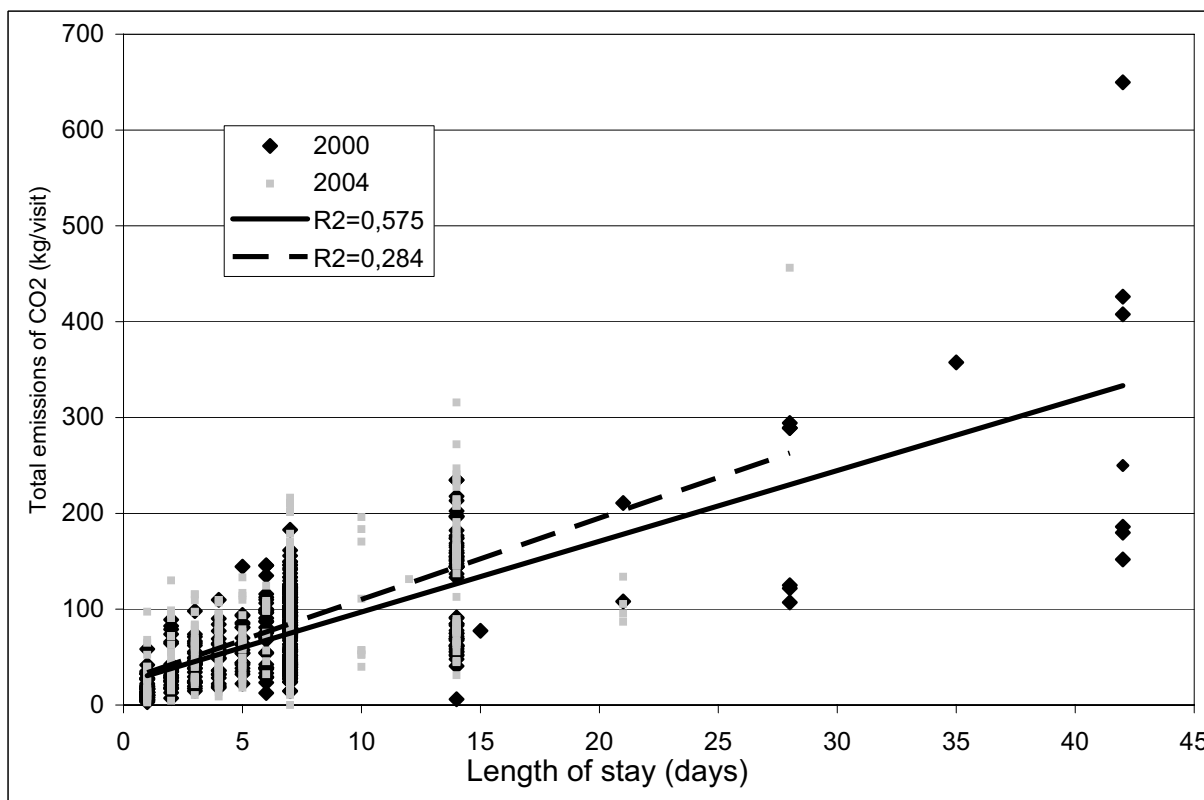


Figure 2: Regression analysis for length of stay and total emissions of CO₂ per visit for 2000 and 2004 data.

The most sensitive areas are protected areas in developing countries, which are exposed to an ever-growing number of visitors (Boo 1990).

Several trends have been identified suggesting a growth in consumption and a passive form of tourism in Sumava. The consumption patterns of park visitors were shifting towards less sustainable options – car dependence increased as well as the ‘pace of visit’ (preference of cycling over walking, etc.). Based on the results of the survey, we estimated the share of active eco-tourists among park visitors to be only 3-5%. The rest of the visitors may be categorised as passive eco-tourists.

Regarding visitors’ perceptions of Sumava National Park, we learned that it is to a large degree based on mental images of the Sumava (“clean, pristine, natural nature”). However, over the last years, this image contradicted reality in the park. The image didn’t inspire visitors to act accordingly – in a more environmental friendly way.

CO₂ emissions from nature-based tourism

Concerning the CO₂ emissions caused by nature-based tourism in Sumava National Park, expressed both per visit and per person, results reveal growing emissions (by 9% from 74.3 kg CO₂/visit/person to 81.6 kg CO₂/visit/person). The accommodation sector dominates total CO₂ production, with a 63% and 62% share in 2000 and 2004, respectively.

Regression analyses were carried out to investigate whether there is a linear relationship between the total emissions of CO₂ per person and two explanatory variables: length of stay and distances travelled to the park. The results show that there is a positive correlation between length of stay and emissions of CO₂ in 2000 ($r^2 = 0.575$; correlation coefficient 0.7585; $P = 0.000$). This relationship was weaker but still significant in 2004 ($r^2 = 0.284$; correlation coefficient 0.533; $P = 0.000$) – see figure 2.

In 2004, distance was also a significant factor ($r^2 = 0.262$; correlation coefficient 0.512; $P = 0.000$), which means that 26% of variations in total emissions of CO₂ per visit in 2004 can be explained by distance travelled to the park. In 2000, this relationship was weaker ($r^2 = 0.077$; correlation coefficient = 0.278; $P = 0.005$).

Several conclusions for the Park Administration and regional tourism management have been derived from the above-mentioned results. The Park Administration should be aware of temporary trends of nature-based tourism in Sumava and should actively prevent continuous attempts for ‘hard’, quantitative development of the tourism industry in the park. The environmental information system of the Park Administration has to be reconceptualised to meet the true mental images of the park. It should also try to highlight alternatives to the way that most people currently experience nature, which is based on car use. Moreover, it was suggested that the Park Administration conduct research based on the willingness-to-pay method to set the optimal level of the park entrance fee. If established, entrance fees can generate a significant amount of income to finance the Park Administration’s activities connected with tourism.

Finally, the biggest challenge for all ‘stakeholders’ is to change human behaviour patterns in the park. This will be a time-consuming process and both governmental and Park Administration actions are essential for the enforcement of appropriate measures. To provide valuable scientific arguments for such measures, further research is needed on the tourism-national parks interface, especially with regard to direct and indirect impacts of tourism.

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