

Local residents' place attachment and the perceived benefits for them of the UNESCO Wienerwald Biosphere Reserve

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Abstract

Understanding local residents' perceptions of changes triggered by the creation of a biosphere reserve (BR) is important for a reserve's successful management. This study asked 383 local residents of the Wienerwald BR, Austria, about their perceptions of changes, at individual and regional levels, nine years after the creation of the BR, and correlated these perceptions with place attachment. The vast majority of respondents perceived either no changes or positive ones in the region and for themselves. They saw the most positive impact of the BR as being the preservation of threatened landscape types and cultural landscapes. Study results revealed that local residents with stronger emotional, functional and social ties to the region perceived more positive impacts of the BR. The BR management could make use of the positive relationship between place attachment and perceptions of change, as high place attachment can be beneficial for the preservation of natural and cultural landscapes, and can contribute to greater involvement in participation processes by, and quality of life of, the local population.

Profile

Protected area

Wienerwald Biosphere

Reserve

Mountain range

Alps

Country

Austria

Introduction

Understanding park-people relationships has become important for the successful management of protected areas such as national parks or biosphere reserves (BR) (Arnberger & Schoissengeier 2012; Huber & Arnberger 2016; Job 1996; Lindern et al. 2020; Morgan & Messenger 2009; Ruschkowski 2010; Ruschkowski & Nienaber 2016; Stoll 1999). Knowledge of the impacts and changes perceived by the local population due to the implementation of a protected area is essential for management (Arnberger & Schoissengeier 2012; Pokorny 2013). Managers need to know whether the protected area they are working for has any impact on the region and what changes it has triggered. They need such information for developing communication strategies addressing the local population, but also for visitor management, marketing, and regional and local economic activities. In addition, management needs to know whether place attachment, defined as the intensity of the human-place bond, plays a role in these perceptions (Proshansky 1978; Williams et al. 1992). Research has found that place attachment is related to attitudes towards protected areas and management measures, and has positive effects on quality of life and civic engagement. Thus, place attachment is important for understanding the human dimensions of natural resource management (Williams et al. 1992).

Place attachment

Place attachment and a sense of place (which are similar) are widely and increasingly used concepts in the context of natural resource and protected area

management (Jorgensen & Stedman 2001; Williams et al. 1992). A setting, such as a region, community, neighbourhood or protected area, can become a unique place when it is endowed with meanings through lived experiences (Tuan 1977). Place formation is an experiential and interactive process involving physical and social dimensions (Lin & Lockwood 2014), and place attachment provides a number of psychological benefits. It is positively associated with quality of life, life satisfaction and wellbeing (Scannell & Gifford 2017). High place attachment can keep residents in the community (Comstock et al. 2010), and can encourage their social and political involvement in the preservation of the physical and social features of their community or neighbourhood, such as public green spaces or protected areas (Comstock et al. 2010; Lewicka 2005; Schmied, 1985); it is positively related to regional identity (Job 1996).

Place attachment has been conceptualized in several ways, and many studies have confirmed the multi-dimensional nature of place attachment (Kyle et al. 2004a,b,c; Williams et al. 1992; Williams & Vaske 2003). Its dimensions can be described as emotional, symbolic and functional; place attachment can also have a social dimension (Halpenny 2010; Kyle et al. 2004c; Williams et al. 1992; Wynveen et al. 2020). To measure the intensity of the dimensions of the human-place bonds, many researchers have relied on the approach suggested by Williams and Roggenbuck (1989), who developed a two-dimensional measure of place attachment: a cognitive component (place identity), and a functional component (place dependence). Place identity, a substructure of self-identity, refers to the connections people have between a place and their

personal identity in relation to it (Proshansky 1978; Proshansky et al. 1983). Individuals use places such as protected areas to affirm their identity and express it to others (Twigger-Ross & Uzzell 1996). Place dependence has been operationalized as the individual's assessment of the functional utility of the particular setting, compared to other places, in providing for goal achievement (Jorgensen & Stedman 2001; Williams et al. (1992). Kyle et al. (2004a,c) used a third component – social bonding: strong social ties are created among friends and family members who live in the same geographic locale.

Place attachment and protected areas

Previous research on place attachment in protected areas has explored relationships between place attachment and recreation behaviours. These include: visitor conflicts and perceptions of crowding (Eder & Arnberger 2012; Budruk et al. 2008; Hammitt et al. 2004; Kyle et al. 2004a,b; White et al. 2008); pro-environmental behaviour and environmental concern (Halpenny 2010; Larson & Lach 2018; Ramkissoon & Mavondo 2017; Wynveen et al. 2013); acceptance of protected areas (Huber & Arnberger 2016), and support for management actions (Warzecha & Lime 2001). However, findings were mixed regarding the influence of place attachment on these topics. Many researchers have suggested that natural features which allow people to relax and escape from their daily routine contribute to attachment (Kyle et al. 2004c). Arnberger and Eder (2012a), for example, showed in their study on local residents of the Viennese part of the Danube Floodplains National Park, Austria, that the perceived sum of green spaces and their qualities, as well as visits to recreation areas correlated positively with place attachment. Earlier research assumed higher place attachment to more remote natural areas. However, Wynveen et al. (2020) recently showed that attachment to an urban national park or a small urban heritage site can be even higher than attachment to remote natural or protected areas.

Research on the link between place attachment and protected areas showed that people with higher place attachment were more supportive of protected areas and management measures (Toscan 2007). Lin and Lockwood (2014) found indications that living and working in close proximity to the Tasman National Park, Australia, increased attachment. However, Huber and Arnberger (2016) showed that local residents with high place attachment counted both opponents and supporters of a planned BR in Austria. The authors assumed that supporters who had a sense of attachment might perceive the BR as beneficial to the region, while the opponents who felt attached to the place might work against the BR to defend the area's traditions and economic activities. Bonaiuto et al. (2002) observed high place attachment among opponents of two Italian national parks. Several authors assumed that local residents with high place attach-

ment would be against new developments imposed by outside experts in a top-down approach (Bonaiuto et al. 2002; Stoll 1999). Other authors (Chapin & Knapp 2015; Manzo & Perkins 2006) suggest that residents' high place attachment influences their willingness to act for the benefit of the places: however, their actions may not always be in line with the management goals of a protected area because of their own limited knowledge of social-ecological complexities.

So far, place attachment research has provided somewhat contradictory results regarding the influence of place attachment on the perception of protected areas and natural conditions. The influence of the separate dimensions of place attachment remains unclear, even though place attachment is supposed to explain local residents' readiness to act, and to support pro-environmental behaviour (Huber & Arnberger 2016; Larson & Lach 2018; Lewicka 2005; Schmied 1985; Manzo & Perkins 2006). In addition, little is known of how residents' place attachment correlates with perceptions of regional and personal changes several years after the designation of a BR in an urban / suburban context.

Study aims

This study responds to the frequent call to better incorporate attachment to place into the management of protected areas (Kaltenborn & Williams 2002; Morgan & Messenger 2009; Stewart et al. 2013; Wynveen et al. 2020). The specific objective was to investigate whether local residents of the Wienerwald Biosphere Reserve (WBR), Austria, perceived any changes triggered by the WBR nine years after its implementation. The following research questions guided this study:

RQ1: Have local residents perceived positive or negative changes at individual and regional levels due to the implementation of the WBR?

RQ2: How strong are the cognitive, functional and social ties of local residents to the WBR?

RQ3: Are the perceptions of individual and regional change influenced by dimensions of place attachment?

The WBR is a useful study area because it has an important recreational function for residents; for many, it is part of their immediate neighbourhood and thus potentially influences place bonding. In addition, the existence of an earlier study (Gastinger 2006) on awareness of the Lower Austrian part of the WBR provides the opportunity to explore whether the level of awareness has changed.

Methodology

Study area

In 2005, the Wienerwald was declared a UNESCO BR. The 105 645 ha of the WBR protect one of the largest continuous areas of deciduous forests in Central Europe and harbour a great variety of natural landscape types and cultural features (Köck & Brenner

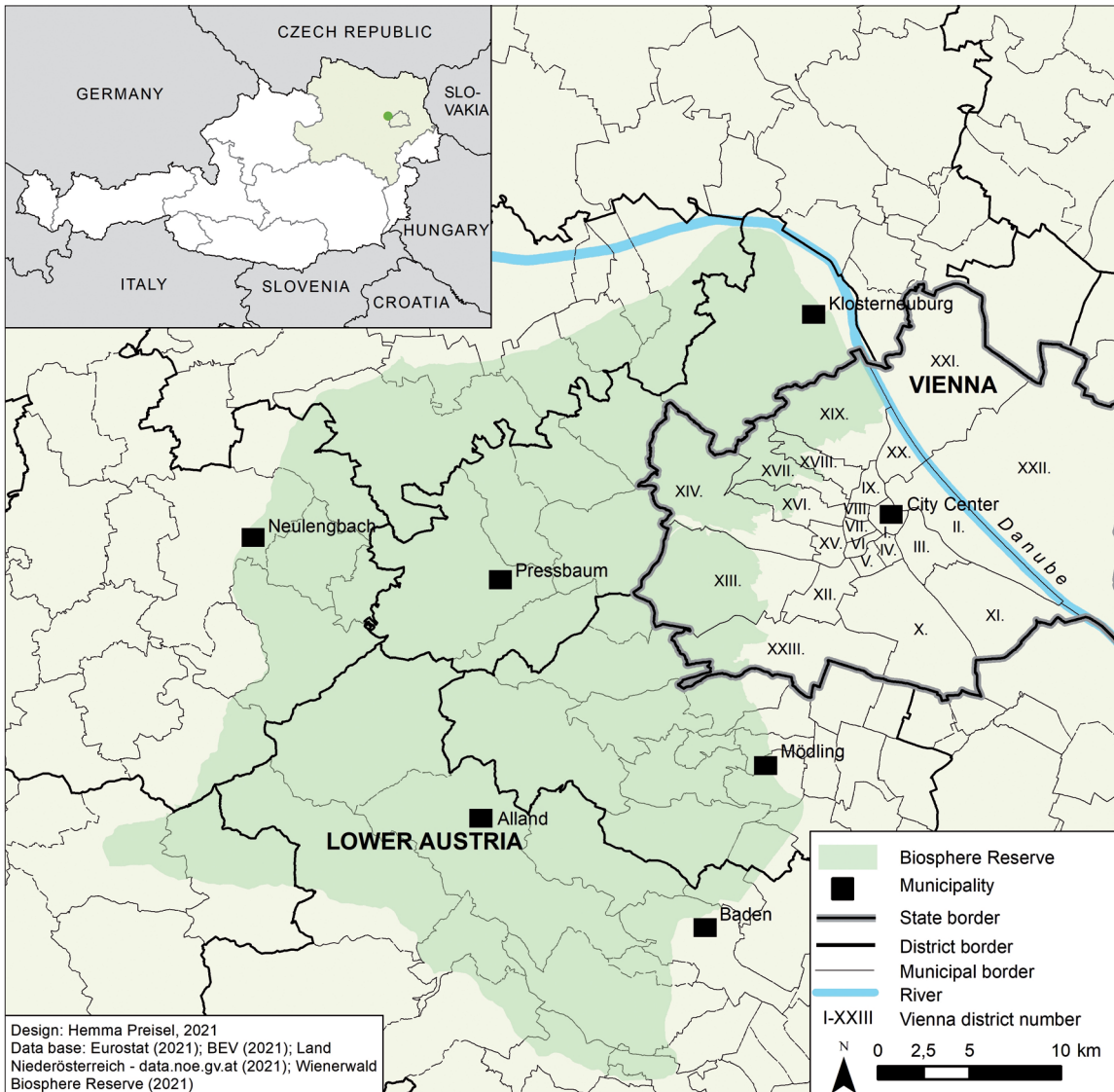


Figure 1 – Location of the Wienerwald Biosphere Reserve.

2015). Wooded hills, dominated by beech forests, alternate with extensive meadows, pastures, fruit orchards, vineyards and dry grasslands. Four nature parks and the Viennese Lainzer *Tiergarten*, an extensive historic game park, are among the 15 nature preserves in this region (Biosphärenpark Wienerwald n.d.).

The WBR extends across 51 communities in Lower Austria and seven municipal districts in Vienna, the capital of Austria, which has close to 1.9 million inhabitants (Figure 1). In total, about 815000 people live in communities or city districts within or partly within the WBR. About 60% of the communities in Lower Austria have fewer than 5000 inhabitants. The proximity of the metropolitan area results in high recreation-use pressure on the area, particularly close to Vienna (Arnberger & Eder 2012b; Köck & Brenner 2015).

Data sampling

Data were collected from March to December 2014 using three approaches. At the request of the WBR management, and instead of the planned postal sur-

vey, so-called *BR Ambassadors* were asked to distribute questionnaires among local residents, aged 18 years or above, with one ambassador nominated for each community or Vienna district within or partly within the WBR. However, this approach resulted in just 121 questionnaires being returned. In addition, questionnaires were distributed at WBR events, resulting in a further 160 returns. Finally, a snowball system initiated by the research team generated an additional 368 completed questionnaires. Respondents could return the completed questionnaires using either a pre-paid envelope or the collection boxes located at WBR events. Our approach, however, did not allow us to determine a response rate, which is a limitation of the study. Analysis of age, gender and education level showed that age and gender were in line with population data generally (Stadt Wien 2017; Statistik Austria 2020), while more people with higher education filled in the questionnaire. Because of the sampling process, it is possible that residents who are more knowledgeable about the BR were over-represented.

In total, 649 questionnaires were returned; the maximum sampling error (margin of error) was calculated as <5% for a 95% confidence level. About 68.1% ($N=442$) of the respondents who were local residents were aware of the WBR, with greater awareness among those from Lower Austria (77.3%) than among those from Vienna (55.0%). Of the 442 local residents, 59 did not fully complete the questions about place attachment and perceived changes since the establishment of the WBR, resulting in a final sample size of 383.

Questionnaire

The survey included questions about socio-demographic characteristics, such as age, gender, education level, and length of residence in the region. It also included a question on knowledge of the WBR using an answer scale from 1 = very high knowledge to 5 = very low knowledge. Three dimensions were used to determine localized place attachment, with questions relating to place identity (PI), place dependence (PD) and social bonding (SB). The items relied on scales developed by Williams and colleagues (e.g., Williams & Roggenbuck 1989; Williams et al. 1992; Williams & Vaske 2003; Kyle et al. 2004a,c). These scales are frequently used in outdoor recreation (Budruk et al. 2008; Eder & Arnberger 2012; White et al. 2008; Wynveen et al. 2018, 2020), community attachment (Arnberger & Eder 2012a), and regional attachment research (Huber & Arnberger 2016). Five items measured PI, two measured PD, and three measured SB. All items were measured on a five-point agreement scale (i.e., 1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree). We used only two items for PD, which might be seen as a limitation of the study. However, a reliability test resulted in a useful Cronbach's alpha of greater than .60 (Cortina 1993).

Questions relating to the perceived personal impacts and impacts on the region due to the WBR used a 9-pt. scale, ranging from -5 = negative change, to +5 = positive change, with 0 in the middle indicating no perceived change. Follow-up open questions

asked what positive or negative changes respondents perceived on regional and personal levels. Fourteen items asked in detail about the perceived impacts on the region of creating the WBR. These used a 5-pt. answer scale, ranging from 1 = totally agree, to 5 = totally disagree.

Data analyses

A paired-samples t-test was conducted to test for differences between perceived individual and regional changes. Cronbach's alpha assessed internal consistency in the PI, PD and SB dimensions. Pearson correlations were used to calculate the relationships between the place attachment dimensions on the one hand, and perceived personal and regional changes and impacts due to the WBR on the other. A significance level of $p < .05$ was chosen.

Results

Sample profile

The majority of the respondents were females (53.6%); the mean age was 50.0 years (18–93 yrs.). The mean number of years of residency in the region was 32.6, with 41.7% having lived in the region since birth. About 46.4% had a university degree, 31.6% had a diploma from secondary school qualifying for university admission, and 22.0% had other school leaving exams. About a quarter (27.1%) reported having very high or high knowledge of the WBR, while 27.1% reported a very low or low level of knowledge.

Place attachment

All respondents showed high PI to the Wienerwald Region (Table 1). They enjoyed living in there, and agreed that the Wienerwald had a special meaning and was something special to them. Most of them felt connected to the Wienerwald and would recommend the Wienerwald to their acquaintances as a place to live. Agreement on the PD items was lower than for the PI items, in particular for the statement *“With regard to quality of life, no other region can be compared with the*

Table 1 – Mean values of place attachment items and dimensions, and Cronbach's alpha per dimension ($N = 383$); answer scale: 1 = strongly agree, 5 = strongly disagree

Items	Mean	Cronbach's alpha
Place Identity	1.69	0.809
I enjoy living in the Wienerwald	1.24	
I feel intensely connected to the Wienerwald	1.73	
The Wienerwald is something special to me	1.78	
I would recommend the Wienerwald to my acquaintances as a place to live	1.83	
I would find it a great pity if I had to move away	1.92	
Place Dependence	3.02	0.735
I wouldn't live in any other place than the one where I am currently living	2.80	
With regard to quality of life, no other region can be compared with the Wienerwald	3.28	
Social Bonding	3.04	0.679
If I moved away from the Wienerwald, I would lose a lot of acquaintances	2.78	
My whole family lives in the Wienerwald	2.86	
All my friends live in the Wienerwald	3.48	

Wienerwald". Highest agreement of the SB items was found for the item "If I moved away from the Wienerwald, I would lose a lot of acquaintances", while more respondents disagreed with the statement "All my friends live in the Wienerwald".

An attachment index was developed by aggregating the individual item scores for each dimension; low values indicated high place attachment. The three place attachment dimensions had an acceptable Cronbach's alpha statistic (Cronbach's $\alpha > .679$) for all dimensions (Table 1). PI correlated positively with PD ($r = .628, p < .001$) and SB ($r = 0.322, p < 0.01$), and PD correlated positively with SB ($r = .481, p < .001$). The longer respondents had resided in the Wienerwald Region, the higher their place attachment (PI $r = -.191, p < .001$; PD $r = -.321, p < .001$; SB $r = -.466, p < .001$). There was no difference in place attachment for respondents residing in Lower Austria or Vienna, except for a higher SB in Lower Austria ($t = 4.692, p < .001$).

Perceived personal and regional changes due to the WBR

Many respondents perceived positive changes for the region triggered by the implementation of the WBR (Figure 2). About two thirds (66.1%) perceived no changes on a personal level, but about 30% reported positive changes. Very few respondents reported negative changes at the regional ($N = 3$) and the personal levels ($N = 11$). The personal changes ($M = .77$) were perceived as less positive than those for the region ($M = 1.87; t = 14.009, p < .001$). The higher the knowledge about the WBR was, the more positive the personal ($r = -.196, p < .001$) and regional changes ($r = -.306, p < .001$) were perceived to be.

When asked what specifically had changed (open question), respondents mostly mentioned increased awareness of the local protection of nature and species, sustainable development of the region, and an increase in educational and recreational offers. Very few mentioned negatively perceived changes, which

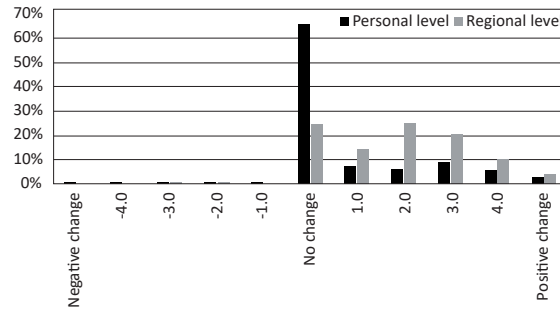


Figure 2 – Perceived changes on a personal and a regional level triggered by the implementation of the WBR ($N = 383$); Answer scale: $-5 =$ negative perception of change, to $+5 =$ positive perception of change, with 0 indicating no change perceived.

included regulations governing land use of the BR, increased numbers of visitors, intensive forestry, and increased urban sprawl.

Perceived regional impacts due to the WBR

The most positive perceived impacts of the WBR were the preservation of threatened landscape types and of traditional cultural landscapes (Table 2). Most respondents agreed that traditional economic land use management was now of greater importance locally; new opportunities and chances for the marketing of regional agriculture and its products had emerged; quality of life and recreational possibilities had increased in the Wienerwald Region. Agreement was lower for statements concerning more jobs being provided in the region, the regional economy being revived, the WBR not having changed anything in the region, and few people having profited from the WBR.

Relationships between place attachment and perceived regional and individual changes

Significant but mostly weak correlations between the place attachment dimensions and perceived personal and regional changes due to the WBR were

Table 2 – Perceived impacts on the region due to the WBR ($N = 383$); answer scale: 1=strongly agree, 5=strongly disagree

Due to the implementation of the WBR...	Mean	Place Identity	Place Dependence	Social Bonding
... threatened landscape types in the region have been preserved.	2.09	n.s.	n.s.	n.s.
... a substantial contribution for the preservation of traditional cultural landscapes has been achieved.	2.16	0.224***	0.159**	n.s.
... traditional economic land use management was reassigned a higher local value.	2.43	0.116*	0.149**	n.s.
... new opportunities for regional agriculture and the marketing of its products emerged.	2.48	0.172***	0.139**	n.s.
... the recreational quality in the region has increased.	2.50	0.274***	0.252***	0.109*
... quality of life in the region has increased.	2.61	0.287***	0.240***	n.s.
... the Wienerwald region now stands out more distinctly from the surrounding regions.	2.69	0.173***	0.256***	0.130*
... new ideas have been implemented more easily.	2.78	0.176***	0.185***	n.s.
... there are more restrictions because of nature conservation.	2.90	n.s.	n.s.	0.102*
... tourism has been impacted positively.	2.95	0.109*	0.199***	0.105*
... more jobs have been created in the region.	3.08	0.174***	0.230***	n.s.
... the regional economy has been revived.	3.15	0.146**	0.246***	n.s.
... nothing has changed in the region.	3.28	-0.113*	n.s.	n.s.
... few people have profited from the WBR.	3.31	-0.127*	n.s.	n.s.

Significance levels: *** $p < .001$; ** $p < .01$; * $p < .05$; n.s. = not significant

Table 3 – Correlations between place attachment dimensions and the perceived personal and regional benefits of the WBR.

Place attachment dimensions	Personal changes	Regional changes
Place Identity	−0.198 ^{***}	−0.261 ^{***}
Place Dependence	−0.129 [*]	−0.164 ^{**}
Social Bonding	−0.150 ^{**}	−0.62

Significance levels: *** $p < .001$; ** $p < .01$; * $p < .05$

found (Table 3). The higher the PI and PD, the more positive the perceived personal and regional changes. SB was related not to perceived regional changes but to personal changes. The higher the SB, the higher the perception of positive personal changes. PI showed stronger correlations with perceived personal and regional changes than the other dimensions.

Relationships between place attachment and regional impacts

Many significant weak or moderate correlations were found between the place attachment dimensions and perceived impacts of the WBR (Table 2). For both PI and PD, the highest positive correlations were with quality of life and of recreational possibilities. PD, and to a lesser extent PI, correlated positively with impacts on tourism, jobs and the regional economy. SB showed that social ties were often not correlated with perceptions of regional impact. The higher the SB, the higher the recreational quality was perceived by residents, and the more they felt that tourism was positively impacted and that the Wienerwald Region stood out more distinctly from the surrounding regions. However, they perceived more restrictions due to nature conservation.

Discussion

Changes in awareness of the WBR and perceived changes

Results indicate that awareness of the WBR among the local population has increased significantly since the study conducted by Gastinger (2006) shortly after the designation of the WBR, a study which relied on telephone interviews. In Gastinger's study, about one third of local residents in Lower Austria reported being aware of the WBR. However, comparability with the present study is limited because of the different data collection approaches used. In the context of Germany, Pokorny (2013) also found an increase in awareness of BRs as a category over the 19 years since the creation of the Rhön BR in 1991.

Many respondents who were aware of the BR status reported positive changes in the region and for themselves triggered by the implementation of the WBR about nine years previously. Residents perceived far more benefits than drawbacks. This result is in line with other studies which found that residents are more likely to report positive benefits of a pro-

tected area (Arnberger & Schoissengeier 2012; Huber & Arnberger 2016; Job 1996; Lindern et al. 2020; Pokorny 2013; Ruschkowski 2010). For the study's participants, the WBR has achieved most in the preservation of the typical Wienerwald landscape and in promoting traditional land uses. Previous studies on residents of, and tourists to, protected areas often give the protection of nature as these areas' highest achievements (Kaltenborn & Williams 2002). Others have shown that modifications of familiar landscapes caused by bark beetle outbreaks, infrastructure projects, or changes in traditional land use practices due to nature conservation regulations have a significant influence on attitudes towards protected areas (Arnberger & Schoissengeier 2012; Ruschkowski & Niener 2016; Stoll 1999). WBR respondents felt that the BR benefited the region more than themselves, and the local population as a whole rather than local individuals. This indicates a fairly positive impression of the WBR for most of its residents, and that the WBR preserves their environment and increases their quality of life.

Place attachment and perceived changes

Results revealed that local residents showed a high PI towards the region, indicating that connections between their personal identity and the Wienerwald Region are strong. All three dimensions of place attachment correlated highly with each other, showing that social, functional and cognitive ties are all important for forming human-place bonds. The longer respondents had lived in the region, the stronger their ties were. This is in line with earlier findings that place attachment increases through lived experiences (Arnberger & Eder 2012a; Lewicka 2005). Compared to many studies on visitors in urban and rural protected areas, the mean PI was very high (Arnberger & Eder 2012a; Halpenny 2010; Kainzinger et al. 2018; Warzecha & Lime 2001; Wynveen et al. 2018, 2020). Huber and Arnberger (2016), however, reported higher place attachment in all three dimensions for local residents to the Salzburger part of the Salzburger Lungau and Kärntner Nockberge BR. It seems that local residents usually report a stronger PI to their own protected area than do visitors to protected areas, confirmed by the study of Kaltenborn and Williams (2002) among tourists to, and residents of, a Norwegian national park. However, this pattern is not always consistent (White et al. 2008).

PD and SB were lower in our study, a finding similar to ones reported by others (Eder & Arnberger 2012; Halpenny 2010; Huber & Arnberger 2016; Kyle et al. 2004a; Warzecha & Lime 2001; White et al. 2008). As the functional and social ties to the Wienerwald were not as strong as identity, many residents may consider other places to be potential sites for goal achievement, and they seem to have friends and family members outside the region. This is not surprising for people living in the metropolitan area of Vienna.

Several studies have found that rural residents reported lower place attachment than residents of more urban environments (Arnberger & Eder 2012a; Kim & Kaplan 2004), while the present study found that only the SB dimension differed between the Lower Austrian and Viennese samples. This may be because residents of smaller towns and suburban areas were included in the Lower Austrian sample. In addition, previous studies looked at community or neighbourhood attachment in different environments; they did not refer to contexts like the Wienerwald where urban and rural residents share the same environment. The reported higher SB in Lower Austria indicates that social ties may be stronger in more rural environments.

The study revealed that local residents with stronger emotional and functional ties to the region perceived more positive impacts of the WBR. However, the dimensions did not correlate uniformly in relation to perceived changes: in particular, social bonding was often not related to perceived changes. Previous research has found a positive relationship between place attachment and perceived changes due to the implementation of a protected area (Toscan 2007). However, several researchers have reported that local residents with high place attachment can be opponents of protected areas (Bonaiuto et al. 2002; Huber & Arnberger 2016; Stoll 1999).

PD was positively related to economic effects, which underlines the functional ties of place attachment and the importance of a region for jobs, the regional economy and tourism (Kaltenborn & Williams 2002). However, the mean values of the dimension were not very high, indicating that the Wienerwald cannot satisfy the economic needs of all residents. The high number of commuters from Lower Austria to Vienna may be an indication of this. SB was related not to regional benefits but to personal benefits, underlining the social component of the dimension. Overall, place attachment was weakly related to nature conservation issues. In addition, the higher the SB, the more restrictions resulting from nature-conservation regulations were perceived. Those who have strong social ties in the region and who have lived there for a long time seem to be less convinced about the regional benefits of the WBR.

Conclusions

This study found that local residents perceived no change or positive changes due to the implementation of the WBR. There seems to be local support for the management of the WBR, because many respondents perceived the WBR as beneficial for the region and quality of life (Lindern et al. 2020; Scannel & Gifford 2017; Stoll 1999). As level of knowledge about the WBR correlated positively with perceived benefits, further awareness-raising and education about the WBR, in particular in the urban area, might further increase the acceptance of the WBR. Place attachment

dimensions and perceived changes and impacts correlated with each other: the stronger the place attachment, the more positive changes were perceived by local residents who were familiar with the BR status. As strong place attachment can increase pro-environmental behaviour, readiness to act for the region, and support for management actions, the BR management could make use of this finding.

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