Landscape-Level Conservation

Modern management of traditional lands: A case study of common rangelands in Germany's Southern Black Forest.

By Tobias Plieninger and Andreas Reinbolz

In the United States, pristine, undisturbed wilderness continues to be the guiding principle of conservation. Conversely, there is broad consensus in Central Europe that extensively used traditional rangelands are among the most valuable landscapes in terms of biodiversity and other environmental amenities (Vos and Meekes 1999). There are outstanding examples in most European countries showing that traditional land-use practices have created and continue to maintain conservation value, eg, the Camargue in France (Bignal and McCracken 1996). In recent years, traditional forms of land use, especially grazing, have been discovered as a tool for conservation management that can be adjusted to the needs of a particular purpose (Bakker and Londo 1998). Consequently, the conservation debate in Western Europe is not about how to end grazing on public lands but rather how to preserve traditional farming practices. Networks that bring together conservationists, scientists, and farmers to develop strategies for the preservation of traditional low-input agriculture have been established (EFNCP 2003). Underlying motivations are diverse and comprise esthetics, preservation of the rural cultural heritage, tourism, sustainable regional development, and especially species and habitat conservation. Characteristics of traditional pastoral systems are (compared to modern agricultural systems) (Bignal and McCracken 1996):

- low inputs of nutrients, agrochemicals, and concentrate feed,
- low livestock-stocking rates,
- a low degree of mechanization,
- the use of hardy, regional breeds of livestock, and
- a survival of long-established management practices.

In recent decades traditional farming and livestock systems have heavily decreased, while agriculture was intensified in the more productive areas, and large tracts of extensive grazing land have been abandoned or afforested (Luick and Bignal 2002). The abandonment of extensive rangelands takes place in marginal areas throughout the European Union (MacDonald et al 2000). Therefore, important issues in European landscape conservation are to preserve these seminatural traditional land-use systems and to prevent both agricultural intensification and land abandonment.

In this article, we provide an overview of the evolution and the ecological and cultural significance of

Table 1. Site characteristics of the Southern Black Forest.

Geology and soils	Gneiss and granite bedrock Clayey and sandy soils (pH > 4) with large rock Alluvial soils on the bottom of the valleys more fertile Surface and soils shaped by glaciers
Climate	Precipitation between 1,000 mm year^{-1} on the western edge up to 2,100 mm year^{-1} on the Feldberg mountain Average mean temperature between 10°C (Freiburg) and 3.2°C (Feldberg mountain)
Natural vegetation	Entirely forested with European beech (*Fagus sylvatica*) in the lowlands and European silver fir (*Abies alba*), Norway spruce (*Picea abies*), and sycamore (*Acer pseudoplatanus*) in the upper regions. Only the uppermost summit of the Feldberg mountain is naturally unforested

Figure. 1. *Characteristic mosaic of grassland and forest patches in Southern Black Forest (source: W. Konold).*

traditional rangelands in Germany's Southern Black Forest (Table 1). The focus is on about 73,900 ha managed by the state grazing service (Staatliche Weideinspektion) in the southern part of the Black Forest. This once predominantly forested landscape currently supports a mosaic of forest and traditionally used rangelands (Fig. 1). We present a historical land-use system, the Allmendweiden (commons) and the changes it has experienced, and show how this can be used as a model for future conservation and sustainable management of farming systems with high nature conservation value in Europe.

Table 2. Characteristic plant and animal species on traditional rangelands in the Southern Black Forest.

Endangered plant species	Moonwort (*Botrychium lunaria*) Field gentian (*Gentiana campestris*) Greater broomrape (*Orobanche rapum-genistae*) Purple colt's foot (*Homogyne alpina*)
Characteristic bird species	Rock bunting (*Emberiza cia*) Red-backed shrike (*Lanius collurio*)
Plant species that are glacial relicts	Hawkbit (*Leontodon helveticus*) Golden cinquefoil (*Potentilla aurea*) Dwarf cudweed (*Gnaphalium supinum*)

Ecological and Societal Amenities of Traditional Rangelands

The pasture landscape complex of the Black Forest contains a significant proportion of the area's biodiversity. About 30 different endangered plant species are found in the meadows of the Southern Black Forest. These species require pastures with poor soils and low livestock-stocking rates. Many bird species depend on open and structurally rich habitats in the Black Forest meadows (Table 2).

Many subalpine species were pushed back to the higher altitudes of the Black Forest in the period beginning around 20,000 BP. Later, some of those glacial relicts expanded progressively into the grasslands "artificially" kept open by livestock grazing. Some of them evolved to different eco-

Figure. 2. *The high structural diversity of traditional rangelands provides rare habitats for specialized plants and animals.*

types during this process, differentiating the Black Forest populations from those in the Alps and conferring on them the status of a characteristic regional feature. The structural diversity of the landscape (scattered pasture beeches, field clearance mounds, stone walls, paths, irrigation channels, hazelnut hedges, and ancient field terraces) is also remarkable and provides habitats for specialized plants and animals (Fig. 2).

The present pattern of land use and particularly the remains of former land-use systems characteristically shape the landscape. Therefore, the landscape represents history and life of the ancestors and connects inhabitants with their environment and the history of their homeland. The maintenance of traditional landscapes is furthermore crucial for tourism, a significant source of income in the region. The identity and the singularity of a certain area become more and more important for marketing success in the competition between different regions.

Economic analyses show a high willingness among the population to pay for the conservation of cultural landscapes originating from such uses. Estimations vary around US$0.79 visitor^{-1} day^{-1} for the maintenance of traditional cultural landscapes in Austria or US$10.46 household^{-1} month^{-1} for the management of rural landscapes in Germany's Lahn-Dill-Bergland. In 1992, the conservation of historical cultural landscapes and landscape elements received legal status through an amendment to the objectives of the German Nature Conservation Act. Recently, public support for traditional, low-intensity agriculture and livestock raising has increased further because of severe crises such as Bovine Spongiform Encephalopathy (BSE) and Foot-and-mouth disease (FMD) (Sutherland 2002).

Development of Pastoralism and Common Rangelands

The history of settlement in the Southern Black Forest reaches back 1,200 years beginning with

Table 3. Differences in land use and expected effects on ecosystem properties between the historical land-use system and modern extensive grazing (Reif, Katzmaier, and Knoerzer 1996).

Land use	Historical land-use system	Modern extensive grazing
Livestock management	Herding	Mostly fencing
Distribution of grazing pressure	Over the whole pasture	Concentration on feeding and water points
Vegetation management	Fire, tillage	Mechanical shrub removal
Secondary land uses	Crop cultivation	—
Stocking densities	Higher	Lower
Livestock breeds	Frugal, light, indigenous breeds	Partly demanding introduced breeds
Livestock composition	Often mixed herds of cattle, sheep, and goats	Single-species herds
Feeding	Overcoming of shortages by forest grazing, shrub browsing, and foliage feeding	External fodder
Fertilization and range improvement	No or very little fertilization	Regular fertilization, mechanical shrub clearing

Ecosystem properties	Historical land-use system	Modern extensive grazing
Nutrient balance	Nutrient exportation by driving livestock to the farm at night	Nutrient importation through fodder and nutrient inputs
Vegetation	Less fertile pasture, eg, acidic grassland	Moderately fertile pasture or fertile pasture
Structural diversity	High through rock outcrops and woody plants	Low after removal of rocks and woody plants by range improvement
Species richness	High	Some lower

monasteries that were established in the lower valleys. The colonization was driven by the discovery of silver deposits in the area with an evolving demand for wood, charcoal, and food. Most mines were depleted in the 16th century. An increasing demand for pasture and wood pushed the forests back and led to a scarcity of timber and firewood in the 17th and 18th centuries (Brückner 1970). The landscape was divided into one-third each forests, pastures, and farmland. Cattle and goat husbandry became the most important source of income with an ever-increasing demand for pastures and fodder for wintertime.

The legal construction of common property was derived from ancient Germanic rules and has barely been modified for at least 1,000 years. Large fractions of the Black Forest were used this way in the Middle Ages, especially marginal and remote areas that were not suitable for agriculture and hayfield use. They were often separated from the privately owned land with stone walls and hedges. The land-use system of agriculture and livestock husbandry in the Southern Black Forest was affected by a crucial problem: The heritage of estates was commonly distributed among all children, in contrast to other parts of the Black Forest where only the youngest son inherited the undivided farmland. The result was fragmented farmland with parcels too small to make a living. So there was a great need to hold the remote areas of the parishes in common property. Documents from the 15th century provide information about detailed regulations for the commons use, eg, the persons entitled to put livestock on the commons. The management of the commons was mostly up to the local administration that hired herdsmen in charge of the livestock on the summer pastures. Local farmers had to pay a tax or deliver compulsory labor for this service.

Local differences in the law of succession, in traditions, social structure, religious affiliation, and the ecological settings resulted in a variety of property and land-use types among the 11,000 ha of common rangelands that have been preserved until today. The 4 most common ones are public commons (owned by the community of all neighbors),

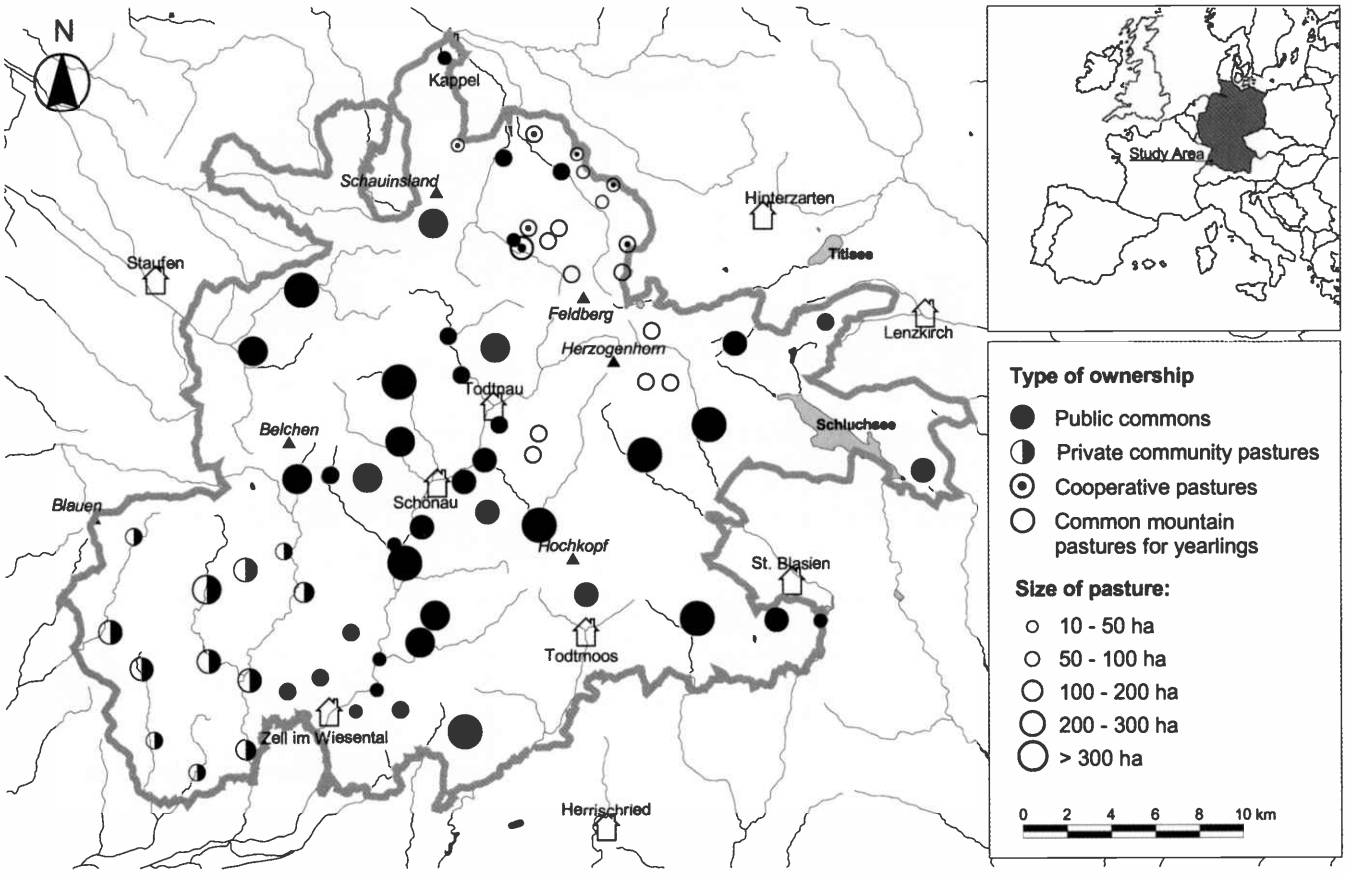

Figure. 3. *Map of the study area (source: F. Geiger).*

cooperative pastures (pastureland owned by a cooperative), private community pastures (commonly used, but privately owned lands), and common mountain pastures for yearlings (special form of public commons on higher elevations) (Fig. 3).

The beginning of the 19th century was characterized by an era of economic modernization in Germany. During the epoch of "enlightenment" the agricultural sector was considered especially underdeveloped, and government-supported masterminds and reformers propagated an increase of agricultural production. The grazing habits of livestock were viewed as the primary cause of all devastation recognized by the modernizers. In this context, common rangelands represented the best visible element of an old-fashioned agricultural economy that was to be eliminated in the battle for higher yields (Beck 1996). Government intervention on Allmendweide rangelands began with a large-scale survey of range conditions in the Southern Black Forest. This assessment was a report about the devastation of the rangelands. Only 3% of the pastures on the bottom of the valleys and 18% of the mountain pastures were considered to be in good range condition. Problems identified were overstocking of the more productive pastures and those close to the villages and a precocious start of the grazing season in early spring. Proposed government measures were a legal control of grazing management (especially stocking rates, grazing seasons, and the spatial distribution of grazing), and range improvements (ie, the removal of shrubs, unpalatable herbaceous plants and stones, and the fertilization of the acid soils). These measures would not have been possible without the establishment of a state authority controlling common lands (Schwendemann and Müller 1980). Still, it was extremely difficult to implement any changes because of the property system, the great poverty of peasants, and because of their tough resistance to any restrictions of their uses.

In 1925, a grazing service was established in the area and started a systematic range management. Continuous work has been put into clearing woody plants and fertilization until today. After World War

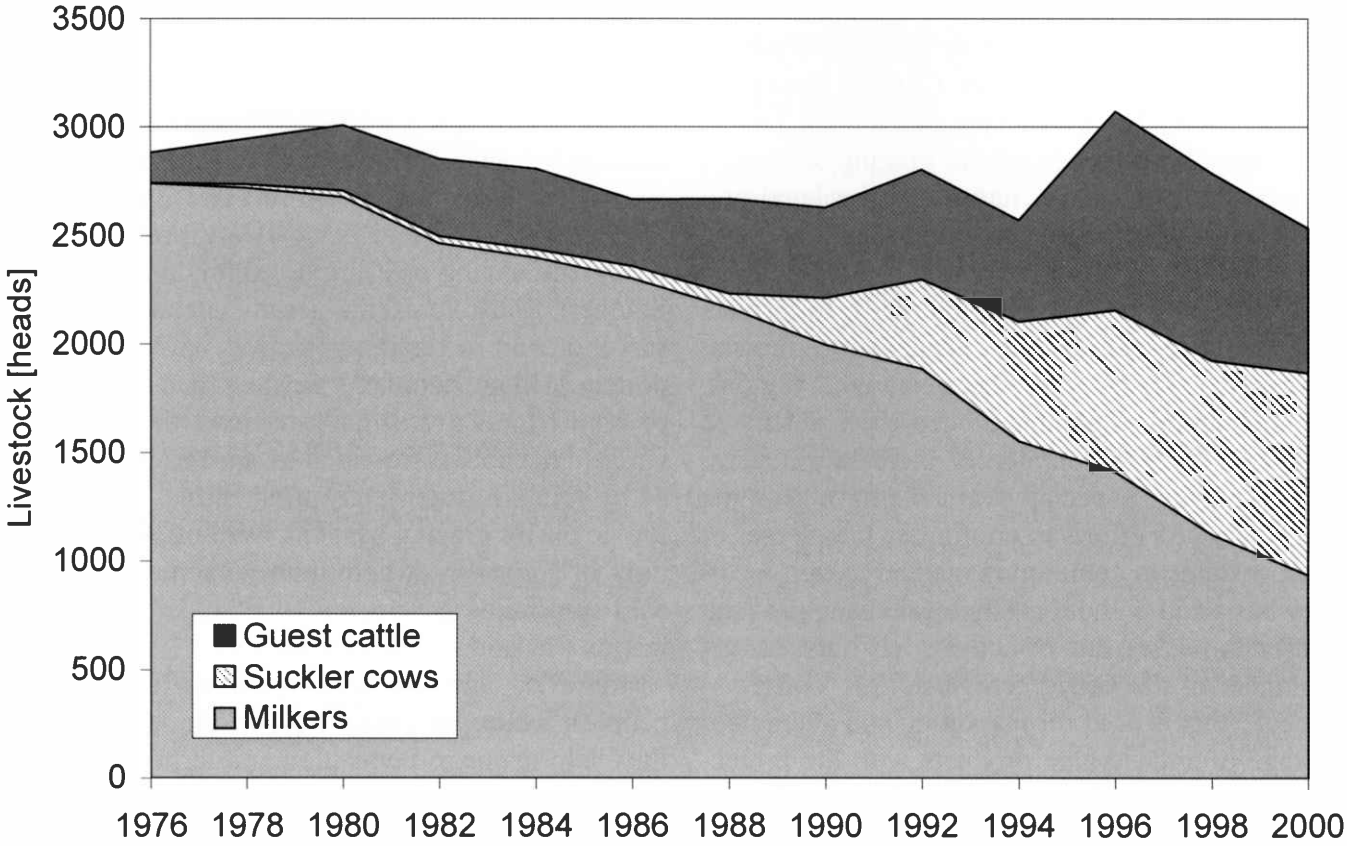

Figure. 4. *Changes in heads and composition of cattle in the highlands of the Lörrach administrative district from 1976–2000 (source: Staatliche Weideinspektion).*

II, new technical and socioeconomical developments provoked changes in the land-use system. For example, the invention of electric wire and the disappearance of the herders led to the establishment of a paddock system where milk cows and yearlings became spatially separated (the former close to the villages, the latter in the periphery).

Since then, conditions of pastoralism and landscape development have changed drastically. Many farms went out of business, local inhabitants migrated out of the area, and land abandonment with increasing expansion of monospecific conifer forests are now a major threat to landscape integrity. The number of full-time farm operations declined in 3 sample parishes from 324 farms in 1949 to 223 in 1971 and finally 16 in 1997. This could be partly compensated, though, by the rise of the formerly unknown part-time farms that nowadays completely maintain livestock husbandry in the area (129 farms in 1997). The transition implied significant changes in the land-use system (Table 3).

Traditional Institutions and the Solution of Modern Environmental Problems

Allmendweiden have been preserved in a period and region of agrarian crisis where the complete end of livestock raising had been predicted for a long time. The situation of the commons is a success story for pastoralism and landscape conservation. The surface of common rangelands has now expanded to its extent in 1900 again (11,000 ha) although it had decreased to only 7,000 ha in the 1970s. Despite a crisis in dairy farming, the number of livestock remained stable in the last decades (Fig. 4). This was facilitated by a shift toward the accommodation of summer guest cattle and the raising of suckler cows. Altogether, the Southern Black Forest still has 35% open landscapes, which is the highest share among all marginalized mountain ranges in Germany. In acknowledgment of this positive development, the area has recently been declared an "outstanding landscape of national significance" by the German Ministry of the Environment.

Why could traditional pastoralism be preserved in the Southern Black Forest while it suffered such a severe rollback in most other Central European mountain areas? We think there are 2 main factors responsible: the presence of the grazing service, a unique institution in Germany, and the legal and management system of the commons itself.

The grazing service fulfills important functions for pastoralism (directed first, internally, to farmers and second, externally, to the outside world) that are not covered sufficiently in other geographic regions. Most influential might have been their ability to motivate farmers to continue or increase extensive livestock raising. Especially valuable have been the grazing service's efforts to coordinate the merger of private pastures to common rangeland use on a voluntary basis and without costly legal change of land property. A further line of activity has been the establishment of a specific certificate for "conservation beef" that is used for marketing and guarantees a linkage of added-value products with the protection of environmental commodities (Knickel 2001).

Another important aspect of the work of the grazing service is to act as a lobby for extensive pastoralism toward forest service or conservation authorities, policy, and society as a whole. Although originally established rather for objectives of limiting grazing use, the grazing service has proven able to adapt to changing societal demands and to convert itself into an effective tool for modern range management and landscape conservation.

It is also the existence of common lands itself that has proven helpful for countryside preservation. In most other areas of Germany, common lands were converted to private property in the 18th and 19th centuries. The perception of the commons experienced a paradigm shift in recent years. Heavy overgrazing and resource degradation were regarded as consequences of uncontrolled grazing and competition for grazing resources among peasants for a long time. The possible influence of formal and informal social rules among local farmer communities limiting resource overuse had not been considered. Disapproval of common lands was later theoretically based with Hardin's (Hardin 1968) "tragedy of the commons" doctrine arguing that common property is inevitably connected with resource overuse because each participant pursues his own short-term advantage regardless of the rights of others. Nowadays, after the transition of European countryside from a period of productivism with maximized agricultural production to postproductivism focusing on environmental and societal amenities (Whitby and Lowe 1994), problems have changed: Grazing pressure on common lands in the Southern Black Forest has greatly declined and conservation and recreation objectives have gained importance. Many commons are now seen as "islands" of traditional grazing systems with important wildlife habitats surrounded by species-poor forests or by modern, intensively used farms. Traditional low-intensity grazing systems were often preserved only in commons, where management and ownership constraints have acted as a barrier to modernization (Wilson and Wilson 1997).

Moreover, common lands are beneficial to local people's feeling of being close to the land and can thus help maintain population and farm numbers in an area that is threatened by depopulation. In the Southern Black Forest the common lands proved especially valuable to motivate people from a context other than agriculture to engage in hobby or part-time livestock husbandry. This social group is predicted to increase significantly with decreasing work schedules and might become an important partner for landscape conservation in the future.

What can be learned from this model for open space conservation elsewhere? First, the role of commons in developed nations (provided they exist) has to be redefined, and the conservation movement should intensively care for the remaining commons as, at least in Europe, they often contain the most valuable habitats to be preserved. Second, the Southern Black Forest shows that a system of common land use can also be implemented on private lands fragmented into parcels too small to be efficiently managed on their own. We therefore consider common grazing systems a promising tool for the maintenance of extensively used pastureland in marginal areas in Europe. Prospects depend on the establishment of institutions like the state grazing service that can facilitate the merger of local farmers and integrate their interests into a management system with an ancient history.

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Authors are staff researchers at the Institute for Landscape Management, Albert-Ludwigs-Universität, D-79085 Freiburg, Germany.

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