

COMPLEX ENVIRONMENTAL SURVEYS ON THE WORLD HERITAGE ENVIRONS OF PANNONHALMA

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Abstract: In Western Hungary an outstanding asset dominates the landscape, fitting neatly into its environment: the 1000 years old Benedictine Abbey in Pannonhalma. The monastery – together with its harmonious natural environment – was put on the World Heritage List in 1996. The monastery hill is highly exceeding from the region, it can be seen from hundreds of kilometers. The Abbey together with its wider ambience (farmsteads, fields, villages, etc.) recalls a time when the monks were self-sufficient. The cultural and architectural values are strongly connected with their environs, the monastery is surrounded by a 7052 hectare Landscape Protection Area, a not yet fully transformed remain of the limy sand plains of the Little Hungarian Plain. The sustainment of the world heritage area must be planned and managed in quite a prudent and complex (agrarian, urban, archeological, natural, etc.) system. Our goal is to create the World Heritage Area's land use structure, based on the natural and cultural values of the region.

Keywords: Pannonhalma, World Heritage, landscape, land use, nature protection

Introduction

The 1000 years old Benedictine Arch-Abbey in Pannonhalma – together with its harmonious natural environment – was put on the UNESCO World Heritage List in 1996. It was declared as a cultural heritage, but – because of its amazing landscape-value – the natural environs are also included. The different natural and landscape values are strongly connected with the architectural monuments, the abbey is surrounded by old forests and ancient botanical lands. The natural and artificial environment forms a quite diverse unit, which can be sustained and developed only with a complex approach (Pottyondy 2003, Csorba 2003, Barczy and Centeri 1999, Vona 2005).

The observed area, Pannonhalma microregion is part of the Western Hungarian Mountains mesoregion, ranging from Bakony hills until the southern part of Kisalföld (Smaller-Lowlands). The most important city of the region is Győr.

Although the whole abbey was renovated between 1995 and 1997, the official regulations of the natural surroundings are still not completed. Those areas, which are strongly effected by tourism, are undergone destruction at various levels. The centralized scientific surveys and the construction of an issue-based development plan were not started, yet.

The 283 meters high monastery hill is highly emerging from the region, it can be seen from hundreds of kilometers. (If the weather conditions are ideal, the Tatras and the closest pikes of the Alps can be seen from the tower of the Pannonhalma Monastery.) The whole monument has got an extremely high landscape-value. Any kind of development (architectural, forestry, etc) can be seen from the whole region, so all of the projects must be handled in a real wide-scaled approach. Due to this situation the surveys cannot be stopped at the border of the world heritage areas, we have to extend them on the closer regions, too. It is necessary to include the closest parts of the Pannonhalma Landscape Protection Area and the

whole territory of the neighboring settlements. Traditional land use methods were observed on the basis of close-to-natural state habitats. These areas are extremely important for nature conservation because valuable plant taxa may only be preserved for the future generations with sustaining the management patterns, used through hundreds of years. Unfortunately there are no domesticated animals on the formal grazing-lands. Grazing should be one of the best sustaining method of the sand plains. The plant communities and protected species of the studied area were described by Hortobágyi (1982) and Rékási (1998, 1999, 2000) according to landscape management methods. The survey-based development of a natural-cultural-historical monument serves the sustainable maintenance of the whole region.

Materials and Methods

The world heritage area of Pannonhalma Benedictine Monastery and its historical surroundings is touched by different land-use methods. Agrarian lands, settlements, protected grasslands and forests (All of them are part of the Pannonhalma Landscape Protection Area – Fertő-Hanság National Park), regional roads (M1 between Budapest and Vienna, R82 between Győr and Lake Balaton) and railways (Budapest-Vienna) can be found on the observed area. It is important to find a common base for land-use methods, urban-development, tourism and nature protection. Therefore we started the researches with comprehensive soil-mapping. The sampled places are lying in our 20 * 20 meters large botanical squares. Soils were examined in situ with core samples and in soil profiles, too. The in situ soil examinations were done by the Pürckhauer type soil core sampler (Finnern 1994) and by full soil profile descriptions (Stefanovits 1992). The core sampling gave possibility to take several samples and examine the depth of layers, pH, color, soil physical type, carbonate content, soil type. After all it is possible to prepare a genetic soil map.

Meanwhile we prepared the soil maps we also measured erosion. In the measurement of erosion we used different techniques:

- **Simple viewing** of the fields, looking for various signs or indicators
- **Direct measurements** (collecting deposited materials, weight measurements, correlations etc)
- **Indirect measurements** (natural benchmarks, erosion pins)

During the botanical investigations I used the A-NER categories (Fekete et al 1997, Mjazovszky et al 2003). The occurrence and location of the most important or endangered species and the border of the different associations (Borhidi and Sánta 1999) are signed with GPS, and dotted on M1:10000 maps. Enumeration of plant species follows the nomenclature of Simon (2000). We designated several botanical quadrats (20 * 20 meters large) on the most typical parts of the World Heritage Area and in the Historical surroundings of the Pannonhalma Monastery. Some of them are representing the formal vegetation, the others are covered by degraded vegetation.

For zoological examinations I used the monitoring system (MMM) of the Hungarian Birding Committee (MME). The observed area was one of the test-lands during the developing period of this monitoring system. We designated 4 (2,5 * 2,5 km large) sampling

quadrats with 20 sampling spots on each. We observed the different bird species, the wind and the attendance of clouds. We made groups for the birds:

- **Nesting species:** these species are common or can be found in every year or every summer. They have nests and nestling on the observed area.
- **Migrating species:** these species can be seen only for a few days during the migrating seasons, or just fly through the observed area.
- **Winter guests:** these species can be observed during the winter period.
- **Unusual, extraordinary species:** these birds are here only once or twice, they are absolutely unusual in the region

Actually we have more than 140 species on our bird-list. Most of them (approximately 60 %) have nests on the observed area.

For the higher acceptance of our goals it is necessary to include the local farmers, NGOs and politicians, self governments of the settlements, etc. in the examinations. In the interest of successful planning we organize different formal and informal forums and conferences, where all the local inhabitants and NGOs are invited. In the future we would like to construct surveys.

During investigations on old management methods and landscape history of the area we need different sources. The most important ones are the following five:

- **Aerial photos:** while we tried to get the newest photos, we tried to find some oldest picture too. With these it is much more easier to follow the plant-succession and the spread of settlement on the surveyed district. Because of the outstanding landscape and of the historical importance of the Pannonhalma Monastery, we managed to find photos from the very early times (1950's – 1960's) too.
- **Maps:** Although we have the newest maps of the region, we purchased the oldest maps too. Fortunately the Pannonhalma monastery is signed on lots of different maps, because in the middle ages it was a little fortress, one link in the Western-Hungarian Chain of Fortresses. During previous military mappings they marked not only the (monastery)fortress, but its environs too. The changes in land use can be followed up well.
- **Narrations of older inhabitants:** when we need information about the closer past it is easy to get it from older inhabitants. Some of them was born before the second World War, so they could tell some really important data, like previous land-use methods on the observed area.
- **Working plans of forestry** (Barta 2005): Two part of the world heritage district is covered with wooden vegetation. These parts are owned by the Hungarian State, but are managed by the Regional Forestry. They have to construct a managing plan for the forests in every 5th or 10th year.
- **Land degradation descriptions** (Centeri 2005, Gournellos et al. 2004): Approximately 40 % of the historical surroundings is used as agricultural land Smaller

and larger fields, species-rich orchards, vineyards and meadows can be found there. The region has ideal makings for agriculture: the hills are thickly covered with quaternary loess; the luvisol is a perfect base for forestry and agriculture. The strongest barrier of agrarian-development is erosion.

After all we can be sure, that with wide-scaled planning it is going to be possible to create an operable land-use proposal, which is based on the region's specific resources and relation-system.

Results

The most typical soil type is the brown forest soil on loess. Examination of the soil cover of the areas showed that they previously (in the last 40-50 years) had been under intensive use. These areas, now used extensively, give home for valuable, protected plant species and very shallow soils.

Near the Benedictine Monastery the slope angle is in the category of 10-16% on the lower slope and in the category of 17-25% in the upper slope (Vona and Falusi 2004). For the investigation we choose slopes with different vegetation cover. After all it is possible to prepare not only the genetic soil map of the area, but the erosion map too.

Thanks to the wide-scaled examinations more than 1000 plant species were found in the observed area. The most important species are the orchids, like *Orchis purpurea*, *Orchis tridentata*, *Orchis militaris*, or the highly protected *Ophrys sphecodes*. On some fields *Cephalanthera alba*, *Pulsatilla pratensis subsp. nigricans*, *Iris pumila* and *Iris variegata* can be found.

As mentioned before, there are forests in the world heritage zone. All of them are part of the Pannonhalma Landscape Protection Area, they are under protection. Although the actual status of these forests is Recreational Forest, there are no paths or benches anywhere. The whole vegetation is in a very bad condition. To regenerate these parts of the zone it is necessary to create a special usage plan, focusing on these forests. It must be done in the close future.

The diverse vegetation gives home for diverse fauna. More than 140 bird species were found in the observed area. The population of the *Merops apiaster* and of the *Corvus corax* is one of the largest in Europe.

In 2005 we were able to finish the pre-study of the complex development- and land-use plan of the World Heritage area. It contains the most important tasks and strategies that we have to follow during the construction of the final development plan. It must be based on the regions unique natural and economical resources. Besides the value-observing it was necessary to find the most serious (potential) endangering effects too. We made a SWOT analysis and a special check list. With this list it is much more easier to observe future innovations and to offer alternative solutions.

The following studies are completed or are in progress:

- The complex investigation of the World Heritage Area's natural values
- The list of the plant and animal species
- M 1:10000 Genetic Soil Map of the observed area
- Local resource-based land-use structure
- Demonstration program for experts and tourist

Discussion and conclusions

According to the results, it is obvious that the development of the world heritage area can be planned only in a very complex way. For this it is necessary to have the sufficient number of measures and to have enough data. Based on the investigations it is possible to prepare a guidebook where farmers and other inhabitants can choose the optimal land-use type in order to prevent their land from soil and fertilizer loss or to protect the endangered species, etc. Local decision makers should be also using this to have the adequate basis before making decisions.

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