

## Objectives of public participation: Which actors should be involved in the decision making for river restorations?

Berit Junker,<sup>1</sup> Mattias Buchecker,<sup>1</sup> and Ulrike Müller-Böker<sup>2</sup>

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[1] River restoration as a measure to improve both flood protection and ecological quality has become a common practice in river management. This new practice, however, has also become a source of conflicts arising from a neglect of the social aspects in river restoration projects. Therefore appropriate public involvement strategies have been recommended in recent years as a way of coping with these conflicts. However, an open question remains: Which stakeholders should be involved in the decision-making process? This, in turn, raises the question of the appropriate objectives of public participation. This study aims to answer these questions drawing on two case studies of Swiss river restoration projects and a related representative nationwide survey. Our findings suggest that public involvement should not be restricted to a small circle of influential stakeholder groups. As restoration projects have been found to have a substantial impact on the quality of life of the local population, avoiding conflicts is only one of several objectives of the involvement process. Including the wider public provides a special opportunity to promote social objectives, such as trust building and identification of people with their local environment.

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### 1. Introduction

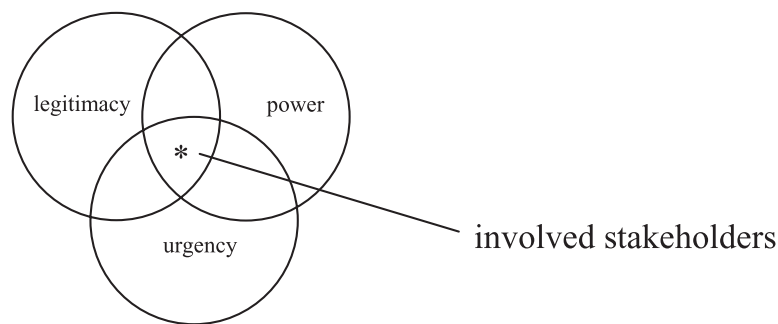
[2] Rivers in many geographical regions of the world have been channeled and modified in the course of the last 150 years in order to prevent floods and to facilitate the economic use of the land along the watercourses. This process has caused a massive loss of riverine natural habitats and a drastic decrease in their biodiversity. The last few decades have, however, been marked by a paradigmatic shift in the practice of river engineering. River restorations are today expected to combine improved flood protection measures with the ecological rehabilitation of the river reaches. The planning and implementation of river restoration projects have, however, frequently proved to be sources of conflict. As a result, restoration projects have frequently been retarded or even averted [e.g., Zaugg, 2002; Zaugg Stern, 2006; Camenisch et al., 2001]. This is due to the fact that most restorations imply a loss of the agriculturally or otherwise used land along the rivers. Resistance to restoration projects arises also from the tendency for local people to prefer the status quo (D. Gloor and H. Meier, *Soziale Raumnutzung und ökologische Ansprüche, Grundlagen und Materialien*, Professur Forstpolitik und Forstökonomie, ETH Zürich, Zürich, 2001, available at <http://e-collection.ethbib.ethz.ch/show?type=incoll&nr=296>), which may be associated with past achievements in river engineering as well as with the need for local self-determination.

[3] As a reaction to the social conflicts arising in this context, an increased implementation of participatory planning methods has been recommended [*Bundesamt für Wasser und Geologie (BWG)*, 2001; *European Union*, 2000; *U.S. Congress*, 1969]. However, up to now there has been no consensus on which stakeholder groups should be involved in the planning of river restoration projects, on which principles stakeholder identification should be based [*Ejderyan et al.*, 2006; *Lubell*, 2000], or on which objectives of public participation would be appropriate. It is the aim of this paper to examine these questions.

[4] A range of general objectives for widely inclusive participation strategies in natural resource planning has been suggested. These objectives include their potential for increasing the public acceptance of decisions, reducing conflicts [*U.S. Department of Energy, Environment, Safety and Health*, 1998; *Dukes and Firehock*, 2001; *Susskind and Cruikshank*, 1987] and promoting trust in planning agencies [*Beierle*, 2000; *Beierle and Cayford*, 2002; *Schneider et al.*, 2003]. It is also claimed that comprehensive participation makes it possible to identify public concerns and values [*Creighton*, 1981; *Bauer and Randolph*, 1999; *Stirling*, 2006] and to use local knowledge [*Garcia-Zamor*, 1985; *Firorino*, 1990; *Raffensperger*, 1998], which can lead to better informed and more creative decision making [*Mostert*, 2003]. This would then improve the substantive quality of decisions [*Gee et al.*, 2001; *Coenen et al.*, 1998]. In this view public involvement represents a chance to promote not only environmental learning [*Beierle and Cayford*, 2002], but also to enhance local awareness of people's responsibility for the environment in which they live and to increase their identification with it [*Fordham et al.*, 1991; *Buchecker*, 1999].

<sup>1</sup>Social Sciences in Landscape Research, Swiss Federal Institute for Forest, Snow and Landscape Research, Birmensdorf, Switzerland.

<sup>2</sup>Department of Geography, University of Zurich, Zurich, Switzerland.



**Figure 1.** Identification of stakeholders according to *Mitchell* [1997].

Public involvement is further perceived as fostering social learning in the community [*Pahl-Wostl, 2002; Craps et al., 2003*] and sustainable lifestyles [*Gallopín, 1991; Iyer-Raniga and Treloar, 2000*].

[5] However, are these claims of public involvement also recognized and put into practice in the context of river restorations? It is commonly acknowledged that involving stakeholders helps decrease conflicts in the planning of river restorations [*Duram and Brown, 1998; Beierle and Konisky, 2001; House and Fordham, 1997*]. River project managers, however, tend to perceive the risks rather than the potential benefits of the more far-reaching objectives of public involvement that go beyond conflict avoidance. Frequent arguments against extensive public involvement are, for example, lay people's lack of expertise [*Vining, 1993*] and of interest in participating [*Buchecker et al., 2003; O'Riordan, 1977*]. More involvement in decision making is also frequently perceived as too complicated and expensive [*Mostert, 2003*], and there is concern that the public will make bad decisions [*Beierle and Cayford, 2002*]. Further, project managers often believe that they already know locals' needs and interests and can represent them, or at least the local community officials can [*Dearden, 1981*]. They tend to expect more inclusive public involvement in decision making to be detrimental to the particular project aims, especially to ecological restoration aims [*House and Fordham, 1997; Mostert, 2003*]. A further problem often raised is that the social and environmental aspects of sustainability might be mutually exclusive; that is, public involvement could prevent environmentally beneficial outcomes [*Sköllerhorn, 1998; Mason, 1997*].

[6] Because of these reservations about public participation in decision making, most project managers in Switzerland focus on conflict avoidance. Therefore they commonly use a scheme of stakeholder identification that entails the inclusion of established organized stakeholder groups in the planning process (e.g., environmental groups, regional farmers' unions, fishing and hunting organizations) or economically affected landowners within the project perimeter. Such schemes tend to exclude other groups from direct participation, for instance, local sports and recreational groups (both organized and unorganized), as well as the general local public beyond these groups. They are often excluded because they are thought to have only little political power and to be unlikely to cause conflicts [see also *Ejderyan et al., 2006*]. These other groups are usually informed about the decision-making process, but not directly involved in it. This practice of stakeholder identification seems to be derived from a

theory developed by *Mitchell* [1997]. According to this theory, which stems from the field of business management, only the stakeholders holding a critical level of legitimacy, urgency and power need to be involved in the participatory planning process (Figure 1).

[7] That is, only those stakeholders should become involved who have legitimate and urgent claims, as well as the necessary political power to cause conflicts and to hinder or block a given project. (This theory is similar to the "normative" approach to participatory policy as described by *Firorino* [1990] and *Stirling* [2006]).

[8] It is not well understood, however, whether this circle of involved stakeholder groups is sufficient in the context of river restorations, or whether a wider inclusion of the public would be desirable or even needed, as is increasingly the case now in landscape and village planning [*Buchecker et al., 2003; Beierle and Cayford, 2002; Selle, 1996; Roux and Heeb, 2002*]. Apparently, which groups are invited to participate in the decision making of river restorations depends on the underlying objectives for public involvement. However, are there other desired objectives, besides avoiding conflicts, that are relevant in the context of river restorations?

[9] According to *Habermas'* [1981] theory of communicative interaction, which is widely used in planning theory, involving powerful stakeholders is sufficient if conflict prevention or, more generally, functional integration is the main objective. This is essentially the case in fields such as economy and policy. Fields, however, where social integration and identification have first priority can be attributed to the "life world," or in this case it might be better to say the "life space" of a community. In such fields more far-reaching objectives are relevant, and an extended public inclusion in participatory planning will be appropriate.

[10] Empirical studies confirm that interfering with people's living space without involving them leads them to become alienated, as well as to feel less responsible for changes in their everyday landscape [*Pickup et al., 2004; Pfister, 1997; Pöttker, 1997*]. Public involvement, on the other hand, helps people to identify more with their living space and to strengthen social cohesion [*Weichhart, 1990; Buchecker et al., 2003; Volker, 1997*].

[11] To clarify which objectives for public participation are relevant for river restorations and which groups of the public should best be involved in the decision making, we first have to understand the social relevance of river spaces. That is, we first need to find out if locals view river corridors only in a functional way or if they perceive them

**Table 1.** Methods Used in the Study

Qualitative Data: Interviews	Number	Quantitative Data: Survey	Response Rate, %
	<i>Case Study Thur</i>		
Local public	10	local public	57.9
Members of stakeholder groups involved	10	stakeholder groups (involved and not involved)	59.3
Project team	4		
	<i>Case Study Flaz/Inn</i>		
local public	6		
members of stakeholder groups involved	7		
Project team	3		
	<i>Swiss Wide</i>		
		phone	39.0
		written	28.7

to be part of their living space. Second we will have to investigate whether the stakeholders that are involved adequately represent local residents' values, aims and interests. Third, we will have to determine whether the wider public's interests might clash with the aims of project teams. On the basis of the answers to these questions, requirements regarding adequate inclusion can then be formulated.

## 2. Methods

### 2.1. Data Collection

[12] Research on the type of questions posed in this paper often relies mainly on qualitative case studies and less on quantitative empirical methods. Exceptions to this are the studies of *Beierle and Cayford* [2002] and *Lubell* [2000]. In this paper, we draw on the results of two case studies (including both qualitative and quantitative data collection methods) and of two representative surveys in Switzerland to answer these questions. This method triangulation [*Denzin and Lincoln*, 1994; *Lamnek*, 1988; *Backhaus*, 2001] was especially appropriate in this study since it offered an opportunity to obtain a deeper understanding of the issues at stake through interviews and observation, and then to quantify relevant aspects using the standardized questionnaires.

[13] The two case studies on Swiss restoration projects were carried out in the framework of restoration projects on the rivers Thur and Flaz/Inn. In both of these case studies we conducted problem-centered, explorative interviews using fairly open question guidelines with local people in each community, with the members of the project teams and with organized stakeholders who participate/d in the decision-making processes. All the interviewees were chosen on the basis of theoretical sampling [*Flick*, 1995; *Hunziker*, 2000].

[14] For the River Thur project, a questionnaire was designed on the basis of the qualitative research phase. This questionnaire was used to survey the local population of the case study community (Weinfeldten), all potential stakeholder groups and those actually participating in the decision-making process. We distributed the questionnaire to pedestrians in Weinfeldten several days a week at different locations within the community between 7:00 A.M. to 21:00 P.M. The same questionnaire was sent by mail to all potential stakeholder groups. The sample consisted of all

stakeholder groups actually involved in the decision-making process for the River Thur as participants in the regional working group (see section 2.1 for the description of the case study "Thur").

[15] Some stakeholder groups were not invited to participate in this concrete decision-making process but could nevertheless have stakes in the future of the local River Thur corridor. To find these groups, we used the local phone directory and made extensive use of the snowball principle, i.e., referrals from initial subjects to generate additional subjects [*Lubell*, 2003]. Altogether, we sent out 280 questionnaires to members of stakeholder groups. For the River Thur project, we also observed the ongoing decision-making process itself (see section 2.1). All of the qualitative and quantitative data for the two case studies were gathered from fall 2002 to spring 2004.

[16] The qualitative and quantitative data from the two case studies were then used as the basis for designing a standardized nationwide phone survey. It contained mainly fixed-response questions and was translated into all three official Swiss languages (French, German, and Italian). Although we designed the survey, we appointed a private market research firm specialized in large phone surveys to actually conduct the phone interviews.

[17] The sampling for this phone survey followed a random-quota procedure; that is, first a random sample was made on the basis of the Swiss telephone directory. In a second step strata (in this case age and gender) and the proportions in which they are represented in the whole Swiss population were identified according to the most recent census data. Finally, the number of respondents was limited according to these respective proportions or quota. In terms of the content of the survey, questions covered topics to do with the meaning of the river corridors for the locals, their relationship with rivers, their use of the river corridors, their attitudes and their expectations in regard to the design of river restorations, as well as their active involvement in the decision making in such projects.

[18] Since a phone survey cannot be too long, we also conducted a written survey to include further aspects that were not covered in the phone survey, such as respondents' willingness to pay for restoration projects and the perceived importance of river restorations in comparison to other rehabilitation measures. This written survey was sent to a random representative sample throughout Switzerland drawn up by the Swiss Federal Office of Statistics (BFS) on the basis of the national register of Swiss residents with a phone extension. 4000 copies of the questionnaire were mailed to this sample, together with a cover letter and a postage-paid return envelope on 30 November 2004. Of these, 3500 were deliverable. A reminder was sent out after 5 weeks to those people who had not responded until then.

[19] All surveys used in this study were designed according to the Dillman protocol [*Dillman*, 1978, 2000], and they were all pretested before the actual survey was conducted. The nationwide phone and written surveys were carried out at the same time (December–February 2004). Table 1 gives an overview of the different qualitative, and quantitative, data collecting methods, and the respective numbers and response rates.

[20] All the surveys contained several questions on socio-demographic characteristics of the respondents (Table 2).

**Table 2.** Sociodemographic Characteristics of the Respondents (in%)

Age		Education	
Years	Respondents, %	Highest Level	Respondents, %
<i>Case Study Thur: Local Public<sup>a</sup></i>			
15–24	24.4	primary school	2.9
25–39	21.9	secondary	9.7
40–54	28.5	grammar school	10.5
55–69	18.7	apprenticeship/vocational school	39.4
>70	6.5	higher professional education university/college	23.2 14.3
<i>Swiss-Wide: Phone<sup>b</sup></i>			
15–24	14.3	primary school	1.5
25–34	19.0	secondary	8.5
34–54	40.6	grammar school	12.1
55–74	26.1	apprenticeship/vocational school higher professional education university/college	37.1 21.2 19.6
<i>Swiss-Wide: Written<sup>c</sup></i>			
15–24	3.3	Primary school	3.3
25–39	24.2	secondary	4.1
40–54	28.8	grammar school	12.6
55–69	28.1	apprenticeship/vocational school	36.9
>70	15.4	higher professional education university/college	19.9 23.2

<sup>a</sup>Percentage of male respondents was 51.6; percentage of female respondents was 48.4.

<sup>b</sup>Percentage of male respondents was 48.9; percentage of female respondents was 51.1.

<sup>c</sup>Percentage of male respondents was 62.4; percentage of female respondents was 37.6.

The samples in the River Thur survey and the nationwide phone survey had a well-balanced gender distribution. Considerably more men than women responded to the nationwide written survey. A one-way ANOVA, however, revealed no significant differences between the mean ratings of men and women. In terms of age, all the surveys have a relatively even distribution. Exceptions to this are the proportionally high share of the youngest age group (15–24 years) for the River Thur survey, and the small share of the same age group for the nationwide written survey.

[21] As part of the River Thur survey, we asked also for respondents' membership in a stakeholder group. On the basis of this information we were able to divide the responses for further analysis into a set of stakeholder groups involved in the actual decision-making process (N = 46) and a set of stakeholder groups not involved (N = 120).

## 2.2. Data Analysis

[22] The qualitative interviews of the case studies Thur and Flaz/Inn were recorded on audio tape, transcribed and coded using the program NViVo and finally interpreted from a content analysis perspective [Lamnek, 1988]. We used these qualitative data as the basis for the survey design. For example, we collected all aspects of river corridor importance that were mentioned by the interviewees and used them as items for the nationwide phone survey.

[23] We conducted several statistical analyses using SPSS for Mac OSX version 11.0 to examine the quantitative data. In order to interpret the data on the significance of local river corridors (section 4.1), we reduced the various aspects

using a principal components factor analysis. We further calculated the mean values from the respective aspects for the two resulting factors. To test for differences in these mean values, we employed a *t* test for dependent samples. For the other survey questions, we calculated the descriptive statistics, and employed *t* tests for dependent samples to test the statistical significance of differences between mean values (see section 4.1.3). In order to obtain the mean values for stakeholder preferences, we calculated the mean values for the responses from each single stakeholder group (e.g., affected farmers) and then averaged these values.

[24] To test the statistical significance of differences in the mean values for the preferences of the local public, the involved stakeholder groups and the uninvolved stakeholder groups (section 4.2), we weighted the responses of the single stakeholder groups to account for varying response numbers among the different groups. We then conducted a one-way ANOVA with Bonferroni and Fisher's LSD Post-Hoc tests. These were chosen as they provide one more rigorous and one less strict test of the statistical significance of differences in mean values between all pairs of these three groups (i.e., local public versus involved stakeholder groups, involved stakeholder groups versus not involved stakeholder groups, local public versus not involved stakeholder groups). Further, we tested the statistical significance of differences in mean values for the preferences of the local public regarding the River Thur project and the Swiss population with *t* tests for independent samples.

## 3. Case Studies: Thur and Flaz/Inn

### 3.1. Case Study Thur (Weinfelden/Bürglen)

[25] The first case study focused on the area between the community Weinfelden and Bürglen along the River Thur in northeast Switzerland (Canton Thurgau). There the river project team from the cantonal Office for the Environment (AfU Thurgau) had developed plans for a large river project with the goal of combining flood protection with widening the river and constructing a retention basin. This project was part of the 2nd Thur correction that was launched after disastrous floods in 1978. Several restoration projects along the River Thur have already been carried out (e.g., in Frauenfeld, Gütighausen, Niederneunforn). Some of these projects were controversial, with conflicting opinions among agricultural interest groups, environmental organizations and the Federal Office for Forest and Landscape [Zaugg, 2002; Zaugg Stern, 2006]. As the locals knew about previous projects of the second Thur correction they were familiar with the idea of river restoration along the River Thur and how it could change the river's landscape.

[26] The river project Weinfelden-Bürglen started in 1999. By January 2000, the project team had drawn up an initial project scheme. In 2003 a committee was set up to monitor the project, consisting of several cantonal and federal offices for water engineering, the environment, agriculture, forestry and fisheries. Two years after having worked out the first project scenario, the project team established a so-called regional working group in order to facilitate a public participative decision-making procedure. The regional working group consists of invited representatives of the following groups (numbers in brackets indicate the number of the representatives of each stakeholder group

in the regional working group): people owning (3) or using (2) land affected by the project, the gravel industry (1), fishing (1) and hunting (1) communities, supraregional environmental NGOs (2), regional Farmers Union (1), Office of Tourism Weinfelden (1), and the mayors of the boroughs affected (2). The mayor of one of the affected boroughs (Bürglen) was asked by the project team to lead and act as a moderator for the regional working group. The participants were either personally invited or an invitation was sent to the organization with a request to select a representative for the regional working group. Meetings were therefore not open to the general public and other stakeholder groups.

[27] At their first meeting (in November 2003) with the regional working group, the project team defined the following three overall project goals: (1) widening the river, (2) constructing a retention basin, and (3) restoring the existing dams. Beyond working toward these main goals, the participants had considerable room to maneuver. The project team said that there were no concrete project plans apart from these three project goals, but most of the stakeholders did not believe this as they knew about the existing project scheme. The participants were asked to draw up and to explain their own project scenarios for the second meeting. These were supposed to provide the basis for the further negotiation process.

[28] At the second meeting of the regional working group, strong opposition to the proposed project became evident. This was mainly from landowners and land users. Most participants believed that the participative decision-making process was only something the project team felt they were supposed to do, without actually being willing to incorporate stakeholder perspectives and preferences into potential project schemes. There was also some misunderstanding about the necessity for local flood protection measures versus systemic measures for the whole river and about the potential use of a retention basin. The landowners further criticized the lack of concrete information on compensation. The project team was able to clarify some of the misunderstandings, and at the third meeting there was more willingness to find a consensus and to reconcile differing claims.

[29] At the same time, a cantonal petition was launched by a member of the regional Farmers' Union about the lack of wider public participation and discussion of the project. This meant the project team's design of the public participation process was discredited. The project team has since commissioned a private firm to design and present four scenarios for further discussion with the regional working group. The local public is sporadically informed about the state of the project through the distribution of project leaflets (1000 copies printed). A very short overview is also available on the Web page of the cantonal Office for the Environment (<http://www.umwelt.tg.ch/>). A local survey [Junker et al., 2003] found that the local population's level of knowledge about the ongoing project was very low (know about the project: 19.6%; do not know about the project: 75.4%; no answer: 5%).

### 3.2. Case Study Flaz/Inn (Samedan)

[30] In contrast to the Thur project, the Flaz/Inn project in Samedan in the Engadin region (southeast Switzerland) has already been successfully completed. After a flood event in

1987, the project was initiated by Canton Grisons initially to focus on flood protection measures. However, the local authorities saw no need to pursue either flood protection or a restoration project in the region at the time.

[31] The Canton reacted (in 1997) by declaring substantial parts of the area to be a high-risk flood zone so that no new building could take place in this area. In reaction to this measure, Samedan's local council decided to develop a variety of project scenarios in cooperation with the cantonal offices and federal research institutions. Several of these scenarios included ecological rehabilitation aspects. After the community voted against more expensive restoration scenarios and for purely technical flood protection in 1997, a potential restoration project was halted. A new mayor was, however, elected in 1998, who personally saw the advantages of river rehabilitation and openly invited everybody interested and potentially affected to work on further river scenarios. He also explicitly invited outspoken opponents of the restoration project scenarios to participate.

[32] A regional working group was then launched (led by the mayor), as well as an ecological monitoring committee. The regional working group consisted of representatives of farmers (1), residents of Samedan (3), and the local industry (2). The ecological monitoring committee was made up of stakeholders from: the cantonal hunting and fishing offices (2), the Grison Cantonal Office of Environment (1), ornithologists (1), environmental organizations (1), the local public (1) and fishing/hunting groups (1).

[33] These two working groups, in cooperation with the Grison Cantonal Office for Civil Engineering, worked out several scenarios ranging from purely technical flood protection schemes to combinations of flood protection and, to varying extents, ecological restoration measures. Throughout this whole planning and decision-making process, the local public was continuously and very openly informed via the monthly community newsletter. Further, the mayor established weekly office hours to answer local inhabitants' questions. Samedan's citizens finally voted on a scenario proposed by the local council in the village assembly on 15 June 2000 and on credit for the project on 26 November 2000. The proposed scheme was the maximum scenario, involving a dismantling of the dams in the area, a relocation of parts of the river Flaz and extensive ecological restoration measures along the new Flaz bed, along its old bed and along the river Inn (for more information on the project see [www.flaz.ch](http://www.flaz.ch)).

[34] In contrast to the Thur project, the locals living near the rivers Flaz/Inn first had to revise their negative attitudes toward a restoration project and only slowly recognized its potential. It became apparent during the case study interviews that the continuous and open planning and decision-making processes were largely responsible for the development of positive attitudes toward a project that combined flood protection with an ecological restoration. In the end, the proposed maximum scenario, as described above, received the majority of votes (pro: 128; contra: 6). This scenario has since been implemented.

[35] Evidently, the context of both the decision-making and the involvement processes differed in the two projects, Thur and Flaz/Inn. For example, they affected different number of inhabitants (Weinfelden/Bürglen: 12400; Samedan: 2000). Nevertheless, such differences do not have to influ-

**Table 3.** Principal Component Factor Loadings and Their Mean Values for Perceived Importance of Swiss Local River Corridors<sup>a</sup>

Aspects of Importance <sup>b</sup>	Living Space	Functional Space	Mean Value
Space for economic use (agriculture/forestry)	0.185	<b>0.674</b>	2.19
Achievement of engineering	0.061	<b>0.730</b>	2.56
Source of danger	0.065	<b>0.615</b>	2.57
Channel/drainage	0.189	<b>0.652</b>	3.08
Something belonging to me	<b>0.673</b>	0.228	3.20
Part of everyday living space	<b>0.753</b>	0.093	3.44
Source of life	<b>0.667</b>	0.295	3.54
Part of home	<b>0.636</b>	0.210	3.63
Peaceful and quiet place	<b>0.789</b>	0.053	3.63
Space for experiencing nature	<b>0.774</b>	0.129	3.70
Recreation area	<b>0.789</b>	0.055	3.81
Ecologically valuable space	<b>0.653</b>	0.099	4.05
Mean value of items/factor	3.65 <sup>c</sup>	2.72	
Cronbach's alpha	0.88	0.63	

<sup>a</sup>Factor loadings according to Varimax rotation. This was a phone survey, with N = 2016. Boldface items represent factors loaded on most strongly (>0.600).

<sup>b</sup>Aspects of importance rated on a five-point Likert scale: 1, not important; 2, slightly important; 3, medium importance; 4, important; and 5, very important.

<sup>c</sup>Significantly larger than mean value of factor "functional space" at p = 0.000.

ence how easily a public involvement procedure can be conducted and how successful it might be [Beierle and Konisky, 2000].

## 4. Results

### 4.1. Local Rivers: Do They Provide a Living Space or a Functional Space?

[36] We first examined the question whether the local people perceive the local river corridors to be part of their living space or only as a purely functional space. For this purpose, we found the following indicators to be suitable: (1) the importance of the local river corridors for the public, (2) their use for recreation and leisure, and (3) the strength of people's personal relationships with the local river corridors as well as their level of concern about planned river restoration projects in the neighborhood.

#### 4.1.1. Importance of River Reaches

[37] We investigated how important the local river corridors are for local inhabitants to gain some basic reference points for analyzing their (conscious or subconscious) understanding of the river corridors, as part of their living space or as a functional space [Tunstall et al., 1997; Backhaus and Müller-Böker, 2006].

[38] We incorporated all aspects of importance that were mentioned in the exploratory qualitative interviews during the two case studies in the representative phone survey. They were reduced in a principal components factor analysis and were assigned to factors if the loading on the factor was at least 0.600. The two factors "living space" (eight items) and "functional space" (four items) could be clearly identified (Table 3). They have an eigenvalue of 4.7 and 1.5, respectively, and they account for 52% of the variance in all aspects.

[39] The overall mean value of the aspects that characterize the local river landscape as a living space were

significantly higher than the mean evaluation score of the aspects pointing to its perception as a functional space. Altogether, the importance of the local river landscape for the public seems to have much more to do with aspects of living space and quality of life than with aspects of functional space.

#### 4.1.2. Use of River Reaches

[40] Another indicator of the role local river reaches may play in people's everyday lives is how they use this space. The nationwide phone survey included questions about different forms of use as well as their frequency. (The following forms of use were examined: walking, fishing, bathing, relaxing, biking/cycling, riding, jogging/Nordic walking, barbecuing, walking the dog, working, observing nature, meeting people, going by boat, and other.)

[41] Overall, the survey showed river corridors are frequently and variously used by locals (several times/week: 32.4%; once/week: 20.9%; several times/year: 39.0%; less often: 4.8%; never: 2.9%). (If several activities were mentioned, the highest frequency was used in the computation.) About half of all respondents use the local rivers and the land along their banks once a week or even several times a week. Most respondents pursue some sort of activity along the river at least several times a year. Only a small fraction says it uses the river less often or never. Of the various activities assessed in the survey, walking, relaxing and observing nature were most frequent.

[42] In interpreting these data, we have to consider that the respondents to the survey may use the river reaches more often than those who did not participate in the survey. However, the number of users is, nevertheless, still substantial, and it appears that river landscapes play an important role in many people's everyday lives.

#### 4.1.3. Respondents' Personal Relationships With Rivers and Concern About Restoration Projects

[43] In the nationwide phone survey we included two further indicators that we think offer additional insight into whether the local river reaches' are perceived more as living or as functional spaces. The first is the perceived strength of respondents' personal relationships with rivers and the second their level of concern about river restoration projects in the neighborhood. It can be assumed that a strong personal relationship correlates positively with people's perception of river landscapes as local living spaces. The same is true for a high level of concern about planned rehabilitation measures in the local river sector [House and Fordham, 1997]. The results clearly indicate that most respondents have a strong personal relationship with rivers in general and a medium level of concern about planned river restoration projects in their neighborhood (see Table 4).

[44] In order to evaluate the context for interpreting these results, the written nationwide survey included a question on the importance of rivers and riversides in comparison to the meaning of other typical features of a landscape. The results clearly show that river landscapes (reference value 3.0) are rated on average similarly to lakes ( $\bar{x} = 3.0$ ) and forests ( $\bar{x} = 3.0$ ), but higher than mountains ( $\bar{x} = 3.11$ ), fields and meadows ( $\bar{x} = 3.35$ ) and, interestingly, also higher than villages ( $\bar{x} = 3.47$ ) and towns ( $\bar{x} = 3.76$ ) (Respondents rated the significance on a five-point Likert scale (1, much less; 2, less; 3, same; 4, more; 5, much more).

**Table 4.** Perceived Strength of Respondents' Personal Relationships With River Landscapes and Level of Concern About River Restoration Projects in the Neighborhood of Their Homes<sup>a</sup>

Rating	Respondents' Personal Relationship With Rivers, <sup>b</sup> %	Respondents' Level of Concern About Local Restoration Projects, <sup>c</sup> %
1	6.9	13.2
2	22.0	20.0
3	39.9	29.9
4	30.0	21.7
5		13.2
No answer	1.2	1.9
Mean	2.97	3.07

<sup>a</sup>Phone survey Switzerland wide, with N = 2016.

<sup>b</sup>Question: How strong is your personal relationship with rivers, or perhaps only to one river? Rating was on a four-point Likert scale: 1, very weak; 2, rather weak; 3, rather strong; and 4, very strong.

<sup>c</sup>Question: Assuming a restoration project is planned for a river in your neighborhood, how concerned would you personally be about it? Rating was on a five-point Likert scale: 1, very low; 2, rather low; 3, medium; 4, rather high; and 5, very high.

[45] From the criteria above, we conclude that people perceive the local river landscapes rather as part of their living space than as a functional space – even though the rivers are still mostly channeled and far from “natural.” The data indicate that the river corridors are very important for most respondents in their everyday lives, for example, as recreational and natural spaces.

#### 4.2. How Well Do the Involved Stakeholder Groups Represent Public Interests?

[46] It is frequently argued that the aims and interests of the broader public are identical with those of the salient and organized stakeholder groups and/or the project managers. They can thus be represented by these groups and/or the project managers [Moote *et al.*, 1997; Blahna and Yonts-Shepard, 1989; Connelly and Knuth, 2002]. We were concerned therefore to find out whether this is the case or

whether there are differences between the aims of “involved” stakeholder groups, of “uninvolved” stakeholder groups, of the general local public and of the project managers. The Thur case study shows that the public and the organized, not involved stakeholder groups have very similar preferences for the future of the local river corridor.

[47] For the most controversial issues, such as naturalness, forestry, recreation and agricultural use of land, we found the public's preferences to be different from those of the stakeholder groups involved. The comparison of the quantitative survey data and also the qualitative interview data of the local Thur public with the qualitative data of the project team shows, however, that the public's preferences with regard to these issues are very similar to the aims of the project team. All of the interest groups (involved and not involved) and the public share strong preferences with regard to flood protection and groundwater quality. However, their preferences differ considerably from those of the managing project team (Figure 2). This finding was also confirmed when the qualitative interview data of the local public, stakeholders and the project team were compared. It seems that more discussion about the improvement of the water and groundwater quality is needed since these topics are not explicit aims of the river Thur project although they are relevant to all of the stakeholder groups. Furthermore, measures to increase flood protection are prone to generate misunderstandings because the project team aims to improve flood protection not only locally but also for the whole river Thur system. Locals and the stakeholder groups, however, tend to see only the local need. A comparison of the findings with the data from the nationwide survey supports the finding that the attitudes of the River Thur locals toward the issues in the survey are very similar to those for the whole of Switzerland (Figure 3).

#### 4.3. Participation Versus Optimal Restoration Projects?

[48] In the literature on natural resource management and among managers of restoration projects it is often argued that more inclusive public participation in river restorations

Aspects	Local Public <sup>b</sup>		Stakeholder Groups: Not Involved <sup>b</sup> (Recreational Groups)		Stakeholder Groups: Involved <sup>b</sup>		Managing Project Team
	Mean	Need for Action <sup>d</sup>	Mean	Need for Action <sup>d</sup>	Mean	Need for Action <sup>d</sup>	Need for Action <sup>e</sup>
Naturalness	3.78 <sup>e</sup>	↑	3.85 <sup>f</sup>	↑	2.85	→	↑
Forestry	2.98 <sup>e</sup>	→	3.11 <sup>f</sup>	→	2.12	↓	↓
Recreation	3.51 <sup>e</sup>	↗	3.39 <sup>f</sup>	↗	2.89	→	↗
Agriculture	2.27 <sup>e</sup>	↓	2.21 <sup>f</sup>	↓	3.12	→	↓
Flood protection	3.15	→	3.01	→	2.96	→	↑
Water quality	3.78 <sup>g</sup>	↗	4.31	↑	4.20	↑	→
Groundwater quality	4.06	↑	4.12	↑	4.22	↑	→

<sup>a</sup>Local public, N=124; organized stakeholder groups (recreational groups) not involved in the decision-making process, N=120; stakeholder groups involved in the decision-making process, N=46; and the managing project team, N=6.

<sup>b</sup>Quantitative data according to the following scale: 1, much less; 2, less; 3, same as now; 4, more; 5, much more.

<sup>c</sup>Qualitative data.

<sup>d</sup>Need for action scale derived from mean values.

<sup>e</sup>Differences in mean values between responses from the local public and involved stakeholder groups statistically significant for Bonferroni and Fisher's LSD PostHoc tests at  $p < 0.05$ .

<sup>f</sup>Differences in mean values between responses from not involved stakeholder groups and involved stakeholder groups (for same tests as <sup>e</sup>).

<sup>g</sup>Difference in mean values between responses from the local public and not involved stakeholder groups (for same tests as <sup>e</sup>).

**Figure 2.** Case study Thur. Preferences for the need for action in regard to the future of the local river corridor of the local public, organized stakeholder groups (recreational groups) not involved in the decision-making process, stakeholder groups involved in the decision-making process, and the managing project team are shown. See footnote “a” for additional information.

Swiss Public		
Aspects	Mean	Need for Action <sup>b</sup>
Naturalness	3.83 <sup>c</sup>	↑
Forestry	3.11 <sup>c</sup>	→
Recreation	3.43 <sup>c</sup>	↗
Agriculture	2.42 <sup>c</sup>	↘
Flood protection	3.43 <sup>d</sup>	↗
Water quality	3.87 <sup>c</sup>	↗
Groundwater	4.11 <sup>c</sup>	↑

<sup>a</sup>Written survey, N=1005.

<sup>b</sup>Quantitative data are according to the following scale: 1, much less; 2, less; 3, same as now; 4, more; 5, much more.

<sup>c</sup>Here  $p > 0.05$  for independent samples  $t$  test on differences in mean values between responses from River Thur locals (Table 5) and Swiss population.

<sup>d</sup>Here  $p < 0.05$ .

**Figure 3.** Preferences of Swiss population for need for action with regard to local river corridors. For written survey, N = 1005. Footnote “a” provides survey total.

projects could threaten optimal implementation of higher-ranking project aims. Further, it is frequently argued that broader public participation could lead to increased resistance during project negotiations and implementation [Fordham *et al.*, 1991; Bruton, 1980]. However, is wide public involvement really counterproductive? Our findings show that the expressed preferences and interests of the general public are not very different from those of the project team. In fact, the Swiss survey showed that the public had very positive attitudes toward restorations, which suggests that involving the general public could have a favorable impact on the optimal outcome of restoration projects (Table 5).

[49] In the cases where preferences differ considerably, as happened in the first phase of the Flaz/Inn project, widely inclusive public participation strategies are likely to promote a transformation of opposing views into cooperative and approving ones. The qualitative findings from the case study Flaz/Inn suggest that the opponents of restoration measures will be less motivated to prevent a project if they are directly involved in planning (see case study description Flaz/Inn in section 3.2).

[50] In situations such as the case study Thur, where the public tends to agree more with the aims of the project team than the involved stakeholder groups (see Figure 3), a wider inclusion of the local public is not likely to be detrimental,

but rather should help to promote the ecological aims of the restoration project. Participation schemes where the representation of stakeholders is skewed toward stakeholders directly affected economically [Curtis *et al.*, 1995; Fortman and Lewis, 1987; Moote *et al.*, 1997] are more likely to face the kind of resistance there was to the Thur project where an official petition was launched against it (see case study description Thur in section 3.1). Thus our data support findings of studies in other areas of natural resource management that widely inclusive stakeholder involvement does not only help to avoid conflicts and to bring about a higher approval of management decisions, but that it also leads to a better accomplishment of project aims [Beierle, 2000].

## 5. Discussion

[51] The main aim of our study was to examine the question of which stakeholder groups should be involved in deciding about river restoration projects. Our results imply that involving the wider and unorganized local population beyond politically influential stakeholder groups is not only important but furthermore has the potential to enhance support for project aims. This insight is based on our empirical findings on the residents' attitudes and interests toward rivers and their restoration in particular the

**Table 5.** Attitudes of Swiss Population to River Restorations in Different Cases<sup>a</sup>

Measured Items <sup>b</sup>	Opposed, %	In Favor, %	No Answer, %	Mean
Flood protection in combination with river restoration in Switzerland	12.0	85.1	2.8	3.32
Flood protection in combination with river restoration in own residential region	20.1	75.6	4.4	3.19 <sup>c</sup>
Pure river restoration in Switzerland	34.5	60.9	4.7	2.90 <sup>c,d</sup>
Pure river restoration in own residential region	39.2	55.2	5.6	2.83 <sup>c,e</sup>

<sup>a</sup>Phone survey, with N = 2016.

<sup>b</sup>Average evaluation in percent along a four-point Likert scale: 1, strongly opposed; 2, rather opposed; 3, rather in favor; and 4, strongly in favor. Scale values 1 and 2 were grouped here as “opposed”; 3 and 4 were grouped as “in favor.”

<sup>c</sup>Significantly lower than attitude toward flood protection in combination with river restoration in Switzerland at  $p < 0.01$ .

<sup>d</sup>Significantly lower than attitude toward flood protection in combination with river restoration in own residential region at  $p < 0.01$ .

<sup>e</sup>Significantly lower than attitude toward pure river restoration in Switzerland at  $p < 0.01$ .



answers to the following questions: (1) Are the river corridors a meaningful part of the residents' everyday life, so that enhancing identification, trust and the sense of responsibility are relevant objectives of public involvement? (2) Do the stakeholders generally involved in decision making also represent the local residents' aims, preferences and interests? (3) Do the wider public's aims clash with the aims of the river restoration project, i.e., with those of the project team?

[52] 1. Our findings confirmed that river corridors are highly significant for people's local living space. Thus people were found to attach importance to river corridors as recreational and natural spaces, but also as landscapes associated with local identity, whereas functional aspects were perceived as significantly less relevant. River reaches also appeared to be very intensively used by the residents for recreation and leisure activities. Finally, it became evident that people tend to relate strongly to these areas, at least as strongly as to most other landscape features and even more strongly than to villages and towns. Thus river landscapes are a significant part of people's everyday environment, which means the residents tend to experience exterior interventions in this area without their involvement as an intrusion.

[53] 2. Our findings further substantiated the claims that the interests of the local public cannot be adequately represented by members of those stakeholder groups which are generally included in the decision-making process. The preferences and aims of the wider public appear to differ considerably from those of these organized stakeholders, and can be regarded as at least as important as those of the stakeholders [Curtis *et al.*, 1995]. This applies particularly to requirements regarding recreation activities, so that at least a direct representation of the public interest "recreation" is needed. An "independent" representation of this group by the project management itself, as has usually been the case so far, is not appropriate either. This is not only for reasons of legitimacy, but also because the interests of the project management do not fully correspond with those of the recreational groups.

[54] 3. In terms of the third question, our findings indicate that including the public tends to support rather than jeopardize far-reaching restoration goals. The public often has a very positive attitude toward restoration projects. We also found the preferences of the public to be closer to the project managers' aims than to those of the involved stakeholders. Therefore including representatives of the general public could further the project managers' aims. If the only stakeholders who are involved are those who are organized and materially affected, as suggested by Mitchell [1997], there is a danger of overrepresenting stakeholder interests (e.g., those of landowners, farmers' unions) that are in opposition to restoration aims. Involving the local public could also weaken the potential resistance of a materially affected minority of stakeholders and thus lead to more realistic project solutions based on a more representative range of interests. A widened debate might be an opportunity for the affected stakeholders as well, particularly for farmers and foresters, since this could contribute to increased recognition of their services and, in some cases, sacrifices.

[55] Our results indicate that involving organized and materially affected stakeholders according to the Mitchell

[1997] scheme appears to be sufficient to avoid conflicts. Since river restorations, however, affect the living space of the local population, an extended circle of stakeholders (e.g., local recreational users) needs to be involved. That is, more long-term and far-reaching objectives of public participation should be aimed for. These objectives include promoting an increased identification of the locals with their changed everyday living space [Buchecker *et al.*, 2003; Weichhart, 1990], as well as a sense of local self-determination and responsibility for the local environment. Planned public involvement should also aim to increase trust between the public and the authorities, and to foster a social learning process promoting future participation as well as environmental protection aims [Beierle, 2000; Pahl-Wostl, 2002; Mostert, 2003; Beierle and Cayford, 2002].

[56] Inviting only a restricted circle of stakeholder groups to participate in the decision-making process of river restoration projects would mean just focusing on conflict prevention and missing a rare opportunity to promote these wider social objectives.

## 6. Conclusions

[57] A general shift in the social discourse on natural resource management has taken place in recent decades, moving from a focus on efficient land use in economic terms toward a focus on sustainable development. This is true for the domains of land development, forest and river management. The main economic aim in river management has been and continues to be flood protection. In the past decade this has been extended to include ecological aspects providing more space for nature and restoring rivers to more natural states, as specified in various laws and regulations [BWG, 1991]. The social objectives of sustainability, maintaining or enhancing people's quality of life and actively involving the public, have so far been neglected in the management of river landscapes. These aspects have, however, increasingly been taken into account in land development and forest management. As our study has shown, river landscapes are at least as much part of people's living space, as settlements and forests. Therefore more involvement of the public, as practiced in planning other domains of people's living space is not only justified, but also needed.

[58] The call for broader public involvement schemes is often countered by the objection that river projects entail aspects that are not negotiable, such as the implementation of federal policy guidelines on both flood protection and restoration aims [BWG, 1991]. If clear limits, however, are defined within which an examination and communication of the range of existing interests can take place and within which several scenarios can be discussed, then these aims can still be met. Wider stakeholder involvement also tends, as an added benefit, to lead to public support for restoration efforts.

[59] According to our study, it seems that all of the indicated preferences of the public for involvement in restoration projects could be best accommodated if project managers offer a variety of ways of being involved, as other authors have also recommended [e.g., Gregory, 2000; Moote *et al.*, 1997]. Social objectives might best be served by including the wider public in the first planning phase, as other authors also suggest [e.g., Junker and Buchecker, 2006; Lubell, 2000]. Deliberate instruments for public participation could be expedient for achieving this, such

as planning cells, advisory committees, future scenarios, public surveys, citizen reports and public value forums [Gessenharter, 1996; Keeney et al., 1990; Beierle and Cayford, 2002]. Then the whole range of elicited aims and preferences could serve as a basis for all further planning measures. The representation of local recreational groups seems appropriate in this first planning phase, but also in the consensus-finding phase when different scenarios are negotiated.

[60] More research is needed to optimize the decision-making process in river restoration, in particular regarding the effect and efficiency of different forms of public involvement [Beierle and Cayford, 2002]. Research schemes using a measurement of indicators at the onset and a measurement of the same indicators at the end of a public involvement process (premeasurement/postmeasurement method) appear very promising, as initial experiments in landscape planning have shown [Gehring et al., 2004; Buchecker and Hunziker, 2006].

[61] Developing suitable instruments to evaluate and monitor the success (or failure) of public involvement schemes is an essential precondition for achieving social and institutional learning objectives. In summary, only if the wider public can be provided with adequate opportunities to become involved in the planning process will it be possible to tap the full potential of river restoration projects for a sustainable landscape development.

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M. Buchecker and B. Junker, Social Sciences in Landscape Research, Swiss Federal Institute for Forest, Snow and Landscape Research, Zuercherstrasse 111, Birmensdorf CH-8903, Switzerland. (matthias.buecheker@wsl.ch; berit.junker@wsl.ch)

U. Müller-Böker, Department of Geography, University of Zurich, Winterthurerstrasse 190, Zurich, CH-8057, Switzerland. (boecker@geo.unizh.ch)