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The Human Dimensions of a Proposed Restoration of European Bison in
Germany and a Comparison of European Expert and German Public
Preferences for Characteristics and Methods of Public Involvement

by

© Stephen E. Decker

A thesis submitted to the
School of Graduate Studies
in partial fulfillment of the
requirements for the degree of
Master of Arts

Department of Geography
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Newfoundland Labrador

Abstract

Human dimensions of wildlife management research and associated public involvement tools can reduce conflicts between interest groups and help to understand public attitudes and beliefs. The proposed restoration of free-ranging European bison (*Bison bonasus*) in North Rhine-Westphalia, Germany presents an opportunity to explore human dimensions issues and address questions pertaining to public involvement.

Randomly distributed questionnaires (n = 398) were used to assess attitudes and beliefs of residents surrounding the proposed restoration area. Residents from Siegen-Wittgenstein held significantly higher attitude and knowledge scores than Hochsauerlandkreis (HSK) respondents. Attitudes comprised general attitude and lifestyle impact factors. General fear of bison had greatest influence on attitudes.

In the second aspect of the study, interviews with residents surrounding the proposed bison area (n = 246) and questionnaires distributed to European experts (n = 46) were used to assess preferences for characteristics and methods of public involvement. Few differences were found between Siegen-Wittgenstein and HSK. Significant differences were found between American and German public preferences and between European expert and German public preferences.

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Thanks also to the research assistants who took part in both conducting interviews and distributing self-administered questionnaires. I would also like to express my gratitude to the German public and European expert respondents for participating in the study and providing the data for this thesis.

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List of Abbreviations and Symbols

EU	European Union
GA	General attitude component
HSK	Hochsauerlandkreis administrative region
ha	Hectares
IUCN	International Union for the Conservation of Nature
km	Kilometers
KS	Knowledge score
LI	Lifestyle impact component
n	Sample size
PCA	Principal components analysis
SSC	Species Survival Commission
SW	Siegen-Wittgenstein administrative region
WWF	World Wide Fund for Nature
α	Cronbach's alpha (reliability estimate)

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Co-authorship Statement

I have relied on a number of individuals for assistance and guidance in the preparation of this thesis and the research papers contained within, however, I have played an active and leading role in all phases of this research. While my supervisor, Dr. Alistair Bath, assisted in the design of the research project; I was directly responsible for all phases of implementation of the study on the ground. During preparation of the thesis and research papers, I was grateful to have received input from Dr. Bath, advice in the area of statistical analysis from Dr. Alvin Simms, and guidance from my German colleagues Mr. Uwe Lindner, and Mr. Edgar Reisinger. In the versions of the research, which have been submitted for publication, Dr. Bath, Dr. Simms, Mr. Lindner, and Mr. Reisinger are listed as co-authors. The thesis and research papers presented here are my work as input from the co-authors was mostly in the form of editorial suggestions.

Chapter 1 Introduction

1.1 Thesis Overview

The purpose of this thesis is to contribute to a better understanding of the human dimensions of resource and wildlife management within the context of human - environment relationships, an established tradition within geography (Pattison, 1964). More specifically, the research presented here explores human dimensions issues associated with a proposed restoration of free-ranging European bison (*Bison bonasus*) in the state of North Rhine-Westphalia, Germany. For the purpose of this study, a free-ranging herd is defined as a herd that is virtually unrestricted in its movements. In the case of bison restoration in North Rhine-Westphalia, the bison, if they are restored, will be considered free ranging though restoration proponents plan to use fences in specific areas to exclude bison from areas where there is public opposition to the restoration. Research associated with the human dimensions of wildlife management seeks a better understanding of how people view wildlife species and explores the reasons behind public support of, and opposition to, management efforts (Decker, Brown, & Siemer, 2001). Human dimensions research should also help to affect changes in public attitudes, should that be desirable.

As suggested by Bath and Farmer (2000), understanding the human dimensions of conservation efforts is particularly important as wildlife species return to areas where people are no longer accustomed to their presence. Thus, when discussions began concerning the proposed bison restoration, a feasibility study was launched to explore not only the ecological and biological issues but also the human dimensions issues. While

exploring the human dimensions of wildlife management and conservation efforts is a well-established practice in North America, notably fewer examples of such research are found in Europe (Bath & Majić, 2001). Where European human dimensions research does exist, it tends to focus on large carnivore management and restoration efforts (Schröder, 1998; Bjerke, Reitan, & Kellert, 1998; Kaltenborn, Bjerke, & Vitterso, 1999; Bath, 2000; Bath & Majić, 2001; Williams, Ericsson, & Heberlein, 2002; Kleiven, Bjerke, & Kaltenborn, 2004), and not on large herbivores. By documenting residents' attitudes and beliefs toward the proposed bison restoration, this study applies similar North American methodology to a different location, species, and wildlife management issue. The first of two research articles included in this thesis documents findings from this study and discuss the attitudes, beliefs, and expectations of residents living in areas surrounding the proposed bison restoration area.

Jacobson and McDuff (1998, p. 263) state that “[p]ublic influence is especially prevalent in controversial conservation issues such as the reintroduction of species.” Thus, the bison’s long absence and their proposed restoration provide an opportunity to gain a better understanding of associated human dimensions issues and address public involvement questions. Public involvement, the applied aspect of human dimensions research, can offer benefits and help to resolve issues with members of the public and wildlife managers alike. Hunsberger, Gibson, and Wismer, (2005, p. 624) suggest that public involvement “produces a locally relevant and relatively inexpensive body of information, heightened public awareness of and capacity to engage in issues of local concern, and decisions that are stronger and more acceptable”. The second research

article included in this thesis concerns public and expert preferences for characteristics and methods commonly associated with public involvement processes. Based upon this research, managers could improve the design of effective decision-making procedures thereby contributing to the pursuit of positive public involvement outcomes such as those outlined by Hunsberger et al. (2005) above.

1.2 Organization of the Thesis

This thesis has been organized into three main sections, which are further subdivided into chapters. The first section has five chapters. The first chapter provides readers with a brief introduction to the areas of research addressed in this thesis and provides an overview of the information contained within the thesis. Chapter 1 also gives readers a sense of the layout of the thesis and the information included in each chapter. Chapter 2 provides a review of the current literature in the field of human dimensions of wildlife management and the related field of public involvement in resource and wildlife management decision-making. This literature review helps place the thesis within the context of the field of human dimensions of resource and wildlife management and provides justification for the current research. The second chapter also includes a brief introduction to the two research papers that have been prepared for publication in scholarly journals. Together, these manuscripts comprise the second section of the thesis. Chapter 3 presents information concerning European bison and examines the animal's history, distribution, population status, and management. Chapter 4 consists of a description of the study area for the current research. This chapter includes information

concerning the geographical location and physical extent of the study area and describes a selection of socio-demographic characteristics of residents in the two administrative regions spanned by the proposed restoration area. Chapter 5 provides an overview of the methodology followed during the data collection and analysis phases of the thesis research project. More specifically, this chapter provides information concerning questionnaire design, sampling, data collection, and data analysis.

The second section of the thesis comprises two research papers. Chapter 6 contains the manuscript entitled *The Return of the King or Bringing Snails to the Garden? The Human Dimensions of a Proposed Restoration of European Bison (Bison bonasus) in Germany*. In this research paper, the attitudes, beliefs, expectations, levels of support or opposition, and demographic characteristics of the public and interest groups associated with a proposed restoration of free-ranging European bison in the state of North Rhine-Westphalia, Germany are documented and discussed. This manuscript has been submitted for publication in *Restoration Ecology*, a peer reviewed journal focusing on both basic and applied research addressing ecosystem recovery. With an impact factor of 1.380, *Restoration Ecology* is considered a leading journal in the field of ecology.

Chapter 7 concerns the applied component of human dimensions research: public involvement. In this second manuscript, *What Do Experts Know? Context as a Determinant of Public Preferences for Methods and Characteristics of Public Involvement*, public and expert preferences for particular characteristics and methods of public involvement are examined as well as questions concerning whether preferences are context dependent or independent as has been suggested by other researchers (Tuler

& Webler, 1999; Mortenson & Krannich, 2001; Chase, Decker, & Lauber, 2004). This research article has been submitted for publication in *Society and Natural Resources*. With an impact factor of 1.339 *Society and Natural Resources* is considered a reputable journal in the field of human - environment interactions.

Chapter 8 comprises the final section of the thesis. In this section, the main findings of the two manuscripts are briefly highlighted and discussed. This final section also includes concluding remarks regarding findings from the current research, presents implications for European biodiversity and nature conservation policy, and provides suggestions for future research in the field of human dimensions of wildlife management.

Chapter 2 Human Dimensions and Public Involvement in Wildlife Management

Human populations continue to advance into wilderness or natural areas while, at the same time, the popularity of nature conservation and wildlife restoration efforts are increasing (Kleiman, 1989; Sarrazin & Barbault, 1996; Balčiauskas, 1999). To manage the conflicts that inevitably result from the intersection of these two trends, resource and wildlife managers increasingly rely on the many facets of the field of human dimensions (Dobson, Riley, & Gaden, 2005; Parkins & Mitchell, 2005; Weber, Lovrich, & Gaffney, 2005). Human dimensions research can help managers learn about the attitudes, beliefs, levels of support or opposition, and demographic characteristics of publics and interest groups associated with resource and wildlife management efforts (Bath, 1996).

Such information is important to resource and wildlife managers as unfounded assumptions about the positions of the public and interest groups can result in unsupported decisions, which may contribute to public opposition to nature and wildlife conservation efforts (Miller & McGee, 2001). With accurate information about beliefs and attitudes, however, managers, human dimensions researchers, and interest groups who are willing, can more effectively work toward common goals which may include consensus on a decision, the preparation of a mutually acceptable management plan, or simply, greater knowledge levels concerning the matter in question.

The conflicts surrounding collaborative efforts present formidable challenges for resource and wildlife managers (Lawrence & Deagen, 2001; McCool & Guthrie, 2001).

Such difficulties can be seen all over the world, wherever attempts are made to alter land use patterns or to influence public opinions and behaviors or management priorities in the name of resource or wildlife conservation (see: Schröder, 1998; Bath & Farmer, 2000; Andersone & Ozoliņš, 2002; Bath & Enck, 2003). These conflicts can take a number of forms which are generally identified as either cognitive (e.g. different beliefs regarding what may or may not be true), value (e.g. differences regarding the importance of the issue in question when compared with other issues facing respondents or the region in general), cost/benefit (e.g. differences of opinion regarding who will pay for, or benefit from, the effort in question), or behavioural conflicts (e.g. issues regarding mistrust or questionable credibility of individuals or groups involved in the effort) (Mitchell, 1989; Bath, 2000; Bath & Majić, 2001). Many resource and endangered species management efforts struggle and sometimes fail under the weight of public opposition (Bath, 2000; Lawrence & Deagen, 2001; Dearden, 2002; Brown & Harris, 2005). Therefore, the need to successfully involve the public in decision-making, gain a greater understanding of the nature of these conflicts, and thereby reduce the severity and frequency of these conflicts is obvious.

A number of authors have suggested that successful public involvement efforts can reduce conflict, build trust and credibility between managers and the public (Bath & Enck, 2003), and forestall litigation by those who wish their voice to be heard (The Regional Environmental Center For Central and Eastern Europe, 1998; Lawrence & Deagen, 2001). To ensure that their voices are heard, members of the public and interest groups increasingly seek participation in resource and wildlife management decisions

(Bath, 1996; McCool & Guthrie, 2001; Chase, Siemer, & Decker, 2002; Chase et al., 2004). Thus, the importance of well designed, and thus effective, public involvement processes continues to increase.

2.1 Public Involvement

Public involvement is based on a premise of the power of individuals or groups to influence the decisions that will affect their future, a premise perhaps best exemplified by Margaret Meade's statement, "[n]ever doubt that a small group of thoughtful, committed citizens can change the world. In fact it's the only thing that ever has" (The Margaret Meade Centennial, 2001). Involving the public in resource and wildlife management decision-making also results in a "heightened public awareness of and capacity to engage in issues of local concern, and decisions that are stronger and more acceptable" (Hunsberger et al., 2005, p. 624). Thus, public involvement not only empowers individuals and interest groups but also results in sound decisions that are more acceptable to both managers and concerned or affected members of the public.

Support for the use of effective public involvement efforts has also been provided by Stoll-Kleemann (2001b) who suggests that many of the conflicts associated with efforts to develop and manage protected areas result when conservationists misinterpret challenges as being ecological problems requiring biological solutions and not human dimensions issues requiring public input to better understand the positions of interest groups. Similarly, the International Union for the Conservation of Nature (IUCN) identifies a lack of involvement of interest groups, affected members of the public, and

resource users in the development of biodiversity management strategies as contributing to institutional failures resulting in chronic biodiversity loss (Emerton, 2000).

Just as successful resource and wildlife management decisions must be informed by the opinions of both the affected general public and experts (Hunsberger et al., 2005), so too must acceptable and effective public involvement processes address the preferences of members of the public and experts with experience in public involvement efforts. Past research, however, has focused on identifying criteria to evaluate the success of completed public involvement processes (Lauber & Knuth, 1999; McCool & Guthrie, 2001). Such research offers little guidance to resource and wildlife managers attempting to design public involvement processes that are both effective and acceptable (Lawrence & Deagen, 2001; Chase et al., 2004). In an attempt to fill this research gap and help improve the design of public involvement processes, researchers increasingly look to public and expert preferences for features generally associated with public involvement efforts (see: Tuler & Webler, 1999; Mortenson & Krannich, 2001; Chase et al., 2004).

As researchers explore public and expert preferences for various factors and methods of public involvement, findings of similarities in preferences between somewhat disparate regions and apparent trends in expert preferences, have prompted some researchers (Tuler & Webler, 1999; McCool & Guthrie, 2001; Mortenson & Krannich, 2001; Chase et al., 2004) to question whether findings in particular contexts can be generalized to other situations. Information concerning expert opinions and similarities and differences between contexts has design implications for managers wishing to implement a popular and effective public involvement process. Differences in

preferences between contexts suggest that managers may wish to consider an area-specific process while findings of no differences in preferences suggests that while similar preferences do not necessarily mean widespread acceptance, managers are able to implement an area-wide process. Further, by employing a public involvement process that is deemed effective by experts and is attuned to the preferences of the public, managers will likely enjoy greater levels of public acceptance for their decisions, thereby, fostering good public relations and cooperation with the public in the future (Lauber & Knuth, 1999; Stoll-Kleemann & Welp, 2006).

2.2 Rationale

Human dimensions of resource and wildlife management research is notably rare in Europe when compared with North America (Bath & Majić, 2001). Further, those examples of human dimensions of wildlife management research that do exist in Europe tend to focus on large carnivore management and restoration efforts (Bjerke et al., 1998; Schröder, 1998; Bath, 2000, Bath & Majić, 2001; Williams et al., 2002), not on large herbivores. In Germany, Europe's second most populous country (Central Intelligence Agency, 2006), human dimensions research regarding any wildlife issue is extremely rare. Similarly, while public and expert preferences for various characteristics and methods of public involvement have been addressed by other researchers (Tuler & Webler, 1999; Mortenson & Krannich, 2001; Chase et al., 2004), few studies combine public and expert preferences to offer advice for designing acceptable and effective public involvement processes.

2.2.1 Human Dimensions Research in Europe

Though rare in Europe (Bath & Majić, 2001), human dimensions research is well established as an important part of resource and wildlife management in North America (Bath, 2000). The relatively long history of human dimensions of resource and wildlife management research in North America is evidenced by studies from North American countries, which have addressed attitude change over a number of decades (Kellert, Black, Rush, & Bath, 1996; Manfredo, Teel, & Bright, 2003; Butler, Shanahan, & Decker 2003). These longitudinal studies indicate both that research in the field began several decades previous and that there has been a progression in the level of research over time. Perhaps in response to a lack of research in this area, in some areas of Europe earnest efforts have begun to more effectively involve the public and interest groups in resource and environmental management decision-making (O'Riordan, Fairbrass, Welp, & Stoll-Kleemann, 2002). However, it seems that some countries, such as Germany, are enjoying better success than others (O'Riordan et al., 2002).

As a consequence of efforts by German nature conservationists to more effectively involve the public in decision-making, proponents of the proposed restoration of free-ranging European bison in an area of North Rhine-Westphalia, Germany identified a better understanding of human dimensions issues as one of the main goals of the associated feasibility study. In the first manuscript presented, *The Return of the King or Bringing Snails to the Garden? The Human Dimensions of a Proposed Restoration of European Bison (Bison bonasus) in Germany*, we explore the attitudes, beliefs, and levels of support or opposition of local residents and interest groups towards the proposed bison

restoration. This aspect of the study concerns differences in attitudes and knowledge levels between two administrative regions and offers guidance to restoration managers in both making informed decisions and targeting management and information efforts to address the concerns of respondents.

2.2.2 Research Addressing Public Involvement Aspects of Human Dimensions

Until recently, direct public involvement was rare in many European countries (Stoll-Kleeman & Welp, 2006). Attesting to this fact O’Riordan et al. (2002, p. 124), in their examination of WWF Europe’s evaluation of the efforts of 15 member states to meet the goals of the EU Habitats Directive, state that “No member state has yet financed adequately the management plan process, nor has adequate stakeholder involvement been effective”. O’Riordan et al. (2002) go on to suggest that while many States are doing very little to incorporate local interests and values into their efforts to implement the Habitats Directive, countries like Germany, the United Kingdom, and France are making progress in this area.

Interestingly, just one year earlier, Stoll-Kleemann (2001a, p. 120) wrote that “[i]n Germany a widespread lack of participation during the whole process of planning and implementing nature conservation measures is an important factor that leads to opposition”. Similarly, in another article, Stoll-Kleemann (2001b) suggested that conflicts surrounding nature conservation in Germany are rooted in conservationists’ lack of knowledge concerning the importance of avoiding stereotyped images and how to approach certain groups. Thus, it seems that while some European countries are making

efforts to involve the public in resource management decision-making, such efforts are in their infancy and lack effectiveness in many cases.

Managers increasingly realize that understanding and addressing the concerns and opinions of the public is an essential component of successful management efforts, especially when such efforts concern issues as contentious as wildlife reintroductions. Owing to the diversity of views regarding wildlife reintroduction efforts, public involvement is often identified as the most important contributor to a successful restoration effort (Jacobson & McDuff, 1998). Sarrazin and Barbault (1996, p. 474) have noted the importance of public consultation and cooperation to the success of wildlife reintroduction and state that “reintroduction in a hostile human context, and with low funding, would be very unlikely to succeed whatever the biological background...”. Similarly, in their discussion of wolf management in Croatia, Bath and Majić (2001, p. 21) stated that “[w]olf populations and their conservation in Croatia appear to be highly dependent upon human factors more than biological factors”. Thus, the European bison’s long absence and their proposed restoration has provided an opportunity to not only gain a greater understanding of levels of support or opposition concerning this controversial wildlife conservation effort, but to also explore preferences for various characteristics and methods of public involvement.

In the second manuscript, *What Do Experts Know? Context as a Determinant of Public Preferences for Methods and Characteristics of Public Involvement*, we explore public and expert preferences for particular characteristics and methods of public involvement. In addition, German public preferences are compared with those

documented in a similar American study by Chase et al. (2004) to gain a better understanding of the influence of context on preferences. Such information has design implications for resource and wildlife managers wishing to implement a public involvement process that is both popular and effective.

Chapter 3 History and Status of the Species

Originating in southern Asia in the late Pliocene, animals of the genus *Bison* spread throughout Western, Central, and South-Eastern Europe, Asia and across the Bering Strait into North America. After the separation of the original *Bison* into the North American bison (*Bison bison*) and the European bison (*Bison bonasus*) (Pucek, Belousova, Krasieńska, Krasieńki, & Olech, 2004), European bison, like other large herbivores, played a role in early forest ecosystems throughout Europe. Though the composition of these early European forest ecosystems remains a matter of much debate (Erschbamer, Virtanen, & Nagy, 2003; John & Birks, 2005; Mitchell, 2005), one hypothesis suggests that early European forests resembled a park-like landscape with solitary trees or tree stands surrounded by thorny scrub and open grasslands (Vera, 2000; Kirby, 2004). Some researchers suggest that large herbivores helped keep grasslands open by feeding on a mixture of grasses, shrubs, tree bark, and woody plants. (Vera, 2000; Pucek et al., 2004).

The European bison was seen as a symbol of power, and as a symbol of homeland for many early Europeans. Hunters also held the bison in high esteem and attributed characteristics such as power and charisma to the animals, making them a popular target for royal sport hunters. Though hunting did take its toll on bison numbers, the protection afforded by royal hunting preserves prevented the complete decimation of the European bison population (Pucek et al., 2004). Despite this limited protection, by the late 19th century a combination of unregulated hunting, poaching, fragmentation of habitat, and the decimation of food sources by artificially high red deer populations resulted in the

extinction of all but two wild populations of European bison. Then, following a brief population rebound, political instability again led to drastic reductions in the population. By the end of World War II, all wild European bison were extinct and the population consisted of just 54 animals, all of which were descendant from the same 12 ancestors (Pucek et al., 2004). While it is generally accepted that this second population reduction was the result of the chaos and preoccupation of war, an interesting article from 1947 in *The Journal of Mammalogy* places much of the blame with the Allied forces and states that:

because their [the bison's] preservation was so German an enterprise, the Western invaders, for all their interest in saving civilization and culture, cared not at all for the wisents [bison] the Germans had so carefully bred and these rare animals were left to take their chance in a starving continent (Glover, 1947, p. 333)

Irrespective of who contributed to the most recent population reduction, the 12 animals that survived the unrest following World War II became the root from which the current population of approximately 2900 animals has grown (Pucek et al., 2004).

Despite this rebound in numbers, however, the European bison remains on the list of protected fauna species in Appendix III of the Bern Convention and are listed as an endangered species in the 2003 IUCN Red List of Threatened Species (Pucek et al., 2004). While this status does provide the remaining animals with some level of protection, Pucek et al. (2004) note that there are calls to have the European bison included in the Appendix II category of the Bern Convention (strictly protected fauna species) and categories II and IV of the Habitat Directive of the European Union. These efforts to secure higher levels of protection for the species stem from the fact that most European bison live in small, fragmented populations on the fringes of their former range

(Pucek et al., 2004). Additionally, a genetic bottleneck continues to plague the species. Originating from just 12 ancestors, European bison, similar to other species with small, fragmented populations, face a number of genetic problems, which threaten their long-term survival (Litvaitis, Beltrán, Delibes, Morento, & Villafuerte, 1996; Pucek et al., 2004). In an effort to counter these threats, a Status Survey and Conservation Action Plan has been prepared by the IUCN/SSC Bison Specialist Group (European Section). This plan and associated report strive to protect the bison, promote its genetic variability, and facilitate the establishment of free ranging, viable populations (Pucek et al., 2004).

Researchers suggest that establishing more free-ranging populations will allow natural changes in the genetic structure of the species to occur thereby increasing genetic diversity and contributing to the bison's long-term survival (Kleiman, 1989; Balčlauskas, 1999; Pucek et al., 2004). Thus, unless new herds are established soon, European bison may see their numbers dwindle for the third time in their history. In response to the call for more free-ranging herds by large herbivore management experts, free and semi-free ranging herds have already been established in areas of Poland, Russia, Belarus, Lithuania, and the Ukraine (The Large Herbivore Foundation, nd; Balčlauskas, 1999; Pucek et al., 2004). Until now, there has never been a serious attempt to restore a free-ranging herd of European bison into their former range in Germany.

Chapter 4 Study Area

The study area is located in west-central Germany, in the south eastern corner of the state of North Rhine-Westphalia (Figure 4.1). The proposed bison restoration area is located in a section of the 1,355 km² Rothaargebirge, or Red Hair Mountains, Nature Park. Initially, the proposed restoration area totaled approximately 7,200ha, however, because of public opposition, the restoration area has since been reduced to 4,300ha. It is in this area that restoration proponents plan to release 10 to 15 bison and, eventually, maintain a herd of between 20 and 25 animals (Taurus Naturentwicklung e.V., 2006). Restoration managers plan to utilize a partial fence to prevent the animals from accessing areas where residents oppose the restoration. Approximately 25,000 people live in the 17 towns and villages located on the fringes of the proposed restoration area (Landesamt für Datenverarbeitung und Statistik, 2005) (Figure 4.1). The residents of these towns and villages comprise the population from which a sample was taken to provide the data for this thesis.

The study area spans the administrative regions of Seigen-Wittgenstein and Hochsauerlandkreis (HSK). These regions are adjacent to one another and share a number of characteristics including several socio-demographic features (Table 4.1), a similar range of viewpoints regarding the bison restoration, and a similar lack of experience regarding this type of wildlife management issue. As the 17 towns and villages closely surround the proposed restoration area, the restoration issue can also be considered quite important or salient in the regions considered as these people would be the first to experience the effects, whether positive or negative, of a bison restoration.

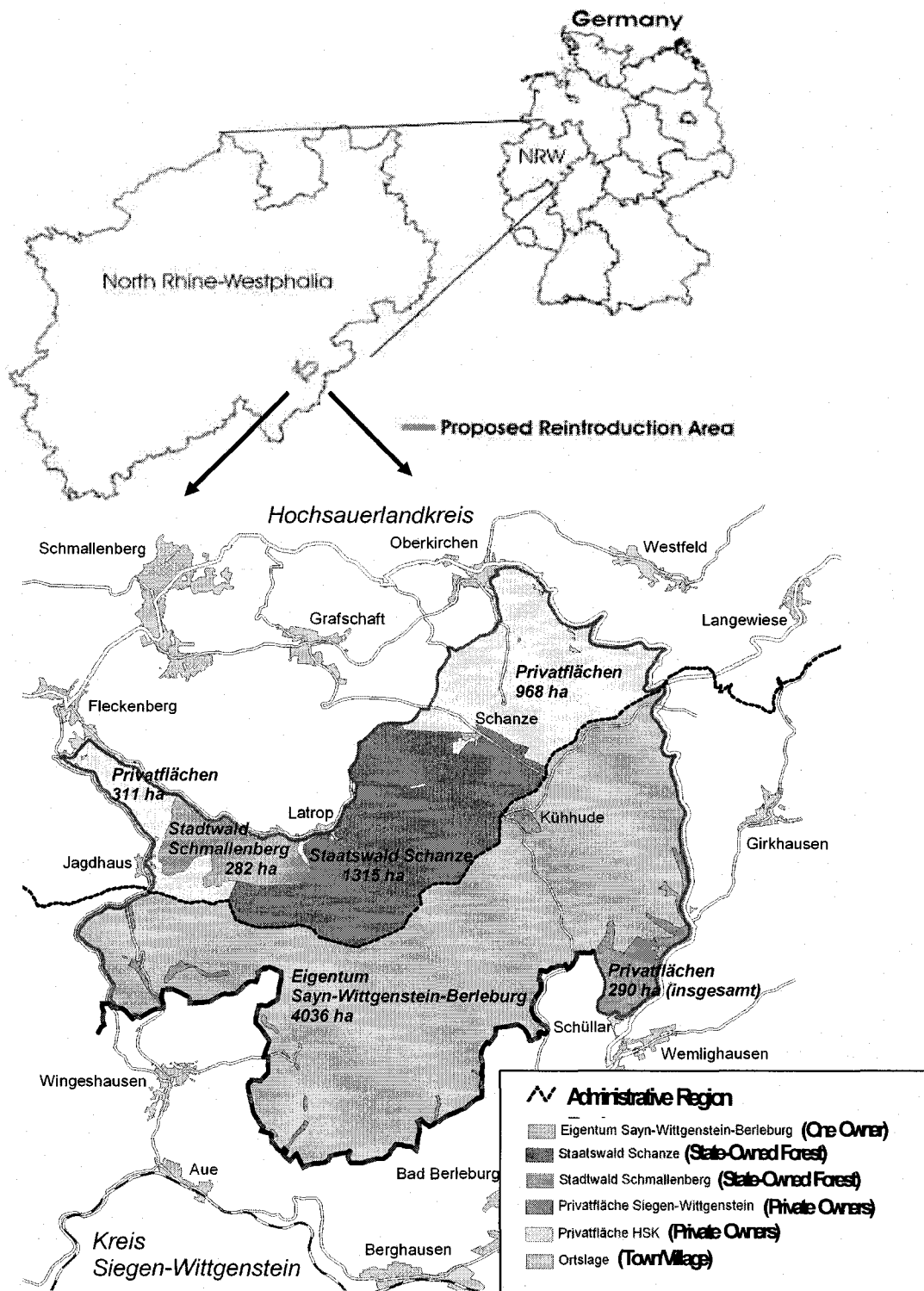


Figure 4.1 Study area

Table 4.1 Socio-demographic similarities between Siegen-Wittgenstein and HSK^a

	Population	Average Household Income	Number with Professional Education	Unemployment Rates	Number Collecting Pension Benefits
S-W^b	291,372	€18,297	128,000	11.0%	57,000
HSK	227,219	€18,531	122,000	11.9%	59,000

^a Data from Landesamt für Datenverarbeitung und Statistik, 2005

^b Indicates data from the region of Siegen-Wittgenstein

The saliency of wildlife management efforts is often linked with one's use and reliance on land for economic gain and also with one's perception of risk of impact on land or property (West & Parkhurst, 2002; Daley, Cobb, Bromley, & Sorenson, 2004). As a substantial proportion of landowners in each region (37.1% in HSK and 21.8% in Siegen-Wittgenstein) (Landesamt für Datenverarbeitung und Statistik, 2005) rely on farming to provide their main source of income, issues surrounding the proposed bison restoration are undoubtedly important in both regions. Perhaps demonstrating the significance of the proposed restoration is the fact that public opinion has reached each end of the attitudinal spectrum with restoration proponents promoting the effort as 'The Return of the King' while at least one farmer, with concerns about the possible negative impacts of bison, equated the restoration with 'bringing snails to his garden'.

Despite the significance of the proposed restoration in the regions sampled, both regions share a lack of experience concerning this type of wildlife management effort. The current effort to restore free-ranging bison is the first of its kind in Western Europe and follows several, somewhat larger projects in parts of Eastern Europe (Taurus Naturentwicklung e.V., 2006). In an effort to make residents more aware of the proposed

restoration, proponents organized public meetings, information and photo exhibitions, and published numerous newspaper articles in the regions affected.

Chapter 5 Methods

5.1 Questionnaire

Both self-administered and interview questionnaires were developed over the course of several months with the help of Canadian and German experts. The survey instrument was pre-tested in the study area from October to December 2005. During this time, questionnaires were distributed, in self-administered form only, to a representative, proportionate sample of residents ($n = 207$) drawn from each town bordering the proposed reintroduction area. Fowler (2002) suggests that such pre-testing allows the researcher “to find out how the data collection protocols and the survey instruments work under realistic conditions”. Additionally, this trial questionnaire provided preliminary information concerning respondents’ reaction to the proposed restoration including the spectrum of attitudes in the regions examined and respondents’ level of bison-related knowledge. The data from the questionnaire pre-test are not included in this thesis.

As many of the attitude and belief items used in the current research had been used successfully in other, similar studies (Bath, 1989; Bath & Majic, 2001; Chase et al., 2004) few significant alterations to the sampling instrument were required. Before being distributed, both questionnaires were evaluated and approved by the leader of the farmers’ association of HSK and Canadian, German, and Dutch experts with experience in human dimensions and large mammal management issues. The amended questionnaires and associated methodology also received approval from Memorial University’s Interdisciplinary Committee on Ethics in Human Research [ICEHR Reference No. 2005/06-045-AR].

The self-administered questionnaire (Appendix A) consisted of 48 items designed to address respondents' attitudes, beliefs, willingness to compromise, patterns of forest visitation, changes in forest visitation if bison were present, levels of fear of bison, and demographic variables. Fowler (2002) suggests that using the interview method of data collection can be more advantageous than other forms when respondents are required to follow complex instructions or sequencing and when a longer survey instrument is employed. Questions deemed more complex and thus, likely to require clarification for respondents, were included in the interview questionnaire only. The interview questionnaire (Appendix B) consisted of 70 items that, in addition to the items included in the self-administered questionnaire, covered such topics as sources of information regarding the proposed reintroduction, levels of trust for various information sources, the level of importance of various characteristics of public involvement, and levels of preference for various public involvement methods.

Both the self-administered questionnaire and the questionnaire used in structured interviews included a cover letter that briefly outlined the study and informed participants of the participating organizations, confidentiality, and who to contact if any questions arose from the questionnaire or interview. The cover letter of the self-administered questionnaire (Appendix C) was included with the distributed questionnaires and included information on returning completed questionnaires in the postage paid envelopes provided. The cover letter associated with the interview method of data collection (Appendix D) was given to respondents at the end of the visit with the interviewer giving a brief explanation of the information contained within the letter.

5.2 Sampling

Residents 18 years of age and older, living in the 17 towns and villages bordering the proposed restoration area made up the sampling frame for the study. Only those towns bordering the proposed restoration area were sampled as these residents would likely be most affected by the consequences, positive or negative, of a restoration of free-ranging bison in the area. For the sampled areas, population and demographic data, current to 2005, was obtained from the Landesamt für Datenverarbeitung und Statistik (State Office for Data Processing and Statistics).

Self-administered questionnaires were distributed, proportionate to population in randomly chosen, even numbered mailboxes in each of the 17 towns bordering the proposed restoration area. Places of residence were randomly selected using large-scale village maps overlain with a grid system. Time and financial constraints allowed only a single-phase distribution of self-administered questionnaires. None of the pre-contact or follow-up measures, which have been identified by Dillman (2000) and Fowler (2002) as important for increasing response rates, were utilized. Such measures have been found to increase response rates by an additional 50 percent or more (Miller, 1991). As human dimensions of resource and wildlife management research becomes more common in Europe, project proponents will likely develop a better understanding of associated research methodology and will likely be more willing to follow established research techniques such as that outlined by Dillman (2000) and Fowler (2002).

Pre-testing of the questionnaire involved spreading 801 questionnaires using the same random, proportional, single-phase distribution method. Just over 200 completed

questionnaires were returned resulting in a pre-test response rate of approximately 25%. In anticipation of a similar response rate in the main study, just over 1600 self-administered questionnaires were distributed to obtain a sample size of approximately 400, which was considered adequate to address the research questions of the study.

In the main study, a total of 398 completed, useable self-administered questionnaires were returned resulting in a response rate of 24.6% (Table 5.1). The number of questionnaires distributed in each town was calculated by dividing the population of the town by the population in the entire study area (approximately 25,000); this percentage then became the percentage of the total number of questionnaires to be distributed in that town.

The interview method of data collection targeted residents 18 years of age or older, living in the 17 towns and villages bordering the proposed restoration area. To prevent double sampling, interviews were conducted at randomly chosen, odd numbered houses or apartments only. Random residences were chosen using large-scale village maps overlain with a grid system. While a more solid research design would have included all communities surrounding the proposed restoration area, time and financial constraints resulted in no interviews being conducted in the town of Aue in the region of Siegen-Wittgenstein or in the towns of Latrop and Schanze in the region of HSK (Table 5.1). The town of Aue comprised four percent of the total population in the study area while the towns of Latrop and Schanze together, comprised 0.9% of the total population. To allow the reader to put these proportions into perspective: the percentage of people living in the towns in the study area relative to the population of the entire study area

Table 5.1 Distribution of questionnaires and interviews in towns bordering the proposed restoration area

Town	Number of interviews completed	Number of self-administered questionnaires distributed	Number of self-administered questionnaires returned	Response Rate – self-administered (%)
Wingeshausen	6	112	39	33
Aue ^a	0	64	11	17
Berghausen	17	96	28	28
Bad Berleburg	77	448	113	25
Girkhausen	13	64	18	27
Schüller	4	16	3	19
Wemlinghausen	8	48	10	21
Jagdhaus	1	5	2	40
Fleckenberg	20	96	25	26
Schmallenberg	54	416	72	17
Latrop ^a	0	11	4	36
Grafschaft	20	80	27	33
Oberkirchen	10	64	20	31
Westfeld	11	64	12	17
Kühnhude ^b	---	1	1	100
Schanze ^a	0	3	3	100
Langewiese	5	32	5	16
Total	246	1620	393^c	24.6

^a No interviews were conducted in these towns due to time and financial constraints – opinions recorded using self-administered questionnaires.

^b No interviews were conducted in this town, as the population was too small to ensure confidentiality.

^c Five self-administered questionnaires were returned with the sticker identifying the town removed.

ranged from a low of 0.04% in the town of Kühnhude up to 28% in the town of Bad Berleburg. Data collected using self-administered questionnaires suggests that the views of residents in these three towns are similar to those of other residents in the same administrative region. Interviews conducted in the remaining 14 eligible towns in the study area resulted in a sample size of 246 (Table 5.1) with 125 respondents from the region of Siegen-Wittgenstein and 121 respondents from the region of HSK. Results from

this sample were accurate plus or minus 6.22%, 19 times out of 20. While interview refusal rates were not recorded, interviewers indicated that while there were relatively few refusals, refusal rates tended to be higher in the region of HSK than in the region of Siegen-Wittgenstein.

The final population sampled consisted of European experts with experience in public involvement in large mammal management issues. Self-administered questionnaires were distributed by email to approximately 300 network members of The Large Herbivore Foundation, a Eurasia-wide non-governmental organization focused on providing expert advice on large herbivore restoration and management issues. Forty-four experts from 22 European countries participated in this aspect of the study. As questionnaires were distributed by email to European experts, response rates were difficult to determine due to an unknown number of instances where emails were not delivered or refused.

5.3 Data Collection

Self-administered questionnaires were distributed during May and June of 2006. Questionnaires were hand delivered to randomly chosen, even numbered mailboxes in each town in the study area. While some completed questionnaires were dropped off at the feasibility study project office, most were mailed back in the postage-paid envelope provided.

Students from the local university and high school were hired to conduct interviews. All interviewers were informed about the nature of the study, the importance

of being objective, reading questions exactly as worded, and the process for recording participants' responses. I accompanied all interviewers during their first few interviews to ensure they were comfortable with the interview process. Interviewers always worked in groups of two or three. The interview process began with interviewers identifying an eligible, odd numbered household using the map grid system. Upon locating an eligible respondent, interviewers introduced themselves and informed the potential respondent that they were conducting research for independent researchers regarding the proposed bison restoration. Interviewers also informed potential respondents of the length of the interview, the requirement that participants be 18 years of age or older, and that information provided during the interview would be kept confidential. Upon agreeing to take part in the interview, participants were informed that they were free to stop the interview at anytime and that they could skip questions if they wished to do so. Interviewers then asked the questions as written in the questionnaire and recorded participants' responses directly on the questionnaire. Fowler (2002) suggests that having interviewers follow such a structured list of items consisting mainly of closed end questions helps reduce interviewer bias. At the end of the interview, the interviewer thanked the participant for their time and presented them with a cover letter containing details on who to contact if any questions arose from the interview.

With respect to European expert participants, self-administered questionnaires were sent by email to network members of the Large Herbivore Foundation. Participants were presented with the same questions as were presented to German interview participants concerning preferences for characteristics and methods of public

involvement. Participants were also asked to pass the questionnaire on to colleagues with experience in public involvement in large mammal management issues.

5.4 Data Analysis

Before being analyzed, data were checked and cleaned using descriptive statistical techniques suggested by Tabachnick and Fidell (2001). This involved ensuring that coded values were within the range allowed by the response scale for each item and that no cells were erroneously left vacant. Data were analyzed using version 15.0 of the Statistical Package for the Social Sciences (SPSS) (SPSS Inc., 2006).

A number of statistical methods were employed to analyze the data collected. Descriptive statistics were used to illustrate proportions and overall patterns in the data. Inferential statistics such as *t* tests and chi-square tests were used to examine differences across groups and between observed and expected frequencies. Spearman's ranked correlation was used to look for differences in rankings of characteristics and methods of public involvement between groups of respondents. Principal Components Analysis (PCA), with varimax rotation, was used to identify subsets of variables that reflected underlying processes or themes (Tabachnick & Fidell, 2001). Finally, logistic regression was used to explore whether or not fear of bison influenced respondents' attitudes toward bison and the proposed restoration.

As multivariate analyses are sensitive to skewed data (Tabachnick & Fidell, 2001), transformations were performed where necessary to remove negative skewness. Further, to ensure principal components and logistic regression analysis were not biased

by differing sample sizes, a random sample of respondents was taken where necessary. PCA revealed that respondents' attitudes consisted of a general attitude (GA) factor and a lifestyle impact (LI) factor. The variables loading on each factor were used to calculate GA and LI scores, which ranged from 1, strongly negative to 7, strongly positive. Cronbach's alpha (α) was used to provide a reliability estimate of the internal consistency of the subsets of variables identified in the PCA. Extracted regression factor scores were saved for use in logistic regression analysis. Knowledge scores (KS) were also calculated for each respondent. The knowledge section of the self-administered questionnaire contained 6 items while the interview questionnaire had 9 factual knowledge items. In both cases, the resulting KS ranged from zero to 1. Correct responses to the factual knowledge items were determined from the available literature and information from bison restoration managers.

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Chapter 6 The Return of the King or Bringing Snails to the Garden?

The Human Dimensions of a Proposed Restoration of European Bison (*Bison bonasus*) in Germany

6.1 Abstract

Human dimensions research can help resource and wildlife managers make informed decisions, target information efforts, and gain a greater understanding of the factors that comprise attitudes toward wildlife management efforts. Despite these often-stated merits, studies addressing the human dimensions of resource and wildlife management efforts are rare in Europe. A proposed restoration of free-ranging European bison (*Bison bonasus*) in North Rhine-Westphalia Germany has presented an opportunity to help address this research gap. During May-July, 2006, we used a randomly distributed, self-administered questionnaire (n=398), to assess local residents' attitudes, beliefs, and levels of support or opposition towards the proposed restoration. These factors were compared across two administrative regions spanned by the proposed restoration area. We found that while attitudes in the study area were generally positive, significant differences were found between regions in the study area. Respondents from the Siegen-Wittgenstein region held significantly more positive attitudes and significantly higher knowledge levels than respondents from the Hochsauerlandkreis region. For instance, Siegen-Wittgenstein respondents held more positive attitudes than Hochsauerlandkreis respondents regarding the importance of the proposed restoration to the conservation of the bison species. Principal components analysis revealed that attitudes comprised a

general attitude factor pertaining to issues such as the importance of conserving bison for future generations and a lifestyle impact factor, which included items pertaining to bison-caused damages to trees and crops. Logistic regression was used to show the influence of fear of bison on attitudes. We discuss the likely causes and management implications of our findings and provide suggestions to managers wishing to target information efforts and address the concerns of those affected by the proposed restoration.

6.2 Introduction

Despite numerous endorsements for the benefits of due consideration of the human dimensions of resource and wildlife management, examples of such research are notably rare in Europe when compared with North America (Bath & Majić, 2001). Where European human dimensions research does exist, it tends to focus on large carnivore management and restoration efforts (Schröder, 1998; Bjerke, Reitan, & Kellert, 1998; Kaltenborn, Bjerke, & Vitterso, 1999; Bath, 2000; Bath & Majić, 2001; Williams, Ericsson, & Heberlein, 2002; Kleiven, Bjerke, & Kaltenborn, 2004), not on large herbivores despite the fact that numerous large herbivore management issues exist throughout Europe (Hofer, 2002; Pucek, Belousova, Krasińska, Krasiński, & Olech, 2004; Perzanowski, Olech, Kozak, 2004). In Germany, Europe's second most populous country (Central Intelligence Agency, 2006), human dimensions research regarding any wildlife issue is extremely rare. Stoll-Kleemann (2001, p. 9) has commented on this research gap and suggests that "In Germany a widespread lack of participation during the process of planning and implementing of nature conservation measures is an important factor that fuels opposition".

Opposition to resource or wildlife management efforts is often borne of some form of conflict. Such conflicts are generally identified as cognitive (e.g. different beliefs regarding what may or may not be true), value (e.g. differences regarding the importance of the issue in question when compared with other issues facing respondents or the region in general), cost/benefit (e.g. differences of opinion regarding who will pay for, or benefit from, the effort in question), or behavioural conflicts (e.g. issues regarding mistrust or questionable credibility of individuals or groups involved in the effort) (Mitchell, 1989; Bath, 2000; Bath & Majić, 2001). Human dimensions research can help managers address these conflicts by providing a better understanding of the attitudes, beliefs, expectations, levels of support or opposition, demographic characteristics, and factors affecting attitudes of the publics and interest groups associated with resource management situations (Bath & Enck, 2003). In the absence of such information, unfounded assumptions about the positions of the public and interest groups abound which may lead to unsupported decisions and contribute to public opposition to nature and wildlife conservation efforts (Stoll-Klemann, 2001).

With Germany's lack of human dimensions of resource and wildlife management research, a possible restoration of free-ranging European bison (*Bison bonasus*) in the country has presented an opportunity to begin to address this research gap and gain a greater understanding of beliefs and attitudes concerning the proposed restoration. Referred to in the local media as *Die Rückkehr des Königs* (The Return of the King) (Taurus Naturentwicklung e.V., 2006), the current effort to restore bison to the state of North Rhine-Westphalia is not only the first of its kind in Western Europe (Taurus

Naturentwicklung e.V., 2006), but is also one of the first European large herbivore conservation efforts to consider the human dimension in a structured manner. Reaction to the proposed restoration effort reaches both ends of the spectrum of attitudes. While restoration proponents talk of the 'Return of the King', those opposed have concerns about the possible negative impacts of bison, an opinion voiced by a local farmer who equated bison restoration with 'bringing snails to his garden'.

Bath (2000, p. 10) suggests that "[p]roviding a better understanding of the belief system and underlying issues affecting attitudes will allow for the design of an effective and efficient communication and public awareness campaign". In this case, the attitudes, beliefs, and levels of support or opposition towards the proposed bison restoration were explored using a random sample of residents living in the 17 towns and villages bordering the proposed restoration area. Differences in residents' attitudes and knowledge levels between two administrative regions are examined as well as the factors that comprise and influence attitudes. Special attention is given to the issue of fear of bison and its influence on attitudes towards bison and their perceived impacts. This information will assist restoration managers both in making informed decisions and targeting information and education efforts to address the concerns of respondents, while at the same time providing residents with the information they need to develop informed opinions regarding the proposed restoration.

6.3 History and Status of the European Bison

European bison once ranged throughout Europe and parts of Asia. However, by the end of World War II, a combination of unregulated hunting, poaching, fragmentation of habitat, and the decimation of food sources by artificially high red deer populations had reduced the total number of European bison to 54 individuals and caused the extinction of all wild populations, including those that were once found in Germany (Pucek et al., 2004). Today's European bison population of approximately 2,800 individuals is descendant from just 12 ancestors (Pucek et al., 2004). Thus, European bison, similar to other species with small, fragmented populations, face a number of genetic problems, which threaten their long-term survival (Litvaitis, Beltrán, Delibes, Morento, & Villafuerte, 1996; Pucek et al., 2004).

Some biologists, concerned about the bison's problems regarding genetic variability, have promoted the restoration of free-ranging herds to various locations within the bison's former range in an effort to ease problems associated with the genetic bottleneck (Kleiman, 1989; Balčlauskas, 1999; Pucek et al., 2004). Consequently, free and semi-free ranging herds have been established in areas of Poland, Russia, Belarus, Lithuania, and the Ukraine (Pucek et al., 2004; Large Herbivore Foundation, nd). However, while more than 80% of all captive European bison are spread throughout Germany and other countries in Central and Eastern Europe (Pucek et al., 2004), until now, there has never been a serious attempt to reintroduce a free-ranging herd of European bison into their former range in Germany (Taurus Naturentwicklung e.V.,

2006). A restoration of free-ranging bison to Germany would contribute to the overall goal of bison conservation in Europe (Taurus Naturentwicklung e.V., 2006).

6.4 Study Area

The study area is located in west-central Germany, in the south eastern corner of the state of North Rhine-Westphalia (Figure 6.1). The proposed bison restoration area comprises a 7,200 ha section of 1,355 km² Rothaargebirge, or Red Hair Mountains, Nature Park. Restoration proponents plan to release 10 to 15 bison in this area and, eventually, maintain a herd of between 20 and 25 animals (Taurus Naturentwicklung e.V., 2006).

Approximately 25,000 people live on the fringes of the Rothaargebirge area in 17 towns and villages (Landesamt für Datenverarbeitung und Statistik, 2005) (Figure 6.1). The proposed restoration area spans the administrative regions of Siegen-Wittgenstein and Hochsauerlandkreis (HSK). These regions are adjacent to one another and share a number of socio-demographic characteristics. For example, the regions of HSK and Siegen-Wittgenstein share similar populations (227,219 in HSK versus 291,372 in Siegen-Wittgenstein), similar unemployment rates (11.9% in HSK versus 11.0% in Siegen-Wittgenstein), similar average household incomes (€18,531 in HSK versus €18,297 in Siegen-Wittgenstein), similar numbers of residents with a professional education (122,000 in HSK versus 128,000 in Siegen-Wittgenstein), and similar numbers of residents collecting pension benefits (59,000 in HSK versus 57,000 in Siegen-Wittgenstein) (Landesamt für Datenverarbeitung und Statistik, 2005).

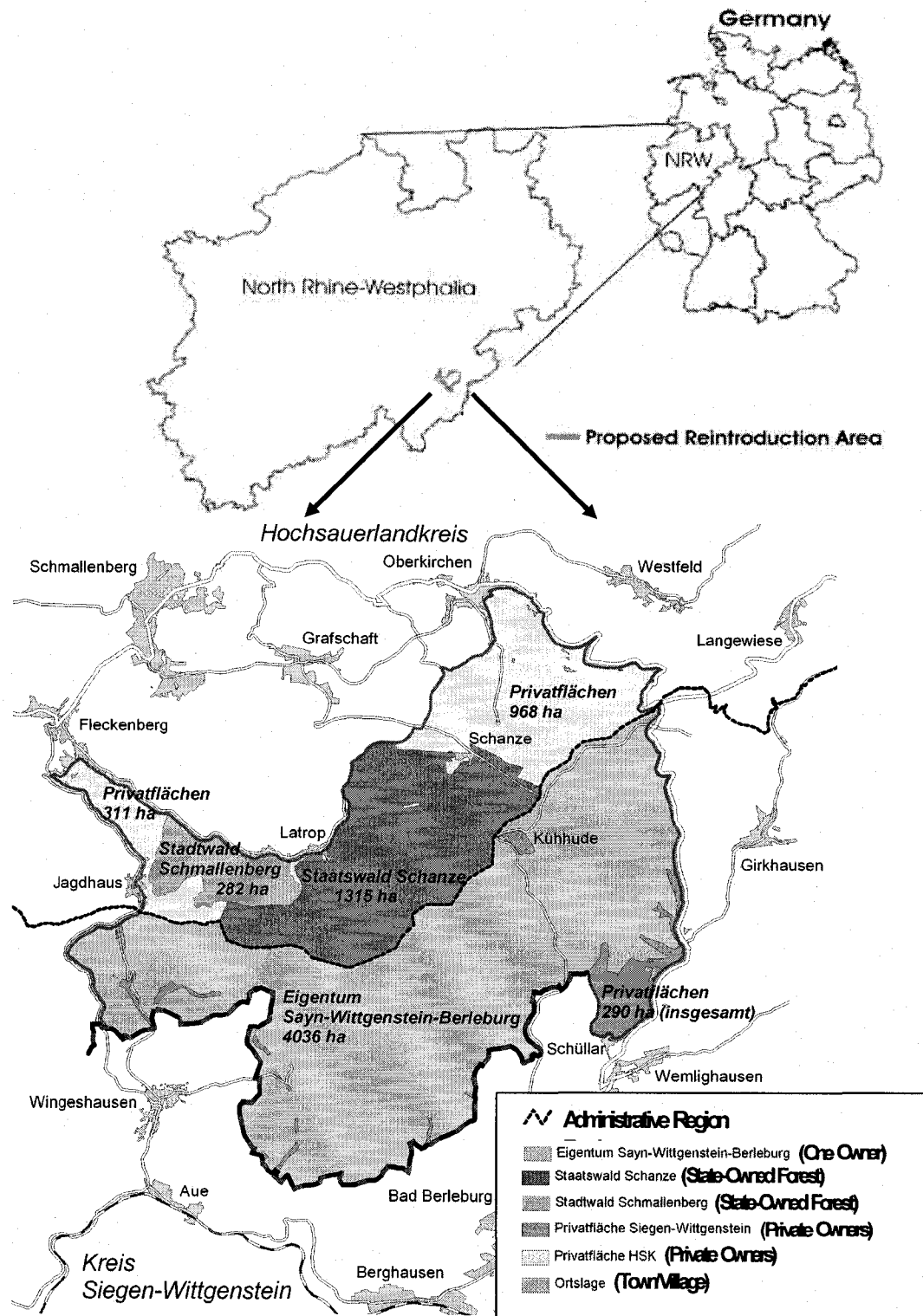


Figure 6.1 Study area

These regions differ, however, with respect to land ownership characteristics. In terms of land area, 55% (1597 ha) of the proposed restoration area within the administrative region of HSK is state-owned forest while the remaining 45% (1279 ha) is owned by private landowners. In Siegen-Wittgenstein, however, 93% (4036 ha) of the proposed restoration area is owned by a single landowner with the remaining 7% (290 ha) belonging to other, smaller private landowners (Figure 6.1). Because of the dominance of a single landowner in the southern region of Siegen-Wittgenstein, there are almost twice as many private agricultural enterprises registered in the northern region of HSK (2,200) compared with Siegen-Wittgenstein (1,207) (Landesamt für Datenverarbeitung und Statistik, 2005). Consequently, a larger proportion of landowners in HSK (37.1%) rely on their farms to provide the main source of income than in Siegen-Wittgenstein (21.8%) (Landesamt für Datenverarbeitung und Statistik, 2005). Given this difference in connection to the land, we hypothesize that attitudes toward the proposed bison restoration will differ between the two regions and that residents of HSK will be more negative as they have a greater perception of perceived negative impacts of bison on their livelihood than residents in Siegen-Wittgenstein.

6.5 Methods

Over the course of several months and with assistance from the leader of the HSK farmer's association and Canadian, German, and Dutch experts with experience in human dimensions and large mammal management, we developed a self-administered questionnaire to be distributed to residents surrounding the proposed restoration area. The

questionnaire was designed to address respondents' attitudes, beliefs, willingness to compromise, patterns of forest visitation, changes in forest visitation if bison were present, levels of fear of bison, and demographic variables. The research instrument was pre-tested in the study area from October to December 2005. The final version of the questionnaire consisted of 48 items and was administered between May and July of 2006 to a random, proportionate sample ($n = 398$) of the approximately 25,000 residents living in the 17 towns and villages bordering the proposed bison restoration area. Population and demographic data for the towns within the study area, current to 2005, were obtained from the Landesamt für Datenverarbeitung und Statistik (State Office for Data Processing and Statistics).

Places of residence were randomly selected using large-scale village maps overlain with a grid system. Pre-addressed, postage-paid envelopes were distributed with the questionnaires. Questionnaires also included a cover letter that briefly outlined the study and informed participants of the participating organizations, confidentiality arrangements, and who to contact concerning any questions that might arise from the study. The cover letter also included information on the postage paid, mail-back procedure.

Prior to analysis, the data collected were checked and cleaned using descriptive statistical techniques as suggested by Tabachnick and Fidell (2001). Descriptive statistics were used to illustrate proportions and overall patterns in the data. Inferential statistics such as *t* tests and chi-square tests were used to examine differences between groups and between observed and expected frequencies. Principal components analysis (PCA), with

varimax rotation, was used to identify underlying processes or themes in attitudinal data (Tabachnick & Fidell, 2001). Finally, logistic regression was used to explore whether or not fear of bison influenced respondents' attitudes toward bison and the proposed restoration.

As multivariate analyses are sensitive to negatively skewed data (Tabachnick & Fidell, 2001), transformations were performed where necessary to remove negative skewness. Multicollinear variables were removed from the PCA. To ensure principal components and logistic regression analysis were not biased by differing sample sizes, a random sample of respondents with no fear of bison was taken to ensure sample sizes were the same for those respondents who feared bison and those who did not.

PCA revealed that attitudes were composed of a general attitude (GA) factor and a lifestyle impact (LI) factor. The variables loading on each factor were used to calculate GA and LI scores, which ranged from 1, strongly negative to 7, strongly positive. No one item was used in the calculation of more than one attitude score. Cronbach's alpha (α) was used to provide a reliability estimate of the internal consistency of the subsets of variables identified in the PCA. Extracted regression factor scores were saved for use in logistic regression analysis. Knowledge scores (KS) were also calculated for each respondent. The knowledge section of the self-administered questionnaire contained 6 items. The resulting KS ranged from zero to 1. Correct responses to the factual knowledge items were determined from the available literature and bison restoration managers. Data were analyzed using version 15.0 of the Statistical Package for the Social Sciences (SPSS).

6.6 Results

The 398 respondents consisted of 225 respondents from the Siegen-Wittgenstein administrative region, 170 respondents from the administrative region of HSK, and three respondents with an unknown place of residence, which were removed from any analysis concerning place of residence. Samples taken from each region were similar with respect to the proportions of males and females and the proportion of respondents in each age category. Most respondents were male (approximately 68%) while females comprised approximately 32% of the sample. The distribution of participants among the three age categories (18-34, 35-54, 55+) was 12.4%, 48.3%, and 39.3% respectively. As residents in the two regions spanned by the proposed restoration area are almost evenly divided between males and females (males = 49%, females = 51%), the sample used in the current study is, like many studies concerning wildlife management issues (see: Riley, 1998; Chavez, Gese, & Krannich, 2005; Majić, 2007), biased toward the opinions of males. It is also important to note that in the regions of Siegen-Wittgenstein and HSK, the distribution residents among the three age categories (18-34, 35-54, 55+) is 24%, 38%, and 38% respectively. Thus, our sample under represents residents aged 18-34 years, and over represents middle-aged residents (35-54 years).

6.6.1 Attitude Differences Between Regions

The regions of Siegen-Wittgenstein and HSK differed significantly in their attitudes concerning bison and the proposed restoration. Siegen-Wittgenstein respondents tended to hold more positive attitudes than HSK respondents. For instance, when asked

about the extent to which they supported or opposed the restoration effort, 61.5% of Siegen-Wittgenstein respondents indicated that they slightly, moderately, or strongly supported the restoration while in HSK, just 36.0% of respondents indicated some level of support for the effort (Table 6.1). Similarly, significantly more Siegen-Wittgenstein respondents than HSK respondents felt that the proposed bison restoration would help conserve the bison species, increase tourism in the area, return the environment to a more natural state, and provide benefits that would balance the monetary costs of restoration (Table 6.1).

While fear is further explored later regarding its influence on attitudes of respondents in general, it is interesting to note that significantly more HSK respondents (41.5%) than Siegen-Wittgenstein respondents (13.5%) indicated that they would be afraid while walking in the forest if free-ranging bison were present. Similarly, significantly more HSK respondents (39.5%) than Siegen-Wittgenstein respondents (18.2%) indicated that the number of times they visit the forest area would decrease if free-ranging bison were present (Table 6.1). Correspondingly, more HSK respondents than Siegen-Wittgenstein respondents felt that a bison restoration would result in both damage to trees and injuries to humans (Table 6.1). Differences between regions were also recorded regarding responses to the item specifically addressing attitudes toward the proposed restoration. When asked to vote for or against bison restoration, 73.5% of Siegen-Wittgenstein respondents indicated that they would vote yes while significantly fewer (44.8%) respondents from HSK indicated that they would be in favour of the restoration [$\chi^2 (1, n = 382) = 32.502$ $p < 0.01$] (Table 6.1). Regional differences were

Table 6.1 Significant differences in mean attitude scores by administrative region

Attitude Item		S-W ^a	HSK
In general, how do you feel about bison? (1=Strongly Dislike, 7=Strongly Like)	Generally Dislike	14.4%	29.1%
	Neutral	20.7%	27.9%
	Generally Like	64.9%	43.0%
	<i>Mean</i>	5.24*	4.28*
Reintroducing the European bison is important for the conservation of the species. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	17.5%	44.2%
	Neutral	9.9%	8.5%
	Generally Agree	72.6%	47.3%
	<i>Mean</i>	5.20*	3.84*
Reintroducing the European bison would increase tourism in the region. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	17.6%	45.5%
	Neutral	9.5%	10.3%
	Generally Agree	73.0%	44.2%
	<i>Mean</i>	5.23*	3.68*
Reintroducing the European bison would help return the environment to a more natural state. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	25.9%	52.1%
	Neutral	17.3%	16.6%
	Generally Agree	56.8%	31.3%
	<i>Mean</i>	4.43*	3.29*
Reintroducing the European bison will result in damage to trees in the area. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	37.4%	32.1%
	Neutral	30.6%	21.2%
	Generally Agree	32.0%	46.7%
	<i>Mean</i>	3.82*	4.42*
Reintroducing the European bison will result in bison-caused injuries to humans. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	63.8%	42.5%
	Neutral	13.4%	13.2%
	Generally Agree	22.8%	44.3%
	<i>Mean</i>	2.92*	4.42*
The benefits of reintroduction will balance the monetary costs. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	23.4%	42.9%
	Neutral	35.1%	30.1%
	Generally Agree	41.4%	27.0%
	<i>Mean</i>	4.35*	3.50*
To what extent to you 'support' or 'oppose' efforts to reintroduce bison? (1=Strongly Oppose, 7=Strongly Support)	Generally Oppose	24.0%	50.0%
	Neutral	14.5%	14.0%
	Generally Support	61.5%	36.0%
	<i>Mean</i>	4.83*	3.46*
Bison should exist in Germany for enjoyment of future generations. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	17.9%	40.2%
	Neutral	10.8%	15.2%
	Generally Agree	71.3%	44.5%
	<i>Mean</i>	5.26*	4.05*

Table 6.1 (continued)

Attitude Item		S-W^a	HSK
European bison have a right to exist in Germany. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	20.4%	35.6%
	Neutral	14.0%	19.6%
	Generally Agree	65.6%	44.8%
	<i>Mean</i>	<i>5.00*</i>	<i>4.10*</i>
The European bison is an important part of the ecosystem. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	23.2%	39.5%
	Neutral	24.5%	29.0%
	Generally Agree	52.3%	31.5%
	<i>Mean</i>	<i>4.54*</i>	<i>3.76*</i>
I would like to see free living European bison. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	13.1%	33.5%
	Neutral	4.1%	12.8%
	Generally Agree	82.9%	53.7%
	<i>Mean</i>	<i>5.75*</i>	<i>4.46*</i>
Bison are often shy and difficult to see in the forest but restoration is still important. (1=Strongly Disagree, 7=Strongly Agree)	Generally Disagree	18.0%	42.9%
	Neutral	9.9%	13.0%
	Generally Agree	72.1%	44.1%
	<i>Mean</i>	<i>5.39*</i>	<i>4.04*</i>
If free-ranging bison were present, the number of times I would visit the forest per month would... (1=Decrease Significantly, 5=Increase Significantly)	Decrease	18.2%	39.5%
	Stay the same	55.0%	46.5%
	Increase	26.8%	14.0%
	<i>Mean</i>	<i>3.05*</i>	<i>2.44*</i>
Vote for or against reintroducing bison into the Rothaargebirge area?	For	73.5%*	44.8%*
	Against	26.5%*	55.2%*
If I were walking in the forest where free-ranging bison were present, I would have...	No Fear	86.5%*	58.5%*
	Fear	13.5%*	41.5%*

* Indicates significant difference between groups, $p < 0.05$ – tested using t tests and chi-square tests.

^a Indicates data from the region of Siegen-Wittgenstein

also recorded concerning existence value of bison. Significantly more Siegen-Wittgenstein respondents than HSK respondents felt that bison are an important part of the ecosystem, that bison have a right to exist in Germany, and that they should be allowed to exist in the country for the enjoyment of future generations (Table 6.1).

6.6.2 Similarities in Attitudes Between Regions

Respondents from the regions of Siegen-Wittgenstein and HSK differed significantly in their responses to 16 of the 19 attitudinal items presented (Table 6.1). However, responses to three items concerning possible lifestyle impacts of bison were found to be similar between the regions considered. While not significantly different, slightly more HSK respondents than Siegen-Wittgenstein respondents had concerns about whether a restoration of bison would result in the destruction of crops and farmland, cause a decrease in hunting opportunities in the area, and result in competition for food between bison and roe deer or other game animals.

6.6.3 Exploring Attitudes

Bath (2000, p. 9) suggests that “[i]f managers can understand the nature of the attitudes held, it is then possible to develop appropriate messages to address the concerns causing those attitudes”. A PCA using those attitudinal items with the same, seven-point response scale identified two interpretable factors with eigenvalues of greater than 1 (Figure 6.2). The item pertaining to whether bison restoration would result in bison-caused injuries to humans was removed from the analysis as it loaded on both factors (loading of 0.494 and 0.608 on first and second factors respectively). The remaining 15 items accounted for 75.196% of variation in attitude scores (Table 6.2). The first factor consisted of 11 items pertaining to attitudes concerning bison and the proposed restoration. This ‘general attitude’ (GA) factor contained items such as extent of support or opposition to the restoration (loading 0.886), the importance of restoring bison even

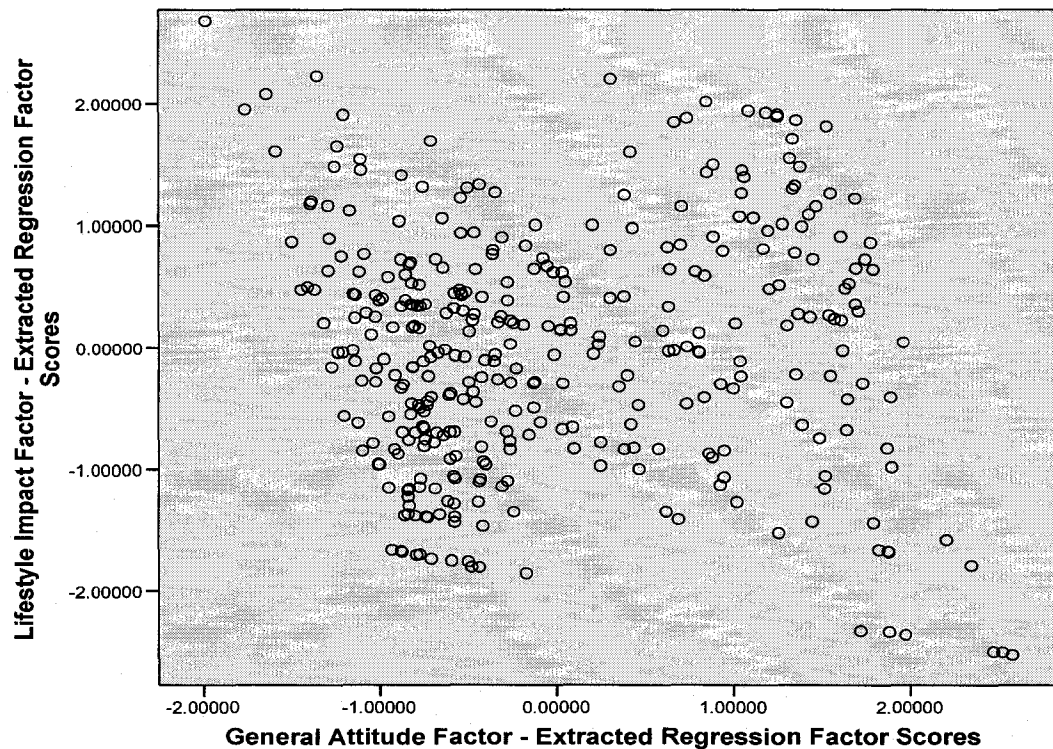


Figure 6.2 Factors identified by PCA

though they are shy and often difficult to see in forest areas (loading 0.894), and the importance of allowing bison to exist in Germany for the enjoyment of future generations (loading 0.909) (Table 6.2). An internal consistency of 0.969 (Cronbach's α) shows that, together, these 11 items are a good measure of general attitudes toward bison and the proposed restoration. GA scores were calculated for each respondent using these 11 items.

The second factor contained four items pertaining to possible bison-caused impacts on respondents' lifestyles. These impacts included a reduction in hunting opportunities in the area (loading 0.804) and competition between bison and roe deer or other game animals for food (loading 0.880) (Table 6.2). The internal consistency of

Table 6.2 PCA of attitudinal items using varimax rotation^{a b}

Items	Components	
	1-General Attitude	2-Lifestyle Impact
	Eigenvalues	
	8.119	3.161
	% of variance	54.125
		21.071
General feeling about bison	.812	
Restoration important for bison species	.880	
Restoration will increase tourism	.867	
Bison help restore natural environment	.839	
Benefits of restoration will balance cost	.692	
Extent support / oppose restoration	.886	
Bison important for future generations	.909	
Bison have a right to exist in Germany	.873	
Bison is important part of the ecosystem	.798	
Would like to see free living bison	.867	
Bison often shy but restoration still imp.	.894	
Bison will destroy crops and farmland		.776
Bison will compete with deer for food		.880
Bison will reduce hunting opportunities		.804
Bison will damage trees in the area		.810

^a n = 398

^b Only loadings of 0.32 or greater are included in the table

these four items was also acceptable (Cronbach's $\alpha = 0.736$), suggesting that the items comprising this second factor were a good measure of 'lifestyle impacts' (LI). These items were used to calculate LI scores.

As was the case above regarding reaction to most individual attitude items, Siegen-Wittgenstein respondents held significantly more positive attitude scores than their counterparts in HSK. These differences were seen in both GA [$t(278) = 5.768$, $p <$

0.001] and LI scores [$t(306) = -2.080, p < 0.038$] (Table 6.3). As responses to three of the four items comprising the LI factor were similar between the regions of Siegen-Wittgenstein and HSK, it seems that the difference in LI scores between regions is driven mainly by attitudes regarding the item pertaining to whether bison would destroy trees in the area as responses to this item were significantly more positive in Siegen-Wittgenstein than in HSK. Regional differences in response to this item may be at least partially attributed to landownership characteristics in the regions considered. In the region of Siegen-Wittgenstein, just 7% of the proposed bison restoration area is owned by private landowners while in the region of HSK, 45% of the proposed area is owned by private landowners and the remaining 55% is state-owned forest.

Table 6.3 Significant regional differences in GA and LI scores

Attitude Scores ^a		Siegen-Wittgenstein	HSK
General Attitude Score ^b	Mean	5.06*	3.93*
Lifestyle Impact Score ^c	Mean	3.64*	3.98*

^aAttitude scores based on 7 point scale

^bLarger numbers correspond with more positive attitudes

^cSmaller numbers correspond with less perceived bison-caused impact

*Indicates significant difference between groups, $p < 0.05$

6.6.4 Bison-Related Knowledge

Knowledge scores (KN) were calculated from responses to six factual knowledge items. The number of correct responses were divided by the total number of items to obtain a knowledge score that ranged from 0 (all responses incorrect) to 1 (all responses correct). Mean knowledge scores were 0.5699 and 0.5130 for Siegen-Wittgenstein and

HSK respectively indicating that while generally low overall, bison-related knowledge was significantly lower in HSK than in Siegen-Wittgenstein [$t(305) = 2.161, p = 0.031$].

While Siegen-Wittgenstein respondents outscored HSK respondents on all but one knowledge item (Figure 6.3), significant differences were recorded only for those knowledge items pertaining to direct bison impacts. Significantly more Siegen-Wittgenstein respondents than HSK respondents correctly answered the factual knowledge item pertaining to whether bison commonly transfer diseases to cows [$\chi^2(1, n = 369) = 5.860, p = 0.015$] (Figure 6.3). (It is important to note that while disease transmission from bison to livestock is a persistent problem in some areas of the United States, it is considered a very rare occurrence in Europe). Similarly, Siegen-Wittgenstein respondents were more likely than HSK respondents to correctly indicate that in areas where bison currently exist, bison-caused injuries to humans are not common [$\chi^2(1, n = 370) = 21.088, p < 0.001$] (Figure 6.3).

Anecdotal comments suggested that many respondents were concerned about direct bison impacts such as disease transmission, interbreeding between bison and cows, and injuries to humans, however, most respondents correctly answered that such incidents do not commonly occur (Figure 6.3). Conversely, less than half of Siegen-Wittgenstein respondents (45.7%) and just 38.7% of HSK respondents correctly answered that bison had indeed once lived in NRW. Further, just 20.9% of Siegen-Wittgenstein respondents and 26.7% of HSK respondents correctly answered the question pertaining to the size of an average adult bison (Figure 6.3) as most respondents (77.5%

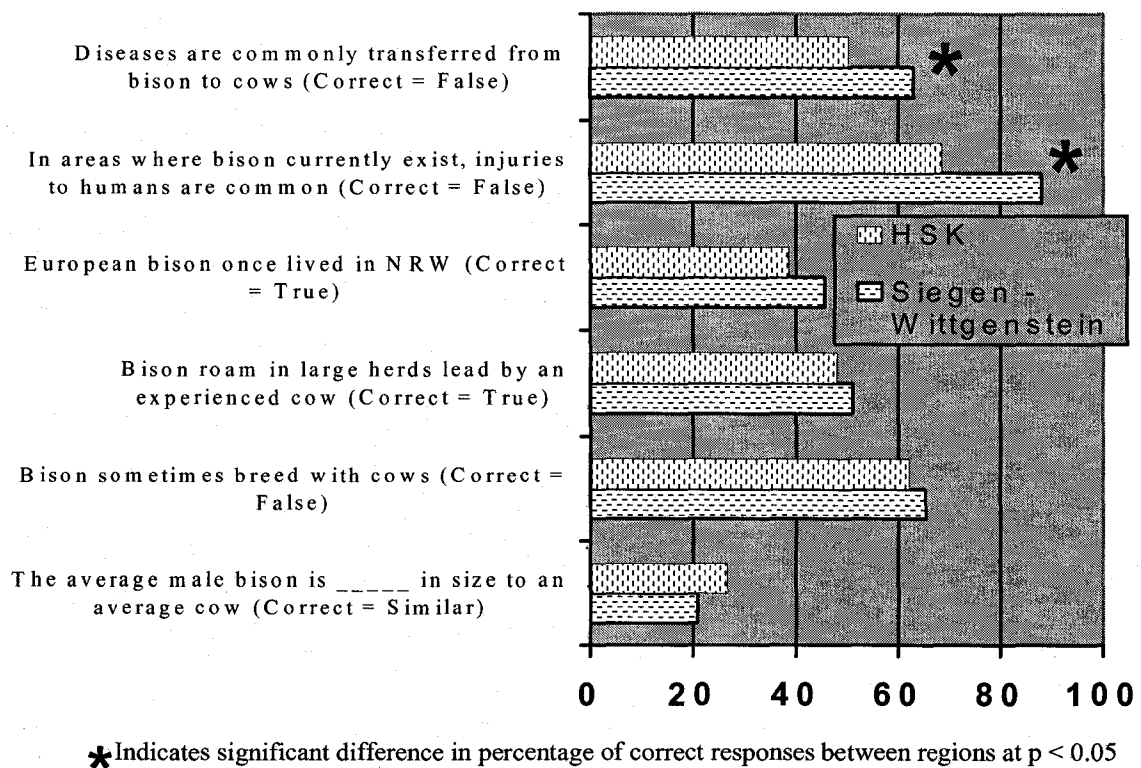


Figure 6.3 Percentage of correct responses to knowledge items

in Siegen-Wittgenstein and 72.6% in HSK) overestimated the size of an average bison and incorrectly indicated that they were larger than an average cow.

6.6.5 Understanding Attitudes

Fear of bison played a large role in the beliefs and opinions of respondents. GA, LI, and KN scores all correlated significantly with fear of bison such that increasing fear corresponded with less positive attitudes, greater concerns regarding lifestyle impacts, and lower knowledge levels (Table 6.4). Using a logistic regression of extracted regression factor scores, we found that those respondents who feared bison were 21.682 times more likely than no fear respondents to hold negative attitudes regarding bison and

Table 6. 4 Significant correlations between fear of bison and GA, LI, and KN scores

Item	Correlations (r values)		
	GA Score ^a	LI Score ^b	KN Score
If I were walking in the forest where free-ranging bison were present I would have... (Fear, No Fear)	+0.813* n = 132	+0.336* n = 132	-0.478* n = 108

^aItems used to calculate GA scores were transformed to remove negative skewness, therefore, positive correlations suggest that those respondents who fear bison have negative attitudes.

^bPositive correlations suggest that those respondents who fear bison have greater concerns regarding bison-caused lifestyle impacts.

*indicates $p < 0.001$

were 3.242 times more likely to have concerns regarding possible lifestyle impacts such as injuries to humans and the destruction of crops and farmland. Based on responses to the subsets of variables comprising the GA and LI factors, this logistic regression model correctly classified respondents in the fear category 90.9% of the time.

Not surprisingly, those respondents who did not fear bison held significantly higher GA scores and significantly lower LI scores than those respondents who feared bison (Table 6.5). Correspondingly, responses to individual attitude items differed significantly between those respondents who feared bison and those who did not. For instance, while 78% of no fear respondents indicated some level of support for the proposed restoration, none of the randomly sampled fear respondents (0%) supported the restoration [$X^2 (6, n = 143) = 108.078 p < 0.01$]. When asked if bison should be allowed to exist so that future generations could enjoy them, 79.4% of no fear respondents slightly, moderately, or strongly felt that they should, while just three randomly sampled fear respondents (4.3%) indicated only slight agreement with the statement [$X^2 (6, n = 142) = 104.292 p < 0.01$]. Finally, while approximately 78% of those respondents who

Table 6.5 Significant differences in attitude scores between fear and no fear respondents

Attitude Scores ^a		No Fear	Fear
General Attitude Score ^b	Mean	5.58*	2.01*
Lifestyle Impact Score ^c	Mean	3.03*	4.62*

^aAttitude scores based on 7 point scale

^bLarger numbers correspond with more positive attitudes

^cSmaller numbers correspond with less perceived bison-caused impact

*Indicates significant difference between groups, $p < 0.001$

feared bison, slightly, moderately, or strongly agreed that the restoration would result in bison-caused injuries to humans, significantly less no-fear respondents (18%) agreed with the statement [$X^2 (6, n = 146) = 67.195 p < 0.01$].

6.7 Discussion

Research associated with the human dimensions of wildlife management seeks a better understanding of how people view wildlife species and explores the reasons behind public support of, and opposition to, management efforts (Decker, Brown, & Siemer, 2001). We have shown that, for the groups surveyed, the regions of Siegen-Wittgenstein and HSK are fundamentally different in their beliefs, attitudes, and levels of support or opposition regarding bison and the proposed restoration. We also show that attitudes toward bison and the proposed restoration consist of two independent factors: general attitudes and lifestyle impacts. Fear of bison was found to have a large influence on attitudes. Fear scores correlated with lower knowledge scores, less positive attitudes, and greater concerns regarding lifestyle impacts.

6.7.1 Attitude Differences Between Regions

Respondents from the region of Siegen-Wittgenstein held significantly more positive attitudes and had significantly less concern regarding lifestyle impacts than HSK respondents thus confirming our hypothesis. Also supporting our hypothesis is the fact that these differences in attitudes are likely due to the fact that a greater proportion of HSK residents than Siegen-Wittgenstein residents rely on the natural environment for their livelihood. This closer connection to the natural environment likely translates into greater concerns regarding bison-caused impacts. This assumption supports findings by a number of other researchers. For instance, Daley, Cobb, Bromley, & Sorenson (2004) found that “[l]andowner attitudes toward wildlife in North Carolina appear closely linked to property use and reliance on land for direct economic income”. Similarly, West and Parkhurst (2002) found that people who use their land for the production of various agricultural products were less tolerant of deer damage than those who did not produce agricultural products.

6.7.2 Knowledge Differences Between Regions

Though formal education levels were similar in Siegen-Wittgenstein and HSK and despite the fact that restoration proponents held public meetings, information and photo exhibitions, and published numerous newspaper articles in both regions, Siegen-Wittgenstein respondents scored significantly higher than HSK respondents on items pertaining to knowledge of bison and their characteristics. These findings suggest that there is a need for managers to continue to provide residents with accurate information

and address issues of fear of bison, especially in the region of HSK. As suggested by Mankin, Warner, and Anderson (1999), “[m]embers of the public can make sound, informed decisions on natural resource issues only if they are provided with accurate information accompanied by ecological comprehension”.

There are differing opinions, however, regarding the effectiveness of such information efforts. Undoubtedly, people can support or oppose resource or wildlife conservation and management efforts based on a number of factors and increases in knowledge may not necessarily result in more positive attitudes. While some researchers suggest that education and information efforts positively influence attitudes and opinions (Hughes & Saunders, 2005; Marks & Zadoroznyj, 2005; Trumbo & O’Keefe, 2005), others assert that such efforts rarely result in attitude change (Stoll-Kleemann, 2001; Meadow, Reading, Phillips, Mehringer, & Miller, 2005). These differences of opinion are likely due to the nature of the information presented. While general information presented through mass media channels such as television and newspapers seems virtually ineffective in influencing attitudes (Besley & Shanahan, 2004), a number of researchers have found that information efforts tailored to the interests and concerns of the intended audience will more likely be accepted and more effective in influencing attitudes and contributing to increased knowledge levels (Weeks & Packard, 1997; Lauber & Knuth, 2004).

In issues concerning resource and wildlife management, effective targeting of information efforts is especially important as members of the public often reconstruct or ‘cherry pick’ information presented to them to make it coincide with their value system

(Stoll-Kleemann, 2001; as cited in Freddy et al., 2004). Thus, similar to the situation regarding regional differences in attitudes, differences in landownership characteristics between regions, may also contribute to the observed differences in knowledge scores between regions. As a greater proportion of HSK respondents than Siegen-Wittgenstein respondents rely on the natural environment for their livelihood, HSK respondents may be more likely than Siegen-Wittgenstein respondents to skew or reconstruct the general information presented by restoration proponents to make it coincide with their perceptions of threats from direct bison impacts. Conversely, as Siegen-Wittgenstein respondents are less dependant on the land, they may be more likely to trust restoration proponents and accept the information as presented, making them more likely than HSK respondents to respond correctly to the factual knowledge items presented in the questionnaire.

For managers in North Rhine-Westphalia, future information and education efforts aimed at promoting the bison restoration should be presented by trusted messengers and should concentrate on providing accurate information regarding those issues that can be perceived as a threat to both lifestyles in general and agricultural or livestock production, especially in the region of HSK. Our research suggests that these targeted messages should address issues such as disease transmission from bison to cows and bison-caused injuries to humans. Messages should also focus items that may contribute to fear of bison, which has been found to have the greatest influence on attitudes of participants in the current study.

6.7.3 Factors Comprising Attitudes

As suggested by West and Parkhurst (2002, p. 144) regarding attitudes toward deer damage in Virginia, “to successfully manage deer populations, managers must understand the factors that produce attitudes of intolerance among stakeholders”. While Siegen-Wittgenstein respondents held significantly lower mean LI scores (i.e. were less concerned about bison-caused lifestyle impacts) than HSK respondents, regional differences in GA scores were even more pronounced. This finding was somewhat unexpected as the large differences in landownership characteristics between regions were expected to translate into regional differences in LI scores that would surpass regional differences in GA scores. Thus it seems that attitudes toward bison and the proposed restoration, are influenced by factors other than those concerning bison-caused lifestyle impacts. We suggest that such factors likely pertain to a fear of the unknown or, more specifically, a general fear of bison.

In the case of deer management in Virginia, West and Parkhurst (2002) suggested that respondents’ opinions may not only be influenced by concerns regarding personal experiences (or in the case of the current research: supposed personal experiences) but may also be influenced by information from the media and acquaintances. Thus the lower than expected GA scores (relative to LI scores) of HSK respondents may represent those respondents who, while not personally anticipating bison-caused lifestyle impacts, share in the concerns of others who feel they are at risk of such impacts. Such second-hand concerns would not likely be reported as LI issues as the actual impacts accrue to someone else (e.g. farmers or foresters) but may surface in responses to other items such

as those concerning the costs versus benefits of restoration or, simply, extent of support or opposition to the proposed restoration. Such concerns may also translate into a general fear of bison. This assumption is supported by the fact that while the attitude item specifically addressing fear of bison correlated with both LI and KN scores it was most strongly correlated with GA scores [($r = +0.813$, $n = 132$, $p < 0.001$).

6.8 Conclusions

Similar to findings by Daley et al. (2004) in North Carolina, a 'one-size-fits-all' approach will not likely be successful in effectively promoting the proposed bison restoration and addressing the concerns of respondents in the regions of Siegen-Wittgenstein and HSK. Fundamental differences between the two regions call for region-specific and focused efforts by restoration managers. In fact, restoration proponents recently took the first, albeit large, step toward such region-specific management. The significantly less positive reaction from respondents in the region of HSK, has prompted managers to remove those areas within the region of HSK from the proposed restoration area. While managers still plan to restore the 20-25 free-ranging bison in the remaining 4,300ha area within the region of Siegen-Wittgenstein, this significant decision by restoration proponents to exclude areas within HSK from the proposed restoration site reaffirms the importance of understanding public opposition to large mammal management efforts.

Our research concerning reaction to the proposed restoration in Germany has shown that while concerns regarding bison-caused damage or lifestyle impacts do play a

role in the formation of attitudes, the bigger issue is fear. Thus, similar to human dimensions research which illustrates the importance of fear in predicting attitudes toward large carnivores, reaction to a large herbivore like bison is no different. The influence of fear on attitudes toward large carnivores has been studied by numerous researchers throughout areas of Europe (Bath & Farmer, 2000; Røskraft, Bjerke, Kaltenborn, Linnell, & Andersen, 2003; Linnell et al., 2003; Kleiven et al., 2004; Majić, 2007) and North America (Lohr, Ballard, & Bath, 1996; Bath & Enck, 2003; Meadow et al., 2005). However, researchers studying the human dimensions of large herbivore management have given little consideration to the issue of fear, preferring instead to focus on livelihood impacts or damage to personal property. This is especially evident in North America where though research concerning attitudes toward herbivore damage is very common (see Christoffel & Craven, 2000; West & Parkhurst, 2002; Lee & Miller, 2003; Fulton, Skerl, Shank, & Lime, 2004; Lauber & Brown, 2006) the issue of fear of the large herbivore species receives little or no attention. Future human dimensions researchers working with large mammals should build into their methodology specific measures of fear as this may be the most important variable in understanding support or opposition to large mammal restoration efforts.

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Chapter 7 What Do Experts Know? Context as a Determinant of Public Preferences for Methods and Characteristics of Public Involvement

7.1 Abstract

The question of context in determining public preferences in public involvement is a relatively new area of research for the field of human dimensions of wildlife management. This study focused on German public and European expert preferences for various characteristics and methods of public involvement. We found little difference in public preferences between two regions in North Rhine-Westphalia, Germany. However, significant differences were found between American and German public preferences. German participants ranked cost effectiveness as the most important feature of a public involvement process while other researchers have found that American study participants attribute little importance to this characteristic. We also found differences between European expert and German public preferences. While German respondents attributed high levels of importance to cost effectiveness and representing the entire region, experts attributed significantly less importance to these factors and instead favoured including scientific information in the process. We discuss the likely causes and implications of these similarities and differences in preferences.

7.2 Introduction

Identifying the characteristics and methods that contribute to a publicly acceptable and practically effective public involvement process for resource and wildlife management efforts is a goal as elusive as it is ambitious and worthwhile (Lawrence & Deagen, 2001; Chase, Siemer, & Decker, 2002). Past research has focused on identifying criteria to evaluate the success of completed public involvement processes (Webler, 1995; Lauber & Knuth, 1999; McCool & Guthrie, 2001). Such research offers little guidance to resource and wildlife managers attempting to design effective and popular public involvement processes (Lawrence & Deagen, 2001; Chase, Decker, & Lauber, 2004).

To address this research gap, researchers increasingly look to public and expert preferences regarding those characteristics associated with established evaluative criteria to help improve the design of public involvement processes (see: Tuler & Webler, 1999; Mortenson & Krannich, 2001; Chase et al., 2004). Undoubtedly, information concerning public and expert preferences for particular characteristics of public involvement processes, such as cost effectiveness or the use of scientific information, has design implications for managers seeking a popular and effective decision-making procedure (Chase et al., 2004). Consequently, studies showing similarities in public preferences between somewhat disparate regions and apparent trends in expert preferences have prompted some researchers to suggest that some public involvement characteristics and methods may be important components of a successful public involvement process in any context (Tuler & Webler, 1999; Mortenson & Krannich, 2001; Chase et al., 2004).

We challenge these assumptions with findings from a study conducted in North Rhine-Westphalia, Germany. The study was designed to explore similarities and differences between two administrative regions regarding preferences for particular characteristics (Table 7.1) and methods (Table 7.2) of public involvement. We tested whether preferences are context dependent or independent as suggested by Chase et al. (2004). For the purpose of this study, context encompasses the following aspects: the saliency of the wildlife management issue in question, the diversity of viewpoints regarding the wildlife management issue in question, residents' past experience with a

Table 7.1 Factors of public involvement processes

Factors	
Cost Effective	Uses scientific information
Promotes Communication	Is long term ¹
Represents the entire region ²	Weighs input
Treats all citizens fairly	Input has a genuine influence

¹Presented as 'time effective' by Chase et al. (2004)

²Not included in the list of main factors by Chase et al. (2004) but deemed important in this context

Table 7.2 Methods of public involvement

Methods	
Information Materials ¹	Questionnaires
Public Meetings ²	Advisory Groups ¹
Task Forces	Closed Meetings With Experts
Unsolicited Materials	

¹Not included in the list of main factors by Chase et al. (2004) but deemed important in this context

²Presented as 'open meetings' by Chase et al. (2004)

similar wildlife management issue, and a selection of socio demographic characteristics including, population, unemployment rates, average household income, number of residents with professional education, and number of residents collecting pension benefits. This study also documents the preferences of European experts with experience in public involvement in resource and wildlife management situations. This allowed the comparison between expert and public opinions as has been suggested by a number of researchers as an area worthy of research (Tuler & Webler, 1999; Mortenson & Krannich, 2001; McCool & Guthrie, 2001).

7.3 Study Area

The study area is located in west-central Germany, in the south eastern corner of the state of North Rhine-Westphalia (Figure 7.1). The data for this article were collected in conjunction with human dimensions research into a proposed restoration of free-ranging European bison (*Bison bonasus*). Thus, the study area is located in a 7,200ha section of the 1,355 km² Rothaargebirge, or Red Hair Mountains, Nature Park. Restoration proponents plan to release 10 to 15 bison in this area and, eventually, maintain a herd of between 20 and 25 animals (Taurus Naturentwicklung e.V., 2006).

Approximately 25,000 people live in the 17 towns and villages located on the fringes of the proposed restoration area (Landesamt für Datenverarbeitung und Statistik, 2005) (Figure 7.1). The study area spans the administrative regions of Seigen-Wittgenstein and Hochsauerlandkreis (HSK). These regions are adjacent to one another and share a number of characteristics that have been used to describe context by other

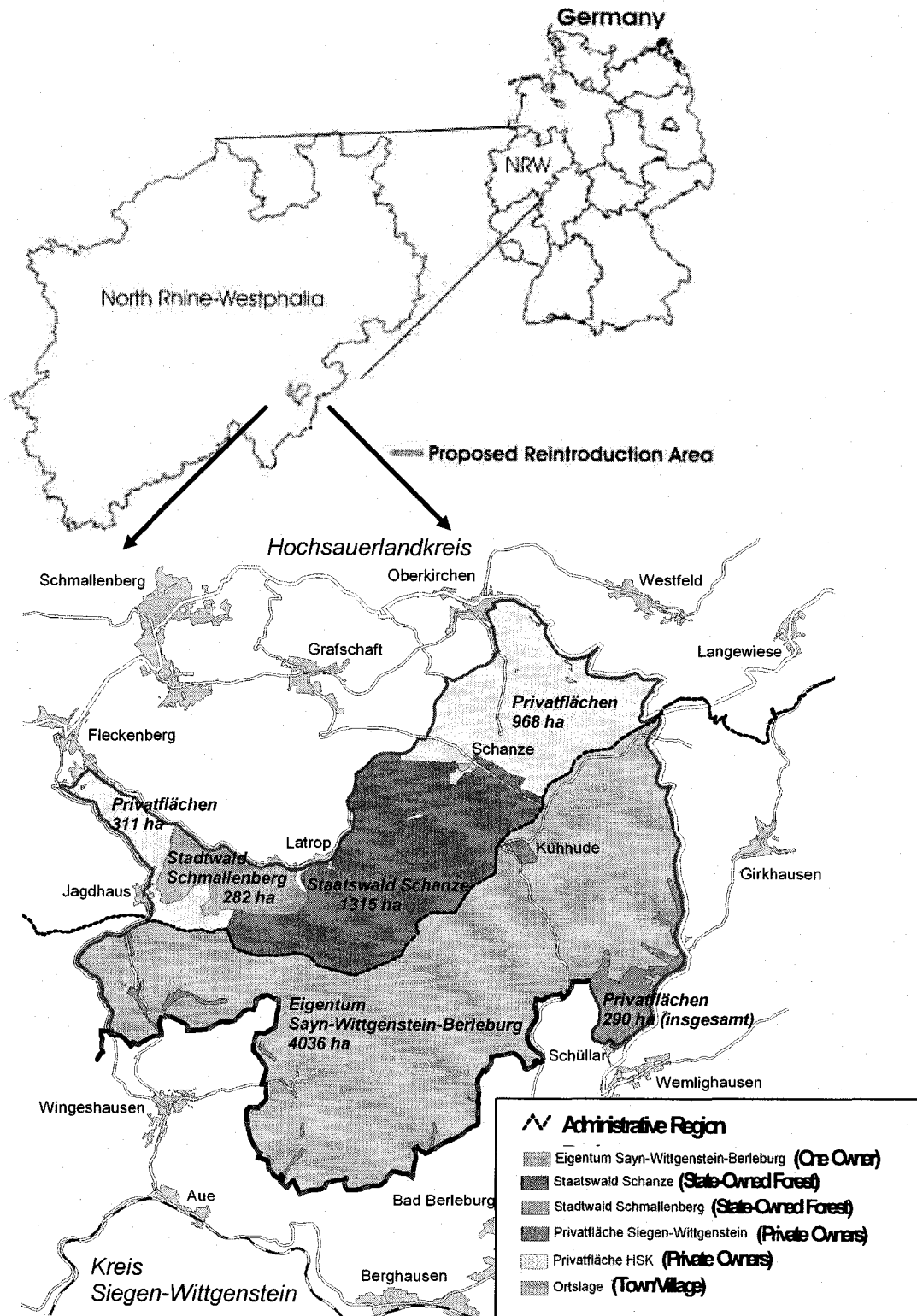


Figure 7.1 Study area

researchers. For example, Chase et al. (2004) identified several socio-demographic characteristics, the diversity of viewpoints regarding the wildlife management effort, and the saliency of the effort in question as contributing to context for the regions in their study. Undoubtedly, these aspects contribute to respondents' overall context; however, this narrow definition fails to address respondents' past experiences with the wildlife management effort in question. Preferences for characteristics and methods of public involvement in areas where people have ample experience with a particular wildlife management issue would likely differ from the preferences of respondents who, like participants in the current study, have little or no past experience with the wildlife management effort in question.

With respect to socio-demographic characteristics, the regions of HSK and Siegen-Wittgenstein share similar populations (227,219 in HSK versus 291,372 in Siegen-Wittgenstein), similar unemployment rates (11.9% in HSK versus 11.0% in Siegen-Wittgenstein), similar average household incomes (€18,531 in HSK versus €18,297 in Siegen-Wittgenstein), similar numbers of residents with a professional education (122,000 in HSK versus 128,000 in Siegen-Wittgenstein), and similar numbers of residents collecting pension benefits (59,000 in HSK versus 57,000 in Siegen-Wittgenstein) (Landesamt für Datenverarbeitung und Statistik, 2005).

The saliency of wildlife management efforts is often linked with one's use and reliance on land for economic gains and also with one's perception of risk of impact on land or property (West & Parkhurst, 2002; Daley, Cobb, Bromley, & Sorenson, 2004). As a substantial proportion of landowners in each region (37.1% in HSK and 21.8% in

Siegen-Wittgenstein) (Landesamt für Datenverarbeitung und Statistik, 2005) rely on farming to provide their main source of income, the proposed bison restoration is undoubtedly viewed as an important issue in the regions considered. Perhaps demonstrating the significance of the proposed restoration in the area, public opinion has reached both ends of the attitude spectrum with restoration proponents promoting the effort as 'The Return of the King' in the local media (Taurus Naturentwicklung e.V., 2006) while at least one farmer, with concerns about the possible negative impacts of bison, equated the restoration with 'bringing snails to his garden'.

Despite the importance of the proposed restoration in the German regions sampled, both regions share a lack of experience concerning this type of wildlife management effort. The current effort to restore free-ranging bison is the first of its kind in Western Europe and follows only a small number of somewhat-larger, projects in parts of Eastern Europe (Taurus Naturentwicklung e.V., 2006). In an effort to make residents more aware of the proposed restoration, proponents have organized public meetings, information and photo exhibitions, and published numerous newspaper articles in the regions affected.

Given the similarities between regions, we would hypothesize that if preferences for characteristics and methods of public involvement are dependent on context, as defined by the attributes identified above, there should be no difference between the two regions considered. Similarly, we would hypothesize that preferences identified in other, somewhat dissimilar contexts, such as those defined for Cayuga Heights, New York and

Evergreen, Colorado by Chase et al. (2004), would differ from preferences of participants in the current study.

7.4 Methods

Although researchers have used a variety of approaches to help identify which characteristics are important to a successful public involvement processes, several characteristics surface consistently regardless of the approach employed (Table 7.3). Chase et al. (2004), used factor loadings to condense an assortment of 19 features into several main factors (Table 7.1). To facilitate the comparison of results between studies, we adopted many of these factors for use in the current research. The public's ranking of each factor was compared across the two regions (HSK and Siegen-Wittgenstein). Similarly, mean scores of expert rankings for each factor were compared with those of the general public.

Public preferences for public involvement factors and methods were assessed through structured interviews (n = 246) conducted between May and July of 2006. Following recommendations outlined in Fowler (2002), the interview method of data collection was chosen, as some questions pertaining to preferences for characteristics and methods of public involvement were deemed too complex for a self-administered questionnaire format. Interviewers were trained and instructed to help ensure respondents fully understood the nature of the survey questions. Participants were randomly sampled from a population of approximately 25,000 residents living in the towns and villages bordering the proposed bison restoration area. Interviewers presented participants with

Table 7.3 Consistencies in characteristics identified as important to successful public involvement

Characteristic	Approach used to define characteristic	Reference
Increased knowledge of issue/viewpoints	Post process evaluation by participants	McCool and Guthrie, 2001
	Post process evaluation by managers	Landre and Knuth, 1993
	Analysis of theory	Laird, 1993
Sense of ownership of the process (involvement of public views)	Post process evaluation by participants	McCool and Guthrie, 2001
	Post process evaluation by interviewees	Tuler and Webler, 1999
	Post process evaluation by researchers	Weeks and Packard, 1997
Promotes communication/ builds relationships between participants	Post process evaluation by participants	McCool and Guthrie, 2001
	Post process evaluation by interviewees	Tuler and Webler, 1999
	Post process evaluation by researchers	Weeks and Packard, 1997
	Post process evaluation by managers	Landre and Knuth, 1993
	Analysis of theory	Fiorino, 1990
	Case study analysis and post process evaluation by participants	Lauber and Knuth, 1999
Representative of the variety of interests involved	Post process evaluation by participants	McCool and Guthrie, 2001
	Case study analysis and post process evaluation by participants	Lauber and Knuth, 1999
	Analysis of theory	Fiorino, 1990
	Case study analysis	Blahna and Yonts-Shepard, 1989
Input from certain participants or groups were not assigned more weight than others	Case study analysis and post process evaluation by participants	Lauber and Knuth, 1999
	Post process evaluation by interviewees	Tuler and Webler, 1999
	Analysis of theory	Fiorino, 1990
Perception that decision will be stable over time	Case study analysis and post process evaluation by participants	Lauber and Knuth, 1999
The process uses personal and interactive methods	Case study analysis	Blahna and Yonts-Shepard, 1989
	Post process evaluation by interviewees	Tuler and Webler, 1999
Citizen involvement in long term	Case study analysis	Blahna and Yonts-Shepard, 1989
Input obtained early in the process	Case study analysis	Blahna and Yonts-Shepard, 1989
Process was time effective	Case study analysis and post process evaluation by participants	Lauber and Knuth, 1999
Process was cost effective	Case study analysis and post process evaluation by participants	Lauber and Knuth, 1999
Reputable information used and made available to participants	Case study analysis and post process evaluation by participants	Lauber and Knuth, 1999
	Post process evaluation by interviewees	Tuler and Webler, 1999
	Post process evaluation by researchers	Freddy et al., 2004
Participants input genuinely influenced decision	Case study analysis and post process evaluation by participants	Lauber and Knuth, 1999
	Analysis of theory	Fiorino, 1990
	Analysis of theory	Laird, 1993

eight factors of public involvement (Table 7.1) and recorded their responses along a five-point response scale that ranged from 1 – “not at all important” to 5 – “very important”. Respondents were also asked their opinions regarding seven methods commonly associated with public involvement processes (Table 7.2). The response scale for these items ranged from 1 – “least preferred” to 5 – “most preferred”.

Expert preferences were assessed using a self-administered questionnaire distributed to network members of The Large Herbivore Foundation, a Eurasia-wide non-governmental organization focused on providing expert advice on large herbivore restoration and management issues mostly within Europe. Experts were presented with the same questions as were presented to German public participants. Forty-four experts from 22 European countries participated in this aspect of the study.

7.5 Results

7.5.1 Factors of Public Involvement

As indicated by the mean importance of each of the eight factors of public involvement, respondents considered all factors at least moderately important, however, some factors were identified as more important than others (Table 7.4). Participants in both regions tended to attribute high levels of importance to the cost effectiveness of the public involvement process (Table 7.4). Furthermore, it seems that participants in both regions tended to favor factors pertaining to more democratic and open decision-making over factors associated with the duration of the process or assigning greater importance to the views of certain interest groups or individuals (i.e. weighing input) (Table 7.4). While

Table 7.4 General public factor rankings by region

Factor	HSK		Siegen-Wittgenstein		Significance ³
	Rank ¹	Mean ²	Rank	Mean	
Cost Effective	1	4.34	1	4.25	t (212) = -.701, p = 0.484
Promotes Communication	4	4.16	2	4.23	t (214) = .562, p = 0.575
Represents the entire region	2	4.24	3	4.07	t (214) = -1.329, p = 0.185
Treats all citizens fairly	3	4.20	4	4.04	t (214) = -1.003, p = 0.317
Uses scientific information	6	3.85	5	3.92	t (208) = .496, p = 0.621
Is long term	7	3.81	6	3.85	t (213) = .271, p = 0.787
Weighs input	8	3.21	7	3.77	t (181) = 3.491, p = 0.001*
Input has a genuine influence	5	3.90	8	3.65	t (217) = -1.535, p = 0.126

¹Rankings range from 1 – most important to 8 – least important

²Means calculated from response scale ranging from 1 – not at all important to 5 – very important

³t tests used to compare mean preferences between regions

both regions attributed little importance to weighing input from participants, respondents in the region of HSK attributed significantly less importance to this factor than did their counterparts in the region of Siegen-Wittgenstein [t (181) = 3.49, p = 0.001] (Table 7.4).

Expert and public preferences were found to differ on a number of factors (Table 7.5). Despite the fact that greater than one third (34.1%) of experts felt that their opinions concerning the importance of various factors of public involvement would coincide with the opinions of the public, experts attributed significantly greater importance to including scientific information in decision-making [t (78) = -3.181, p = 0.002] than did general public respondents. Conversely, the public attributed significantly greater importance to

Table 7.5 Factor rankings by general public and expert respondents

Factor	General Public		Experts		Significance ³
	Rank ¹	Mean ²	Rank	Mean	
Cost Effective	1	4.30	7.5	3.47	t (256) = 5.109, p < 0.001*
Promotes Communication	2	4.19	2	4.31	t (257) = -.776, p = 0.438
Represents the entire region	3	4.15	7.5	3.47	t (53.7) = 3.709, p < 0.001*
Treats all citizens fairly	4	4.12	3	3.90	t (257) = 1.058, p = 0.291
Uses scientific information	5	3.88	1	4.33	t (78) = -3.181, p = 0.002*
Is long term	6	3.82	4.5	3.81	t (256) = .076, p = 0.939
Input has a genuine influence	7	3.77	4.5	3.81	t (72.8) = -.238, p = 0.812
Weighs input	8	3.50	6	3.74	t (85.7) = -1.680, p = 0.097

¹Rankings range from 1 – most important to 8 – least important

²Means calculated from response scale ranging from 1 – not at all important to 5 – very important

³t tests used to compare mean preferences between groups

factors pertaining to cost effectiveness [t (256) = 5.109, p < 0.001] and representing the entire region [t (53) = 3.709, p < 0.001] than did experts (Table 7.5). Differences were also observed between preference rankings of public participants in the current study and preference rankings of public participants in an American study by Chase et al. (2004) (Table 7.6). Spearman's ranked correlation showed no significant correlation between rankings of factors in American study areas and rankings of factors by participants in the German study [$r_s = .14$, n = 6, p = 0.01, two tails] (Table 7.6).

Table 7.6 Rankings of factors by general public in German study areas and American study respondents

Factor ¹	General Public		American Study ⁴	
	Rank ²	Mean ³	Rank	Mean
Is cost effective	1	4.30	5	3.35
Promotes communication	2	4.20	2	4.20
Treats all citizens fairly	3	4.12	4	4.00
Uses scientific information	4	3.89	1	4.25
Has genuine influence	5	3.76	3	4.10
Weighs input	6	3.50	6	2.95

¹Only those factors common to both studies included

²Rankings range from 1 – most important to 6 – least important

³Means calculated from response scale ranging from 1 – not at all important to 5 – very important

⁴Data adapted from Chase et al. (2004); Data from the two regions within each country averaged

7.5.2 Methods of Public Involvement

Respondents in both German regions ranked information materials and public meetings as their first and second most preferred methods of public involvement respectively. Similarly, both regions rated closed meetings with experts as the least preferable form of public involvement. Differences between regions were recorded, however, concerning preferences for other methods of public involvement (Table 7.7). *T* tests revealed significantly larger mean preference scores in the region of Siegen-Wittgenstein for both the taskforce [$t(191.9) = 2.459, p = 0.015$] and questionnaire [$t(218) = 1.993, p = 0.047$] methods of public involvement than in the region of HSK (Table 7.7).

Differences were also recorded between public and expert preferences for different public involvement methods (Table 7.8). Despite the finding that more than

Table 7.7 Preferences for methods of public involvement by region

Method	HSK		Siegen-Wittgenstein		Significance ³
	Rank ¹	Mean ²	Rank	Mean	
Information Materials	1	4.31	1	4.13	t (223) = - 1.516, p = 0.131
Public Meetings	2	3.84	2	3.85	t (219) = .031, p = 0.975
Task Forces	5	3.43	3	3.82	t (191.9) = 2.459, p = 0.015*
Unsolicited Materials	4	3.51	4	3.59	t (221) = .557, p = 0.578
Questionnaire	6	3.18	5	3.49	t (218) = 1.993, p = 0.047*
Advisory Groups	3	3.58	6	3.43	t (216) = -.907, p = 0.366
Closed Meetings With Experts	7	2.55	7	2.68	t (219) = .766, p = 0.444

¹Rankings range from 1 – most preferred to 7 – least preferred

²Means calculated from response scale ranging from 1 – least preferred to 5 – most preferred

³t tests used to compare mean preferences between regions

Table 7.8 Public and expert preferences for methods of public involvement

Method	General Public		Experts		Significance ³
	Rank ¹	Mean ²	Rank	Mean	
Information Materials	1	4.22	4	3.86	t (268) = 2.379, p = 0.018*
Public Meetings	2	3.84	3	4.11	t (264) = -1.710, p = 0.088
Task Forces	3	3.63	1	4.28	t (72.8) = -4.046, p < 0.001*
Unsolicited Materials	4	3.55	7	2.77	t (266) = 4.270, p < 0.001*
Advisory Groups	5	3.50	2	4.27	t (77.3) = -4.866, p < 0.001*
Questionnaire	6	3.33	6	3.20	t (71.8) = .793, p = 0.430
Closed Meetings With Experts	7	2.62	5	3.43	t (263) = -3.906, p < 0.001*

¹Rankings range from 1 – most preferred to 7 – least preferred

²Means calculated from response scale ranging from 1 – least preferred to 5 – most preferred

³t tests used to compare mean preferences between public and expert respondents

40% of the experts felt that their preferences for various public involvement methods would be the same as public preferences no significant relationship was found between rankings of methods by the general public and experts (Table 7.8). General public participants indicated significantly higher levels of preference for information materials [$t(268) = 2.379, p = 0.018$] and unsolicited comments [$t(266) = 4.270, p < 0.001$] than did experts. Conversely, experts attributed significantly higher levels of preference to task forces [$t(72.813) = -4.046, p < 0.001$], closed meetings with experts [$t(263) = -3.906, p < 0.001$], and advisory groups [$t(77.293) = -4.866, p < 0.001$] than did general public respondents (Table 7.8).

When asked to identify the most effective method of public involvement, more than 60% of experts identified task forces, advisory groups, or some combination thereof, as methods most likely to contribute to a successful citizen involvement process. In contrast, less than one quarter of public respondents identified task forces or advisory groups (24.2% and 20.6% respectively) as their most preferred method of public involvement. The most popular method of public involvement among public respondents was information materials as this was identified by approximately 40% of respondents as their most preferred method.

7.6 Discussion

Preferences for various factors and methods of public involvement appear to be dependent on context as defined for the current study. Few differences were recorded between the administrative regions of HSK and Siegen-Wittgenstein. However,

differences were observed between the preferences of general public participants in the current study and the preferences of members of the public participating in studies in disparate contexts. While other researchers have identified the inclusion of scientific information and the ability of participants to genuinely influence decisions as important to a successful decision-making process (Tuler & Webler, 1999; Chase et al., 2002; Chase et al., 2004), participants in the current research attributed little importance to these factors.

These differences may, at least partially, be attributed to respondents' levels of experience regarding the issue in question. While participants in the studies by Chase et al. (2004), Chase et al. (2002), and Tuler and Webler (1999) had extensive experience with the resource or wildlife management issue addressed in the study, participants in the current study were partaking in the first ever efforts to restore free-ranging bison in Western Europe (Taurus Naturentwicklung e.V., 2006). Thus, preferences of German respondents likely reflect their inexperience with the wildlife management effort in question and consequently, their desire to learn more about the proposed restoration and make their opinions and concerns known to managers. Perhaps alluding to these desires, we found that information materials and public meetings were identified as the two most popular methods of public involvement while closed meetings with experts and questionnaires received relatively poor preference scores in both German regions.

As participants tend to favor factors generally associated with democratic and open decision-making (Table 7.4), high levels of preference for methods such as information materials and public meetings, which are generally thought to involve one-

way flows of information from managers to the public (Arnstein, 1969), are somewhat unexpected. Faced with similar discrepancies between participants' preferred public involvement methods and the ability of these methods to furnish preferred public involvement characteristics, Chase et al. (2004) presented several possible explanations. These explanations include the following: participants' failure to understand the actual characteristics of public involvement methods, participants utilizing hidden criteria to evaluate public involvement methods, and respondents failing to consider the tradeoffs associated with certain public involvement methods (Chase et al. 2004).

Chase et al. (2004), however, fail to consider that such discrepancies may be due to respondents failing to separate their overall preferences for factors and methods of public involvement from their desire to see various factors and methods of public involvement utilized in the wildlife management situation in question. Thus, while German respondents may generally prefer more representative forms of public involvement, their concerns over a lack of information regarding the proposed bison restoration may prompt them to attribute greater importance to information materials and public meetings as such methods are more likely to provide more information to the public.

Many European experts felt that their preferences regarding factors and methods of public involvement would correspond with public preferences. However, results show significant differences between expert and public rankings. Thus, similar to suggestions by Treves, Wallace, Naughton-Treves, and Morales (2006), in their review of human-wildlife conflict management, managers should continue to actively assess public

preferences and opinions before attempting to move forward with efforts to promote the proposed restoration. Such steps are surely warranted as numerous authors have noted that the willingness of the public to accept management decisions is often influenced by the extent to which the public involvement process addresses those factors and issues most important to process participants (Lauber & Knuth, 1999; Hunsberger, Gibson, & Wismer, 2005; Stoll-Kleeman & Welp, 2006; Lejano, Ingram, Whiteley, Torres, & Agduma, 2007).

In the absence of context independent guidelines for designing effective public involvement procedures, decision-making processes must not only be informed by public knowledge and preferences (McCool & Guthrie, 2001; Lawrence & Deagen, 2001; Chase et al., 2004), but must also incorporate those methods deemed most effective by experts. For example, as more than 60% of the experts sampled in the current study identified task forces and advisory groups as the most effective methods of public involvement, managers would be wise to employ these methods while, at the same time, incorporating those factors deemed important by the public. In the case of the German public, this means promoting the cost effectiveness and democratic merits of the methods chosen while avoiding characteristics such as weighing input.

Despite the fact that preferences for most public involvement factors differed by context, some features of public involvement appear to be important to respondents regardless of context. Factors pertaining to treating citizens fairly and promoting communication between interest groups were considered moderately important by German study participants. Similarly, these same factors have been identified as

important in studies conducted in other contexts (see: Lauber & Knuth, 1999; Tuler & Webler, 1999; Chase et al., 2002). These features may therefore, be cautiously identified as context independent factors that contribute to public perceptions of an effective decision-making process in any situation. However, larger sample sizes and more information concerning non-response bias are needed before such claims can be made with confidence. Further research across a wider variety of contexts will also likely contribute to a greater understanding of similarities in preferences for some factors of public involvement.

7.7 Conclusion

Understanding public and expert preferences regarding the factors and methods commonly associated with public involvement processes is important for resource, wildlife, and environmental managers seeking a public involvement process that is both effective and acceptable to the public. While preferences for most factors of public involvement are common to both regions in the German study area, these preferences differ from those identified in other studies. We suggest that these differences may be due to differences between study areas in respondents' levels of experience regarding the wildlife management issue in question. As the current research was conducted in conjunction with a proposal to restore free-ranging European bison, an entirely new wildlife management effort in the region, respondents likely choose those factors and methods of public involvement that best reflected their desire to learn more about the restoration effort and to make their opinions and concerns known to managers. These

preferences differed from those identified by American participants (see: Chase et al., 2004) as American participants were reportedly quite familiar with the wildlife management issue associated with that study.

Notwithstanding similarities between regions in the German study area and differences between German and American public preferences for factors and methods of public involvement, Chase et al. (2004) found consistencies in preferences between two, relatively distant regions in the United States. Thus, preferences may remain consistent within a particular country and differ only when compared across national boundaries where contexts differ to such an extent as to influence preferences. Additional research is needed in a greater number of regions in both Germany and the United States to adequately explore this research question.

Discrepancies between expert and public preferences for factors generally associated with public involvement processes suggest that in the absence of information regarding public opinions, managers will not likely be successful in designing a public involvement process that is acceptable to the public. Further, unless such discrepancies are revealed and acknowledged, managers' preconceived ideas about what factors and methods of public involvement are important will guide their decision-making and could negatively influence their public involvement efforts. For instance, in the German study area, general public respondents indicated high levels of preference for information materials while European experts attributed substantially less importance to this method and instead favoured task forces. If managers were to move ahead with the task force method of public involvement, members of the public would likely be opposed to

participating in higher levels of public involvement without first being provided with the basic information they need to formulate attitudes and opinions. A similar situation can be seen regarding the level of importance attributed to the cost effectiveness of public involvement processes. While German public respondents indicated that the cost effectiveness of the public involvement process is the most important consideration, European experts indicated that cost effectiveness was the least important factor, indicating instead that the utilization of scientific information in the public involvement process was most important. Such discrepancies have serious design implications for managers wishing to implement a public involvement process that is acceptable to members of the public. It is important to note, however, that discrepancies were also recorded between the public's preferred factors and the ability of the public involvement methods chosen by the public to provide those characteristics. As public respondents may confuse their overall preferences for factors and methods of public involvement with their desire to see certain factors and methods emphasized in public involvement efforts surrounding a particular wildlife management effort, expert opinions likely provide a clearer picture of which methods of public involvement are most effective.

North American wildlife managers studied by Mortenson and Krannich (2001) identified systematic surveys as their preferred method of public involvement while those European nature conservation and large mammal management experts participating in the current study preferred task forces and/or advisory groups. The relative rarity of human dimensions of nature conservation and wildlife management research in Europe when compared with North America (Bath & Majić, 2001) may help explain this difference.

North American managers' experience with public involvement has likely taught the importance of truly representative information especially in increasingly litigious North American contexts. European experts on the other hand, seem to prefer higher levels of public involvement that effectively bring about consensus in contentious resource and wildlife management decisions, while at the same time allowing managers to retain some control over the process.

Given the complex nature of public preferences and contextual considerations (Treves et al., 2006), attempting to outline a single, specific public involvement process that is successful in all nature or wildlife management situations has been considered difficult by some researchers and unrealistic and naïve by others (McCool & Guthrie, 2001; Chase et al., 2002; Chase et al., 2004). However, as suggested by Landre and Knuth (1993, p. 159), "understanding contextual factors that inhibit or enhance public involvement programs can help professionals design programs to enable effective community participation". Thus, by examining public and expert preferences for factors and methods of public involvement in various contexts, managers can gain a greater understanding of the importance of context in the design of public involvement processes. By implementing a public involvement process attuned to the preferences of the public, managers will likely gain credibility and trust, thereby fostering good public relations and cooperation with the public in the future.

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Chapter 8 Conclusions

A number of authors have suggested that successful public involvement efforts can reduce conflict, build trust and credibility between resource and wildlife managers and the public (Bath & Enck, 2003), and prevent litigation by those who want their opinions to be heard (The Regional Environmental Center For Central and Eastern Europe, 1998; Lawrence & Deagen, 2001). Involving the public in decision-making and taking into consideration the human dimensions of resource and wildlife management offers benefits to both members of the public and managers. Hunsberger, Gibson, and Wismer (2005) suggest that public involvement efforts provide managers with information relevant to the local area, shows that managers are interested in understanding local concerns, and results in decisions that are more acceptable. For members of the public, genuine public involvement efforts can, depending on the level of involvement, provide information, help make the voice of the public heard by managers, and provide an opportunity to influence the decision-making process. Given these benefits, it is not surprising that members of the public and interest groups increasingly seek participation in resource and wildlife management decisions (Bath, 1996; McCool & Guthrie, 2001; Chase, Siemer, & Decker, 2002; Chase, Decker, & Lauber, 2004).

While managers are often required to provide information and involve the public in decisions regarding resource development and wildlife management efforts, (Steelman & Ascher, 1997; Lawrence & Deagen, 2001; The Canadian Association of Petroleum Producers, 2003; Hunsberger et al., 2005), managers realize the benefits of public participation and, in some cases, actively seek public input (McCleery, Ditton, Sell, &

Lopez, 2006). Some researchers have noted, however, that increased opportunities for public participation do not necessarily result in increases in public influence on final decisions. More than three decades ago, Heberlein (1976), in his discussion of a selection of public involvement techniques, noted that in addition to playing a role as a lower level public involvement technique, public hearings can serve another, less honourable function.

A public hearing serves a *cooptation function* when the goal of the hearing is to let irate citizens and interest groups let off steam and complain about the project...[w]hile it is implicit that public input will have no impact on the program or policy, people are formally given a chance to have a say, so they may not take the agency to court for failure to provide public involvement. (Heberlein, 1976, p. 200)

Similarly, yet decades later, Smith and McDonough (2001) cautioned managers against presenting predetermined alternatives to the public for comment as such an approach reduces public involvement to a formality and prevents participants from influencing more fundamental decisions. Mankin, Warner, and Anderson (1999), however, state that “[m]embers of the public can make sound, informed decisions on natural resource issues only if they are provided with accurate information accompanied by ecological comprehension”. Thus while part of the role of resource managers is to provide the public with unbiased information to assist them in decision-making, managers must tread the fine line between presenting the information needed by the public and presenting a narrow selection of management options which restricts the ability of the public to truly influence decisions. Genuine public involvement efforts, rather than simply allowing concerned and affected individuals or groups to marginally influence decisions already

taken on their behalf, must allow “humanity...the right to sit in judgment of its own fate” (as cited in Henning, 1987, p. 288).

The decision by those managing the bison restoration effort in North Rhine-Westphalia to exclude from the proposed restoration area the region of HSK, where a majority of residents harbored negative attitudes and opposed the restoration effort, indicate that managers are willing to allow public opinion to influence fundamental decisions associated with the proposed restoration. This decisive action by managers relates to issues of justice and fairness, which have been identified by Smith and McDonough (2001) as important to the success of resource management decision-making. Perceptions by participants that the decision-making process and decision outcomes are just and fair, result in increased support for decisions and a long lasting trust of decision-makers (Smith & McDonough, 2001). While such benefits are important to resource and wildlife managers working in a variety of contexts, public support and trust is especially important for those promoting controversial issues such as species restorations. Thus, restoration managers in North Rhine-Westphalia should continue their efforts to ensure that fundamental decisions regarding the future of the restoration effort are informed by public opinion.

8.1 The Human Dimensions of Bison Restoration in Germany

While exploring the human dimensions of wildlife management efforts is a well-established practice in North America, fewer examples of such research are found in Europe (Bath & Majić, 2001). The proposed restoration of European bison in the State of

North Rhine-Westphalia has provided an opportunity to begin to fill this research gap. In this thesis, I have documented and discussed the attitudes, beliefs, and levels of support and opposition of local residents regarding the proposed bison restoration and compared attitude and knowledge levels across the two regions spanned by the proposed restoration area. These findings have implications not only in the context of bison restoration in North Rhine-Westphalia, but for the field of human dimensions of wildlife management more generally.

As evidenced by the findings presented here and the decision by restoration proponents to exclude areas within HSK from the proposed restoration area, a 'one-size-fits-all' approach will not likely be successful in effectively promoting the proposed bison restoration and addressing the concerns of residents in the regions of Siegen-Wittgenstein and HSK. With almost twice as many landowners as Siegen-Wittgenstein, HSK residents have greater perceived risk of bison-caused lifestyle impacts resulting in less positive attitudes toward the proposed restoration. Further, HSK residents, in an attempt to reaffirm their concerns, likely skew the information presented to them thereby resulting in significantly lower bison-related knowledge scores than Siegen-Wittgenstein respondents.

If restoration managers wish to address these issues and attempt to gain greater acceptance for their efforts in HSK, their efforts must be region-specific and focused on those issues having the greatest influence on attitudes. In terms of bison restoration in general, such efforts should address issues pertaining to fear of bison. However, on a more local scale, managers attempting to promote the restoration in North Rhine-

Westphalia should also focus on issues pertaining to disease transmission between bison and cows, the destruction of crops and trees, and injuries to humans, especially if they wish to increase support for their efforts in the region of HSK.

The finding that general fear of bison is the best predictor of negative attitudes toward bison and the proposed restoration may have important ramifications for the field of human dimensions of large herbivore management as a whole. To date, most researchers studying opposition to large herbivore conservation and management have given little consideration to the influence of fear on attitudes toward large herbivore species, and have instead focused on reaction to property damage and other lifestyle impacts (see: Christoffel & Craven, 2000; West & Parkhurst, 2002; Lee & Miller, 2003; Fulton, Skerl, Shank, & Lime, 2004; Lauber & Brown, 2006). Similar to their colleagues who study opposition to large carnivores (see: Lohr, Ballard, & Bath, 1996; Røskraft, Bjerke, Kaltenborn, Linnell, & Andersen, 2003; Majić, 2007), researchers studying the human dimensions of large herbivore management should incorporate measures of fear of large herbivores into their methodology.

By addressing the issue of fear in future studies, researchers could explore whether the importance of fear as observed in the current study and those regarding large carnivores, emerges as important to individuals and groups associated with other large herbivore restoration and management efforts. Such information would likely contribute to a better understanding of support or opposition to large herbivore restoration efforts. Given the influence of the element of fear on attitudes of participants in the current study, future research should also explore ways to reduce fear of large herbivore species such as

allowing the public to view animals in a controlled setting. Majić (2007, p. 63) suggests that “seeing a captive wolf could be seen as a “shortcut” to increased knowledge about wolves and more positive attitudes toward wolves”. Thus research exploring public attitudes and knowledge levels pre and post viewing of captive large herbivores may reveal changes in attitudes and beliefs regarding large herbivore species.

8.2 Preferences for Characteristics and Methods of Public Involvement

Jacobson and McDuff (1998, p. 263) state that “[p]ublic influence is especially prevalent in controversial conservation issues such as the reintroduction of species”. Thus, the proposed bison restoration has presented an opportunity not only to gain a better understanding of associated human dimensions issues but to also explore questions relating to public involvement in decisions regarding wildlife management issues. Steelman and Ascher (1997, p. 73) state that “[s]ince the ‘participation explosion’ in the 1960s, policy makers, academics and the public have wrestled with the ideals and reality of citizen involvement in decision making”. While this struggle has essentially run its course in some areas of the discipline of Geography such as resource development, in other sub fields, such as human dimensions of wildlife management, the struggle continues and many questions remain regarding the design of effective public involvement processes for wildlife management decision-making.

Geographers working in the natural resource management and environmental impact assessment arenas have carefully honed public involvement tools to provide valuable information regarding the beliefs and opinions of the public and, where possible,

to achieve higher levels of cooperation between interest groups (Environment and Community Policy Branch, 1998; The Canadian Association of Petroleum Producers, 2003; Hunsberger et al., 2005). Despite falling clearly within Geography's human-land interaction tradition (Pattison, 1964), however, researchers in the human dimensions of wildlife management field have just recently begun to slowly gather and apply those tools pertaining to public involvement processes. Thus, while adequate information is available regarding appropriate public involvement tools for resource and environmental management, there is little academic literature available pertaining to the design of effective public involvement processes within the field of wildlife management.

It is important to note, however, that this gap in the literature may not be indicative of a lack of public involvement work being done by those associated with wildlife management efforts. This gap may result from those "doing" public involvement in wildlife management (e.g. facilitated workshops, joint management planning, etc.) not being in an academic setting where documenting their experiences in academic journals is required. On the other side, academic researchers tend to be less applied and thus tend not to write about examples of doing public involvement but rather provide discussions of public involvement theories.

One approach in attempting to fill this research gap has been for researchers to carry out studies after the completion of public involvement or decision-making processes. While this approach is effective in identifying which characteristics or methods were important to the success or failure of the process (see: Webler, 1995; Lauber & Knuth, 1999; McCool & Guthrie, 2001), the resulting information tends to be

more evaluative than prescriptive. While wildlife managers realize the importance of involving the public in decision-making, questions remain regarding which public involvement methods should be used. Thus, managers are in need of prescriptive information concerning the design of public involvement or decision-making processes that are both effective and acceptable to the public in a particular context (Lawrence & Deagen, 2001; Chase et al., 2004). Similar to suggestions by Treves, Wallace, Naughton-Treves, & Morales (2006) regarding the importance of the opinions of both managers and the public in managing human-wildlife conflicts, the design of acceptable and effective public involvement efforts for wildlife management must also be informed by expert and public preferences. Accordingly, this thesis includes a discussion of public and expert preferences for characteristics and methods of public involvement as well as an examination of the role of context in influencing these preferences in this new arena of wildlife management.

When asked to indicate their preferences for various characteristics and methods of public involvement, few differences were found between the German regions sampled. These German public preferences differed, however, from those identified by participants in studies conducted by other researchers in the United States (see: Chase et al., 2004). Differences were also recorded between European expert and German public preferences. Thus, it seems that context does play a role and that public and expert preferences are not universal, issues that have been identified as deserving of more in-depth research by a number of authors (Tuler & Webler, 1999; Mortenson & Krannich, 2001; Chase et al., 2004). These findings indicate that researchers must continue to take into consideration

the role of context in the design of public involvement processes to ensure they are both effective and appropriate for particular areas and situations.

Differences between the preferences indicated by German study participants and participants in the American study by Chase et al. (2004) are likely due to differences in respondents' levels of experience regarding the wildlife management issue associated with each study. As data for the current research were collected in conjunction with the proposed restoration of free-ranging bison in North Rhine-Westphalia, an entirely new wildlife management issue in the region, respondents likely choose those methods of public involvement that best reflect their desire to learn more about the restoration effort and to make their opinions and concerns known to managers. Conversely, participants in the American study by Chase et al. (2004) were reportedly quite familiar with the deer and elk management issues in question.

These findings suggest that researchers need to be aware that preferences for various characteristics and methods of public involvement, which are elicited using studies associated with some sort of resource or wildlife management issue, likely pertain to the resource or wildlife issue specifically and could differ a great deal depending on respondents level of experience or values regarding the issue in question. Issue saliency has been recognized for many years as important in influencing response rates for social science researchers (see: Connelly, Brown, & Decker, 2003), but the idea that participants' level of awareness of an issue may influence preferences for characteristics and methods of public involvement is an issue that has not yet been explored. Future researchers should also be aware that differences may exist between preferences

regarding public involvement in resource development contexts and preferences regarding wildlife issues. For example, whether knowledgeable about toxic waste or not, fear of the unknown often prompts the public to pursue active public involvement mechanisms to influence policy and oppose proponents that try to establish a waste site in their area (see: Davis, 1986; Kraft & Clary, 1991; Sjöberg & Drottz-Sjöberg, 2001). In contrast, even a controversial wildlife restoration effort may result in calls for more information rather than immediate opposition.

8.3 Policy Implications

The research findings presented here contribute to a clearer understanding of the factors that comprise and influence attitudes toward large herbivore restoration. This thesis also provides guidance to resource or wildlife managers seeking an approach to determining the design of effective and acceptable public involvement processes. These findings have implications for European biodiversity conservation and associated policies.

The European Commission aims to significantly reduce biodiversity loss by 2010 and to integrate “nature protection requirements into other policy areas, such as farming, fishing, and industry” (European Commission, 2006, p. 1). Helping to realize this aim is the Commission’s Habitats Directive. Adopted in 1992, the Directive requires European Union Member States to identify and protect important wildlife species and their habitats (European Commission, 2006) and also requires Member States to give due consideration to the feasibility of restoring endangered species native to their region (Schofield, 2005).

In Germany, opposition to the establishment of protected areas has restricted the application of the Directive and the establishment of associated Natura 2000 sites (Stoll-Kleemann, 2001). In Germany, Stoll-Kleemann (2001) suggests that in many cases, before protected areas can be designated, assurances of monetary compensation must be made to placate farmers who fear negative livelihood impacts from nature conservation efforts. Thus, it seems that research findings presented in this thesis, concerning the influence of landownership characteristics and concerns regarding lifestyle impacts on attitudes, have implications for those wishing to more effectively implement the Habitats Directive in Europe. Further, as the Directive requires Member States to carry out adequate public consultation before implementing significant nature or wildlife conservation efforts, such as species restorations (Schofield, 2005), Member States would likely also benefit from the findings presented concerning the design of acceptable and effective public involvement processes. Information concerning appropriate public involvement processes coupled with an understanding of attitudes and beliefs regarding biodiversity loss and conservation should assist Member States in implementing the Habitats Directive and achieving significant reductions in biodiversity loss.

8.4 Opportunities for Further Research and Analysis

As this research represents one of the first efforts to examine human dimensions issues regarding large herbivore restoration and management in Europe, there was a clear focus on identifying and documenting the attitudes and beliefs of residents living in the towns and villages surrounding the proposed bison restoration area. Understanding

“what” the attitudes are toward wildlife conservation issues is obviously only a first step in the human dimensions process. Financial and time resources limited the possibilities of pursuing the “why” behind the attitudes revealed in this study, but ideally further qualitative techniques (e.g. interviews, focus groups, etc.) would provide decision-makers with a greater understanding of resident’s attitudes. Indeed, the advantages of such methodological pluralism have been promoted by a number of researchers (Chelimsky, 1997; Chase et al, 2004).

Perhaps one of the greatest challenges of doing the first human dimensions study on bison issues in Germany with a limited budget and timeframe is determining the scope. While the study was able to offer managers some understanding of the issues in the area, it is important to communicate to managers that similar to how one biological study of bison cannot answer all biophysical questions, one human dimensions study cannot address all human dimensions questions. Thus, human dimensions information should eventually become integrated into the decision-making process for large herbivore management in Europe and be seen by managers as more than a one-shot study. In fact, one of the strengths emerging from this research is to provide a baseline for a longitudinal study to monitor attitudes and beliefs over time if restoration efforts continue and new information is provided to residents.

One issue, which has emerged as important in the current research and is deserving of further investigation, is that of fear of bison. Future researchers could use interview or focus group techniques to gain a better understanding of the roots of respondents’ fear of bison to determine if this fear pertains specifically to bison or if it

actually stems from a fear of the unknown. As noted by Jacobson and McDuff (1999), few wildlife management or conservation efforts are as controversial as species restorations. Thus, further research pertaining to fear of the unknown and its influence on attitudes is certainly warranted as concerns regarding unknown impacts from newly restored species may contribute greatly to public reaction to all manner of species restorations.

With respect to preferences for characteristics and methods of public involvement, less structured research techniques could help test the assumption that preferences pertain to participants' level of experience regarding the wildlife conservation effort in question. In terms of research findings from the current study, a qualitative research approach could help determine whether the preferences reported by participants in North Rhine-Westphalia, where a new type of wildlife management effort has been proposed, are applicable to other areas where the affected public has little experience with the wildlife species or resource management effort in question. By using less-structured research instruments such as focus groups or unstructured interviews to 'unpack' public preferences, future researchers could have greater confidence in assessing whether their findings apply only to a particular situation or to a broader spectrum of wildlife management efforts.

It is important to note that the research findings presented in this thesis may, similar to other studies assessing attitudes toward wildlife management issues (Riley, 1998; Chavez, Gese, & Krannich, 2005; Majić, 2007), be biased toward males. Though no participant selection criteria were employed in this study, some researchers have

found that men tend to be over-represented in studies related to wildlife management even when such criteria are used (Chavez et al., 2005). Despite the fact that participants and places of residence were randomly sampled, there was an over-representation of middle-aged (35-54 years of age) people and an under-representation of younger people (18-34 years of age).

While such disproportionate sampling was less pronounced among those residents sampled using the interview technique, it is important to acknowledge the deviations of the sample from the gender and age proportions of the population as a whole and be conscious of the possible implications of this. Generally, older respondents tend to hold more negative attitudes toward nature conservation and wildlife management efforts (Jorgensen, Wilson, & Heberlein, 2001; Majić, 2007) so managers may find comfort that support for bison restoration may in fact be even stronger among the general public. However, gender differences in attitudes regarding the proposed restoration may be more difficult to deduce as it seems that in some cases females tend to hold more negative attitudes than males regarding resource and wildlife management issues (Bath & Farmer, 2000; Andersone & Ozolins, 2002), while in other cases the opposite is true (Eisler, Eisler, & Yoshida, 2003). As random sampling alone cannot ensure an accurate representation of the demographic subgroups of a population, future research should employ techniques to try to ensure samples are as representative as possible of the population in question to help ensure results can be accurately generalized to the population.

In today's world of expanding human populations and shrinking natural areas, resource and wildlife managers must increasingly rely on the field of human dimensions to better understand the attitudes, opinions, and knowledge levels of those people concerned and affected by resource and wildlife management efforts. Ideally, human dimensions research helps produce decisions that are more acceptable to the variety of interests involved, however, the trend toward higher levels of public involvement and away from top down decision-making is often borne more of necessity than the pursuit of democratic ideals. In the absence of human dimension information, management decisions are based on unfounded assumptions about the positions of the public and interest groups. However, by working to understand and address the concerns and opinions of individuals and interest groups associated with resource and wildlife management efforts, managers help pave the way for future efforts to effectively involve the public in decision-making processes. By soliciting and addressing the public's concerns, the credibility of resource managers increases, thereby securing continued support for their efforts into the future and helping to ensure management decisions are acceptable in the court of public opinion.

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Appendix A

Self-Administered Questionnaire - Public Opinion Regarding the European bison (*Bison bonasus*)

Section A

The following question addresses your general feelings toward the European Bison. *Please circle the number that best represents your response.*

	Strongly <u>Dislike</u>	Moderately <u>Dislike</u>	Slightly <u>Dislike</u>	<u>Neutral</u>	Slightly <u>Like</u>	Moderately <u>Like</u>	Strongly <u>Like</u>
1. In general, how do you feel about bison?	1	2	3	4	5	6	7

Section B

The statements that follow concern potential outcomes or views concerning the reintroduction of the European bison. Please indicate the extent to which you "Agree" or "Disagree" with each statement. *Please circle the number that best represents your response.*

	Strongly <u>Disagree</u>	Moderately <u>Disagree</u>	Slightly <u>Disagree</u>	<u>Neutral</u>	Slightly <u>Agree</u>	Moderately <u>Agree</u>	Strongly <u>Agree</u>
1. Reintroducing the European bison in the Rothaargebirge area would be an important contribution for the conservation of the European bison	1	2	3	4	5	6	7
2. Reintroducing the European bison would increase tourism in the region.	1	2	3	4	5	6	7
3. Reintroducing the European bison would help return the environment to a more natural state.	1	2	3	4	5	6	7
4. Reintroducing the European bison would result in much destruction of crops and farmland.	1	2	3	4	5	6	7

	<u>Strongly Disagree</u>	<u>Moderately Disagree</u>	<u>Slightly Disagree</u>	<u>Neutral</u>	<u>Slightly Agree</u>	<u>Moderately Agree</u>	<u>Strongly Agree</u>
5. European bison will compete with roe deer and other game animals for food	1	2	3	4	5	6	7
6. Reintroducing the European bison will cause a decrease in hunting opportunities in the area.	1	2	3	4	5	6	7
7. Reintroducing the European bison will result in much damage to trees in the area.	1	2	3	4	5	6	7
8. Reintroducing the European bison will result in bison-caused injuries to humans.	1	2	3	4	5	6	7
9. The benefits of having a European bison population in the Rothaargebirge area will balance the monetary cost of the reintroduction.	1	2	3	4	5	6	7

Section C (a)

The following questions address whether you support or oppose the European bison reintroduction program. For question one (1) *Please circle your response.* For question two (2) briefly outline your reason(s) for supporting or opposing bison reintroduction.

1. To what extent do you "Approve" or "Disapprove" of reintroducing the European bison into the Rothaargebirge area?

1	2	3	4	5	6	7
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2. If you were given the opportunity to vote **for** or **against** reintroducing the European bison into the Rothaargebirge area, how would you vote?

For
Reintroduction

Against
Reintroduction

2. What is your primary reason for being in favor **or** being against bison reintroduction?

Section C (b)

If you have voted **for** reintroduction in section C(a) above please go to **Section D**. This aspect of Section C addresses your views concerning a compensation program that may accompany the reintroduction effort. However, complete this section **only** if you would vote **Against Reintroduction**.

If you would vote **Against Reintroduction**, please circle your response to the following statements.

- | | | | |
|---|-----|----|----------|
| 1. I would change my opinion and vote For reintroduction if a program of financial compensation for bison-caused damages was implemented. | Yes | No | Not Sure |
| 2. I would change my opinion and vote For reintroduction if I am assured that the project will be cancelled by representatives of interest groups if problems develop. | Yes | No | Not Sure |
| 3. I would change my opinion and vote For reintroduction if I were assured that steps were taken to reduce the risk of diseases being transmitted from bison to livestock. | Yes | No | Not Sure |
| 4. I would change my opinion and vote For reintroduction if a fence was used to to keep most of the animals in remote areas, away from private farm land. | Yes | No | Not Sure |
| 5. I would change my opinion and vote For reintroduction if a hotline were made available to report any bison-related problems that may arise. | Yes | No | Not Sure |

Section D

Below are several statements about the European bison. *Please circle the answer that best describes your opinion.*

- | | | | |
|---|---|----------|-----------------|
| 1. The average adult European bison is... | a) smaller than an average cow
b) similar in size to an average cow
c) larger than an average cow | | |
| 2. European bison once lived in NRW. | Generally True | Not Sure | Generally False |
| 3. European bison usually roam in mixed herds lead by an experienced cow | Generally True | Not Sure | Generally False |
| 4. In areas where European bison populations currently exist, bison-caused injuries to humans are common. | Generally True | Not Sure | Generally False |
| 5. Bison sometimes breed with cows. | Generally True | Not Sure | Generally False |
| 6. Diseases are commonly transmitted from bison to cows. | Generally True | Not Sure | Generally False |

Section E

This section addresses how patterns of visitation to the Rothaargebirge area might change if free ranging bison were reintroduced.

1. How often do you walk in or visit the forest of the Rothaargebirge? _____ times per month
2. Please indicate your response to the following statement: "I would be afraid to walk in the forest if free ranging bison were present."
- Big fear some fear no fear don't know

2. *Please check (✓) your response to the following statement:* "If free ranging bison were reintroduced into the Rothaargebirge forest, the number of times I visit the area per month would..."

- ___ decrease significantly
___ decrease slightly
___ stay the same
___ increase slightly
___ increase significantly
___ don't know

Section F

This section concerns your attitude toward a potential European Bison reintroduction project.
Please circle the answer that best describes your response.

1. With 1 being not at all important and 10 being extremely important please use the scale to identify how important the issue of reintroducing bison into the Rothaargebirge area is to you personally?

Not at all
important
1 2 3 4 5 6 7 8 9 10
Extremely
important

Strongly Disagree Moderately Disagree Slightly Disagree Neutral Slightly Agree Moderately Agree Strongly Agree

2. European bison should be allowed to exist in Germany so that future generations can enjoy them.

1 2 3 4 5 6 7

3. European bison have a right to exist in Germany.

1 2 3 4 5 6 7

4. The European bison is an important part of the ecosystem.

1 2 3 4 5 6 7

5. I would like to see a European bison.

1 2 3 4 5 6 7

6. Bison are often shy and difficult to see in forested areas however, I feel they should exist in the proposed reintroduction area even if I will not be able to see them.

1 2 3 4 5 6 7

7. Have you ever seen a free ranging European bison? a) Yes b) No

8. I believe it is important that a hotline be made available to allow people to immediately report any bison-related problems that may arise.

(a)Yes

(b)No

(c)Not Sure

Section G

For the analysis of the questionnaire, we require some basic information from you. This information will be kept confidential and analyzed as a group with no individual responses identified. *Please circle your response.*

1. Are you?

a) Male

b) Female

2. How old are you?

18-24

25-34

35-44

45-54

55-64

65-74

75 or older

3. What degree do you have?

a) No degree

b) Primary school

c) Secondary school

d) High school

e) No professional training

f) Professional training finished

g) University degree

4. How long have you lived at this address? _____

5. Do you belong to any non-profit, volunteer, or community organizations? a) Yes b) No
If Yes please list the organization(s) below.

6. Are you a forester? a) Yes b) No

7. Are you a hunter? a) Yes b) No

8. Are you a farmer? a) Yes b) No

9. Are you an active nature conservationist? a) Yes b) No

10. Did you take part in the first questionnaire? a) Yes b) No

If you would like to receive further information on the European bison and the potential reintroduction program please contact the bison office by telephone at 02751-9360110, or by email at wisent@wittgenstein-berleburg.net. Or you can visit our office at the Wittgenstein-Berleburg'sche Rentkammer.

Mailing Address:
Wisentbüro
Goetheplatz 8
57319 Bad Berleburg

Thank you for participating in our study

Appendix B

Interview Questionnaire - Public Opinion Regarding the European Bison (*Bison bonasus*)

Section A

1.a) Have you heard about the proposed reintroduction of European bison into the Rothaargebirge area?

(Please check (✓) the response)

☐ Yes ☐ No ☐ Not Sure

(If No > go to Section B)

(If Yes >)

1.b) Where did you hear about the proposed project? *(Please check (✓) all that apply.)*

- ☐ This questionnaire only
- ☐ Questionnaire from phase 1 (October – December 2005)
- ☐ Newspaper articles
- ☐ Television
- ☐ Radio
- ☐ Photo/Information Exhibition by Taurus (the initiating organization)
- ☐ Friends/Family
- ☐ Rentkammer
- ☐ Other(s) (please specify) _____

(If more than one source, *please circle the source where most of the information was received*)

Section B

	Strongly <u>Dislike</u>	Moderately <u>Dislike</u>	Slightly <u>Dislike</u>	<u>Neutral</u>	Slightly <u>Like</u>	Moderately <u>Like</u>	Strongly <u>Like</u>
1. In general, how do you feel about bison?	1	2	3	4	5	6	7

Section C

The statements that follow concern potential outcomes or views concerning the reintroduction of the European bison. Please indicate the extent to which you "Agree" or "Disagree" with each statement. (*Please circle the number that best represents the response*).

	<u>Strongly</u> <u>Disagree</u>	<u>Moderately</u> <u>Disagree</u>	<u>Slightly</u> <u>Disagree</u>	<u>Neutral</u>	<u>Slightly</u> <u>Agree</u>	<u>Moderately</u> <u>Agree</u>	<u>Strongly</u> <u>Agree</u>
1. Reintroducing the European bison in the Rothaargebirge area would be an important contribution for the conservation of the European bison	1	2	3	4	5	6	7
2. Reintroducing the European bison would increase tourism in the region.	1	2	3	4	5	6	7
3. Reintroducing the European bison would help return the environment to a more natural state.	1	2	3	4	5	6	7
4. Reintroducing the European bison would result in much destruction of crops and farmland.	1	2	3	4	5	6	7
5. European bison will compete with roe deer and other game animals for food	1	2	3	4	5	6	7
6. Reintroducing the European bison will cause a decrease in hunting opportunities in the area.	1	2	3	4	5	6	7

	<u>Strongly Disagree</u>	<u>Moderately Disagree</u>	<u>Slightly Disagree</u>	<u>Neutral</u>	<u>Slightly Agree</u>	<u>Moderately Agree</u>	<u>Strongly Agree</u>
7. Reintroducing the European bison will result in much damage to trees in the area.	1	2	3	4	5	6	7
8. Reintroducing the European bison will result in bison-caused injuries to humans.	1	2	3	4	5	6	7
9. Though populations of European bison already exist in Eastern Europe, it is still beneficial to reintroduce them here.	1	2	3	4	5	6	7
10. The benefits of having a European bison population in the Rothaargebirge area will balance the monetary cost of the reintroduction.	1	2	3	4	5	6	7

Section D (a)

The following questions address whether you support or oppose the European bison reintroduction program. (For question one (1), *Please circle the response*. For question two (2) briefly outline the reason(s) for supporting or opposing bison reintroduction).

1. If you were given the opportunity to vote **for or against** reintroducing the European bison into the Rothaargebirge area, how would you vote?

For
Reintroduction

Against
Reintroduction

2. What is your primary reason for being in favor **or** being against bison reintroduction?

Section D (b)

(If the participant voted **for** reintroduction in section D (a) above please go to **Section E**. This aspect of Section D addresses participant's views concerning a compensation program that may accompany the reintroduction effort. However, complete this section **only** if the participant would vote **Against Reintroduction**).

Would you change your opinion and vote **For** the reintroduction under any circumstances?
(Please circle the response).

Yes

No

Comment: _____

Section E

How would you respond to the following statements? (Please circle the answer that best describes the opinion).

1. How many European bison do you believe exist in Europe today? _____
2. Do you think the population of European bison is...
 - a) increasing
 - b) decreasing
 - c) staying the same
3. The average adult European bison is...
 - a) smaller than an average cow
 - b) similar in size to an average cow
 - c) larger than an average cow
4. European bison will attack and sometimes kill other animals that are competing for the same food.

	Generally True	Not Sure	Generally False
--	----------------	----------	-----------------
5. In areas where European bison populations currently exist, bison-caused injuries to humans are common.

	Generally True	Not Sure	Generally False
--	----------------	----------	-----------------
6. European bison once lived in North Rhine-Westphalia.

	Generally True	Not Sure	Generally False
--	----------------	----------	-----------------
7. European bison are the same as the Plains bison, found in North America.

	Generally True	Not Sure	Generally False
--	----------------	----------	-----------------
8. Free living bison sometimes breed with cows.

	Generally True	Not Sure	Generally False
--	----------------	----------	-----------------

9. Diseases are commonly transmitted from bison to cows.

Generally True

Not Sure

Generally False

Section F

This section addresses how patterns of visitation to the Rothaargebirge area might change if free ranging bison were reintroduced.

1. How many times per month do you walk in or visit the forest of the Rothaargebirge?

_____ times per month.

2. Please respond to the following statement: "If free ranging bison were reintroduced into the Rothaargebirge forest, the number of times I visit the area per month would..." (*Please check (✓) the response*)

___ decrease significantly

___ decrease slightly

___ stay the same

___ increase slightly

___ increase significantly

Section G

This section concerns your attitude toward the potential European Bison reintroduction. (*Please circle the answer that best describes the response*).

1. With 1 being not at all important and 10 being extremely important please use the scale to identify how important the issue of reintroducing bison into the Rothaargebirge area is to you personally?

Not at all
important

1 2 3 4 5 6 7 8 9 10

Extremely
important

Strongly
Disagree

Moderately
Disagree

Slightly
Disagree

Neutral

Slightly
Agree

Moderately
Agree

Strongly
Agree

2. Please indicate your response to the following statement: "I would be afraid to walk in the forest if free ranging bison were present."

1

2

3

4

5

6

7

3. Have you ever seen a free ranging European bison? a) Yes b) No
4. I believe it is important that a hotline be made available to allow people to immediately report any bison-related problems. a) Yes b) No c) Not Sure

Section H

The following questions ask about where you have heard about the proposed reintroduction and where you usually get information regarding this issue.

1. How much information would you believe from each of the following sources regarding the proposed reintroduction? (*Please circle the appropriate number*).

	Believe <u>nothing</u> 1	Believe a <u>little</u> 2	Believe <u>half</u> 3	Believe <u>most</u> 4	Believe <u>all</u> 5
Taurus Naturenwicklung e.V.					
Private Foresters Association	1	2	3	4	5
Federal Nature Conservation Agency (BFN)	1	2	3	4	5
Local biodiversity and nature conservation org.	1	2	3	4	5
Farmers Association	1	2	3	4	5
Renkammer	1	2	3	4	5

2. Do you think the public should be involved more in decisions regarding the proposed reintroduction? *Please check (✓) the response.*

- ☐ Yes
☐ No
☐ Not sure

3. Please indicate the level of importance of the following features of decision-making processes.
(Please circle the number that best represents the response.)

	<u>Not at all Important</u>	<u>Moderately unimportant</u>	<u>Neutral</u>	<u>Moderately important</u>	<u>Very important</u>
Uses scientific information	1	2	3	4	5
Has genuine influence (public actually influence decisions)	1	2	3	4	5
Treats all citizens fairly	1	2	3	4	5
Promotes communication	1	2	3	4	5
Is long term (all the interest groups)	1	2	3	4	5
Weights input (puts some interests higher than others)	1	2	3	4	5
Is cost effective	1	2	3	4	5
Is representative of the entire region	1	2	3	4	5

4. Please indicate your preference for each of the following ways you could get involved in decision- making. Please circle the response.

	<u>Least preferred</u>	<u>Generally not preferred</u>	<u>Neutral</u>	<u>Moderately preferred</u>	<u>Most preferred</u>
Information materials (brochures, press releases, media, etc.)	1	2	3	4	5
Unsolicited comments (public letters)	1	2	3	4	5
Public meetings (more informative)	1	2	3	4	5
Task forces (a group of people representing various interests seeking a solution to a specific problem)	1	2	3	4	5
Questionnaires	1	2	3	4	5
Closed meetings with experts	1	2	3	4	5
Advisory groups (representing various interest groups throughout the course of the management effort)	1	2	3	4	5

Section I

For the analysis of the questionnaire, we require some basic information from you. This information will be kept confidential and analyzed as a group with no individual responses identified. ***Please circle your response.***

1. Are you? a) Male b) Female
2. How old are you? 18-24 25-34 35-44 45-54 55-64 65-74 75 or older
3. What degree do you have?
 - a) No degree
 - b) Primary school
 - c) Secondary school
 - d) High school
 - e) No professional training
 - f) Professional training finished
 - g) University degree
4. How long have you lived at this address? _____
5. Do you belong to any non-profit, volunteer, or community organizations? a) Yes b) No
If Yes please list the organization(s) below.

6. Are you a forester? a) Yes b) No
7. Are you a hunter? a) Yes b) No
8. Are you a farmer? a) Yes b) No
9. Are you an active nature conservationist? a) Yes b) No

If you would like to receive further information on the European bison and the potential reintroduction program please contact the bison office by telephone at 02751-9360110, or by email at wisent@wittgenstein-berleburg.net. Or you can visit our office at the Wittgenstein-Berleburg'sche Rentkammer.

Mailing Address:
Wisentbüro
Goetheplatz 8
57319 Bad Berleburg

Thank you for participating in our study

Appendix C
Self-Administered Questionnaire Cover Letter

Proposed Reintroduction of the European Bison (*Bison bonasus*)

Dear Resident:

The purpose of this survey is to gather information about your attitudes, knowledge levels, and opinions concerning a proposed reintroduction of the European bison in the Rothaargebirge area. Your opinions are very important to this study, as those people living in those towns bordering the proposed reintroduction area will be most affected by the proposed reintroduction.

This questionnaire is part of the second phase of a research study being carried out by the Taurus organization and the University of Siegen in cooperation with Professor Alistair Bath and Stephen Decker from Memorial University of Newfoundland in Canada. The results of the study will help managers make decisions regarding the future of the proposed bison reintroduction. Your responses will provide valuable information to these managers.

No final decision has been made regarding the proposed reintroduction, so it is important that you voice your opinions whether strongly against, neutral, or strongly in favor of the project. It is important to understand all the views before any decisions are made regarding the possible reintroduction.

You have been randomly selected to give your opinions on this issue. If you were asked to complete a questionnaire during phase one of the study, please complete this questionnaire as well. However, we request that only people 18 years of age and older take part in this aspect of the study as questionnaire response will influence important decisions regarding the future of the proposed reintroduction project. There are no right or wrong answers to the questions. I encourage you to answer all the questions and to please return the questionnaire in the postage paid envelope provided within the next day or two. Your answers will be grouped together with others, and individual responses will be kept strictly confidential.

Thank you in advance for your help. If you have any questions about the study or the validity of the questionnaire please feel free to contact Mr. Uwe Lindner at 02751-9360110.

Sincerely,

Stephen Decker
MA Candidate
Department of Geography
Memorial University
St. John's, NL
Canada

Dipl.-Soz. Raimund Klauser
Institut für Medienforschung
Universität Siegen
57068 Siegen

Edgar Reisinger
1. Vorsitzender von
Taurus Naturentwicklung e.V.
Lindenhöhe 16
07749 Jena

Appendix D

Interview Questionnaire Cover Letter

Proposed Reintroduction of the European Bison (*Bison bonasus*)

Dear Resident:

The purpose of this survey is to gather information about your attitudes, knowledge levels, and opinions concerning a proposed reintroduction of the European bison in the Rothaargebirge area. Your opinions are very important to this study, as those people living in those towns bordering the proposed reintroduction area will be most affected by the proposed reintroduction.

This questionnaire is part of the second phase of a research study being carried out by the Taurus organization and the University of Siegen in cooperation with Professor Alistair Bath and Stephen Decker from Memorial University of Newfoundland in Canada. The results of the study will help managers make decisions regarding the future of the proposed bison reintroduction. Your responses will provide valuable information to these managers.

No final decision has been made regarding the proposed reintroduction, so it is important that you voice your opinions whether strongly against, neutral, or strongly in favor of the project. It is important to understand all the views before any decisions are made regarding the possible reintroduction.

You have been randomly selected to give your opinions on this issue. If you were asked to complete a questionnaire during phase one of the study, please take part in this phase as well. However, we request that only people 18 years of age and older take part in this aspect of the study as questionnaire response will influence important decisions regarding the future of the proposed reintroduction project. There are no right or wrong answers to the questions. Your answers will be grouped together with others, and individual responses will be kept strictly confidential. You are free to end the interview at anytime and can skip questions if you wish.

Thank you in advance for your help. If you have any questions about the study or the validity of the questionnaire please feel free to contact Mr. Uwe Lindner at 02751-9360110.

Sincerely,

Stephen Decker
MA Candidate
Department of Geography
Memorial University
St. John's, NL
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