

Meadows and Pastures – Islands of Biodiversity in the National Park Kalkalpen (Upper Austria)

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Figure 1: Species-rich hay meadow in the Kalkalpen National Park (Spannriegl hay meadows)

Keywords

Pastures and Meadows, Biodiversity, Land Use

Introduction

Kalkalpen National Park in Upper Austria comprises the two ranges Sensengebirge and Reichramiger Hintergebirge. Its total area encompasses 208 km². Forests cover 81 % of this area whereas 8 % are covered with dwarf pines. Rocks and boulder cover 5 % of the area and only 6 % are covered with grasslands. Therefore Kalkalpen National Park is characterized by dense forests hosting many small meadows, pastures and alps. These areas are often hidden in the National Park and located far away from anthropogenic impacts. Areas not covered by forests are e.g. landslide tracks. From this wide range of open lands 65 meadows and pastures were chosen and investigated in detail. These open patches of grassland are indeed a relevant factor of landscape diversity and an enrichment for the biodiversity of the Park. The importance of these meadows, pastures and alps is related to biodiversity; this study demonstrates the close relationship existing between biodiversity and land use.

Methods

From the wide range of open landscapes in the Kalkalpen National Park 65 meadows, abandoned grasslands, alps and pastures were chosen. These areas were investigated within detailed field studies. The studies were based on existing information (e.g. biotope maps), aerial photographs containing the edges of the study sites and a data sheet allowing a systematic description of these areas.

The parameters of investigation were the following:

- accessibility
- typical vegetation type/FFH habitats
- biotope types
- hydrological balance
- nutrient balance
- list of plant species
- structures
- disturbances
- current land use
- forage yield
- forage quality
- measures

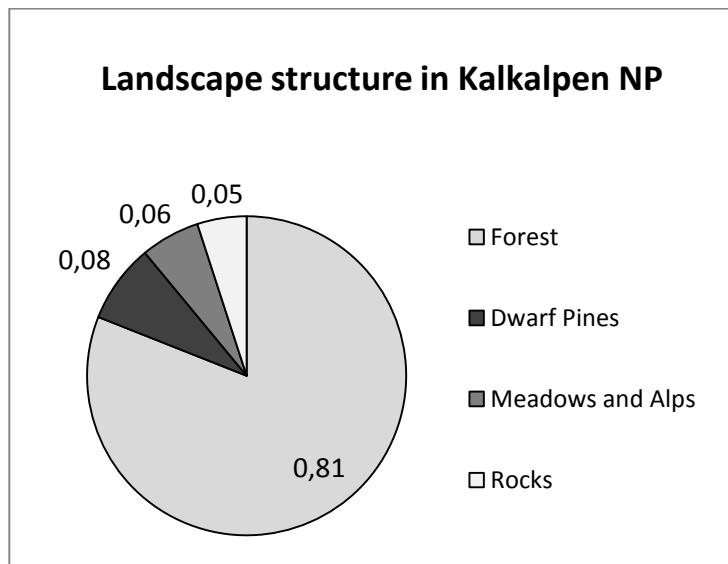


Figure 2: Main biotope types in Kalkalpen National Park (percentage).

In addition to these investigations existing valuable data and studies could be used for the project: EGGER (2007), GREIML (1994), GREIML (1991), HÖLZL (1991a + b), PILS (1994), Riedl (1992), SCHERMAIER (1995), STUMMER (1990), STUMMER (1991); LENGLACHNER & SCHANDA (2002).

The collected data were entered into a data base (developed by the Kalkalpen National Park). This data base was the most essential mean of investigation. It is connected with ArcGis and serves as a tool for planning, administrating and monitoring the grassland areas in Kalkalpen National Park.

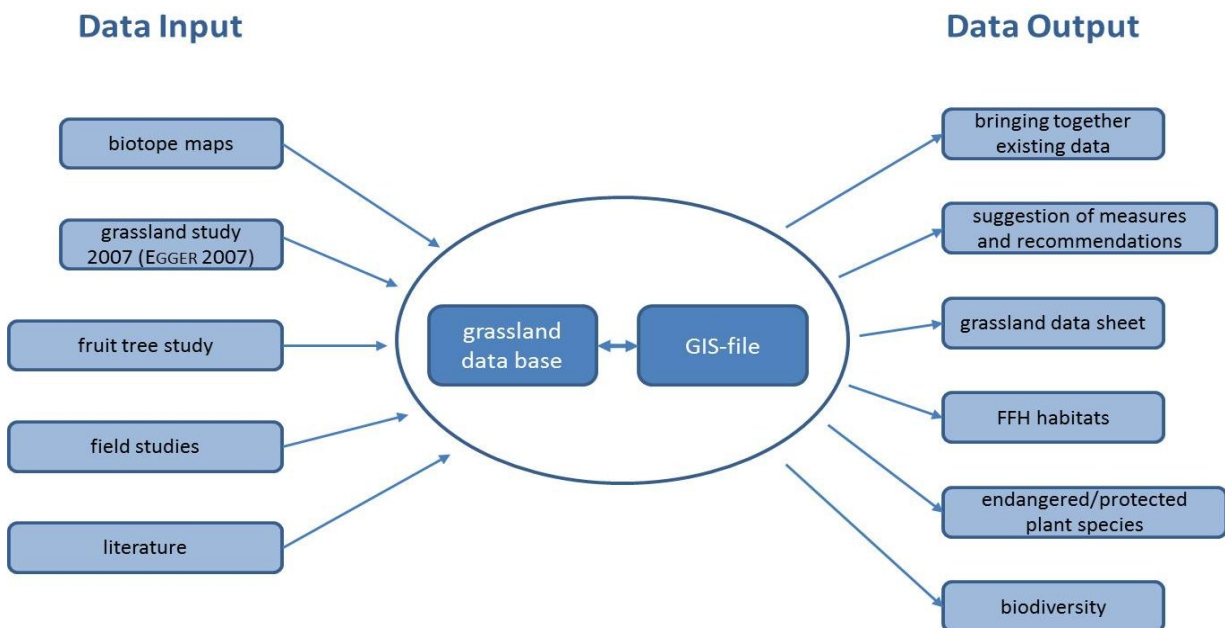


Figure 3: Scheme of data flow in the Kalkalpen National Park's data base

Results

Kalkalpen National Park is focused on nature conservation, interventions, even those aimed at maintenance of biodiversity, must be kept as low as possible. However, in order to maintain species richness in the grasslands, some management measures such as mowing or pasturing, must be periodically performed. In Austria extensively used grassland is endangered due to agricultural intensification on the one hand and on the other hand due to abandonment of land use.

In total the Kalkalpen National Park's grasslands were allocated to 26 different biotope types. According to the Red List of endangered Biotopes in Austria (ESSL & EGGER 2010), 17 of these biotope types are endangered. Mostly of the endangered biotope types occur in meadows, on alps and pastures. Within the abandoned grassland, the majority of biotope types is not endangered (see following figure).

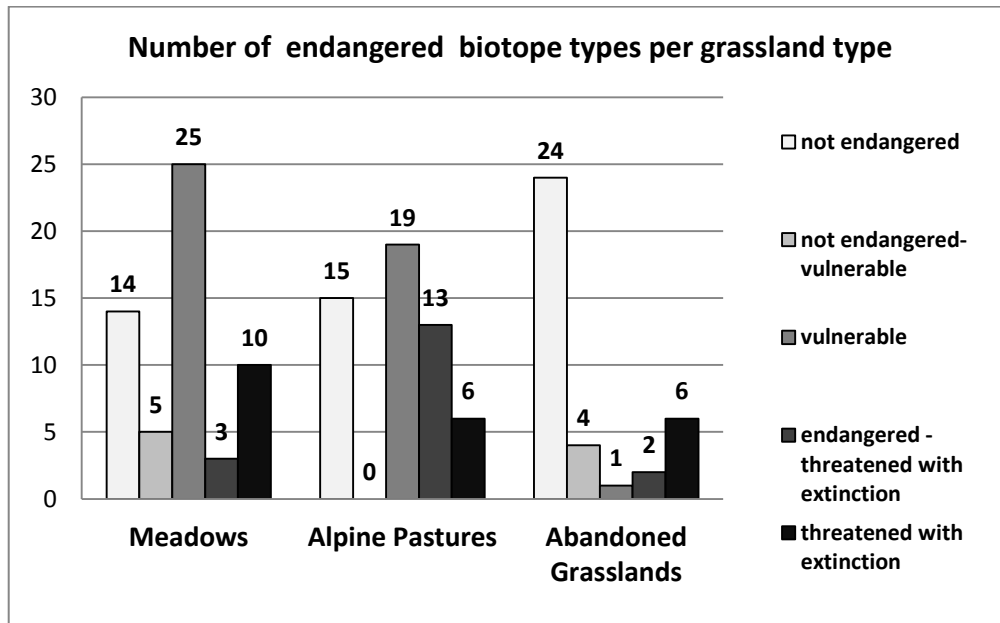


Figure 4: Number of endangered biotope types (according to Red List of endangered Biotopes in Austria) per single grassland type

Within the framework of the investigations a total number of 812 different plant species was counted on grasslands (meadows, alps, pastures and abandoned grasslands). Among those, 117 species are fully protected according to the Upper Austrian Nature Protection Law; 126 plant species are endangered according to the Red List of endangered species for Upper Austria. In addition many plant species regionally endangered were found AMT DER OÖ. LANDESREGIERUNG (1997 – 2010), LAND OBERÖSTERREICH (2001), LENGLACHNER & SCHANDA, (2002), NIKLFELD (1999).

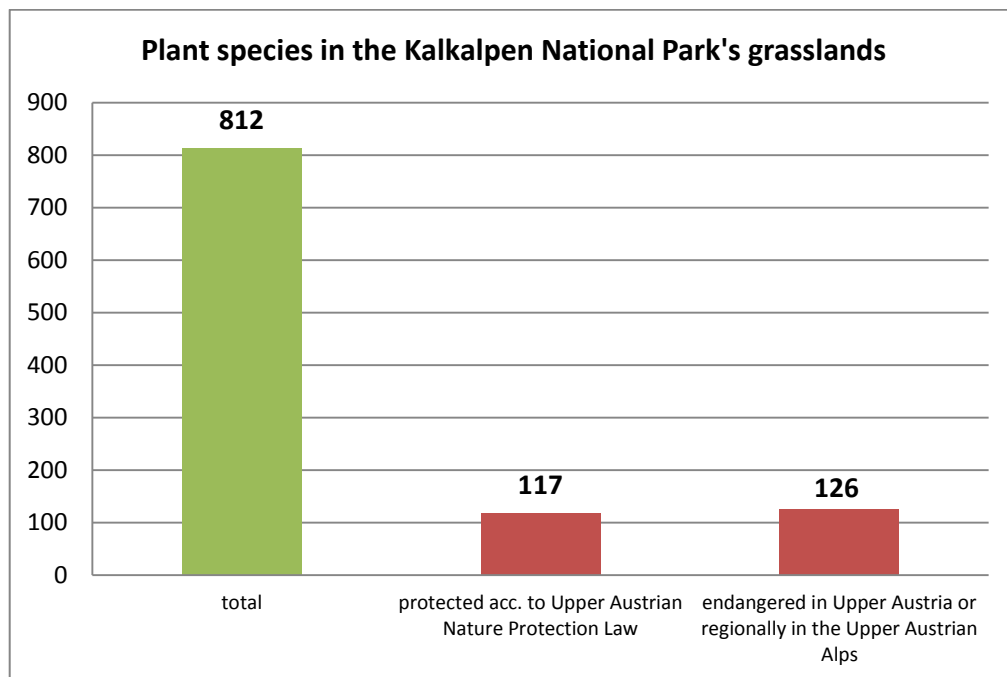


Figure 5: Overview of the numbers of detected plant species and their status of endangerment

Meadows

Most of the meadows in the National Park are mowed once a year. Date and frequency of mowing are adapted to local conditions and have a great impact on species diversity of the grasslands. The majority of the grasslands is mowed only due to nature protection objectives. Most meadows are located in the territories “Bodinggraben” and “Holzgraben”. Altogether, more than 450 plant species were found on the meadows; among these, 51 are plant species protected in Upper Austria and 70 plant species that are, according to the Red List of vascular plants for Upper Austria (HOHLA et al. 2009), endangered.

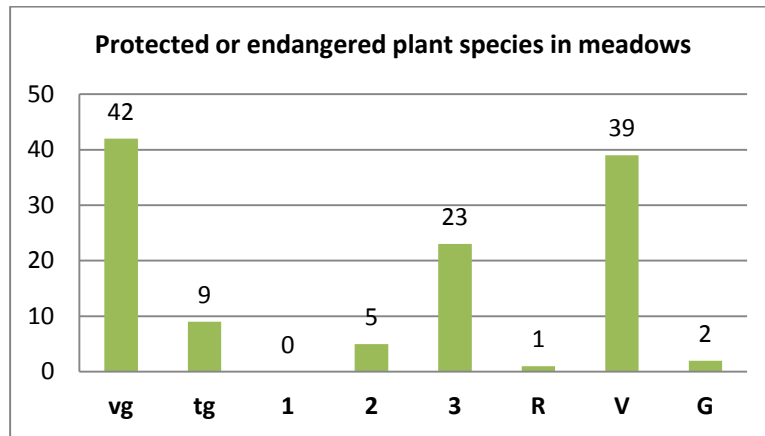


Figure 6: Number of protected or endangered plant species on meadows (multiple mentioning is possible if a species is protected and endangered) (vg = fully protected, tg = partly protected - according to Upper Austrian Nature Protection Law), (0= exterminated, extinct or missing, 1 = threatened with extinction, 2 = endangered, 3 = vulnerable, R = very rare, but not endangered (potentially endangered), V = near threatened, G = data deficient, but endangerment assumed according to Red List for Upper Austria)

Alps and Pastures

Since centuries alps and meadows are used during the summer season to feed livestock. In the Kalkalpen National the grazing livestock is mostly cattle and in some cases horses. Rarely, sheep or goats are sent to the alpine pastures. The natural timber line shifted down, partly due to active clearings and partly due to livestock grazing. Especially within the extensively used areas, the alps represent a very high species diversity. In addition the high diversity of structures and a small-scale landscape mosaic contribute to a high diversity of habitats. Altogether more than 650 plant species were found on the investigated alps, some single alps contain more than 200 plant species. Many of these species have a high value from an environmental protection point of view. In this sense 90 species are fully protected in Upper Austria whereas 20 species are partly protected. Altogether 111 plant species are endangered according to the Red List of vascular plants for Upper Austria.

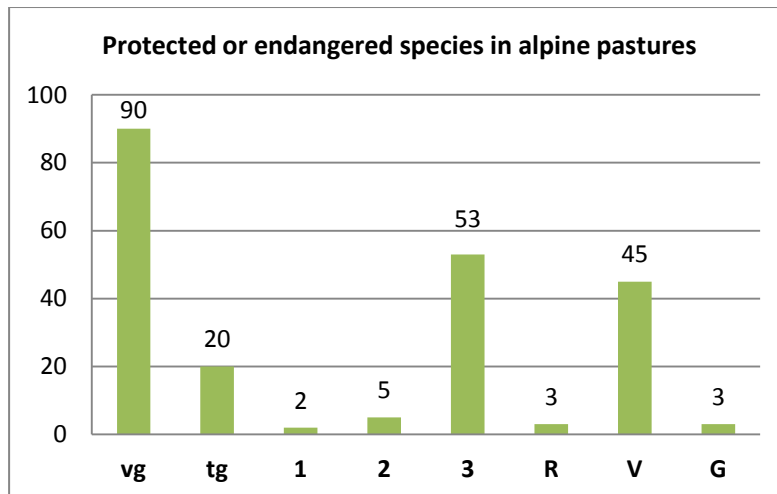


Figure 7: Number of protected or endangered plant species on alps and pastures (multiple mentioning is possible if a species is protected and endangered) (vg = fully protected, tg = partly protected - according to Upper Austrian Nature Protection Law), (0= exterminated, extinct or missing, 1 = threatened with extinction, 2 = endangered, 3 = vulnerable, R = very rare, but not endangered (potentially endangered), V = near threatened, G = data deficient, but endangerment assumed according to Red List for Upper Austria)

Abandoned Grasslands

Abandoned grasslands are open landscapes which evolved due to human land use; in the past they were mowed or grazed by livestock but then land use has stopped. Some of these abandoned grasslands have not been used only for some years, others have been abandoned for many years or decades. Species diversity of single abandoned grassland sites decreased considerably after abandonment. Yet some abandoned sites host an high species diversity, here more than 500 plant species were found. According to the Red List of vascular plants for Upper Austria 96 of them are protected and 61 endangered. If the abandonment will continue, in the following decades forest will reclaim these sites and the species range will change seriously. Restarting the land use is hence proposed only for the most valuable abandonment sites.

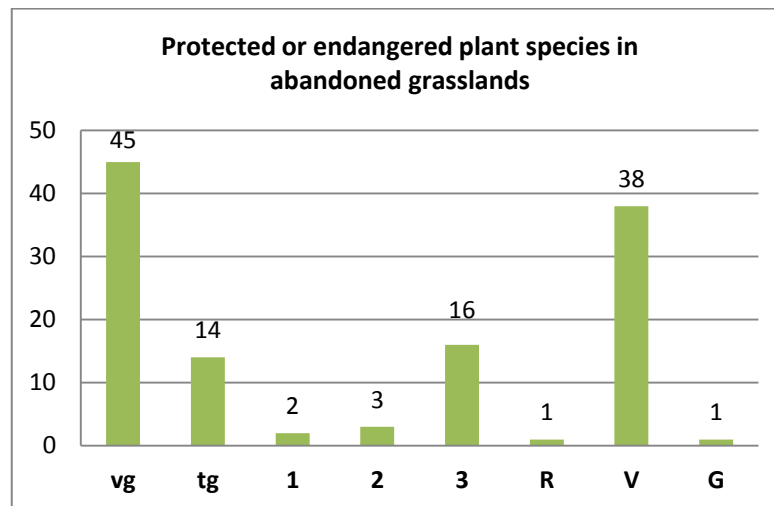


Figure 8: Number of protected or endangered plant species on abandoned grasslands (multiple mentioning is possible if a species is protected and endangered) (vg = fully protected, tg = partly protected - according to Upper Austrian Nature Protection Law) , (0= exterminated, extinct or missing, 1 = threatened with extinction, 2 = endangered, 3 = vulnerable, R = very rare, but not endangered (potentially endangered), V = near threatened, G = data deficient, but endangerment assumed according to Red List for Upper Austria)

Discussion/Conclusion

The project had the objective of analyzing and assessing the species diversity, the biocoenosis and the structures of the grasslands in the Kalkalpen National Park. The assessment was based on a field survey aimed in capturing the ecological status of the meadows, pastures and abandoned sites. The surveyed data encompassed among other things the occurrence of plant species, presence of FFH habitats, plant sociology, hydrological and nutrient balance variables as well as negatively affecting factors. The total number of sampled sites was 65, more or less equally distributed in number among the categories meadows, pastures and abandoned sites. The data thus collected were then organized in a relational database for ease of consultation, storage and maintenance. The data analysis performed with the aid of the database revealed that 812 plants species are currently present in these areas, 117 of them are classified by the Upper Austrian Law as protected species while 126 are included in the Upper Austrian's Red List. The sites with the highest plant diversity are the alps and the pastures followed by the abandoned sites.

Grassland diversity in the Kalkalpen National Park is enormous. The focus of the Kalkalpen National Park is targeted toward nature conservation. Interventions, even those aimed at maintenance of biodiversity, must be kept as low as possible. Pros and cons of such interventions have to be weighed carefully every time. Is there a need for keeping a site open through grazing or mowing or should its further development be left to natural succession? These relations were shown in this study and hence a crucial aid in decision making for future strategies was developed.

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