

Recreation conflict potential and management implications in the northern/central Black Forest Nature Park

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This study explores conflict in recreational use of the Black Forest Nature Park (BFNP) by six different nature sports groups as a function of infrastructure, forest management and other users. A multi-step, methodological triangulation conflict model from US recreation management was applied and tested in the Park. Results from two groups, hikers and mountain bikers, are analysed in depth. The main conflict potentials were due to infrastructure and value conflicts. These were influenced by various visitor characteristics such as resource attachment, experiences, activity-style, expectations and motives. Results of quantitative data analysis were further interpreted by interviews with agency and group leaders. This methodological combination reveals a robust understanding of recreation conflict and management in the BFNP.

Keywords: recreation management; conflict analysis; nature sport; social profile; methodological triangulation

1. Introduction and background information

In Germany, nature sport and outdoor recreation activities have gained societal importance in the last four decades. Prognoses indicate a continual rise of nature sport as a trend (Opaschowski 2001). The effect on the land is also noticeable: high recreational pressure and a general diversification of recreational demands lead to ecological and social impacts in some areas, especially where there is a limited suitable natural landscape close to urban or densely populated areas. Negative effects, such as a high volume of traffic, vandalism to facilities, littering and failure to abide by the rules, have become significant and costly problems for managers in Germany (Schemel and Erbguth 2000). Since the 1970s, the main leisure activities have been surveyed and their ecological impacts quantified for hiking (e.g. Volk *et al.* 1995, Brämer 2000); mountain biking (e.g. Wöhrstein 1998, Jakob *et al.* 2002); horse riding (e.g. Ammer and Tietze 1980); climbing (e.g. Herter 2000); and skiing (e.g. Volk 1986, Job 1991, Petermann 1998). Most studies have concluded that the carrying capacity of nature and recreational landscapes is limited and careful visitor management is required to achieve sustainable recreational development and use.

In addition to general improvements to the site or sport infrastructure, concentrating use in some parts of an area in order to alleviate pressures on ecologically more sensitive

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ones is often the management focus of planners and managers (Roth 2000). Today, the multifunctional use of forest roads may reduce ecological impacts elsewhere in the forest, but it may also engender social conflicts between user groups who have to share the same infrastructures (DSB 2001, AUbE 2002). On average, 25% of hikers and mountain bikers report occasional conflict situations; other studies show 40% or more conflict perception between the user groups (e.g. Opaschowski 1999, Brämer 2002). Other examples of conflicts include winter sport activities (Pröbstl 2000), and conflicts between recreationists and hunters (Revermann and Petermann 2003).

It appears that many conflict potentials are socially based and can cause problems for visitor flow management (AUbE 2002). In the past 40 years, planning, design and management of recreational areas in Germany frequently could not handle these conflict problems in an adequate manner. Most conventional approaches do not incorporate diversified recreational demands and therefore may fail to reduce conflict (Ammer and Pröbstl 1991, Opaschowski 1999). Attempts to reduce conflicts through general laws and site regulations have often failed, and conflict potentials between users are growing faster than conflict solutions are found (Froitzheim 2002). German nature park managers are now recognising that user-group conflicts are less a question of space and quantity, and more one of social values, with different demands and user group expectations (Mann 2006). Today, better cooperation between nature sport, nature protection and landscape managing agencies is required (Feige and Feil 1997, Lana 1999, Roth *et al.* 2004). Therefore, recreation conflict management is a twofold strategy: a spatial and temporal distribution of recreationists in nature, as well as adjusting visitor behaviour by information and education efforts.

This study aimed to show that conflict management concepts could be improved to accommodate current and future recreational situations. The paper deals with (1) new possibilities to analyse recreation conflicts; and (2) management options for handling such conflicts. Six nature sport groups from the Black Forest Nature Park (BFNP) are surveyed to understand their needs, requirements and conflict perceptions. An analysis model from the United States is adapted, modified and applied to BFNP settings. The example of hikers and mountain bikers shows how different user groups perceive conflict, and how conflict differs in both its reasons and effects. The conflict analysis that results forms the basis for management strategies which are discussed among land managers in the BFNP, thereby converting theory into practice.

2. Theoretical orientation

This study explores interactions between recreational use and impact-based visitor perceptions. The main objective is to develop and apply an analysis model to describe nature sport conflict potentials, their reasons and effects. Due to the fact that no unitary theoretical system in the field of leisure and recreational research exists for this purpose, a combination of theoretical approaches is used to understand conflict perceptions in recreation settings (Prah 2002).

Outdoor recreation can be shown in a diagram as a system with three major subsystems. The physical resource comprises landscape, ecological and recreation potential elements. A managerial subsystem subsumes agency efforts, including infrastructure and regulations, and, finally, the recreationists' social attributes and interactions make up a social factors subsystem (Figure 1). The physical, social and managerial factors form an interactive 'stress' field. The elements affect each other with distinctive reciprocal influences, and together create recreation opportunities in the form

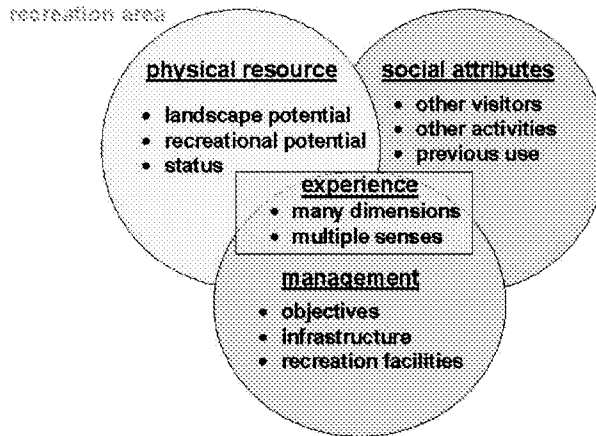


Figure 1. Model of a recreation system.

of different experiences. As a consequence of this reciprocal set of relationships, every recreational use has an effect on the whole system and may change its capacity, if not its character (Federal Interagency Task Force on Visitor Capacity 2002).

During their stay recreationists may recognise disturbances, or conflicts, emanating from the interplay of elements of the recreation system. An early approach to describe and explain conflict reasons and their effects is the goal interference theory by Jacob and Schreyer (1980). They proposed that conflicts are likely to occur if someone's behaviour directly or indirectly interferes with someone else's goal achievement. Their theoretical 'activity' model consists of four social-psychological conflict factors describing a recreationist's sensitivity to conflict. The factors refer to recreationists' attachment to the resource (resource-specificity), their involvement in a recreation activity (activity-style), the way they perceive and experience the environment (mode of experience) and their tendency to accept or reject lifestyles different from one's own (tolerance) (Graefe and Thapa 2004).

For this study, Jacob and Schreyer's four-factor activity model was modified and extended. A fifth factor, 'expectations', was integrated and functioned as an explicit social psychological reference point for a comparison of the actual experienced recreation situation. As such, it derived from the recreational crowding research (e.g. Absher and Lee 1981, Vaske *et al.* 1995, Carothers *et al.* 2001, Budruk *et al.* 2002, Vaske and Donnelly 2002). Crucial to the emergence of conflict perceptions are additional value-orientations and resulting motives, which expect to be fulfilled to some degree by a recreational stay (e.g. Opaschowski 1997). Other studies have pointed to individual hedonistic and idealistic values as being of central interest for leisure research (e.g. Petermann 1998). These values lead to motives that are direct incitements for behaviour (Schwarz 2000). This approach to conflict was also included in the current study's theoretical model, which includes 19 motives taken from the German conflict literature (e.g. Feige and Feil 1997, Braun 1998) and reduced through factor analysis into four motive groups. These motive factors represent today's diverse motivations in German nature sports: meditation/balance; social/activity; nature/body and enjoy/explore. Together, these five activity factors and four motive groups encapsulate the recreationists' 'social world' that exists independently of a recreational stay (pre-experience).

To make this approach operational, a conflict analysis model was developed that included possible on-site impact evaluations, justification questions and acceptability statements about the recreational infrastructure, and assessments of other visitors and forest management (post-experience). Additional questions of how impacts affected individual satisfaction, visitor reactions and management preferences completed the model's explanatory linkages (Figure 2).

The adequacy of the model was revealed in two ways: (1) recreationists' sensitivity to conflicts can be better described by a combination of factors and motives; (2) the model helps to understand recreation conflicts better because it describes a user group's social world more adequately, which in turn leads to better management decisions.

3. Methodology

The BFNP, located in the southwest of Germany, was chosen as the study site. Covering an area of 360,000 ha, it is currently Germany's largest nature park. It has a high concentration of recreational opportunities and these uses are recognised as primary functions for that landscape. In addition, the area has diverse recreational and land-use demands, and on-going resource planning activities, so the Park is an appropriate study area. The Nature Park boundaries served as boundaries of the recreation system to be studied.

A triangulative methodological design was chosen for this study. It is subdivided into an initial quantitative-empirical part to describe and analyse nature sport users and their social structures, followed by a qualitative output-validating part. To study the mass phenomenon of 'nature sport', the quantitative investigation focused on distinct sport groups, each of which was chosen to represent a part of an overall diverse use of the Park. Therefore, a theoretical sampling process was used. That is, instead of focusing on overall representativeness, the sampling stops when sample sizes are large enough for statistical descriptions of a group's preferences, conflict perceptions and other variables of interest (Wiedemann 1991). No one was questioned on site. Contacts were formed through nature sport clubs and organisations that are known to use the Park and contribute to the necessary diversification of activity groups for the conflict study (Mann 2003). Cooperation with nature sport clubs is also a robust means to obtain insight into the social worlds of the activity groups and establish a relationship useful to the qualitative

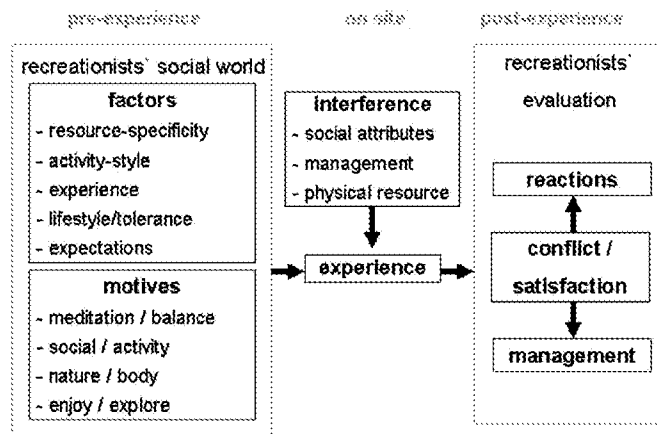


Figure 2. The conflict analysis model.

second phase. The diversity of groups were based in the Park's interim plan and included traditional nature sport activities such as hiking, cycling and horse riding, as well as newer activities such as jogging/walking, mountain biking and hang gliding (Zwischenbericht Naturparkplan 2002). Data collection procedures varied depending upon the activity, the organisation's structure and the expected demography of members. Printed questionnaires were primarily distributed through postal mail, but for reasons of cost and expediency they were distributed online (email) for the mountain bikers and through a member magazine for the horse riders. Data collection took place from July to November of 2003.

3.1. Quantitative analysis phase

The questionnaire consisted of six conflict measurements, corresponding to the elements of the recreation system. Consistent with the US literature, crowding was measured with two 9-point-Likert scales that asked visitors to evaluate an area's visitor density the last time they visited it and, on average, whether they had been to this area more often. The scale ranged from 1 = 'not crowded at all' to 9 = 'way too crowded'. Answers greater than 5 ('crowded – way too crowded') were treated as a social disturbance. In addition, three summative 4-point Likert scaled conflict measures were used to assess perceptions of impacts caused by the infrastructure, forest management and social attributes. A filter question first asked whether an impact was encountered in that area, and if 'yes', answer possibilities ranged from 'very much disturbed' to 'not disturbed at all'. In total, 28 scaled items plus one additional open-ended question originated from recent German and American recreation conflict literature (Cole *et al.* 1997, Opaschowski 1999, Schemel and Erbguth 2000, Schuster and Hammitt 2001, Watson 2001, Schmied *et al.* 2002, AUBe 2002, Froitzheim 2002). Another conflict measure asked whether respondents had encountered any disturbing visitor behaviour during their recreational visit, and, if 'yes', they had to specify that behaviour and the activity group. One more conflict related measure asked for a rating of overall satisfaction with the recreational experience. A 6-point Likert scale based on the familiar German school grading system was used. People answering in the highest categories (4–6) were counted as visitors who had some conflict perceptions. The questionnaire also contained 20 conflict determinants, each of which could be placed into one of five factor indices, and 19 single item recreation motive measures on a 4-point Likert scale from 'not important' to 'very important' that led to four scaled motive groups in a factor analysis. For more detail on the methodology see Mann (2006) or Mann and Absher (2007). In order to find group-specific differences, a regression-based path analysis was carried out (Li 1977).

3.2. Qualitative analysis phase

To further understand the conflict perceptions within each of the nature sport group's social world, the quantitative findings were qualitatively validated internally by group representatives and externally through selected nature sport experts. In this second methodological step, the quantitative results for each group were incorporated into interviews as group-specific questions. Comparability across all groups was assured by the use of a structured interview guideline (Bortz and Döring 1995). A total of 16 problem-centred interviews were used in order to (1) verify the descriptive data for their validity; and (2) to revise the results of the conflict analysis by eliciting their explanations of the conflict factors and motive results for their own nature sport activity. The analysis of the

interviews was assisted, post hoc, by the qualitative analysis program MAXqda in spring 2005.

3.3. *Post-analysis expert workshop*

To transfer empirical results of the analysis into planning practice of the Nature Park, an expert workshop was organised after the data analysis as a final methodological step (Weinbrenner 2001). The workshop provided a platform for the exchange of information among managers in the northern and central Black Forest area. The experts represented a wide range of disciplines such as nature sport, forestry, farming, nature protection, tourism, communities and the Nature Park's management. In this step the empirical results from all sport groups were shared, and experts were asked which strategies they considered helpful to reduce identified conflicts and support field implementation of solutions. The rationale behind this step was that problem-solving potentials could be consciously activated most by affected actors (Böttger 2001). Not only did they provide valuable feedback on the adequacy of the empirical analyses, their Park and managerial knowledge was also thereby mobilised with the aim of developing perspectives for the future and initiating the necessary steps to reach these recreation management goals.

4. Study results

The final sample consisted of 200 member clubs from the six nature sport organisations and 10 representatives of different institutions within the Nature Park. From the 845 returned questionnaires, 805 were usable: 85% from the postal survey of four sport groups (hikers, cyclists, jogger/walkers and hang gliders), 10% from the club magazine of the horse riders and 5% from the online questionnaire of the mountain bikers ($N = 684, 81$ and 40 respectively).

4.1. *Socio-demographic characteristics*

The largest group in the sample were hikers (50%) and the smallest group were hang gliders (3%). The analysis shows that the six group samples differed in their socio-demographic structures (Table 1).

There was an equal distribution of the sexes in the total sample but differences existed between the activity groups: horse riding and jogging/walking were dominated by females, whereas hiking and particularly the activity-oriented groups such as mountain biking and hang gliding were dominated by male participants. The total sample age was characterised by people between 40–60 years with a tendency for more elderly than younger people to be found. This right-tailed distribution of age was found within the hikers sample while there were also younger members (<40 years) within the mountain biking, hang gliding and horse riding groups. This difference within the age structure was also reflected in the level of education; the number of members who attended a comprehensive secondary school was much higher within these 'younger' groups than within the traditional activities.

4.2. *Identified conflict potentials*

The evaluation of conflict potentials from recreation system elements 'infrastructure', 'forest management' and 'social attributes', show different patterns of answers for the

Table 1. Socio-demographic characteristics of the sampled nature sport groups.

Nature sport group (<i>N</i> = 805) (% sample)	Total 100	Hiker 50	Cycler 10	MTB 7	Horse 15	Jg/Wlk 15	Hgl 3
<i>Gender (%)</i>							
Male	55	62	59	86	24	38	83
Female	45	38	41	14	76	62	17
<i>Age (%)</i>							
<18 yrs.	0	0	0	0	2	0	0
18–30 yrs.	6	2	2	19	10	8	22
31–40 yrs.	13	4	13	17	40	12	26
41–50 yrs.	20	9	32	28	25	38	35
51–60 yrs.	22	25	21	23	10	30	9
> 61 yrs.	39	61	32	13	14	12	9
<i>Education level (%)</i>							
Secondary school	38	50	45	34	13	24	13
Junior high	29	28	34	19	26	38	26
Comprehensive secondary	23	13	15	36	51	24	48
Other graduation	9	8	6	11	9	13	13

Notes: Hiker = hiker; Cycler = cyclists; MTB = mountain biker; Horse = horse rider; Jg/Wlk = jogger/walker; Hgl = hang glider.

sampled nature sport groups. The infrastructure results show that 'garbage' (43%) and 'vandalism' (32%) had the highest conflict potential across all nature sport groups. A 'monotonous path design' (7%) or 'too few parking spaces' (7%) were the lowest. Approximately 60% of the sampled horse riders felt disturbed by 'displeasing path surface'. This was much more than indicated by other nature sport groups (9–27%). Especially hardened surface forest roads or the gravel used created problems for the horses. 'Too little signing' was more often criticised by cyclists (32%) and mountain bikers (28%) than by joggers/walkers (20%) or horse riders (21%). A trend among all groups seemed to be a demand for improvements to the infrastructure (Table 2).

Contrary to the infrastructural results above, conflict ratings related to forest management practices were harder to recognise among the groups. Horse riders and hang gliders in particular showed an asymmetric answering pattern compared to the other groups: they felt disturbed mainly by ecologically relevant items such as 'tree damage caused by forest workers' (48%), 'uniform vegetation' [monoculture] (40%) and 'too few close-to-nature forests' [naturalness or wild quality] (36%). Similarly, answers from the mountain bikers criticised 'storm damage' (25%) as well as 'too few close-to-nature forests' (25%). Signs of ongoing forest management activities such as 'branches and splinters' (14%), 'noise by chainsaw' (9%) or 'snag' (8%) were generally evaluated as minor problems, while 'artificial lanes [ruts or user-caused trails] and erosion' disturbed all nature sport groups in a similar strong way (23–46%).

In terms of social attributes, most members of all groups felt disturbed by 'unleashed dogs' (35%), while 'too many mountain bikers' was mentioned by horse riders (35%) and hikers (34%) as their main social disturbance. These two user groups also mentioned mountain bikers' disturbing behaviour (too fast, too close, not giving signals) in an open-ended conflict question. Overall, recreationists were 'rather satisfied' (15%) or 'satisfied' (49%) with their last recreational stay; and 23% reported being 'very satisfied'. This result was found for all subgroups, except hang gliders.

Table 2. The identified conflict potentials.

Conflict potentials (in %) (% sample)	Total 100	Hiker 50	Cycler 10	MTB 7	Horse 15	Jg/Wlk 15	Hgl 3
<i>Infrastructure (N = 767)</i>							
Garbage	43	44	38	38	52	41	13
Vandalism	32	36	34	32	28	25	13
Monotonous path design	7	5	4	9	19	2	
Dirt trails	11	14	7	13	11	6	9
Displeasing path surface	29	27	23	21	61	16	9
Noise civilization	16	18	16	11	19	12	
Fewer huts, benches...	14	17	16	8	12	10	22
Little path signing	25	25	32	28	21	24	13
Few toilets	17	21	18	9	13	10	17
Few parking spaces	7	7	9	4	6	4	22
Illegal firerings	12	16	12	11	7	4	13
<i>Forest management (N = 760)</i>							
Lanes/erosion		31	33	23	46	30	30
Tree damage	14	20	17	17	48	12	13
Less views	33	22	21	26	16	15	39
Uniform vegetation	22	15	16	13	40	7	17
Storm damage	9	18	17	25	22	11	13
Branches/splinters	21	14	16	11	15	15	17
Snags	17	6	12	4	8	4	30
Few close-to-nature forests	18	14	12	25	36	7	13
Noise by chainsaws	18	7	1	6	24	6	4
<i>Social attributes (N = 758)</i>							
People leaving paths	8	11	7	4	6	7	4
Unleashed dogs	35	38	42	47	13	40	22
Mountain biker/cyclist	24	34	2	2	35	12	4
Hiker	2	3	11	12	7	4	
Horse rider	3	13	9	8	1	2	
<i>Crowding (N = 712; 638)</i>							
Crowding-perceptions last stay (> 5)	19	23	15	13	10	20	9
Crowding-perception-Ø (> 5)	17	20	12	13	12	18	17
<i>Satisfaction (N = 741)</i>							
Rather – not unsatisfied at all	6	8	3	4	3	2	22

Notes: Hiker = hiker; Cycler = cyclist, MTB = mountain biker; Horse = horse rider; Jg/Wlk = jogger/walker; Hgl = hang glider.

4.3. The conflict analysis

Further analysis of the relationships among the conflict related variables was carried out for each nature sport group, but for space reasons and simplicity the paper reports and compares just two groups. In general, this part of the analysis was undertaken to demonstrate the model's ability to elucidate differences in conflict perceptions. Two groups, the nature-oriented group, hikers, and another activity-oriented group, mountain bikers, are adequate to demonstrate the analysis procedure and provide meaningful comparisons. The first step is to present the quantitative findings from a path analytic regression analysis (Tables 3 and 4, respectively). The separate influences of the activity and motive factors can be observed for each conflict measure type. The explanatory power of each group's paths is given by overall regression R^2 values (0.042 to 0.071 for hikers; 0.271 to 0.453 for mountain bikers). Besides a lack of predictive power for meditation/balance or tolerance, other regression results show that strength and type of significant path effects are group dependent.

Table 3. Path analysis (regression coefficients) for hikers.

Conflict measure	Motive Factors				Activity Factors				R ²
	Meditat. balance	Social/ activity	Nature/ body	Explore/ enjoy	Resource specif.	Activity style	Experience	Tolerance	Expectations
Crowding	-0.070	0.052	0.026	0.124	0.138*	0.002	-0.020	0.008	0.074
Behaviour	0.093	-0.102	0.005	0.046	0.117	-0.020	0.050	-0.001	0.028
Infrastructure	-0.037	0.011	-0.132*	0.080	0.185**	0.016	0.163**	0.019	0.084
Social attributes	0.064	-0.068	-0.120*	0.168**	0.077	-0.114	-0.064	0.027	0.084
Forest management	-0.051	-0.010	-0.143*	0.127*	0.075	-0.043	-0.017	0.043	0.085
Satisfaction	0.113	-0.034	-0.055	0.076	-0.132	-0.069	-0.012	0.097	0.046

Notes: *sig 0.05; **sig 0.01.

Table 4. Path analysis (regression coefficients) for mountain bikers.

Conflict measure	Motive Factors				Activity Factors				R ²	
	Meditat. balance	Social/ activity	Nature/ body	Explore/ enjoy	Resource specif.	Activity style	Experience	Tolerance		Expectations
Crowding	-0.201	-0.327*	-0.365*	-0.121	-0.192	-0.133	0.022	0.029	0.429**	0.335
Behaviour	0.238	-0.262	-0.203	0.169	-0.190	-0.001	-0.065	0.116	0.160	0.271
Infrastructure	0.029	0.120	-0.022	0.057	0.198	-0.346*	-0.199	0.268	0.405**	0.358
Social attributes	0.124	-0.115	-0.385*	0.048	0.178	-0.247	-0.168	0.159	0.371*	0.281
Forest management	0.172	-0.343*	-0.030	0.113	0.256	0.031	0.100	0.262	-0.066	0.329
Satisfaction	-0.078	-0.158	0.044	-0.119	-0.105	0.099	0.051	-0.062	0.362	0.453

Notes: *sig 0.05; **sig 0.01.

4.3.1. *Hikers' quantitative results*

The main activity factor influences on hikers' conflict perceptions are 'resource-specificity', which positively influences crowding and infrastructure impacts, and 'experience' which influences only infrastructure impact perceptions. The positive influence for both variables means that the more connected respondents are to their homeland landscape and the more experienced they are with hiking, the more likely they are to perceive disturbances through infrastructure and crowding. Of the four motive factors, two are linked to conflict: nature/body and explore/enjoy have multiple significant paths. The regression coefficients for nature/body are negative, suggesting that those with stronger nature- and body-related motives report fewer infrastructural and social conflict perceptions. The explore/enjoy motives work the other way: stronger motives lead to greater sensitivity towards disturbances by other user groups (social) and greater disagreement with forest management (Table 3).

4.3.2. *Hikers' qualitative results*

The next part of this analysis is a 'triangulation', that is, the incorporation of an informed perspective, albeit qualitative, on the conflict analysis results. For this group, the quantitative findings above were presented to hiking group members as 'experts' and they were asked for interpretation and comments following a standardised interview guideline. The group representatives added substantial contextual and substantive information. For example, the experts explained that these clubs are mainly elderly people, with a strong identification to the local region and its leisure traditions. In cooperation with the Forest Service, many members of this group volunteer to take care of the region's hiking infrastructure. Thus, the strong quantitative influence of the factor 'resource-specificity' was confirmed and given depth by the interviews. They further explained that many hiking members are emotionally attached to the resource, which makes them sensitive towards impacts such as garbage, vandalism and too little signage. Of particular note was that those hikers who are responsible for monitoring the condition of the paths often have a strong personal identification with their volunteer forest work and feel individually responsible for the infrastructure. Therefore, the influence of a factor describing attachment to the landscape helps to explain this group's sensitivity to infrastructure conditions.

Similarly, the hikers had a significant coefficient for crowding perceptions, so that ~20% of the hikers indicated crowding was a problem. The hikers' attachment to the infrastructure causes negative sentiments towards other users who are using 'their' infrastructure. Support for this interpretation also comes from the second significant factor, 'experience'. The experts also explained that the club is traditionally comprised of people who have been members for many years (average was 29 years). In comparison to the other activities they are the recreationists with the longest memberships and most experience with their activity. Because they have a long association with the area, they know the infrastructure quite well, and thus most members are able to compare its use and users in former times with today, creating a high sensitivity towards infrastructural and use conditions. Thus, both conflict factors were confirmed, given sociological detail and were even magnified in importance during the interviews. They reported very important influences on the surveyed hikers' conflict perceptions, even though at times the regressions had relatively small statistical explanatory power that might have led some to disregard the effect.

4.3.3. *Mountain bikers' quantitative results*

In comparison, the mountain bikers show a different pattern of results than those of the hikers. The same conflict, motive and activity variables were used. However, the conflict measures were influenced by other factors and overall more strongly compared to hikers, e.g. 'activity-style' negatively affects infrastructural conflicts, meaning the less attached mountain bikers were to the activity the more they felt disturbed by infrastructural impacts. Next, 'expectations' is positively associated with three conflict measures: crowding, infrastructure and social conflict perceptions. 'Expectations' seem to have a particularly strong connection with the mountain bikers' conflict sensitivity and are linked to crowding, infrastructure and social conflict perceptions. Activity-style influence also adds to the perceptions of infrastructural conflict. Turning to the motive factors, it appears that, as before, the motive groups nature/body and social/activity have a negative influence on conflict perceptions (Table 4), notably crowding (2 significant coefficients), and social and forest management as well. These results suggest that mountain bikers are sensitive to crowding and other, non-behavioural, conflict pressures.

4.3.4. *Mountain bikers' qualitative results*

As with the hikers, mountain bike experts were asked to comment and interpret the quantitative findings. They explained that many mountain bikers have a close connection with the region because of its high relief and otherwise good conditions to bike. Differently from hikers, most mountain bikers have a minor emotional attachment to the landscape, as evidenced by the lack of influence by the resource-specificity factor. Instead, 'activity-style' has some influence.

The experts further explained that within the mountain biking fraternity there are intra-group differences which are reflected in different attachment modes of the members to their activity. It was suggested that bikers around the age group 40+ years bike regularly for training purposes. Fewer, mostly younger bikers, ride with more risk as 'free riders' or 'downhillers', and each subgroup has a different attachment mode to the activity, depending on the associated lifestyle and the connected motives. The recreation conflict theory assumes that recreationists with a strong activity attachment react more sensitively towards conflict, but the mountain biker sample shows other results: the less a biker is attached to the activity (style), the more sensitive he or she is to infrastructure conflict. The interviewees also asserted that it was well known that mountain bikers, who train on a regular basis, also know the recreation opportunities well. They are aware of where to go and which situation fits their needs. Normally, experienced bikers maintain a relaxed posture with respect to most conflict situations. Thus it may be important to recognise a lack of conflict perceptions due to the factor 'experience'. The interviewees also explained that the clearer and more focused a biker's expectations are the more a biker reacts if expectations are not met. The conflict perceptions in the regression are further explained by knowing that it is the combination of the two factors. The expectations from someone who seldom bikes are usually high and the recreational situation has to fit to their leisure demands. If expectations are not fulfilled the danger of experiencing conflict is high. The interpretation of the mountain bikers' conflict perceptions are aided greatly by having qualitative information that augments the explanation of factors in the regressions. Both influences seem to be connected with cognitive adjustments to the recreational situation in order to reduce conflict.

5. Discussion and management implications

5.1. Identified conflict potentials

Conflicts most often recognised by the sampled recreationists can be subdivided into two conflict areas: infrastructural/managerial conflicts and social conflicts. To the first conflict area belong impacts, showing a reduced infrastructural quality. The conflict ratings are distinctive and distributed over all sampled nature sport groups.

The second conflict area, social conflicts, arises due to direct contacts or value differences. Within this conflict area asymmetric conflict lines can be found with more sensitive, and more conflict tolerant groups. Both conflict areas have something to do with the recreationists' value orientation and connected motives as important components of their individual expectations. Therefore, most disturbances coming from the infrastructure or from forest management are disturbances of aesthetic perception of the landscape that do not fit into the recreationists' ideas about nature and naturalness. Other German studies show that recreationists favour a landscape where human actions can be sensed but where nature has a recognised 'intrinsic' naturalness that can be experienced (e.g. Nohl and Richter 1986). Within all nature sport samples, many recreationists felt disrupted by other visitors. On many occasions it seems to come from a simple interaction that confirms the goal-interference model, but other times it is much more complex. For example, social conflicts most often originate due to the behaviour of dog walkers (their dogs), and the presence of mountain bikers. It was mainly hikers and horse riders who felt their recreational stay was disturbed by bikers. These interpersonal conflicts are known to occur in areas with mountain bike uses (e.g. Vaske *et al.* 1995, Carothers *et al.* 2001). Arguments about a physical disturbance mentioned by the group of hikers were spoken of in more depth during the interviews with the Black Forest Hiking Club. The representative asserted that this conflict is more of a value conflict between the nature sport groups rather than a physical disturbance. In the specific case of the sampled Black Forest hikers, the value conflict reported by the elderly age group (60+ years) of hikers may be caused by a gap between their leisure and recreational world compared to that of younger recreationists. Additionally, this conflict may be sustained by an infrastructure design that is oriented towards the needs of the Hiking Club Association members.

The traditional value orientation of the organised older hikers with regard to a comfortable and safe design and a preference for single use hiking tracks is transferred generally onto the areas' hiking paths. However, because the paths are also used by other activity groups, often younger with different goal orientations, such as the mountain bikers, value conflicts arise. It is hard for the Hiking Association to accept that an infrastructure that is voluntarily designed and managed by them does not exist only for hikers but also for other users. Despite intense education efforts an enduring conflict exists within the social sector due to multiple use of the infrastructure.

5.2. Results of the conflict analysis model

The conflict factors and motive groups from the quantitative analysis model revealed significant influences on the groups' conflict perceptions. While the factor 'resource-specificity' had no influence on the activity-oriented group of the mountain bikers, it influenced the nature-oriented hikers in a significant way (Confer *et al.* 2000). The factor 'experience' also has an influence on the hiking groups' conflict perceptions. In contrast, activity factors such as expectations are important for the mountain bikers. Similar to Ramthun's (1995) results, subjective influences may play a crucial role in an individual's

attachment to an activity. This was supported by the finding here that mountain bikers, with more distinct 'expectations', were more sensitive toward conflict. A similar influence of the factor 'expectations' has been found for wilderness backpackers (Absher and Lee 1981), canoeists (Ivy *et al.* 1992), and hikers and horse riders (Watson *et al.* 1993).

For interpersonal conflicts caused by other visitors, the same factors and combinations are found for both groups. If conflicts are mostly a manifestation of stress, a familiar and therefore accurately anticipated situation will lead to a predictable level of stress for which they can prepare, whereas a novel or unknown situation engenders a more spontaneous reaction (Schuster and Hammitt 2001).

The motive variables also support these conclusions. Few motives have an influence on conflict perceptions. Only the motive group 'enjoy/explore' has an influence on conflict. 'Seeing new landscapes' is highly important for hikers and mountain bikers. It is the major contributor to the motive group 'explore/enjoy'. Because the landscape and social situation contradicts their recreational needs, mountain bikers may respond sensitively. The hikers can compare a new area with a familiar one because of their prior experience and strong attachments to the home landscape, and thus may react sensitively to changes.

Generally, the results suggest that the influence of visitor characteristics may vary greatly across groups. The same was observed in American studies (e.g. Gibbons and Ruddell 1995, Thapa and Graefe 2003, Manfredo *et al.* 2004). However, a limitation of this study is that the methodological design may have influenced the conflict measures. Some measurements were constructed as summative scales, aggregating diverse sets of social, infrastructural and management-related items, and the influence of each single item within the regression analysis would benefit from further analysis of the interactions among the entire group of items. In addition, different sample sizes among the activity groups and different sampling methods may have caused some bias within the analysis. In part to be responsive to this limitation, a triangulative design for analysis was chosen. The triangulation yielded connections that fitted the data and withstood a critical verification. For validation and interpretation purposes, the qualitative approach complemented the quantitative data, especially where uncertainty appeared and/or expert opinions were necessary to access the social milieus of interest (again, see Mann 2006 or Mann and Absher 2007, for a fuller discussion of these issues). Independent from the methods, the goal of this study's conflict analysis was to gain a satisfactory explanation of meanings that serve the ultimate goal of nature park management.

5.3. Management implications

Interpersonal and value conflicts originate mainly on wide, heavily used paths. Horse riding in the State of Baden-Württemberg is restricted in forests to roads and tracks wider than 3 m, and cycling and mountain biking is only allowed on paths wider than 2 m (State Forest Act Ba-Wü, §41). This means that the recreational use in forests is mainly managed and controlled by path width; wider paths must support diverse recreational use. The sentiments of cyclists and mountain bikers are amplified by the sentiments that these are the paths where they are allowed to cycle (Schlinzig 2002), but this challenges the goal to reduce user group conflict. How useful is a prohibition to cycle on paths smaller than 2 m when conflict potentials are mainly located on wide paths, where heavy and diverse recreational use has to occur by law (Fuss 2005)? Therefore, the width-based use regulation on paths does little to reduce the conflict potentials because it does not subsume the reasons for conflict. The law is in danger of missing its effect and purpose.

Instead, communication strategies would appear to be useful to reduce value conflict. It is essential to develop communication strategies together with the involved user groups in order to allow diverse and multifunctional recreational uses. In order to follow this idea, a final project workshop was used to develop strategies to strengthen the dialogue between recreational users and managers.

The actors stated that a successful dialogue requires a neutral moderator and catalyst. The Nature Park's management would be suitable for this position. As a local institution, they have a durable, local reference to all involved stakeholder groups, i.e. to the nature sport groups as well as the local authorities. Second, the Nature Park authorities have a municipal-political importance. Due to their role as a moderator and dialogue initiator, problems of recreational uses can be identified at an early stage and problematic recreation trends recognised. Park management has the possibility to develop demand-oriented recreational supply and accommodate expectations of specific user groups in their planning process. The Nature Park management has accepted this new role as a mediator. Because of an additional need of allies within the park, the nature sport clubs as well as landowners suggested them as partners. Old attitudes of entitlement and protest behaviour may be reduced in the organised nature sport sector due to collaborative planning activities. Communication in the non-organised sector may also be easier for them than for land management authorities.

Conflicts will never be fully reduced, but as they arise between and within different user groups they can be dealt with through a combination of quantitative data and qualitative strategies. Through knowledge about group-specific perceptions of conflict, visitors can be more effectively guided. Due to changing economic and social framework conditions, demands on the landscape and infrastructure of recreational areas will also change in the future. Recognising these developments and understanding the users' different social worlds can only be done effectively by focusing strongly on the users and listening to their interpretations.

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References

- Absher, J.D. and Lee, R.G., 1981. Density as an incomplete cause of crowding in backcountry settings. *Leisure sciences*, 4, 231–247.
- Ammer, U. and Pröbstl, U., 1991. *Freizeit und natur, probleme und lösungsmöglichkeiten einer ökologisch verträglichen freizeitnutzung*. Hamburg/Berlin: Pareys.
- Ammer, U. and Tietze, H., 1980. Reiten in der offenen landschaft. Eine studie zur verdeutlichung der konfliktsituation. *Reiten und Fahren*, 2, 10–15.
- AUBe e.V., Akademie für Umweltforschung und -bildung in Europa, 2002. *Konflikte und kooperationen im wander-/radwanderbereich: natur- und sozialverträgliche lösungsansätze und strategien*. Dokumentation der Fachtagung, 13.– 14.09.2002. Winterberg/Sauerland.
- Böttger, I., 2001. *Zukunftswerkstatt*. Forum sowie-online e.V. Bielfeld, Abrufbar. Available from: <http://www.sowie-online.de/methoden/dokumente/zukunftswerkstatt.htm> [Accessed March 2006].
- Bortz, J. and Döring, N., 1995. *Forschungsmethoden und evaluation*, 2. Auflage. Berlin: Springer Verlag.
- Brämer, R., 2000. Profilstudie wandern '99 - gewohnheiten und vorlieben von wandertouristen, 1. Grundausswertung. In: Forschungsgruppe Wandern, ed. *Wanderwelt studien zum sanften natursport*, 80a. Universität Marburg.

- Brämer, R., 2002. Koalition der genießer: wanderer und radler zwischen konflikt und kooperation. In: AUBe e.V., Akademie für Umweltforschung und -bildung in Europa, ed. *Konflikte und Kooperationen im wander-/radwanderbereich: natur- und sozialverträgliche lösungsansätze und strategien*. Dokumentation der gleichnamigen Fachtagung, 13.-14.09.2002. Winterberg/Sauerland, 35–45.
- Braun, A., 1998. Walderholung im spiegel der sozialwissenschaften. *Forstwissenschaftliches centralblatt*, 117 (1), 44–62.
- Budruk, M., et al., 2002. Crowding and satisfaction among visitors to a built desert attraction. *Journal of park and recreation administration*, 20 (3), 1–17.
- Carothers, P., Vaske, J.J., and Donnelly, M.P., 2001. Social values versus interpersonal conflict among hikers and mountain bikers. *Leisure sciences*, 23, 47–61.
- Cole, D.N., et al., 1997. *High-use destinations in wilderness: social and biophysical impacts, visitor responses, and management options*. Research Paper INT-RP-496. USDA: Forest Service.
- Confer, J.J., et al., 2000. Differences in place attachment among Allegheny National Forest users. In: USDA Forest Service Northeastern Research Station, ed. *Gen. Tech. Rep. NE-269*, 323–331.
- DSB: Deutscher Sport Bund, 2001. *Natura 2000 und sport. Ein leitfaden zur anwendung der fauna-flora-habitat-richtlinie und der vogelschutzrichtlinie*. (Frankfurt/Main, Eigenverlag).
- Federal Interagency Task Force on Visitor Capacity on Public Lands, 2002. *Visitor capacity on public lands and water – making better decisions*. Washington, DC: National Recreation and Park Association, US Department of the Interior.
- Feige, M. and Feil, T., 1997. *Projektbericht tourismus. Sozioökonomie unter besonderer berücksichtigung des tourismus in den großschutzgebieten mecklenburg-vorpommerns und ihren randgebieten*. Dessau: Umweltbundesamt 51/97.
- Froitzheim, T., 2002. Radler und wanderer auf einer linie: Gemeinsame ziele - getrennte wege? In: AUBe e.V., Akademie für Umweltforschung und -bildung in Europa, ed. *Konflikte und Kooperationen im wander-/radwanderbereich*. Dokumentation der Fachtagung, 13.-14.09.2002. Winterberg/Sauerland, 15–20.
- Fuss e.V. Fachverband Fußverkehr Deutschland, 2005. *Empfehlungen: spazierwege und fahrradnutzung*. Berlin: Eigenverlag.
- Graefe, A.R. and Thapa, B., 2004. Conflict in natural resource recreation. In: *Society and natural resources, a summary of knowledge, the 10th International Symposium on Society and Natural Resource Management*. Jefferson, Missouri: Modern Litho.
- Gibbons, S. and Ruddell, J.E., 1995. The effect of goal orientation and place dependence on select goal interferences among winter backcountry users. *Leisure sciences*, 17, 171–181.
- Herter, W., 2000. Belastungen der vegetation von mittelgebirgsfelsen durch sportklettern. In: A. Escher, H. Egner, and M. Kleinhans, eds. *Trend und natursportarten in der wissenschaft. Band 3*. Hamburg: Czwalina Verlag.
- Ivy, M.I., Stewart, W.P., and Lue, C., 1992. Exploring the role of tolerance in recreational conflict. *Journal of leisure research*, 24, 348–360.
- Jacob, G.R. and Schreyer, R., 1980. Conflict in outdoor recreation: a theoretical perspective. *Journal of leisure research*, 12 (4), 368–380.
- Jakob, E., Türk, S., and Roth, R., 2002. Ökologisch bewusste durchführung von großveranstaltungen - teilbereich mountainbiken. In: *Bundesministerium für umwelt, naturschutz und reaktorsicherheit*, eds. *Forschungsbericht 29994123*. Berlin: Umweltbundesamt.
- Job, H., 1991. Tourismus versus naturschutz: 'sanft' besucherlenkung in (nah-) erholungsgebieten. *Naturschutz und landschaftsplanung*, 1/91, 28–34.
- Lana, Länderarbeitsgemeinschaft für Naturschutz, Landschaftspflege und Erholung, 1999. *Beschlüsse - naturschutz und erholung*, 2. Auflage. Ministerium Ländlicher Raum Baden-Württemberg.
- Li, C.C., 1977. *Path analysis – a primer*. Pacific Grove, CA: Boxwood Press.
- Manfredo, M.J., et al., 2004. *Society and natural resources, a summary of knowledge. 10th international symposium on society and resource management*. Jefferson, Missouri: Modern Litho.
- Mann, C., 2003. *Pilotstudie zur ermittlung der sozialen tragfähigkeit von erholungsgebieten im bereich des naturparks schwarzwald mitte/nord*. Freiburg: Institut für Forstpolitik.
- Mann, C., 2006. *Konflikte in erholungsgebieten – ursachen, wirkungen und lösungsansätze*. Freiburger Schriften zur Forst- und Umweltpolitik, Band 12, Albert-Ludwigs-Universität Freiburg, Remagen-Oberwinter, Verlag Dr. Kessel.

- Mann, C. and Absher, J.D., 2007. A two-stage analysis of recreation conflict as a basis for management strategies in the Black Forest: a methodological contribution. *Forest, snow and landscape research*, 81, 123–138.
- Nohl, W. and Richter, U., 1986. Monetäre folgen des waldsterbens für freizeit und erholung. *Landschaft und Stadt*, 18, 4.
- Opaschowski, H.W., 1997. *Einführung in die freizeitwissenschaft* 3. Auflage. Opladen: Leske + Budrich.
- Opaschowski, H.W., 1999. *Umwelt, freizeit, mobilität, konflikte und konzepte*, 2. Auflage. Opladen: Leske + Budrich.
- Opaschowski, H.W., 2001. *Deutschland 2010: wie wir morgen arbeiten und leben – voraussagen der wissenschaft zur zukunft unserer gesellschaft*, 2. Auflage. Hamburg: Germa Press.
- Petermann, T., 1998. Folgen des tourismus, band 1: gesellschaftliche, ökologische und technische dimensionen. *Studien des Büros für Technikfolgeabschätzungen* 5. Berlin: Rainer Bohn Verlag.
- Prahl, H.-W., 2002. *Soziologie der freizeit*. Paderborn: Ferdinand Schöningh.
- Pröbstl, U., 2000. Ökologische skigebietsuntersuchungen als beitrag zur umsetzung der UVP-Änderungsrichtlinie in Bayern. In: Lehrstuhl für Landnutzungsplanung und Naturschutz, ed. Landnutzungsplanung und naturschutz, aktuelle forschungsberichte. München: TU München, 143–153.
- Ramthun, R., 1995. Factors in user group conflict between hikers and mountain bikers. *Leisure sciences*, 17 (3), 159–169.
- Revermann, C. and Petermann, T., 2003. *Tourismus in großschutzgebieten – impulse für eine nachhaltige regionalentwicklung*. Büro für Technikfolge-Abschätzung beim Deutschen Bundestag. Berlin: Edition Sigma.
- Roth, R., Jacob, E., and Krämer, A., 2004. *Neue entwicklungen bei natursportarten – konflikt-potenziale und lösungsmöglichkeiten*. Bericht 'F&E-Vorhaben Nr. 8018705'. Bonn: Bundesamt für Naturschutz.
- Roth, R., 2000. Das ende der vernunft? – Entwicklungen im natursport am beispiel des Alpenraums. In: *Trends im sport, dokumentation des 7. Symposiums zur ökologischen zukunft des sports*, 23–24 September 1999. Bodenheim/Rhein, Deutscher Sport Bund.
- Schemel, H.-J. and Erbuth, W., 2000. *Handbuch sport und umwelt*, 3. Auflage. Aachen: Meyer und Meyer.
- Schlinzig, F., 2002. Profile der nutzer von 'freizeitwegen'. In: AUB e.V., Akademie für Umweltforschung und -bildung in Europa, ed. *Konflikte und kooperationen im wander-/radwanderbereich*. Dokumentation der Fachtagung, 13.-14.09.2002. Winterberg/Sauerland, 21–24.
- Schmied, M., et al., 2002. *Umwelt und tourismus, daten, fakten, perspektiven*. Bundesumweltamt Forschungsbericht 200 87 112. Berlin: Erich Schmidt Verlag.
- Schuster, R. and Hammitt, W.E., 2001. Visitor experiences of stress and reported hassles in the Shining Rock Wilderness Area. *International journal of wilderness*, 7 (2), 26–28.
- Schwarz, G., 2000. *Qualität statt quantität – motivforschung im 21. Jahrhundert*. Opladen: Leske + Budrich.
- Thapa, B. and Graefe, A.R., 2003. Level of skill and its relationship to recreation conflict and tolerance among skiers and snowboarders. *World leisure*, 45 (1), 15–27.
- Vaske, J.J. and Donnelly, M.P., 2002. Generalizing the encounter–norm–crowding relationship. *Leisure sciences*, 24, 255–269.
- Vaske, J.J., et al., 1995. Interpersonal vs. social value conflict. *Leisure sciences*, 17, 205–222.
- Volk, H., 1986. Zur Belastung von natur und landschaft durch den wintersport. *Allgemeine forst- und jagdzeitung*, 12, 238–243.
- Volk, H., et al., 1995. *Mitteilungen der forstlichen versuchs- und Forschungsanstalt Baden-Württemberg nr. 187*. Freiburg: Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg.
- Watson, A.E., 2001. Goal interference and social value differences: understanding wilderness conflicts and implications for managing social density. In: USDA Forest Service, ed. *Proceedings, RMRS-P-20*. 62–66.
- Watson, A.E., Niccolucci, M.J., and Williams, D.R., 1993. The nature of conflict between hikers and recreational stock users in the John Muir Wilderness. *Journal of leisure research*, 26, 372–385.
- Weinbrenner, P., 2001. *Zukunftswerkstatt*. Forum sowie-online e.V. Bielfeld, Abrufbar. Available from: <http://www.sowie-online.de/methoden/dokumente/zukunftswerkstatt.htm> [Accessed March 2006].

- Wiedemann, P., 1991. Gegenstandsbezogene theorienbildung. In: U. Flick *et al.* eds, *Handbuch qualitativer sozialforschung – grundlagen, konzepte, methoden und anwendungen*. München: Psychologie Verlags Union, 440–445.
- Wöhrstein, T., 1998. *Mountainbike und umwelt; ökologische auswirkungen und nutzungskonflikte*. Dissertation der Universität des Saarlandes, Saarbrücken, Pirrot Verlag.
- Zwischenbericht Naturparkplan Naturpark Schwarzwald Mitte/Nord. 2002. *Analysen und ergebnisse des kommunikationsprozesses*. Etting-Polling: Planungsgemeinschaft Naturpark Schwarzwald Mitte/Nord.