



Black Forest National Park – Managing conflicting goals for protected areas

C31

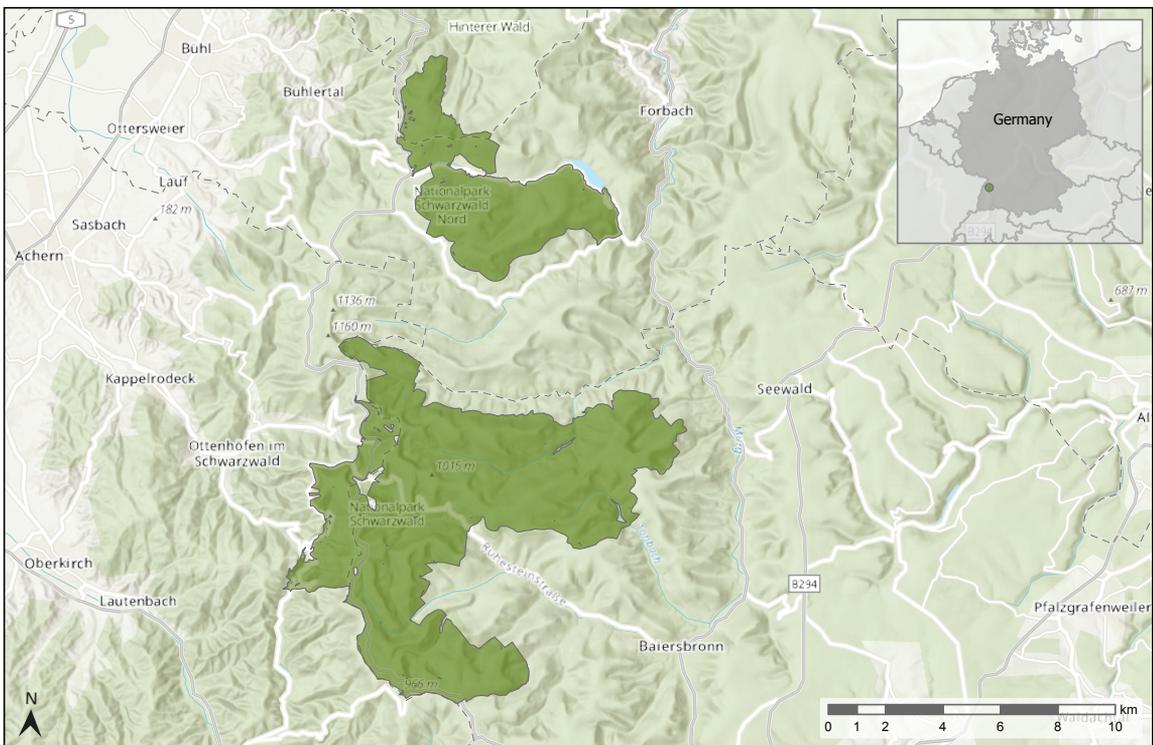
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Background: Rational behind National Parks

In Germany national parks are designated under the environmental law (Bundesnaturschutzgesetz, BNatSchG; Federal Nature Protection Act). Accord-

ing to BNatSchG §24(1) each of the national parks must be large in area, contiguous, and of a special character. A condition for the designation is that they are either completely uninfluenced or only slightly influenced by humans, so as to be able to develop solely as a result of natural processes



< Fig. C31.1. The Eurasian pygmy owl (*Glaucidium passerinum*) is the smallest owl species in Europe, it is typically found in conifer rich, montane forests and it is a mascot of the Black Forest National Park and called 'Karli Kauz' (Photo: Arne Kolb).

Statement

“Together with the people of the region and all who value nature, the park administration aims to make a valued nature conservation project as well as place for education and recreation.”

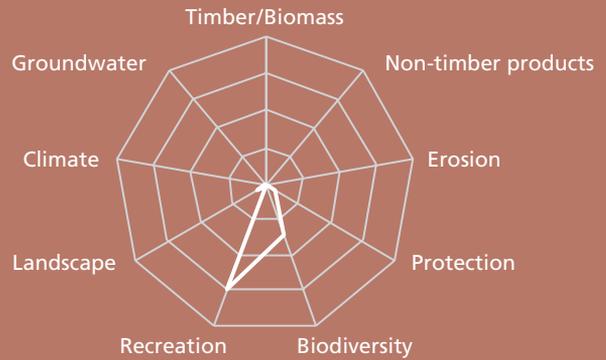


Table C31.1. Basic information about the Black Forest National Park.

Total park area	10 062 ha
Management	No management for resource extraction, except for species and habitat conservation, visitor safety and to protect neighbours – see the description of the zoning concept in the next section.
Total timber volume	281 m ³ /ha in the southern part (Ruhestein)
Annual growth	Not relevant
Annual cutting rate	3500 m ³ /yr, until 2044 including the management and transition zone
Deadwood	no data available yet
Ownership	State forest and municipal forest (~470 ha)
Climate	Average annual precipitation 2200 mm; average annual air temperature 4 to 7 °C (January –3 °C – July 13 °C)
Geology	Bunter/red sandstone, with occurrences of granite and gneiss in lower valleys
Soils	cambisol, podzol, and gley; often very acidic and low in nutrients
Protected area	100 % national park
Natura 2000 area	Special Areas of Conservation (SAC; FFH in German) 2747.1 ha

Data in part from PricewaterhouseCoopers & ö:konzept (2013)

(Europarc 2012). However, given the cultural landscape of central Europe, almost no primary forests remain (Parviainen 2005). Therefore, most of the German national parks are initially designated as ‘transitional national parks (Entwicklungs-Nationalpark)’. This allows for a 30-year transition period until 75 % of their area is deemed to be strictly protecting natural dynamic processes (Europarc and IUCN 2000). This designation is a criterion necessary to be recognised as a national park under IUCN category II protected areas. For this protection category, the primary objective is to protect natural biodiversity along with its underlying ecological structures and supporting environmental processes

(Dudley 2008). Additionally, national parks provide an opportunity for environmental education, to experience nature and for recreation, as well as serving as a reference point from which to learn about natural dynamics through a scientific ecological monitoring programme (fig. C31.2).

Portrait of the Black Forest National Park

The Black Forest National Park was designated on 1 January, 2014 by the parliament of Baden-Württemberg (Nationalparkgesetz, NLPG; National Park Act). It is the second youngest of the 16 national



Fig. C31.2. Northern Black Forest landscape – with its steep slopes facing westwards descending into the upper Rhine Valley (left, Photo: Carmen Richter) and a gently slanting high plateau with deep valleys and tarns to the east (right, Photo: Charly Ebel).

parks in Germany and the first in Baden-Württemberg. It was established only after heated discussions and a regional participatory process. To integrate the national park into the region, it was given a unique structure. Management is done by the national park administration which falls under the 'Ministry of the Environment, Climate Protection and the Energy Sector' of Baden-Württemberg. The administration consists of a directorate with a director's office and five departments, namely: (1) Administration; (2) Ecological Monitoring, Research and Species Conservation; (3) National Park Plan, Regional Development and Tourism; (4) Environmental Education and Visitor Information; and (5) Forest and Conservation.

The most important strategic decisions considering the management of the national park are made by the national park council which is divided into two parts: one part consists of representatives from the region and assembles representatives of the municipalities, counties and city districts, and includes the presidency; and the other part has representatives from the national park administration and the state ministry. The national park council is consulted by an advisory board consisting of external administrative and NGO representatives with different affiliations including conservation, tourism, industry, sports, and religion.

Each national park protects a specific landscape type with its close-to-natural ecosystems and associated flora and fauna. In the Northern Black Forest, it is the mixed mountain forest dominated by beech (*Fagus sylvatica*), silver fir (*Abies alba*), and

Norway spruce (*Picea abies*) interspersed with bogs, tarns, boulder slopes, and remnants of former land use (pastures), the typical high mountain meadows (called 'Grinden') and adjacent peat bogs. The last two are also protected in the Natura 2000 network under the Habitats and Birds Directives.

Today the forest is dominated by conifers (92%). The dominant species are Norway spruce 70%, silver fir 12%, and Scots pine (*Pinus sylvestris*, 6%). Of the broadleaved species, beech is the most common with 5%, followed by birch (*Betula pendula*, 1%) and rowan (*Sorbus aucuparia*, 1%). This species distribution is a result of centuries of agricultural land use and forest management, but also a consequence of natural drivers.

After the last Ice Age, a slow, long-term natural recolonisation process by different tree species occurred. In the case of Norway spruce, this natural process took millennia and continues today (Ludemann 2014). New research shows that Norway spruce arrived in the northern part of the Black Forest long after beech and silver fir had recolonised the area (Ludemann *et al.* 2020).

Because of the unfavourable conditions – cold, wet, nutrient poor, and rocky soils – the Northern Black Forest was settled relatively late by humans compared to the surrounding areas with more favourable conditions. For centuries, the Northern Black Forest was seen as a barrier and Germans and Romans only passed through without settling.

The first lasting footprints date from the Middle Ages: small monasteries and castles were established, and farmers settled and cleared the forest,

with hermitages and inns appearing along trade routes. Wood was used for building, as fuel, and for everyday objects. Because the narrow valley bottoms were used for settlements and fields, livestock were driven up the forested slopes to graze, where in time, woodland pastures developed. The naturally occurring mountain peat bogs of the Northern Black Forest were also used as summer pastures. Tree growth was limited using controlled (and sometimes uncontrolled) pasture burning, thereby maintaining and expanding pastureland (today protected as SAC sites – dry heath).

From 1500 onwards demand for wood increased steadily. As on other mountain ranges of central Europe, the production of charcoal, glass, and iron required enormous quantities of wood which were obtained by clear-cutting which ate deeper and deeper into the Northern Black Forest. Additionally, streams were used for log drives, not only for firewood but also for massive conifer logs which were rafted on the Rhine to Holland to be used in ship building for ship masts and as the piles on which cities such as Amsterdam were built. As a result the forest was almost completely cleared by 1800. All large predators (wolf, lynx, brown bears, golden eagle, eagle owl) and large herbivores (e.g. aurochs, European bison) inhabiting the large forest were gradually eradicated within this time period.

As in other parts of Europe, the devastation stimulated the change away from unregulated exploitation of the forest and the transition to planned and sustainable forestry. The first step was to ban forest pastures. Large parts of the Northern Black Forest were reforested with fast growing conifers, mainly Norway spruce but also Scots pine. In addition to the wood, people also harvested branches, twigs, and leaves for livestock fodder and bedding leading to further impoverishment of the already unfertile soils. While on some sites even-aged monocultures were established, on others, due to farmers needs for a variety of wood sizes, continuous cover forestry (Plenterwald) developed, dominated by silver fir and Norway spruce.

Following a large forest fire around 1808 the area around the Wild Lake was set aside as a non-commercial forest and was subsequently declared a strict forest reserve in 1911 which today is one of the core areas of the national park.

The two World Wars led to the forests being overexploited once again as most everything, including wood, was in short supply. After World War II, France was entitled to large amounts of wood as war reparation. The resulting clear-cuts were later reforested. Although there were trials with species mixtures, it was mostly spruce which was planted and flourished in the extreme conditions. The relatively even-aged conifer forests suffered widespread windthrow in 1990, (storms Wiebke and Vivian) and in 1999 (storm Lothar). Thus, forest conversion to more site adapted species mixtures and to more structured forests, were initiated in the early 2000s. It was these large storms which initiated real changes in Northern Black Forest management practices.

Management – the zoning concept

The Black Forest National Park is designated as a national park ‘in transition’ according to the BNatSchG. One main feature of a national park in development is an area designated temporarily as the so-called ‘transition zone’. At the latest, after 30 years (by 2044), this zone will be completely integrated into the core zone which will then comprise 75 % of the national park area. This is required to comply with the international national park definition of the IUCN. The remaining, existent management zone cannot consist of more than 25 % of the area. This zoning concept affords an opportunity to reach the different, and at times contradictory, goals of a national park (fig. C31.3).

The national park plan must cover a period of 10-years and include several modules (topics) (NLPG §6). The first plan for the Black Forest NLP had to be completed by 2019. The plan consists of, different modules related to forest management: ‘forest

Table C31.2. Changes in zoning area since the designation of the Black Forest National Park.

Zone	2015		2020	
Core zone	3281 ha	32.7 %	5115 ha	50.8 %
Transition zone	4163 ha	42.4 %	2088 ha	20.8 %
Management zone	2645 ha	24.9 %	2857 ha	28.4 %

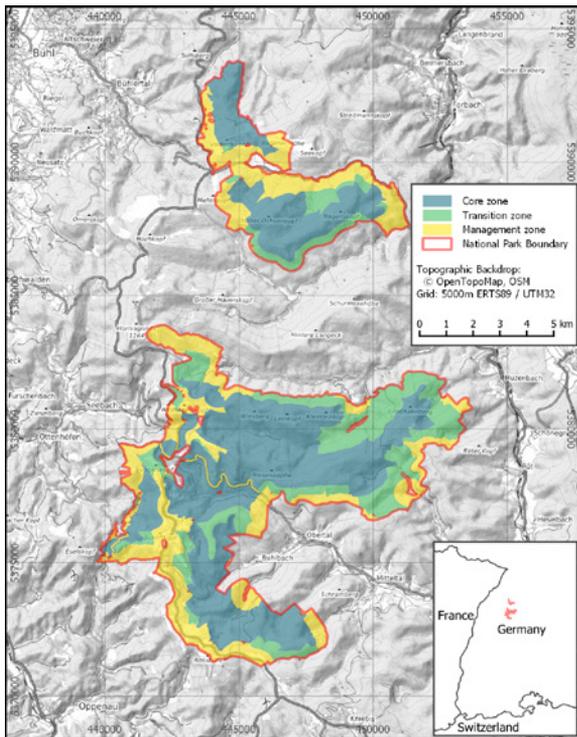


Fig. C31.3. Map of the Black Forest National Park with zoning information.

development' (2017); 'bark beetle management' (2015); 'wildlife management'; 'zoning'; 'trails'; 'habitat and species protection'; as well as 'research and documentation'. The zoning concept was one of the first strategic decisions made by the national park council in 2015. The first extension of the core area occurred in early 2020 adding almost 20 % to the area already strictly protecting natural processes. Visitors must stay on designated trails throughout the park.

Core Zone

Aim 1: Protect natural processes – Leave nature to its own devices

The core area reflects the main purpose for designating a national park. It is not another protection category. The main purpose is to protect natural processes (fig. C31.4).

Strategies:

- No resource extraction is allowed, i.e. no harvesting of trees or non-timber products (e.g. fungi or berries).

- No nature conservation measures are allowed, i.e. no habitat improvement for species protection (except in urgent cases).
- Reduction in the number of trails.

Aim 2: Allow visitors to experience wilderness

Strategies:

- Guided tours led by park rangers.
- Opportunities for hiking, horse riding, cycling, cross country skiing, or snowshoeing only on designated trails.
- Maintain trails for visitor safety.
- Provide infrastructure, i.e. benches and picnic tables at scenic viewpoints.

Aim 3: Educate and study – enhance the knowledge and awareness of students, the public and the scientific community

Strategies:

- Provide educational institutions and young people of the region with an opportunity to spend time in the park with teachers i.e. school classes, kindergarten, junior ranger programmes.
- Educate the public by offering specialised tours, talks, social media posts, and press releases.
- Conduct intensive long-term ecological monitoring programmes investigating forest development and its impact on a large range of organisms.
- Present research results at conferences and in scientific journals.

Transition Zone

Aim 1: interventions for habitat and species protection

Strategies:

- Temporal habitat management of NATURA 2000 species. For example, improvement of forest structure for capercaillie (*Tetrao urogallus*) by opening up spruce thickets.
- Temporal habitat management for other rare and protected species (e.g. Red Listed Species).

Aim 2: wildlife management to protect neighbouring stakeholders

Strategies:

- Because of a lack of predators, red deer (*Cervus elaphus*) populations in particular are managed.
- Intensive consultation with stakeholders is carried out because the NLP is a main stakeholder in the 'red deer management strategy' developed



Fig. C31.4. Stand in the core area (since 1911 strict forest reserve – Bannwald Wilder See) (Photo: Marc Förschler).

by the Forest Research Institute of Baden-Württemberg (FVA).

- Intensive monitoring of wildlife with camera traps and by telemetry.

Aim 3: one-time measures for initiating direct succession towards more naturalness

Strategies:

- In young stands, originating after storm Lothar (1999), one-time measures to reduce the dominance of spruce regeneration in favour of other species can be carried out.
- In case it is necessary to cut trees (e.g. to clear trails), Norway spruce or non-native tree species – i.e. Douglas fir (*Pseudotsuga menziesii*), or red oak (*Quercus rubra*) – should be cut.
- Trees older than 100 years are not to be cut.
- Research: One-time silvicultural experiment to speed up wilderness development (Pyttel *et al.* 2020) – create standing deadwood by girdling live trees, and create lying deadwood by pushing over standing trees to simulate storm damage.

Management Zone

A 500 m buffer (i.e. a strip on the perimeter of the national park; inside the national park in the case where the national park borders privately and municipality-owned forests, and outside the

national park in case where the national park borders state forest) provides the forests outside the park with a buffer from natural processes from spreading outside the park. This buffer-strip is constantly monitored, especially for outbreaks of the spruce bark beetle (*Ips typographus*). Additionally, the buffer contains historic openings (Grinden) maintained for nature conservation.

Aim 1: Protect cultural ecological heritage

Strategies:

- Maintain and extend (connect) the SAC type dry/wet moorlands by grazing with livestock – sheep, goats, ‘Hinterwälder’ cattle (a regional heritage breed), ‘Heck’ cattle (this breed is the result of an attempt by Heinz and Lutz Heck to ‘breed back’ to extinct aurochs), and Konik horses – according to the Habitats and Birds Directives (fig. C31.5).
- Permanent habitat management of NATURA 2000 species, e.g. by improving forest structure for capercaillie – by opening up spruce thickets.
- Permanent habitat management for other rare and protected species (e.g. Red Listed Species).
- Motor manual and manual reduction of succession where livestock is not able to maintain early successional stages.
- Monitoring and evaluating effectiveness of conservation measures.



Fig. C31.5. High elevation pastures (Grinden) protected by Natura 2000 (Photo: Carmen Richter).

Aim 2: Protect the neighbouring stakeholders

Strategies:

- Intensive monitoring of bark beetle (especially *Ips typographus*) outbreaks – attacked trees are marked, felled and withdrawn from the forest within two weeks.
- Intensive monitoring and cooperation with hunters and forest owners outside of the park boundary regarding wildlife management – especially for red deer.

Main national park services and benefits

Economics – regional development and tourism

As stated above, a national park has no economic goals therefore natural resource extraction is not permitted. However, the 'national park brand' provides opportunities for the regional economy, and specifically for tourism (Kraus and Job 2015). Based on visitor interviews, Kraus and Job found that for about 10% of the visitors it was 'important' or 'very important' that they were visiting a national park. Calculated for the whole year, this group accounted for a gross income of € 3.9 million in the region, equivalent to 72 jobs (Kraus and Job 2015).

The budget of the national park administration is funded by the state of Baden-Württemberg. An

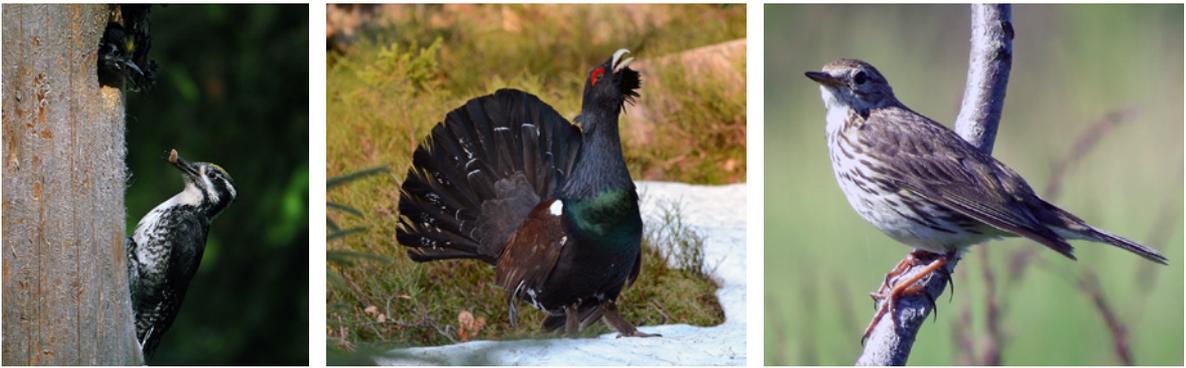
analysis of the invoices paid by the administration and the related postal codes, showed that in 2018: € 1.3 million (33% of the budget) stayed within the national park region (network of municipalities) and an additional € 1.4 million (35%) remained in the counties within the area of the national park (Nationalparkverwaltung 2019).

Social – benefits for education and health

The contribution of national parks goes beyond nature conservation, regional development, and tourism. They also have a positive impact on human health, well-being, and personal development (Ensinger and von Lindern 2019).

From the very start, the Black Forest National Park administration had the goal of connecting with the people in the region. Besides the institutionalised participation of representatives in the national park council or the advisory board, there is a strong emphasis on citizen participation.

Individuals can take part by attending specific activities or as citizen scientists. As well as participation in planning, they may take part in decisions around the development of the different modules of the national park plan, e.g. through developing a trail concept, which was accomplished in workshops, online-surveys, or on public tours.



Strictly Protected Forest

Management

Fig. C31.6. Birds at risk of extinction according to the Red List of Baden-Württemberg (Bauer *et al.* 2016) occurring in the Black Forest National Park. The Eurasian three-toed woodpecker (*Picoides tridactylus*, Photo: Walter Finkbeiner, left) needs old-growth structures, while the meadow pipit (*Anthus pratensis*, Photo: Marc Förschler, right) depends on the managed open meadows and peat-bogs (Grinden and moors). The capercaillie (*Tetrao urogallus*, Photo: Walter Finkbeiner, centre) occurs in strictly protected forest areas with disturbances and old-growth structures (i.e. bark beetle or windblown patches) as well as managed half-open heathland and clearings.

A key part of the mission of the national park is environmental education. In the annual programme of 2018, there were 216 educational events. Additionally, 809 events were provided such as talks and guided tours given to the public to specialists and students of all levels from kindergarten to university (Nationalparkverwaltung Schwarzwald 2019).

Resilience – Protecting natural dynamics and learning from them

According to Schultze *et al.* (2014), in regions such as central Europe with a long land-use history, the underlying assumption is, that in national parks (as strictly protected forest reserves) ‘natural forest development processes’ such as disturbances and succession will lead to more complex structures (e.g. Pickett and Thompson 1978), even if these reserves initially continue to show the effects of past anthropogenic influences, e.g. absence of old-growth structures (e.g. Müller and Bütler 2010).

Especially in times of rapid global change, in managed forests outside of protected areas, there is an economic need to adjust the management

regime, for example, by changing species composition or by decreasing rotation periods. Especially in such instances, there are references needed where natural processes are not interrupted. Therefore, national parks can be seen as areas where ecological baseline data is available to enable the detection of gradual changes and to predict harmful changes to ecosystems that humans depend upon (Sinclair 1998). In the Black Forest National Park, a long-term ecological monitoring programme has been established which provides the opportunity to document and analyse the interactions and functions of the natural system.

Biodiversity – every protected area contributes to global biodiversity conservation

Protected areas are the fundamental building blocks of almost all international conservation strategies, which are supported by governments and international institutions such as the Convention on Biological Diversity (Dudley 2008). According to the IUCN, protected areas are the core of the efforts to protect the world’s threatened species, and are set aside to maintain functioning natural

ecosystems, to act as refuges for species, and to maintain ecological processes that cannot survive in most intensively managed landscapes (Dudley 2008).

In the Black Forest National Park, we aim at protecting natural processes and dynamics on 75 % of the area by 2044. By having a large enough area where nature can develop unrestricted, natural disturbances like storms, snow breaks, or bark beetle outbreaks can result in patch dynamics with different forest development stages. In an expert report written prior to the national park designation (PricewaterhouseCoopers & ö:konzept 2013), 450 Red Listed Species were recorded for the area, 206 of these species would benefit from a strict protection of forest dynamics and the resulting old-growth structures like standing deadwood, root plates, and the accumulation of large deadwood with its long habitat continuity (fig. C31.6).

However, there are an estimated 53 species that would be detrimentally impacted by the cessation of forest management practices. These are mostly species associated with the high elevation pastures, managed for centuries, and because of their habitat value are protected by Natura 2000. These habitats were integrated into the 25 % area of the management zone and can, therefore, be maintained by management practices (Förschler *et al.* 2013; Förschler and Richter 2020).

Conclusion

Management in national parks, mainly means the management for people. To provide opportunities to learn and recreate, but also to protect the neighbouring stakeholders. Furthermore, it can be necessary to preserve specific habitats and species communities (in the case of the Black Forest National Park heaths, meadows and peat bogs).

Natural forest with its characteristic patch dynamics can only establish if an area is large enough and permanently protected to allow for the accumulation of large deadwood in high quantities which provide the necessary habitat continuity. This is only possible in strictly protected forest reserves like national parks. These are the only places where the scientific observation of natural forest dynamics is possible to gain knowledge important for the management of cultural landscapes.

Portrait

National parks are very special places, especially today, when so few areas in densely populated Germany remain where nature can develop unhindered. But the principle behind 'Let nature decide', the central idea behind a national park, is also important to our wellbeing as it provides the insights necessary to preserve natural processes. We learn by observing what changes occur, especially if this is done scientifically like it is in the Black Forest National Park.

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Fig. C31.7. Summer pasture for Heck cattle (a breed that has been bred to resemble the extinct aurochs) as a means to effectively suppress succession of woody species on the SAC type dry/wet moorlands (Photo: Marc Förschler).