Leisure activities - a red rag for wildlife management and nature conservation: an indicator- and spatial planning-based approach for identification of conflict areas

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Leisure as well as recreational activities are often a red rag for wildlife management and nature conservation. The numbers of visitors in recreational areas as well as in nature conservation areas are rising, as is the number of different leisure activities and their demands on landscape and habitats of wildlife species. As a consequence, interactions between leisure activities and requirements of wildlife species are increasingly often a source of conflicts.

The complexity of human-wildlife conflicts calls for innovative, integrated and foresighted approaches to conflict management that are based on objective data and transparent analysis of those conflicts. The study "IESP - Towards Integrated Ecological Spatial Planning for the Wienerwald Biosphere Reserve" developed a professional and methodical basis for anticipatory management of conflicts. The main objective of the study was to develop and demonstrate an integrated spatial planning framework for the management of conflicts between recreationists and wildlife in the Wienerwald Biosphere Reserve in Austria. The study was based on an interdisciplinary and participatory research design as well as on geographic information system (GIS) assisted methods to identify and assess human-wildlife conflict potentials in a spatially explicit way.

Methods

The research team used a two-fold indicator approach, one for wildlife and one for recreation activities: Significant Indicator Species (SIS) and Significant Indicator Recreation Activities (SIRA). Both fulfil umbrella functions for other species and activities. In collaboration with local experts the following hunted and protected animal species were selected as SIS: Red Deer (*Cervus elaphus*), Wild Boar (*Sus scrofa*), Black Stork (*Ciconia nigra*), Capercaillie (*Tetrao urogallus*), and Ground Squirrel (*Spermophillus citellus*). The selected SIRA represent recreation activities that are practised frequently in the region and have a high ecological disturbance potential: mountain-biking, jogging, geocaching, activities with dogs, and ballooning. Knowledge on the distribution of SIS in space and time was gathered by in-depth interviews with local experts and from hunting bag statistics and monitoring data. The spatio-temporal distribution of SIRA was modelled as "recreational use probability" in a GIS environment, based on driving factors in the source and target areas of recreationists derived from e.g. empirical socio- and psycho-demographic profiles, population densities, infrastructure network, landscape suitability attributes, and behavioural preferences of each group. By overlaying GIS layers on SIS (habitat use, population density, connectivity) and SIRA (distribution, use intensities), spatial conflict potentials were identified and then validated with the help of stakeholders.

Results

The results of the study include profiles and characteristics of indicator wildlife species and of indicator recreation activities. Furthermore, the habitat situation and spatial distribution of the SIS as well as the intensity, spatial distribution, and likelihood of occurrence of the SIRA have been identified. A methodical toolbox for GIS-based modelling of the potential occurrence of recreation activities and for spatial analyses of conflict potentials has been developed and prepared for future applications.

Results of the analysis were used to elaborate a catalogue of action strategies and conflict management measures. The recommendations cover measures and decision support for visitor management, communication, information and public relations, prioritisation of spatial aspects and for monitoring of conflict potentials and adaptive management.

Measures proposed range from such on small scale basis as e.g. visitor management measures making sensitive areas less attractive for visitors as well as measures on a larger scale as e.g. land use planning (settlement development...), planning of infrastructure or modes of transport.

In addition, strategic recommendations for the usage of the study results within the Wienerwald Biosphere Reserve as well as for participative follow-up proceedings to implement spatial and ecological conflict management in practice have been provided to the stakeholders.

The results of the analysis, including sets of GIS-based maps, are valid specifically for the Wienerwald Biosphere Reserve (fig. 1). The methods for modelling and analysing conflict potentials, many recommendations for action as well as the conceptual framework to combine measures and spatial analysis of conflicts are transferable to other areas.

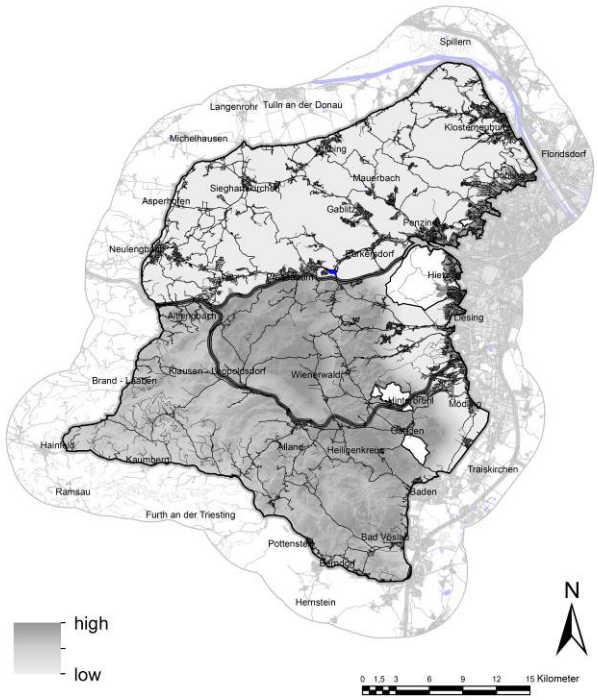

Figure 1: Areas of Conflict Potentials between Red deer (*Cervus elaphus*) and mountain biking (Reimoser et al. 2012)

Project results are communicated to target groups within and beyond the Wienerwald Biosphere Reserve. These include stakeholders that have a role in the emergence of conflict potentials, are affected by the consequences of conflicts, may influence the management of conflicts, or have an interest in their resolution.

References

Reimoser F., Lexer W., Brandenburg Ch., Ziener K., Schreiber B., Bartel A., Tomek H., Heckl F., Hirnschall F., Kasper A. (2012): IESP - Towards Integrated Ecological Spatial Planning for the Wienerwald Biosphere Reserve

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