Supplementary Material to

What takes priority in German national parks? Managers' balancing act between nature conservation, administration and public participation

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Appendix S1 National Parks in Germany – history and EUROPARC evaluation

Unlike North America, East Africa, and Australia, Europe had lost most of its pristine nature as early as the 19th century, after extensive human use of its landscapes over millennia (Akama 1996). Nevertheless, faced with the progressive degradation of nature through industrialization and incited by the romantic notion of undisturbed areas of wilderness as proclaimed in the American national parks, an interconnected European conservation movement spread the concept of national parks throughout Europe at the end of the 19th century, which led to the designation of several European national parks (Ritchie 2011).

In Germany, the first national park was designated in 1970 with a high priority on nature conservation and guided by the concept of "let nature take its own course". Given Germany's high population density (230 humans/km²) and long history of land use, its national parks were inevitably placed in areas where ecosystem properties had been changed considerably relative to natural conditions. These areas and their surroundings have been used for centuries by local residents for e.g., hunting, fishing, and recreational activities. The restrictions that usually accompany the designation of conservation areas were pushed aside from the top down, often against local residents' traditions and personal liberties, which resulted in strong and lasting opposition to protected areas (Stoll-Kleemann 2001). This problem has been acknowledged in the past by managers and politicians, which contributed to a shift from a largely conservation-oriented management to a management with public participation. The current implementation is considered further below.

Nature conservation has high political priority in Germany, in line with the statutory provisions on nature protection according to international conventions, European Union, federal law, and commitments to several non-government nature conservation organizations, such as the International Union for Conservation of Nature (IUCN) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). The most common political response to the loss of biodiversity is the designation of new protected areas (McKinney 2002). The German Federal Nature Conservation Act (Bundesnaturschutzgesetz, BNSchG, §24 Abs 2) requires national parks not only to

protect natural processes but also to enable scientific research, education, and public encounters of nature, as long as these do not affect the protection of nature.

Between 2009 and 2012, the management efficiency of the 14 national parks at that time were evaluated by EUROPARC Germany (the German section of the umbrella NGO of Europe's protected areas, the EUROPARC Federation; Hoffmann & Wied 2013). Of the 16 national parks in Germany today, 12 are completely terrestrial and one is partially terrestrial. As only 2 of these parks were designated before 1990 (Table 1), almost all are still in the development state and have not yet reached the 75% rule of the IUCN recommendations, which state that the primary objectives of the parks should apply to at least 75% of the area (Stolton et al. 2013). In 2013, the non-intervention zone compromised an average of 56% of the area of a national park (SD = 23.6%, min = 17%, max = 90%), which is in compliance with the BNSchG, which requires an area of >50%. The area of the non-intervention zone within the parks ranges from 21.7 km² (21%, Unteres Odertal) to 196.4 km² (61%, Müritz). These areas of all national parks throughout Germany together cover a protected area of 985.18 km², which occupies 0.28% of the area of Germany. National parks follow international requirements (EU Habitats Directive, EU Birds Directive, and IUCN Guidelines), national law (BNSchG), federal state laws, additional regulations, national park acts, and internal park regulations adopted by the government of the respective federal state. Owing to the federal system in Germany, the organization and objectives of the parks in Germany differ between the states. Only a few national park administrations possess all required authority to operate independently; many park decisions are subject to approval by private land owners (regarding their property) and other authorities, e.g., conservation, forestry, and hunting authorities. This often leads to a high organizational burden and delays in implementation. In many cases, the national park is not completely publicly owned but is also privately owned, which is often a source of conflicts. The proportion of privately owned land ranges from 0% (Bayerischer Wald) to 48% (Unteres Odertal), with an average of 7.8% (SD 14%).

The EUROPARC evaluation reported a general lack of qualified personnel in many national parks. This is likely caused by the differences in financing among the parks, which is fully provided by the responsible state. Half of the national parks receive sufficient funds, but the other half are underfunded and not entitled to autonomously allocate the money to projects. The rangers responsible for interactions with visitors and monitoring of compliance with protection regulations are usually well trained, which provides an ideal foundation for high-quality education. However, their efforts are thwarted by their often low

numbers, which does not allow them to appropriately provide services and monitoring throughout the park.

EUROPARC's assessment (Hoffmann & Wied 2013) found that the acceptance of each national park by residents has increased since the designation of the parks. Opposition is limited to single persons, associations, or companies. This positive development was attributed to the intense and well-organized cooperation network with local stakeholders. However, the focus on the maintenance of relationships to the various stakeholders takes up considerable time and human resources at a time of progressive understaffing and reduced funding. According to the assessment, environmental and nature conservation organizations feature very little in some parks, but in others they play a crucial role. However, cooperation with the tourism sector needs to be improved by emphasizing conservation more strongly. Even though public relation activities have a high priority for all national parks, half of them fail to communicate their unique characteristics as a conservation area and do not stress clear messages, such as "Let nature take its course" (Hoffmann & Wied 2013). By contrast, the media covered the results of economic impact studies of national parks that were conducted between 2003 and 2010 (Job et al. 2005, Woltering 2012).

A great variety of free educational activities are provided in almost all national parks. However, evaluations of the programs are rare, and programs are not always multilingual and barrier free. Tourist facilities are usually outside the non-intervention zones, which leads to a concentration of visitors at specific locations ("honey pots").

Scientific research is carried out in all national parks, albeit at very different intensities and qualities. However, the difficult financial and personnel situation does not encourage intensification of scientific studies. In most parks, cooperation with research institutes and universities still rarely lead to publications in international scientific journals.

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