

## Evaluation of the success of visitor flow management projects in the Southern Black Forest Nature Park

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**Abstract:** Nature sports place a number of demands upon the landscape structures being utilised. In order to assess the effects of sporting activities on nature and the landscape, it is insufficient to simply analyse the impacts of certain sports. Therefore, new assessment and planning methods for sporting areas are necessary in order to identify potential ecological conflicts and draw conclusions with respect to the desired aims and the measures to be implemented. The extent of the reference level plays a key role in the planning procedure. Tools, which include spatial as much as factual information, are necessary for implementation at all levels. The application of modern information technology, such as Geographic Information Systems (GIS), is required. The term 'Sport Area Management System' (SAMS) is used to describe management possibilities in the context of the development of a sustainable sporting area. The SAMS includes various components of sport orientated land use planning and the management of sporting activities. It is subdivided into regional and local sport area management. The approaches to visitor flow management and communications are of particular significance at both levels.

The SAMS concept is illustrated on the basis of the example of the sports tourism concepts developed for the Southern Black Forest Nature Park. The park offers many different opportunities for sporting activities and tourism. At the same time, a substantial part of the area is of a high ecological value. Therefore, the nature park association is seeking a sport tourism concept, which identifies and analyses potential conflicts and possibilities for further development. Following a detailed assessment of the current situation an analysis of the possibilities and potential conflicts was carried out. Further emphasis was placed on the development of an overall concept and possibilities for further development. The implementation of the project findings in parts of the nature park, and subsequent monitoring, are also important parts of the concept. Visitor flow management model projects are shown with the examples of hiking, mountainbiking and Nordic Walking.

The methodology behind the SAMS proved to be useful when the projects were put into practice. The initial model projects had the desired positive effect and the concept is to be applied to the whole nature park. Visitor flow management revealed that the large majority of sport tourists made use of the facilities. The co-existence and the cooperation between nature protection and all stakeholders in the region are an important basis for successful future development.

### Introduction

The Southern Black Forest Nature Park was established in 1999 and is the biggest nature park in Germany, extending over 3300 square kilometres.

The area can be subdivided into a fragmented western part with great differences in elevations within short distances and a rather flat eastern part. The average altitude within the nature park is 780 m above sea level, varying from 222 m up to 1496 m.

The nature park is by far the most important sport tourism region within the federal state Baden-Württemberg. Over 11 million people live in the area surrounding the nature park (within a radius of 100 km), which is relevant for day trips. Moreover,

there is a large number of visitors from other parts of Germany and abroad. The tourism sector generates returns of over 3 billion euros per annum and secures about 100,000 jobs. Quite a substantial part of the local population depend on this sector.

The Southern Black Forest Nature Park provides extensive infrastructure for a whole range of sporting activities – both during summer and winter. At the same time, from the viewpoint of nature protection large parts of the nature park are of very high ecological value. This is emphasised by the high number of nature and landscape protection areas, as well as Natura 2000 areas. Protected areas account for 40% of the total nature park area. Therefore, the development towards sport tourism all year around leads to a

considerable amount of negative impacts. As a consequence the Institute of Outdoor Sports and Environment of the German Sport University in Cologne was asked to develop an all-embracing sport tourism concept for the Southern Black Forest Nature Park. The aim of the research project was to develop sustainable strategies and suggest management measures, which serve as a basis for a positive sport tourism development in the area (Roth & Krämer 2000). The concepts are to ensure the long-term preservation of sport and recreation areas in an intact landscape. Furthermore, the development of sport tourism is to be adapted to the needs of the local population and the visitors as much as possible. The approach adopted followed the principles of the ‘Sport Area Management System’, which is introduced in the following section.

### Sport Area Management System

Nature sports place a number of demands upon the landscape structures being utilised and the resulting impacts are manifold. In order to assess the effects of sporting activities on nature and the landscape generally, it is insufficient to simply analyse the impacts of certain sports. Approaches which take into consideration the potential multiple use functions of the land available are required. In addition to that, the capacity limit in some core zones has already been reached – independent of the time of year and the associated sporting activities.

New assessment and planning methods for sporting areas are necessary in order to identify potential ecological conflicts and draw conclusions with respect to the desired aims and the measures to be implemented. Land use planning, which takes into consideration environmental needs as much as the demands of sporting activities is a potential tool for the resolution of any conflicts. Sport Area Management System – SAMS (Krämer, in prep.) represents

an innovative approach, which contributes to the optimisation of land use, meeting the demands of sports and nature protection.

The extent of the reference level plays a key role in the planning procedure. In the course of various research projects a subdivision into two benchmark levels has been found to be useful. The regional level consists of nature sport areas with a range extending over several thousand square kilometres (e.g. the Southern Black Forest Nature Park). These areas may also include several different landscape types. They form the superordinate spatial reference level, within which a specific methodology is necessary in order to achieve a predefined aim (e.g. sport tourism concepts).

At the other end of the scale is the local reference level. At the local level certain nature sport areas and individual management measures can be looked at. In between are nature sport areas, described as connected landscape units extending over several square kilometres, which can be treated separately. This level is necessary, for example in the planning of a nature park, since the research area can be subdivided into several parts, which must be looked at separately due to their natural differences (e.g. the Feldberg region within the Southern Black Forest Nature Park). It should also be pointed out that the borders between the two levels can not always be strictly delineated and may merge. Additionally, measures at one level must always comply with planning at the superordinate level.

The fundamental principle of the SAMS is illustrated in Figure 1. The segment described as regional sport area management applies to large nature sport expanses, as well as more discrete areas (regional benchmark level). It includes visitor flow management measures and communication methods. Most important feature of the management measures is a regional development conception (e.g. nature park planning). The following aspects require consideration:

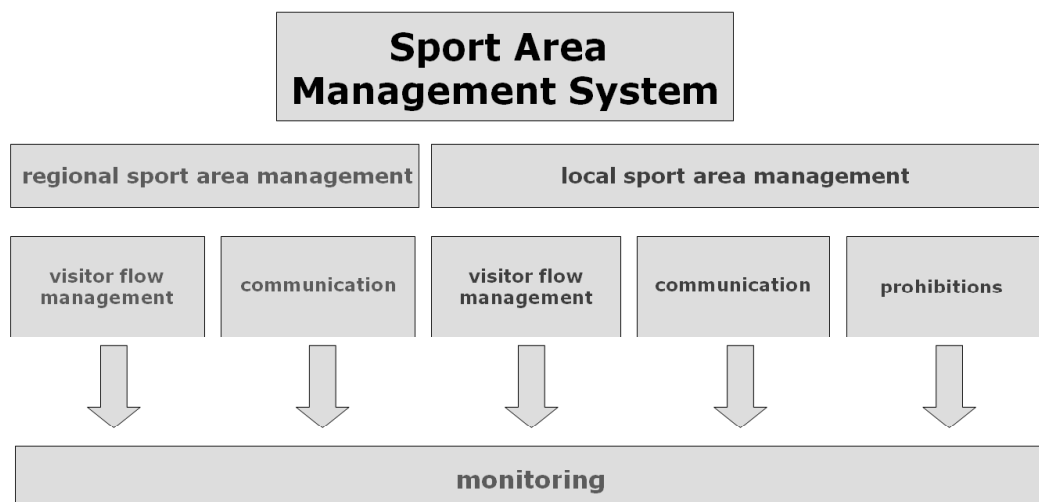


Figure. Components of the Sport Area Management System.

- integral spatial approaches,
- spatial separation by function,
- intercommunal approaches,
- site adapted development and
- provisions for recreation and sports.

Cooperation during each phase of the planning procedure and the participation of all stakeholders leads to a higher degree of acceptance of land use planning. At the regional level communication is based on discussion fora and events, publications, seminars and further education of multipliers. Although the planning is centrally managed on a regional scale, at the local level the implementation is the task of the individual communities or stakeholders. So-called model projects are carried out in order to support implementation. This means that different issues will be dealt with at individual sites, serving as examples which encourage further implementation across the region.

At the local level sport area management includes visitor flow management, communication and prohibitions. Visitor flow management measures are of major importance. The measures include direct interference like routing, as well as facilities targeting visitor convenience and interests. This includes high quality sporting facilities and services, as well as an appealing path network. Furthermore, management measures include planting schemes, barriers and the removal of paths. It is important that the applied measures are conveyed to the public appropriately. Brochures providing background information, signposting and updated maps which include the new paths, as well as guided tours and public presentations are essential tools. The implementation of prohibitions is a final measure. But this is only to be applied if absolutely necessary. It is vital that all sporting activities in the managed areas are analysed and planned with the support of land use planning strategies. This is particularly true for the planning and the building of the infrastructure. The planning does not only include social and economic impact assessment but also environmental impact assessment. The cooperation between executors, legal representatives, communities, sport associations, forestry and nature protection are the basis for successful implementation of visitor flow management. In the interest of a holistic approach sectoral ways of thinking must be avoided.

The final step of the sport area management system also includes monitoring, as all projects, measures and treatments impact upon the future development. Continuous impact assessment of the management makes it possible to draw conclusions regarding the success of the implemented projects and provides crucial information for future planning.

Tools, which include spatial as much as factual information, are necessary for implementation at all levels. Today, it is hard to imagine that the collection and analysis of geographic data, the evaluation and the linking-up of data, as well as the implementation

in the planning phase could be done without the help of information technology. Therefore, the application of modern programmes, such as Geographic Information Systems (GIS), is absolutely necessary. In a first step all the relevant landscape information must be collected. Landscape structures are analysed by means of a digital elevation model, satellite photographs, topographical maps, functional maps (e.g. hiking maps, climate maps) and field data (mapping). Analogous data are digitised and saved in the GIS database. Furthermore, the existing spatial data are linked up with additional factual information, for example the results of surveys. The landscape analysis and evaluation from the viewpoint of sport tourism are based on the data collected.

### Visitor Flow Management Model Projects

Model projects will implement the predefined aims and the overall concept. A key element of visitor flow management for sports that affect the whole area, such as hiking and mountain biking, is the path network. Consequently, the criteria applied for adjusting old paths or constructing new ones take into account the ecological aspects as much as the demands of the sporting activities. As a result, handbooks are available for different sporting activities and distributed among the communities, sport organisations and the tourist services (Roth et al. 2002a, 2002b, Roth et al. 2003a). The handbooks provide information about the principles of the development of path networks that serve the needs of the sporting activities and are environmentally friendly at the same time. Furthermore, signposting rules necessary for the intended visitor flow management are introduced. This is accompanied by other measures of communications in order to ensure a successful implementation of the path network strategies.

In model projects, as well as in an accompanying project dealing with habitat management (Suchant & Schäfer 2002), the concepts were put to practice for hiking, mountain biking and Nordic Walking. The results of these projects will be presented in the following. In the central part of the nature park (Feldberg area) research about the development of the grouse population is conducted in cooperation with the State Forest Research Institute Freiburg and a local team. The monitoring, which is to provide information on the number of capercaillie and hazel grouse, their distribution and the tendencies of future development is accompanied by analyses of the habitat conditions. In selected areas certain habitat management measures are applied and the interrelation between habitat conditions and the presence of the two species is examined.

The visitor flow management and the signposting concepts for the various sporting activities in the model regions are based on a target group analysis. After an evaluation of the management measures the

concept may be modified, if necessary, and will be implemented throughout the area of the nature park. At the same time, it is important to analyse the existing path network and to estimate how frequently these paths are used.

## Target Group Analysis

Target group analyses must be based on extensive knowledge about the various user groups and the requirements of each sporting activity. To gain this knowledge visitors were surveyed and the visitor numbers were counted (Table 1). Own results were compared with findings of other analyses and complemented the research (AGL 1996, Wöhrstein 1998, Brämer 1998, Vollmer 1999).

Data collection was repeated after four years for hiking, and two years for mountain biking. As Nordic Walking is a relatively new sport, data was only collected recently and the presented results are preliminary.

Table 1. Visitor survey and the number of returned questionnaires.

Year	Hiking	Mountain Biking	Nordic Walking
1999	415 (Polenz 2000)		
2000		355 (Nöll 2001)	
2002		305 (Weißberger 2003)	
2003	254 (Roth et al. 2004b)		
2004			73* (Krämer 2004)
Total	669	660	73

\* preliminary results, evaluation has not been completed yet

Research results show that each sport has a quite distinct target group. The most important results are presented in Table 2.

The average age distribution shows clearly that mountain biking is more popular among younger people. Of all the questioned mountain bikers, 75% percent are men. Among hikers the proportion of both genders is fairly balanced, but women clearly dominate Nordic Walking.

The reasons for doing the respective sport vary greatly. Hiking mostly serves nature experience, whereas mountain bikers and Nordic walkers also put emphasis on the sporting activity itself (exercise, health, sport performance, losing weight).

Hiking is mostly done on weekends and during the holidays. In contrast, mountain biking is frequently and Nordic Walking even mainly done during the week.

Within the nature park almost 90% of all mountain bikers are locals. Among the surveyed hikers only

32% lived within the area of the nature park and 38% in the surrounding area. Due to this 75% of the mountain bikers are able to travel to the sport area on bike, whereas the majority of hikers makes use of a car. Evidently, public transport is of greater importance to hikers than to mountain bikers. It has been found that the average range of hikers is 12 km and mountain bikers cover a range of 45 km. The local population also dominates the group of Nordic walkers, but in this group tourists also play an important role.

## Path Networks to Manage the Visitor Flow

In the Southern Black Forest Nature Park the path network has been found to be the most efficient tool in the management of hiking, mountain biking and Nordic Walking. The utilised signposting systems vary because of the different target groups.

### Hiking

In the Black Forest the signposting of hiking paths has a long tradition. Signs for the first long distance hiking path in Germany leading from Basel to Pforzheim, for example, were already put up in 1900. But, due to this long tradition of signposting many different signposting systems have been used over time. Varying path signs, the combination of circular routes with those leading to certain destinations and the lack of general path networks on a larger scale often led to confusion. The Black Forest Association decided to develop a completely new path network in close cooperation with communities and the nature park representatives. The new path system guides hikers through the landscape to specific destinations. At crossings signs list one or more hiking destinations and their distances.

The major focus lies on the main hiking paths beyond the community level, which have traditionally been used and connect to a whole selection of local paths to form a uniform network. The emphasis is on quality rather than quantity, favouring an appealing and ecologically friendly path network. The existing dense community based path network has been scaled back. The criteria for the new path network are specified in the Southern Black Forest Nature Park hiking handbook (Roth et al. 2002a). The Black Forest Association are in charge of the implementation, in close cooperation with the communities. By now the implementation has been completed for large parts of the nature park.

With the help of the new signs, hikers are now able to choose their routes according to their preferences without any difficulties. Additional information guides hikers to specific sights and vantage points or other places of interest, such as inns or train stations and bus stops. Signs showing all the hiking routes have been placed at the important entry points and up-to-date maps are available. The regional path

Table 2. Target group analysis for hiking, mountain biking and Nordic Walking.

	Hiking* <sup>1</sup>	Mountain Biking* <sup>1</sup>	Nordic Walking* <sup>2</sup>
average age (years)	50	37	55
gender	55% male / 45% female	75% male / 25% female	26% male / 74% female
group size	2 people (52%) 3–5 people (30%)	2 people (43%) single (34%)	3–5 people (52%)
motivation (in order of priority)	nature experience, landscape, the view	sporting activity, nature experience, exercise	health, lose weight, nature experience, exercise
Time of activity	mostly weekends / vacation; rarely during the week	weekends / vacation, but also frequently to very frequently during the week	mostly during the week
average range	12 km	43 km	6 km
average duration of activity	mostly for a day or half a day	mostly for a day or half a day on weekends, shorter during the week	mostly shorter tours during the week (2 hours)
origin	local population (32%) surrounding area (38%) tourist (25%)	local population (80%) surrounding area (10%) tourist (5%)	local population (65%) surrounding area (10%) tourist (25%)
means of transport	car (76%), public transport (19%)	mountain bike (75%), car (21%), public transport (4%)	car (80%)
orientation	signs, partly maps	maps and signs	signs

\*1 summary of results of two surveys

\*2 preliminary results, evaluation has not been completed yet

network of the nature park covers 2400 km. The implementation of the new concept and the linking-up of the regional and local paths will lead to a network of about 7000 km of hiking paths which are signposted in a uniform manner.

### Mountain Biking

The signposting of a mountain bike path network in the Southern Black Forest Nature Park was initiated by the Forstdirektion Freiburg (the local forest directorate) during the 1990s. On top of that, some communities offered circular bicycle routes, using different signs. As in the case of hiking, a handbook (Roth et al. 2002b) now defines the criteria for the uniform signposting of mountain bike paths. This has already been implemented in large parts of the nature park.

The emphasis is also on path networks which are beyond the community level and guide mountain bikers to specific destinations. In some places these paths are connected to circular routes, which are either numbered or indicated by a colour. There is a distinction between easy (blue), moderately difficult (red) and difficult (black) routes, as known from the categorisation of cross-country skiing trails. This information is also included in maps.

This combination of different signposting systems is due to the varying demands of mountain bikers as they have a larger activity range. Whereas some mountain bikers prefer to go on more individual routes by combining paths to various destinations, others appreciate the circular routes with information

on distances, altitudes and the degree of difficulty. Tourists, in particular, appreciate the existence of circular routes as they lack local knowledge. It is important that the uniform signposting is applied although the two systems are combined. Information on the circular routes is to be supplementary and should not require additional signs. Altogether, the signposted mountain bike paths extend over roughly 1000 km in the Southern Black Forest Nature Park.

### Nordic Walking

Those who do Nordic Walking have their own requirements with respect to the path network. For this sporting activity the emphasis is on circular routes. The routes begin at the same starting point and are also subdivided according to their degree of difficulty (blue, red, black). Signs along the routes are only put up in one direction. Signs at the start, as well as at other stops along the way include additional information about the route (general maps, height profiles, altitudes, distances, degrees of difficulty). Moreover, the signs provide information relating to techniques, heart rate measurement, equipment rental, courses, as well as stretching and strengthening exercises. An innovative, high quality service is offered to tourists, which is also useful for marketing purposes. The signposting criteria for the nature park are defined in the Nordic Walking handbook (Roth et al. 2003a). Currently, over 20 communities offer more than 400 km of reliably signposted Nordic Walking routes.

These services offer many possibilities to learn and practise this new endurance sport. Almost all of the communities make use of the path network to offer organised Nordic Walking tours and training. Naturally, Nordic walkers may also use the existing hiking paths, if they do not want to make use of the additional services and wish to follow individual routes.

Independent of the applied signposting system, the putting up of signs must be done thoroughly in order to ensure good orientation. Regular checks of the signs and the substitution of damaged or missing signs is mandatory. To manage the routes and the signposting it is helpful to use Geographic Information Systems.

Furthermore, it is absolutely necessary to make the new path network concepts and measures known. Updated and standardised maps, as well as brochures or information in the internet must be made available to (sport) tourists. The application of new media for this purpose, e.g. routing planners in the internet and automatic height profile generation, plays an important role. A vital interest of all new conceptions is that ecological aspects are taken into consideration. In order to avoid conflicts and to come up with solutions, all of the local stakeholders (community, forestry, nature protection, hunting, sports) participate in the planning from the very beginning. The utilisation of Geographic Information Systems is crucial.

### Evaluation of Visitor Flow Management Measures

The end result with respect to hiking is very positive. The vast majority of hikers is very satisfied with the new signposting system. The identical design of signs makes it easier for hikers to orient themselves. The additional information on the signs is appreciated. Only a very small percentage of the hikers uses unmarked paths. For hikers it is important that the route is attractive and that signs do not only guide their way, but also indicate vantage points and guide them through changing landscapes, as well as to inns. Signs combined with a hiking map enable locals and visitors alike to plan individual routes. The provided information material for hikers also received very good feedback.

The results are equally positive in those areas, where management measures were applied as part of the habitat management project (Suchant & Schäfer 2002). In the central Feldberg area existing paths were relocated, removed or closed. If possible, new routes were moved to less sensitive areas and at the same time, attractive paths and good signposting led to improvements. So far habitat management measures were implemented on altogether 300 ha. Simultaneously, 33 km of new hiking paths were constructed and additional path construction measures were undertaken on a combined distance of roughly 15 km in order to improve the quality of the hiking

paths. Surveys among visitors confirm that there are less activities in sensitive areas now.

Nordic Walking also seems to develop in a positive direction. Since the data collection has not been completed yet, the results are only preliminary. Nevertheless, it already becomes clear that this target group is comparable with the hikers and that visitor flow management measures are successful. This target group is very interested in making use of the signposted paths and the additional services as people mostly take up Nordic Walking for health reasons (e.g. exercises, heart rate). It is striking that many joggers and hikers also use these paths for the same reasons. Apart from that, many Nordic walkers still feel uncertain about the right way of doing this new sport. Due to this many people do Nordic Walking as a member of a group or prefer routes where they meet like-minded people. Signposted routes are also frequently used by guided groups. Those who do Nordic Walking in other areas, almost exclusively use the signposted hiking paths.

The majority of surveyed mountain bikers have positive opinions about the paths. It is mostly individual parts of the path network that are used. Only rarely, the additional circular routes are utilised. Mountain bikers also use many paths which are not signposted, partly even in sensitive areas. Most of the mountain bikers are locals. The existing path network is appreciated and made use of in many parts, but the local knowledge enables the mountain bikers to go on individual routes, take short cuts and include other stretches. Information aimed at visitor flow management is not adequately designed for the local population, as brochures and other information material are mostly addressing tourists. The main target group is not reached. Furthermore, there is clearly a lack of marketing mountain biking. Despite ideal natural conditions, there is still great potential for further development. Additionally, the distribution of existing maps must be improved. Only a very small proportion of the surveyed mountain bikers use the existing mountain biking maps.

From the viewpoint of nature protection, due to its large activity range, mountain biking also has negative impacts on many animal species at dusk and dawn. Whereas hikers and Nordic walkers have already returned to the car parks or villages by the time it gets dark, mountain bikers may still be active in remote areas. This requires better communication to highlight the problems and to stress the importance of staying on the signposted paths. Of the surveyed people 62% stated they would be in favour of the relocation or removal of mountain bike paths, if it is beneficial to nature protection. This high percentage is to be looked at critically though, because of the high proportion of locals. Among the hikers 66% agreed.

Better development and integration of single paths may also lead to an improvement of the situation. Many of the questioned people would prefer more of

those demanding stretches. This requires special regulations approved by the forestry commission, but a compromise would be possible. The availability of attractive single paths in less sensitive areas would improve the effects of managing the visitor flow by means of the path network. As a result, this may lead to a reduction of disturbances in ecologically valuable areas.

'Social' conflicts that mostly arise between hikers and mountain bikers are manageable. Information campaigns have already achieved that the different user groups are more considerate towards each other. The surveyed hikers feel mostly disturbed by motorcycles and cars (Polenz & Roth 2000).

To analyse the population development of various animal species and to observe the effects of the visitor flow and habitat management measures, the state Forest Research Institute has set up a monitoring programme throughout the Black Forest. Data are collected at different levels (foresters, ornithologists, volunteers) and saved in a central GIS database. The different effects of the habitat management and the relocation of paths can only be evaluated after a longer period of time, but the monitoring serves as an important basis for an extensive long-term analysis of the effects.

## Conclusions / Discussion

Four years after its foundation the Southern Black Forest Nature Park has managed to firmly establish itself. Many of the overall concepts could be implemented. An extensive programme of events, the implementation of several model projects and the identification of the local population with the nature park reflect the successful development. At the same time, the nature park has become an important label, which makes the region a strong competitor. The coexistence and cooperation between nature protection, agriculture, forestry, settlement development and (sport) tourism in the region are an important basis for successful future development. In the sport tourism sector, especially in core zones, existing conflicts could be neutralised by applying visitor flow and habitat management measures. Apart from resolving conflicts and increasing the value of nature protection issues, an overall improvement or optimisation of the sporting facilities is achieved. It shows that visitor flow management through offering service is accepted by the majority of people. This way rules and prohibitions, as proposed by Scherzinger (1992) and Köhn (1997), can be reduced to a minimum. High quality infrastructure and an extensive information campaign, which must convey knowledge and gain public approval for the implemented measures, form the basis for this. Visitors are provided with the necessary information and are able to make their own decisions, which gives them the impression that there are less restrictions (Riekens 1996). This combined with the exchange of expert

knowledge (guided tours, presentations, etc.) encourages visitors to act environmentally friendly (Janssen 1989). The results found by Suchant (2001), Suchant & Schäfer (2002) and Krämer (2003) also illustrate that (sport) tourism and nature protection can harmonise, even in valuable protected areas, if they are spatially separate. Both can in fact gain from this.

Even so, it is absolutely necessary to develop further in this direction. It will remain a challenge to recognise new trends and developments and implement innovative ideas at an early stage. The initial model projects had the desired positive effect and the concept is to be applied to the whole area. The example of mountain biking underlines how important it is to do an in depth analysis of the target group if the management measures are to be successful.

Current conditions must be analysed continuously and need to be compared with the predefined overall concepts. The methodology behind the Sport Area Management System proved to be useful in this respect. The pillars of success are the planning procedures at the two different levels, the participation of all stakeholders and continuous monitoring. In the meantime the Sport Area Management System methodology has also been applied successfully in further projects, e.g. for the conception of the Central/Northern Black Forest Nature Park (Roth et al. 2003b) or to develop a concept which promotes winter sport tourism in Baden-Württemberg (Roth et al. 2004a).

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