

Spatial Requirements of Outdoor Sports in the Nature Park Southern Blackforest – GIS-based Conflict Analysis and Solutions for Visitor Flow Management

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INTRODUCTION

The fascination of outdoor-sports has been growing in recent years. The affected areas offer numerous experiences of nature and activity in which the image of an exclusive outdoor lifestyle plays an important role. A continuous differentiation of classic outdoor sports into various new types of outdoor sports, including a very specific use of the natural landscape structure, is characteristic for this growth.

From an ecological point of view, this increasing use of landscape related to space and time, offers severe problems for the affected areas. Especially the multiple all-year of landscape bears a high ecological risk. The increasing pressure on nature and cultural landscape evokes numerous conflicts between protection and use of nature and landscape. Nevertheless, all outdoor sports activities have one thing in common: They depend on an intact natural landscape that offers the basis for an exclusive experience connected to outdoor sports activities.

The aim of the project is to analyse the differentiation of classic types of outdoor sports and the resulting utilisation of the specific types of landscape and area. The requirements for the area are defined from a sport scientific prospective and are judged from an ecological point of view. There are two important dimensions for the use of space through outdoor sports: Apart from the sole requirement of space, it is also very important to consider the time of use of the specific area. The multiple use of specific areas is often a crucial point.

RESEARCH AREA AND AIMS OF THE PROJECT

The Nature Park Southern Blackforest in the southwest of Germany was founded in 1999 and, with its 3300 km², it is the second largest nature park of the country. The park consists of two geologically different sections: The western part is relatively steep and valleys are numerous. The eastern part is more flat. The medium height of the nature park is 780 metres above sea level. The lowest regions are 222, the highest 1496 metres

above sea level. The park is by far the most important sports tourism region in southwest Germany. In the catchment area relevant for the daily tourism (radius of 100 km) there live more than 11 million people. Moreover, there is a high number of tourists from other parts of Germany and abroad. The Nature Park Southern Blackforest offers an extensive infrastructure for various nature sports, in summer as well as in winter. At the same time, major parts of the park are considered to be ecologically valuable areas. This is evident because of the existence of many nature conservation areas as well as „Natura 2000“-areas. They alone come to 40% of the nature park.

The development of an all-year sports tourism therefore brings about partially massive impacts. This research project aims to develop strategies that will be consistent in the future and to propose measures that enable an attractive development of outdoor sports in the region. The objective is to conserve the opportunity for experience and sports in an intact landscape and to suit the development of sports tourism to the needs of locals and guests.

METHODS

The methodology of the project can be structured as follows:

mapping out and enquiry of sports infrastructure and data on nature conservation for the analysis of the status quo.

Count of visitors and enquiring participant profiles with the help of various methods

Development of a data base for the GIS-supported analysis of the collected data

Interpretation of the findings and implementation of a strategic management

Evaluation and monitoring of the strategic goals.

The use of geographical information systems serves as a basis for all those steps.

Analysis of the status quo

The basis of a serious planning is the recording of the infrastructure related to sports tourism and the up-to-date use of sports- and leisure opportunities. All activities and structures relevant to sports tourism were recorded: hiking, cycling, mountain biking, alpine skiing, cross-country

skiing, water sports, climbing, paragliding, golf, trendsports and big sport events. At the same time, all relevant landscape ecological data has to be recorded (land use, digital terrain model, protected areas, traffic infrastructure). The collection of data was carried out by mapping out and questionnaires as well as by digitalising of maps. The aim was the implementation of an extensive data base.

Count of visitors and participant profiles

Apart from the mere inquiry of the sports related infrastructure, the basis for the next steps of the analysis is the recording of the spatial and time related distribution of the visitors. Because of the size of the park there could not be carried out an extensive count of visitors, so single model areas were chosen. For the recording of visitor numbers the outdoor activities hiking, mountain biking and cross country skiing were taken into account. Therefore, three different counting methods were used. The participant profiles were recorded with questionnaires.

Automatic count systems

These immobile systems count the visitor numbers at defined points or stretches. At the model areas, three such systems were installed. They consist of a light barrier and an electronic counter. All movements within a defined period of time are recorded for that specific stretch. The data collected allows the comparison of the visitor numbers of different days but does not give information on the overall visitor number.

Complete count

The prospective of complete counts is the recording of the overall number of visitors of an area. For this purpose counting personell at every parking place and every access counted every visitor and recorded their activities (hiking, biking, cross-country skiing, etc.).

Moment recording

By this method developed by Karameris (1982 and 1987) it is possible to record the distribution of visitors in a specific area. For this, the footpaths, MTB-trails or cross-country ski runs are parted into short stretches. A person hikes, rides or skies on the specific stretch and records the visitor number for a specific period of time. Popular stretches and points can be recorded this way. With the moment recordings average results are gathered which characterise the relative importance of the single stretches. Every stretch is only observed for a short period of time, so normally the actual use is much higher. To be able to compare the intensity of use of different stretches, the moment recording has to be combined with a complete count.

Implementation of a landscape information system

The gathering and preparation of spatial data, their evaluation, linking and carrying out in a strategic management is nowadays unthinkable without the help of electronic data processing. Systems which are able to take into account the spatial dimension apart from the objective dimension are mostly relevant for this purpose. For the strategic management of the nature park, most decisions made are based on spatial data. Because of this, the use of up-to-date geographical information systems (GIS) is indispensable.

GIS enables to collect, edit and analyse area related data digitally and to visualize it numerically or graphically. Additionally, apart from the administration of thematic data (attributes, key data) and geometric data (position, shape, size) GIS also allows topologic data analysis (space related). This data can be used for area overlay- and intersection-operations and complex terrain analysis.

For the Nature Park Southern Blackforest a specific GIS user surface was developed and implemented for the different requirements of the project, which also supports the further work of the employees of the nature park offices. All analyses described in the following are GIS-based.

CONFLICT ANALYSIS

Intensity of use

To quantify the intensity of use, the results of the gathered data, infrastructure, visitor counts and participant profiles (see 3.1 and 3.2), were related to each-other.

For the evaluation, crucial points are the real number of visitors and the intensity of use due to the specific activity.

The results suggest that beside the space and time related use of the natural landscape by a single activity especially the multiple use of the same landscape by several activities is one of the major conflicts.

Furthermore there are significant differences between the use in summer and winter. In summer mostly the whole area of the nature parc is affected. The intensity of use is relatively low because visitors are widespread throughout the whole area. In contrast, in winter the visitors are concentrated on single spots which results in a high intensity of use at these specific locations. (Fig. 2)

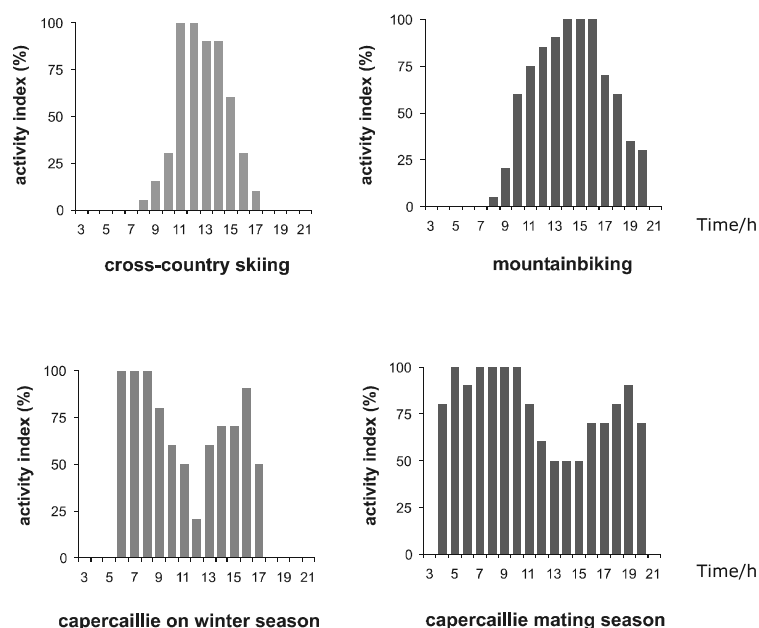


Fig. 1: Time conflict between capercaillie and cross-country-skiers and capercaillie and mountainbikers.

The example of the capercaillie (Fig. 1) illustrates the importance regarding the time of human activity compared to the time of animal activity (time conflict). The capercaillie is a bird species active during the day with specific peaks of activity in morning and evening. If the time of activity of the visitor coincides with the peak of the capercaillie's activity, the disturbance is high. On the other hand, peaks in visitor activities coincide with times of low activity, causes low levels of disturbance. Therefore different types of sports activities have different levels of disturbance on capercaillie. Due to their large action radius, mountain bikers, for example, use the landscape also after 7 p.m., a peak of capercaillie's activity. In consequence, capercaillies have to feed, mate and rear its young at times when mountain bikers use the same territory.

Potential for sports tourism in the Nature Park

Apart from the actual use of landscape through sports tourism, potential areas were singled out. As a result, areas were described which bear a high potential for specific sports activities, either for summer or for winter activities. These areas can be kept in mind for future planning.

Important factors for the usability for summer sports are the variety of landscape, the slope and the altitude. Variety of landscape can be measured by the number of changes of landscape characteristics (vegetation, use of landscape by agriculture, forestry, settlement, etc.) in a defined area, for example per km².

The slope- and altitude-impact on the potential is measured by the number and level of changes in

altitude per km². High changes in altitude increases the number of potential sports activities in the area. The results suggest that almost the whole nature park area is excellent for summer sports activities (Fig. 2).

For winter sports, especially the reliability on snow is the most important factor. To calculate this, long-term data on precipitation and temperature were taken into account. In addition to this, morphologic parameters (altitude, slope, aspect) were regarded.

As expected, highest potential for winter sports could be found along the central mountain range which divides the park from north to south. Due to the higher impact of continental climate, the eastern parts of the park have a higher potential for winter sports than the western parts if the same altitudes are compared.

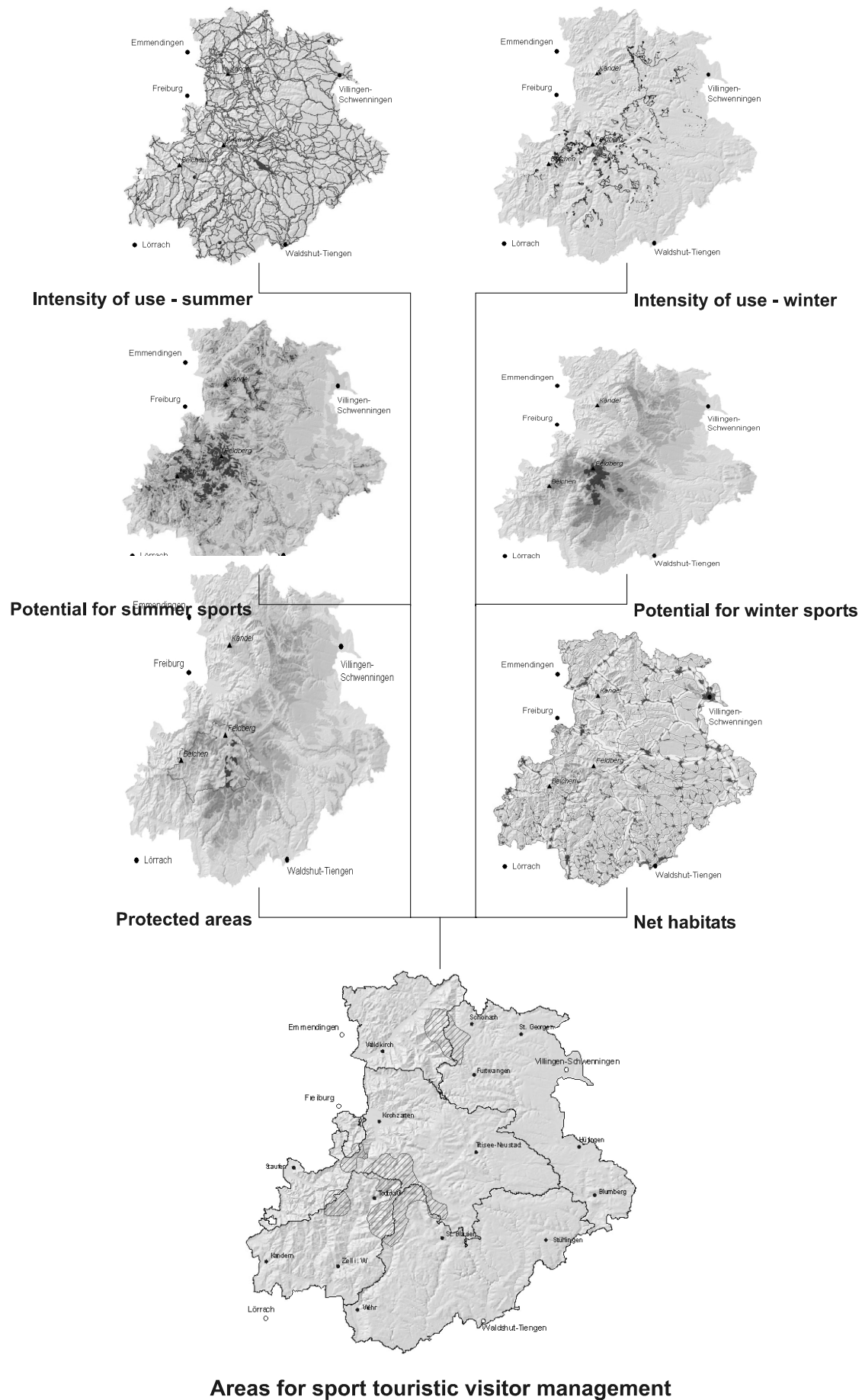


Fig. 2: GIS-based conflict analysis: calculation of visitor flow management areas for sport tourism.

Spatial conflicts

To figure out areas of conflict between nature conservation and sports activities further overlay and intersection operations have to be done in GIS.

The theme sport in landscape consists as described on two maps based on several layers: First the maps of the intensity of use, second the map of potential areas for sport activities (both separately for summer and winter; Fig. 2).

The theme nature conservation consists of protected areas and net habitats. For a large scale view the highest ranks of protected areas, “Naturschutzgebiet” and “Natura 2000”-areas, are respected. Net habitats are defined as areas, which are not intersected by settlements or traffic routes and therefore could function as potential habitats also for more demanding species.

Via different punching tools and with the help of different weight factors the themes are combined and overlayed by GIS. As a result, areas can be figured out which have a high potential for conflicts: On the one hand these areas show a high intensity or potential of sports use and on the other hand they are valuable areas for nature conservation.

Using this strategy our results display an area of 236 km² in the Nature Park Southern Blackforest with high potential for spatial conflicts. These are the areas with the highest requirements for the implementation of visitor flow management systems.

VISITOR FLOW MANAGEMENT FOR SPORT TOURISM

Channelling sport activities in designated areas with high potential for conflicts is a balance act. On the one hand the use of broad areas for sport activities should be enabled also in a high quality and on the other hand nature conservation has to be assured. Channelling measures have to be carefully planned and sometimes creativity is necessary to design an appropriate measure. Goal is always to minimize conflicts.

The level of possible adverse effects of sport on nature and landscape is determined by the factors intensity of use, kind of use, exact location, time and duration of activity.

The strategy for these designated areas is to channel and concentrate sport tourists by forming attractive sites for sport activities. Areas of concentration are either extraordinary resistant against impacts because of their natural characteristics or parts of a site are released which is the prize for protecting more valuable parts of the area.

Important tools to concentrate activities are skiing slopes, tracks and trails. They are part of a strategy which could be described as “channelling by offering comfort”. Therefore the guidelines for the Nature Park Südschwarzwald follow the principle “offerings are better then proscriptions”.

The components of a visitor flow management for sport tourism are shown in figure 3. As described, positive channelling measures are the heart of the strategy. Naturally it is important that sport activities in conflict areas are proper planned using the methods of landscape planning.

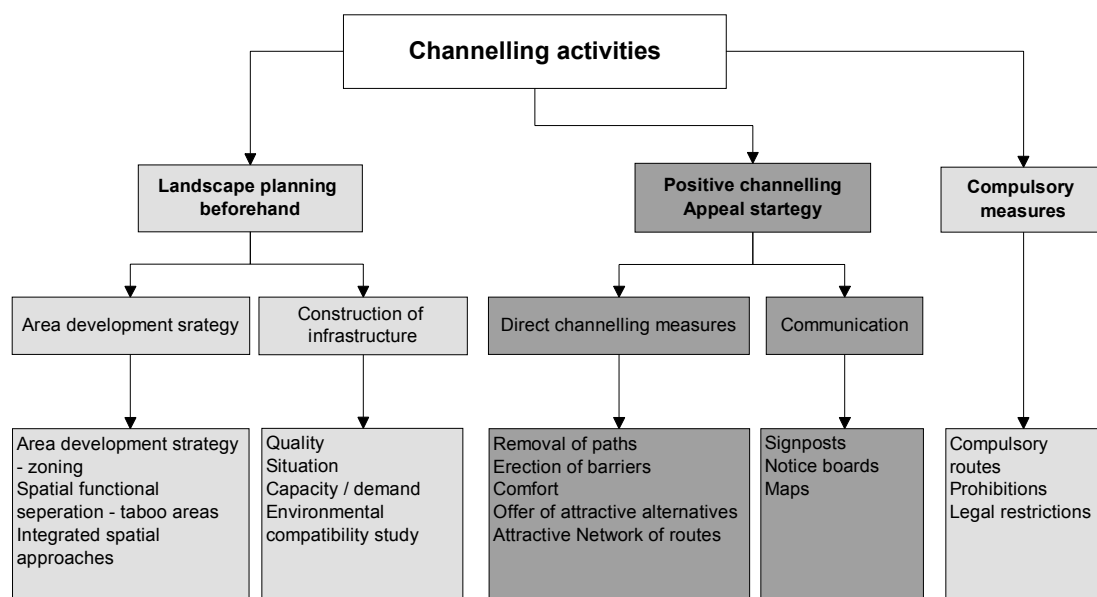


Fig. 3: Different aspects of a visitor flow management systems for sport tourism: voluntary channelling measures must become the central feature; compulsory measures should only be enforced as a last resort.

Compulsory measures are just the last solution. They should be used very careful for high sensible areas or when other measures lead to no success.

Basis for a successful implementation of a channelling strategy is co-operation between public authorities, municipalities, sport, forestry and nature conservation. Sectoral thinking has to be abandoned for an integrative approach.

EXAMPLES OF “GOOD PRACTISE” AND CHECKING SUCCESS

To perform the results of the research in designated conflict areas concrete projects have been initialised. Work groups were formed made up with all parties involved. These work groups escorted the implementation of the measures.

On basis of the carried out research on status quo and conflicts (as described above) infrastructure for sport tourism was newly designed. When rebuilding of trails (hiking, cross-country skiing, mountain biking) was done aspects of nature conservation and sport were respected. For example in the model-area called “Rohrhardsberg” the yore existing system of trails was strongly shortened. Parallel, the quality of remaining infrastructure was raised by offering new possibilities of trail combinations, resulting in a more attractive site.

In stretches highly valuable for nature conservation trails were abandoned and blocked. The trails were displaced in neighbouring less sensible zones.

Figure 4 shows an example of the application of the “ladder”-system used to create a new cross-country trail-system. With the help of short connection trails various skiing-possibilities are created and the disturbance-area can be minimized.

In the same time, in co-operation with the “Forstliche Versuchs- und Forschungsanstalt” (a governmental forestry agency of the federal state Baden-Württemberg), in the calmed down and valuable zones measures for melioration of habitats were planned and performed. Target species in the first line was the capercaillie. For a checking of the success of these measures a monitoring program is necessary. For this counts of visitors were done to proof the acceptance of the marked trail system. Simultaneously on basis of long term research habitat structures were mapped and analysed, as well as a intensive estimation of the stock was done.

A large proportion of nature sports activists will allow themselves to be channelled by convenience. This means extremely good and functional signposting (no profusion of signs), attractive sports opportunities (single trails for MTB, for example), concentrating and extending opportunities to allow the user to choose his own sequence of shorter course loops.

A good public relation and information could be reached by creating pleasing information material and meaningful maps. These information campaign is essential to impart knowledge and acceptance for the channelling measures.

Furthermore manuals exemplary for mountain biking and hiking were made, serving as guideline and information source for municipalities, sport organisations and tourist service providers. The manuals include (amongst other things) the ecological compatible and attractive (in the view of sport) installation of trails as well as sign posting and mapping of trails.

The manuals should help to implement the results of the “good practise”-examples to the whole nature park area.

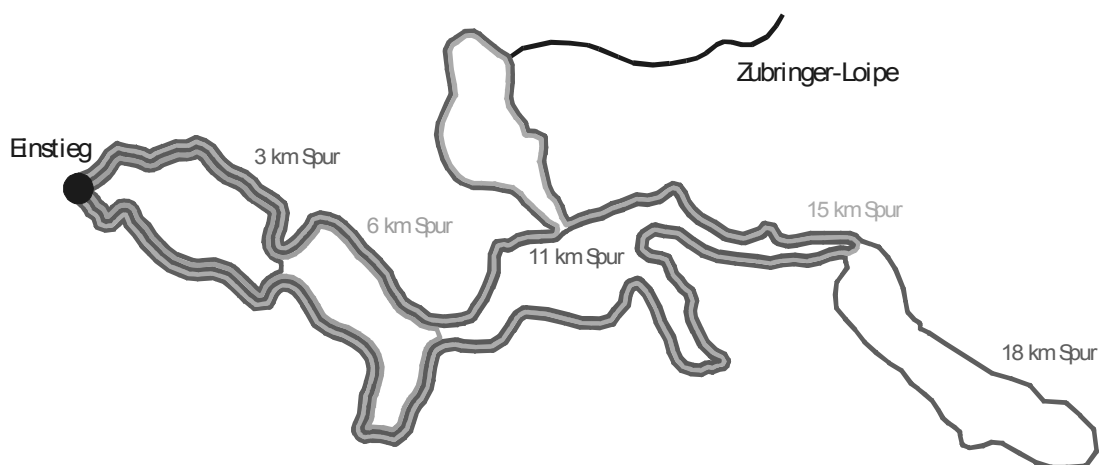


Fig. 4: Cross-country trails as result of the application of the “ladder”-system.

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