Conference Volume	4th Symposium of the Hohe Tauern National Park for Research in Protected Areas September 17th to 19th, 2009, Castle of Kaprun	Pages 17-19

The "Untere Lobau" Biosphere Reserve – The management challenge between urban recreation demands and nature conservation

Arne Arnberger[1], Renate Eder[1], Fredy Frey-Roos[2], Ursula Nopp-Mayr[2], Hemma Tomek[1], Gerald Muralt[2], Margit Zohmann[2]

[1] Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Applied Life Science, Vienna, Austria

[2] Institute of Wildlife Biology and Game Management, University of Natural Resources and Applied Life Science, Vienna, Austria

Summary

Peri-urban protected areas are confronted with high use pressures often exceeding their ecological and social carrying capacities. The goal of this project was to improve the management of the heavily used peri-urban Untere Lobau biosphere reserve in Vienna through the integration of social and ecological carrying capacities. The objectives were (1) To assess the impacts of high-use levels and visitor behaviour on visitors' outdoor recreation experience and analyse compensatory strategies of visitors' and local residents' use due to overcrowding perceptions using interviews and route analysis, and (2) Assess impacts of different human use levels on wildlife (red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), European beaver (*Castor fiber*)), using monitoring methods in parallel over a period of two years. Results indicated that, due to exceeded social carrying capacities, impacts on wildlife are increased.

Keywords

Social carrying capacities, Place attachment, Ecological carrying capacities, Protected Area, Visitor monitoring, Wildlife monitoring

Study aims

Urban protected areas are important components of cities, providing many benefits to society. They are places for outdoor recreation activities, refuges from hectic city life and valuable habitats for wildlife. At the same time, these areas are confronted with high-use levels that often exceed their ecological and social carrying capacities. There is a need for monitoring carrying capacities; however, knowledge about this topic is often rather limited. As social carrying capacities and ecological carrying capacities are closely related, a complex monitoring scheme, using several social and wildlife science methods in a comparative manner over an extended period, is needed. The heavily used "Untere Lobau" biosphere reserve in Vienna has been chosen as a test area to analyse several indicators of carrying capacities by:

Assessing the impacts of high-use levels and visitor behaviour on local residents' and visitors' outdoor recreation experience, and analysing the compensatory strategies (coping behaviour) of respondents due to overcrowding (ARNBERGER & BRANDENBURG, 2007),

Assessing impacts of recreation use on wildlife - red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), beaver (*Castor fiber*),

Understanding the attachments that local residents and visitors form with the protected area to enhance land managers' ability to address a deeper understanding of the landscape and place-specific symbolic values in natural resource management (WILLIAMS & VASKE, 2003).

Duration of the Project

The project, called "Ecological and Social Carrying Capacities as Management Challenges for Peri-Urban Biosphere Reserves – The Upper Lobau" started in spring 2005 and lasted three and a half years. The project was co-financed by the Austrian Man and Biosphere Programme of the Austrian Academy of Sciences.

Area of study

The "Untere Lobau" biosphere reserve of 1100 hectares in size lies within the municipal boundaries of the City of Vienna. The area was declared a biosphere reserve in 1977 and is part of the Donau-Auen National Park. Suburbs of Vienna, rural communities, areas of intensive agriculture, the "Obere Lobau" national park area and the Danube River border the area. About 150,000 people live within a few kilometres of its borders, and about 2.5 million live in the region. The Viennese part of the national park is a traditional, intensively used, recreation area as documented by at least 600,000 visits during the year (ARNBERGER, 2006). The "Untere Lobau" receives fewer visits compared to the "Obere Lobau", which is closer to the urban settlements.

Methods

Social and wildlife monitoring methods were applied in parallel during the period of two years (Table 1). A postal survey, using a modified Dillman approach (1978), was carried out among local residents in 2006. More than 600 residents answered the questionnaire. On-site interviews with about 600 visitors, including a route questionnaire about the trails which visitors had used during their visit of that day, were carried out in 2006. Long-term visitor counting was done using counting devices.

Temporal-spatial behaviour patterns of red deer and roe deer were analysed by using GPS- and VHF-telemetry. Beaver monitoring was conducted by mapping activity signs as well as spatial distribution on selected sample plots.

Table 1: Principal methods applied for the study

Method		Period
Mail survey (N = 602; response rate 53%)	Local population (22nd district of Vienna; community Groß-Enzersdorf)	Late winter to early spring 2006
On-site interviews (N = 605)	Visitors to the Untere & Obere Lobau; at main access points	Spring to autumn 2006; 8 days
Visitor counting by pressure pads, infra-red sensors and image-based observation systems	Several trails in the Untere Lobau	Continuously from late winter 2006 to summer 2008
In-depth interviews	Interviews with experts in urban planning, tourism, agriculture, nature conservation, etc.	During 2005
GPS- and VHF-Telemetry of wildlife	Roe deer and red deer (a total of 5 individuals)	Spring 2006 to autumn 2008
Beaver monitoring	Direct field observations of behaviour Mapping of activity signs	Late spring to December 2006 Winters of 2005/06, 2006/07 and 2007/08.

Results

Local residents, as well as people coming from further away, are very frequent visitors to the Lobau. The Lobau accounts for about 70% of all recreational visits to green spaces in and around Vienna made by local visitors. Respondents assigned very high place attachment and satisfaction scores to the protected area. About half of them indicated overcrowding perceptions on Sundays, and applied coping behaviour because of the overall crowded situation. The strategy most often used was intra-area use displacement, such as off-trail use or a shift of use to less frequented areas. Temporal use displacement was characterised by a shift from weekend to workday use or a shift from afternoon to evening use. A route analysis confirmed the existence of intra-area use displacement due to overcrowding, affecting the Untere Lobau, which harbours very valuable areas for nature conservation.

An analysis of wildlife behaviour patterns indicated that red deer remain in dense vegetation during the day, and went out to open areas (meadows) only during the night. Roe and red deer avoided areas with heavily used trails. Changes in the behaviour patterns of beavers due to variations in recreation use intensities were not observed their main activity periods hardly overlapped with human recreational activities.

Discussion

This urban protected area is confronted with high-use levels, which diminish the visitors' recreation quality. In conditions of overcrowding, visitors activated coping behaviour. Because of high place-attachment values and the lack of attractive recreational areas in the vicinity of the Lobau, intra-area and temporal displacement are the most frequent forms of coping behaviour. However, use displacement increases the problems for the environmental management. Greater dispersal of unpredictable visitor use in time and space increasingly fragments the already heavily used area thereby limiting further undisturbed zones for wildlife. Thus exceeded social carrying capacities seem to increase the use pressure on park wildlife. Strategies for reducing use pressure should address unwanted visitor behaviour (off-leash dog walking, off-trail use) and the establishment of an attractive buffer zone around the area for absorbing visitors.

References

ARNBERGER A. (2006): Recreation use of urban forests: An inter-area comparison. Urban For. Urban Green. 4(3-4), 135-144.

ARNBERGER A. & BRANDENBURG C. (2007): Past on-site experience, crowding perceptions and use displacement of visitor groups to a peri-urban national park. Environ. Manage. 40, 34-45.

DILLMAN D. (1978): Mail and telephone surveys: The total design method. New York: John Wiley& Sons, Inc.

WILLIAMS D.R. & VASKE J.J. (2003): The measurement of place attachment: Validity and generalizability of a psychometric approach. For. Sci. 49(6), 830-840.

Contact

Priv. Doz. Dipl.-Ing. Dr. Arne Arnberger
arne.arnberger@boku.ac.at

Dipl.-Ing. Renate Eder
renate.eder@boku.ac.at

Dipl.-Ing. Hemma Tomek
hemma.tomek@boku.ac.at

Institute of Landscape Development, Recreation, and Conservation Planning
BOKU - University of Natural Resources and Applied Life Sciences
Peter Jordan-Straße 82
1190 Vienna
Austria

Dr. Fredy Frey-Roos
alfred.frey-broos@boku.ac.at

Dipl.-Ing. Dr. Ursula Nopp-Mayr
ursula.nopp-mayr@boku.ac.at

Mag. Gerald Muralt
gerald.muralt@boku.ac.at

Mag. Margit Zohmann
margit.zohmann@boku.ac.at

Institute of Wildlife Biology and Game Management
BOKU - University of Natural Resources and Applied Life Sciences
Gregor-Mendel-Straße 33
1180 Vienna
Austria