54 Disturbance caused by recreational activities -Case study Regional Nature Parc Beverin (RNPB), Switzerland

Martin Wyttenbach, **Felix Volpert**, **Adrian Hochreutener**, **Reto Rupf**, Institute of Natural Resource Sciences, ZHAW - Zurich University of Applied Sciences, Switzerland

Introduction

Due to their structural diversity and altitude gradients, mountain regions provide suitable habitats for a diverse range of wildlife and plant species (Ingold, 2005). At the same time, they are important recreational areas for humans. Due to the increase in outdoor activities, negative impacts on nature and wildlife should be counteracted by means of focussed visitor management (Clivaz et al., 2013).

The RNPB is visited by tourists all year round, with a greater proportion in the summer season. The landscape consists mainly of forests, alpine areas, extensive meadows, pastures, habitats for pioneer species, and covers an area of 412 km^2. The RNPB aims to enable recreationists to experience nature without disturbing it at the same time. In order to achieve this goal, it is necessary to determine which types of recreational activities may be practised in the area and how they can be characterised (spatially, temporally, frequency). The aim of this study is to identify areas in summer and winter in which a potential conflict between recreationalists and nature could occur based on a spatial mapping approach.

Methods

To evaluate where recreational trails most affected sensitive wildlife, we used a geographic information system (GIS)-based approach. For this purpose, we 1) chose relevant recreational infrastructures; 2) determined where wildlife habitats are in proximity of trails; 3) identified the ecological sensitivity of the habitats affected and 4) calculated the loss of available habitat.

Recreational trails were represented by official hiking and mountain biking trails (summer), and snowshoe, backcountry skiing routes, winter hiking and sledging trails (winter). Depending on the movement pattern of recreationalist traffic, recreational trails were assigned linear or planar. The selection of relevant wildlife species was based on a literature review and discussions with experts. Target species were then grouped into species groups representative of different habitats (Graf et al., 2012). The sensitivity of habitat areas was based on the species composition and their sensitivity to disturbances caused by recreationists. If multiple species occurred, their sensitivity was cumulated. To identify trail sections affecting a habitat, the habitats were blended with the recreational trails. Habitat loss was calculated as the share of recreationally-affected habitat divided by the total habitat area. Finally, we assigned each trail section a potential ecological conflict class (no, low, medium, high and very high), according to the sensitivity and habitat loss.

The results were visualised as topographical maps (summer/winter), which show the recreational trails in graded shades of red, depending on their ecological conflict potential.

Figure 1: Schematic illustration of the potential for ecological conflict of the path infrastructures in a section of the RNPB in summer. The buffer around the recreational trails represents the area of the available habitat affected.

Results

The habitats most affected during summer are forests, alpine areas, extensive meadows and pastures. Conflict potential was assigned to 87 % of the trail sections. Low to medium conflict potential is to be expected in 72 % of the trail sections and high or very high conflict potential in 15 %. Furthermore, the analysis shows that in highly sensitive habitats, up to 46 % of available habitat can be affected by recreationists. In low and medium sensitive habitats, 34 % and 41 % respectively of the available habitat can be affected.

The habitats most affected during winter are forests and alpine areas. For 45 % of the recreational trail sections, potential conflict was assigned. Trail sections with low to medium conflict potential were assigned to 28 % of the path network. A total of 17 % of the path sections showed high or very high conflict

potential. Furthermore, the analysis shows that in highly sensitive habitats up to 22 % of available habitat can be affected by recreationists. In low and medium sensitive habitats, 33 % and 26 % respectively of the available habitat can be affected. In summer, a larger proportion of the recreational trails indicates potential for conflicts than in winter. Increased conflict potential is mainly present in areas where multiple species occurred in the same habitat (Figure 1).

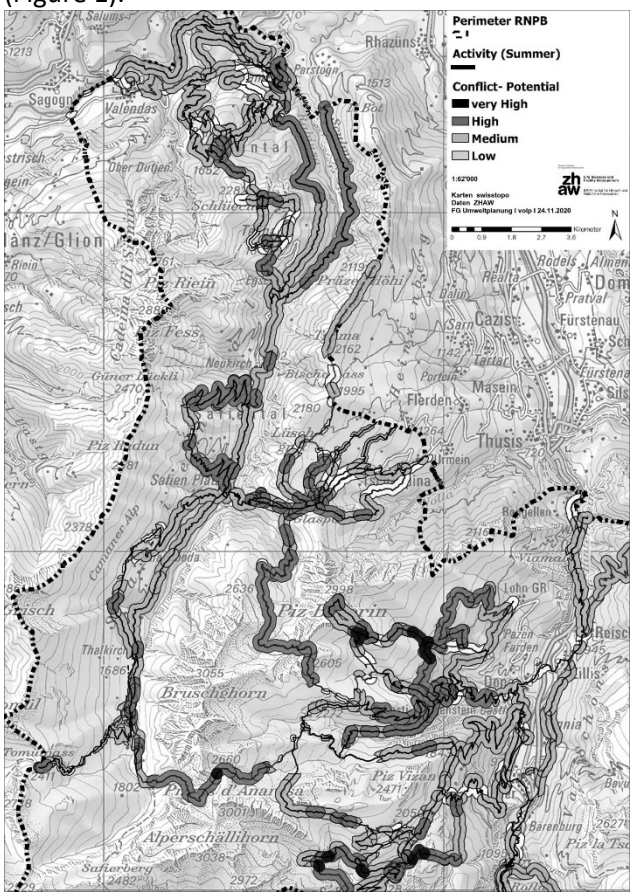

Figure 1.

Conclusions

The results of the study indicate that the ecological conflict potential between recreationalists and wildlife is higher in summer than in winter. This is primarily because the habitat areas are larger in summer. Therefore, the chances are higher that a trail crosses habitats. During winter, wildlife is often concentrated in small areas and, due to external conditions, it needs to conserve energy and is physically adapted to do so (Graf et al., 2012). Travelling in deep snow is energy intense. Therefore, we want to stress that in winter wildlife often reacts much more sensitively to disturbances than during summer. It should be noted that despite wildlife being concentrated in small areas, winter recreation activities are often carried out over a wide area, some of which may be inaccessible in summer, so wildlife is still at significant risk of being disturbed.

We calculated potential ecological conflicts based on wildlife habitats and recreational infrastructure features. However, the frequency of disturbance can have a decisive influence on wildlife reactions (Tablado & Jenni, 2015). In this context, visitor monitoring data is important to alleviate human-wildlife conflict.

By using a GIS-approach, we demonstrated how to locate areas with potential ecological conflict over a large region. This basis in combination with a participative process involving various stakeholders allows the establishment of a visitor management system including visitor guidance measures. In a next step, the inclusion of visitor count data may be included and the results verified in the field. The analysis may be employed in other protected areas to identify potential conflict zones between recreational infrastructure and wildlife.

References

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