



Research and development project “Sustainable development of xerothermic slopes of the Middle Rhine Valley, Germany”

Introduction

The Middle Rhine Valley (Germany) represents a typical example of the widespread conflict between a high nature conservation value of the cultural landscape on the one hand and the loss of any interest in land use as the traditional “management tool” on the other hand. Therefore, possibilities of a sustainable development of this “model region“ with its characteristic xerothermic slopes are studied in the research and development project taking into account nature conservation as well as socio-economic issues.

Habitat characteristics

Characteristics features of the managed habitats are:

- inclination $\geq 50\%$, merely the upper slopes towards the plateau are more or less shallow
- thin, skeletal schist soils, some areas are covered by pleistocene loess
- average annual temperature of 9.5°C
- annual precipitation of 520 mm (southern part) up to 600 mm (northern part).

Together with its neighbouring valleys, the Middle Rhine Valley represents one of the largest coherent xerothermic areas of Germany. Various xerothermic habitats and vegetation types are classified as endangered in Germany or even on the European level. The necessity for the development of management concepts to protect this landscape is emphasised by the inscription of the Upper Middle Rhine Valley in the World’s Heritage List as a protected cultural landscape since 2002.

Over centuries, the landscape has been formed by the cultivation of vine, the shallow slopes were used as common pastures for domestic livestock, as arable land or coppice. However, since the last boom of viticulture at the end of the 19th century the area under cultivation is continuously declining from more than 2000 ha to about 500 ha today. Depending on the surrounding vegetation and former use, open habitats are lost after several years or decades in favour of shrubs and woodland communities. For species of open xerothermic habitats extinctions caused by habitat loss and increasing fragmentation can be already observed or have to be expected in future.

In order to prevent further losses of the characteristic open habitats, the project intends to test the suitability of different conservation strategies, differentiated after the stage of succession and inclination of the slopes. These strategies include traditional and alternative forms of land-use (viticulture, fruit-growing, grazing) as well as different management concepts without any economic interest. The latter particularly take into account the claim of a re-establishment of dynamic processes as characteristic elements of the natural as well as historical cultural landscape. For this purpose, especially the following management strategies will be established, which are in Germany or at least with regard to steep slopes not tested until today:

- More or less uncontrolled (“semi-wild”), extensive grazing by horses and goats on the steep slopes in all stages of succession on an area of about 60 hectares.
- Clearing the shrub-dominated shallow slopes with tank-tracks. In order to do this, two links of a tank-track with a weight of about 1.5 tonnes are mounted in a steel-frame and drawn by a tractor through the shrub vegetation. Shrubs with a trunk-diameter up to 15 cm break and die off because the bark is peeled.
- Prescribed burning in winter (January/February) and late summer (August till October) on the steep slopes. The controlled burning is performed on an area of 0.1 up to 1.0 ha and is tested for the three dominating stages of succession:
 - grass stages (*Arrhenathero-Inuletum*)
 - *Rubus*-dominated stages
 - by *Prunus mahaleb* and *Cornus sanguinea* dominated succession stages

The use of prescribed burning is therefore tested not only as a tool for nature conservation (conservation of grass-dominated stages) but also in the sense of a restoration burning in order to restore open xerothermic habitats out of scrub-dominated habitats.



Figure 1. The landscape of the Middle Rhine valley, recognized as a UNESCO World Heritage site, has been shaped by viticulture over centuries. Abandoned viticulture lands on extremely steep slopes are undergoing succession – an old cultural landscape is endangered. The photo shows Kaub fortress and the slopes on the East side of Rhine river. Photo: GFMC.



Figure 2. Close up of y typical abandoned vineyard at Kaub. Photo: GFMC.



Figure 3. Upslope-running prescribed fire on an abandoned, *Rubus*-dominated site, close to a cultivated vineyard close to Gutenfels Castle / Kaub (7 September 2002). Photo: GNOR.



Figure 4. This photograph of a prescribed fire near Boppard demonstrates the extremely steep slopes along the Rhine valley. Photo: GNOR.

The realization of the different conservation strategies started in summer 2002. All management strategies are compared and valued under conservation aspects as well as socio-economic issues.

Project implementation

The project (duration November 2001 to October 2004) is implemented by:

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Publications

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