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# BE-NATUR: Transnational Management of Natura 2000 Sites

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Additional information is available at the end of the chapter

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## 1. Introduction

The EU-wide network of Natura 2000 sites serves the conservation as well as the protection of endangered species and habitats. One must differentiate between Special Areas of Conservation (SAC), which are protected by the Habitats Directive 92/43/EEC, and Special Protected Areas (SPA), protected by the Birds Directive 2009/147/EC.

All nature sites have an obligation to report to the EU. The development of the Natura 2000 sites (provisions, effects) must be documented in three- or six-year spans. Member states must present conservation plans for all sites of the Natura 2000 network and conduct monitoring. This is to provide information about the preservation of the conditions of the protected species and habitats. How does it affect the protected property? Did the provisions get implemented? Did they have the desired success? Are additional provisions necessary? A habitat is considered adequately covered if up to 60 per cent of its total area is contained within recommended sites. If less than 20 per cent of a habitat's total area is contained in the sites, it is insufficiently represented. The countries are obliged to implement the Natura 2000 standards, or else they face the penalty of high fines to the EU.

According to the first reporting period of inquiry from 2001 to 2006, only 17 per cent of the already reported Natura 2000 areas in the entire EU were in a favourable state of

preservation. The rest were either unfavourable/bad, unfavourable/inadequate, or unknown. Assessments of the state of conservation were not carried out on 18 per cent of the areas. The state of conservation of habitat types associated with agriculture have been worse, with only seven per cent of assessments being favourable, compared to 21 per cent for non-agricultural habitats, in [1].

The Interreg South-East-Europe project BeNatur (Better Management of Natura 2000 Sites) aims at improving the management and organisation of those Natura 2000 sites, with particular focus on wetland areas. In view of actually implementing the EU legal framework in this regard, measures like the definition and implementation of a Joint Transnational Strategy for better management and improvement of the Natura 2000 network, the definition of Joint Transnational Action Plans for the conservation of the habitats and species common to partner areas, practical pilot projects for implementation of the Joint Transnational Strategy and communication activities to build awareness on environment protection are implemented in the partner countries. As basis for the project a gap analysis, which is an approach for the assessment of gaps of existing protected area networks, was made, see [2].

## **2. Biodiversity in the grassland ecosystem**

The term biodiversity is perceived differently among professional groups, such as specialists in taxonomy, economists, agronomists, or sociologists. Moreover, biologists tend to define biodiversity as the diversity of all living beings. Farmers are interested in exploiting the potential arising from the diversity of soils, regions, etc. For industry, biodiversity represents a reservoir of genes of use for biotechnologies or exploitable resources such as timber, fish, etc. The general public largely associates biodiversity to exceptional landscapes or endangered species.

### **2.1. Defining the concept and levels of biodiversity**

In the 1960s, the understanding of ecosystems, as known today, began to rely upon the functioning of natural systems in relation to different species of animals and plants. In the early 70s, specialists started the debate whether certain species may be considered useful or harmful. The term biodiversity (ecological diversity) denotes the variety of life forms which inhabit the biosphere. This is measured by the total number of species (plants, animals, fungi, microorganisms) which represent all terrestrial and aquatic ecosystems found on the planet. According to [3], biodiversity can be considered on five levels: ecosystem diversity; diversity of biological systems in time; assemblies of species diversity; specific diversity; genetic diversity (intraspecific diversity).

Number of species from a particular biological community is expressed as species richness or alpha diversity. This can be used to compare the number of species in different geographic areas or biological communities. Beta diversity refers to the gradient along which the structure of species changes in relation to a geographic factor. Gamma diversity is

characteristic of regions and includes the biodiversity of ecosystems which make up the characterized region.

## **2.2. Intraspecific (genetic) biodiversity**

Field studies of various species confirm the existence of differences between conspecific individuals. These differences often intensify along with the extension of the area occupied by that particular species, see [4].

A population is characterized by a particular genetic structure expressed in gene frequency. The difference between populations of the same species is determined precisely by differences in gene frequency. The sources of genetic variability are mutations, genetic recombination, and gene flow, all acting in relation to the demands of selection, which finalizes the nature of the variations. The diversity of spontaneous or cultivated species' populations is studied by several methods, among which the most commonly used are the following: morphological descriptive methods; methods based on phenological and physiological characters; cytogenetic methods; methods based on the use of molecular markers.

## **2.3. Species biodiversity**

It is estimated that biological communities developed over millions of years are breaking down due to anthropic influence. A large number of species have declined rapidly, some of them being on the verge of extinction. The causes for this situation are multiple, ranging from excessive hunting and habitat destruction to the attack of predators or competitors introduced by humans.

Numerous studies on natural and artificial grasslands confirm the fact that loss of species generates a decline of productivity, the community being less able to respond to environmental variations (e.g. drought). When species are lost, biological communities display a substantially reduced resilience to changes caused by human activities.

## **2.4. Ecosystem biodiversity**

Ecosystem biodiversity refers to the complexity of structural elements (species) and functional elements which characterize an ecosystem on the level of spatial and temporal units. The most prominent manifestation of ecosystem biodiversity is conveyed by species richness (species composition). The species richness of an ecosystem is a result of the interactions between species and the biotope, as well as an effect of interspecific relations.

The biotope displays a selective action upon the species from the early stages of its colonization, eliminating species whose adaptations do not correspond to the variation regime of abiotic factors. Thus, biotope acts as a filter (biotope filter).

If biomass production is low, there is intense competition for nutrients and only slow-growing species are able to survive. If production is high, only a few fast-growing species resist in the competition for light, nutrients, etc.

## 2.5. Methods for quantifying biodiversity

Biodiversity can be classified according to different criteria, e.g. from a taxonomic or ecological point of view. At a taxonomic level, biodiversity is regarded as the species richness of a given area at the moment of the examination.

From an ecological point of view, in [5], biodiversity is characterised on different spatial scales, as follows: alpha diversity, beta diversity and gamma diversity represents the quantification of biodiversity in all ecosystems from a region.

Numerous diversity indices are described in the specialty literature. One category of diversity indices takes into account the total number of species (S) and the total number of individuals (N) present in the sampling surface.

### 2.5.1. Alpha biodiversity

Alpha biodiversity refers to the biodiversity of a given surface area or of an ecosystem and it is generally expressed as the number of species from that ecosystem, see [5].

### 2.5.2. Species richness

Species richness is an insufficient parameter to determine ecosystem biodiversity (Barbault, 1992). Two ecosystems may display the same degree of biodiversity if the number of species they contain is equal, although some species may be represented by fewer individuals. It is therefore necessary to determine quantitative indices for species assessment, such as abundance and frequency.

### 2.5.3. The Shannon indices

The Shannon indices characterize the plant community from a taxonomic point of view, respectively in terms of specific diversity. The two indices are entropy ( $H'$ ) and relative abundance ( $E_{H'}$ ), also called equitability index. The Shannon index ( $H'$ ) employs specific data to measure biodiversity, as it characterizes the entropy of the analyzed sample, considering the species as a symbol and the relative size of their populations as probability.

The Shannon equitability index ( $E_{H'}$ ) represents the relative abundance of the studied sample on a scale from 0 to 1, where values close to 0 indicate a low regularity of species presence and 1 stands for the maximum species' regularity of occurrence. This index is calculated by the formula:  $E_{H'} = H' / H_{\max} = H' / \ln S$

### 2.5.4. Simpson's indices

Simpson's index takes into account not only the number of species but also the proportion of each species. Much like the indices presented in the previous section, Simpson's diversity indices represent a means of assessment which takes into account species richness and the species' regularity of occurrence in the sample. Simpson's index (D) measures the

probability that two individuals randomly taken from a sample belong to the same species.

$D = \sum (n_i / N)^2 = \sum_{i=1}^S p_i^2$  where:  $n_i$  = the total number of individuals of the species  $i$ ;  $N$  = the total number of individuals of all species in the sample;  $p_i = n_i / N$ .

#### 2.5.5. Beta biodiversity

Gamma biodiversity takes into consideration changes in species diversity between different ecosystems. Generally, the total number of species in each analyzed ecosystem is determined and they are compared by assessing the total number of different species [5]. Ecological similarity indices (floristic similarity indices) are employed in order to compare two samples of grassland floristic relevés. These fall into two categories, namely: qualitative and quantitative similarity indices.

#### 2.5.6. The Jaccard index

The Jaccard Index ( $P_j$ ) also called the Jaccard similarity coefficient was introduced by Paul Jaccard (1902, 1928) to statistically compare the similarity and diversity between sample sets. This coefficient allows comparison between station fields based on the following mathematical formula and it can have values ranging from 0 to 100:  $P_j = [c / (a + b - c)] \times 100$  (original formula) where:  $a$  – the number of species from a list (i.e. relevé 1);  $b$  – the number of species from a list (i.e. relevé 2);  $c$  – the common number of species (i.e. in the two compared relevés).

#### 2.5.7. The Sørensen index

The Sørensen index ( $Q_s$ ), also known as Sørensen's similarity coefficient, was developed by botanist Thorvald Sørensen in 1948. Like the Jaccard index, this similarity index takes into account the presence or absence of data. The following formula is employed to determine this index:  $Q_s = 2c / (a + b)$  where:  $a$  – the number of species from a list (i.e. relevé 1);  $b$  – the number of species from a list (i.e. relevé 2);  $c$  – the common number of species (i.e. in the two compared relevés).

#### 2.5.8. The Hamming distance

The notion of Hamming distance ( $H$ ) was proposed by Daget & al. (2003), cited by Le Floc'h (2007), for comparing floristic relevés by utilizing the following formula:  $H = 1 - P_j$  where:  $P_j$  – the Jaccard index.

#### 2.5.9. The Renkonen index

The Renkonen index ( $P$ ), also known as the percent similarity, was developed around 1938. It employs the abundance of species from the compared relevés in applications on grassland vegetation and the obtained result is expressed as a percentage. The Renkonen index is

calculated by the following formula:  $P = \sum \min(p_{1i}, p_{2i})$  where:  $p_{1i}$  – frequency of species  $i$  in relevé 1;  $p_{2i}$  – frequency of species  $i$  in relevé 2.

### 2.5.10. Gamma biodiversity

In [6] Gamma biodiversity represents the general diversity of all ecosystems which make up a region, respectively the diversity of species on a global scale [6]. According to [7],  $\alpha \times \beta = \gamma$ , a relation which must be valid for all the indices utilized in the calculation, according to [8]. Thus, gamma diversity must be determined entirely by alpha and beta diversity. Jost does not specify in what manner alpha and beta determine gamma, but mentions that alpha diversity can never be higher than gamma diversity.

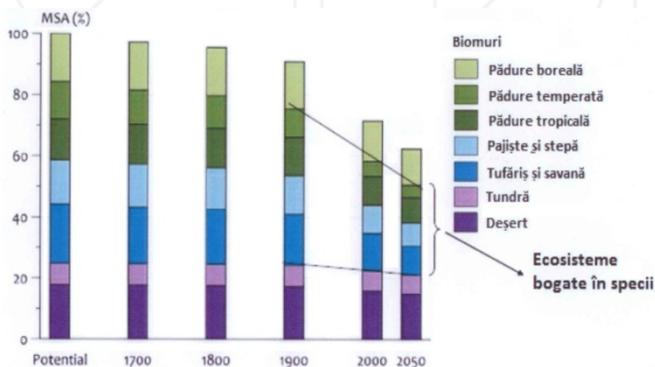
### 2.5.11. The Mean Species Abundance Index (MSA)

The Mean Species Abundance Index (MSA) is currently used to determine gamma diversity and biodiversity on a regional scale. It was developed under the coordination of the Convention on Biological Diversity (CBD) and it provides information on presently extant biodiversity compared to that of previous periods.

The MSA index is used to calculate the estimated average population size of all species in a representative sample, in accordance with the CBD 2010 indicators for species abundance (2010 Biodiversity Indicator Partnership). The index algorithm uses only original species in the characterization of regions, so as to avoid the quantification of opportunistic species, which may mask the loss of original species. Thus, MSA is the combined result of monitoring and modelling.

This index characterizes the integrity of biodiversity, seen as the mean abundance of original species relative to their abundance in undisturbed ecosystems.

By comparing biomes, as shown in Figure 1, it may be conjectured that the areas which will potentially suffer the heaviest loss of biodiversity in the future are likely to be savannas or tropical grasslands, as well as temperate and steppe grasslands.



**Figure 1.** Evolutionary dynamics of extant global biodiversity (MSA %) (Brink, 2010)

### 3. Gap analysis: A useful tool for the assessment and development of perspectives on biodiversity

Aiming at relevant gaps in various biodiversity components the Gap analysis is not a substitute for in-depth biological inventories, but can be used as preliminary planning tool, serving as a basis for further study work, see [9], and for the decision making of institutions dependent on sound scientific data for managing natural resources ,see [10]. Initially defined as an assessment of gaps in the field of conservation in [11], the scope of this commonly applied method is extended within BeNatur project framework.

#### 3.1. Assessment of gaps

A comprehensive gap analysis questionnaire was the main instrument for the assessment of gaps between partner countries, see [12]. The appropriate completion was of high significance, as the outcomes are preconditions and necessary elements for further project steps. Complemented by best and bad practice examples, the data and additional documents gathered by each individual project partner allow useful insights in the actual management and implementation situation. The results are going to serve as a basis for the Joint Transnational Strategy and for the development of tools for the improved management and implementation of Natura 2000 sites in all partner countries. Basically, the questionnaire includes four parts, covering the following main points of interest:

1. legal procedures for the application of directives
2. management and organizational structures
3. ecological assessment and
4. socioeconomic assessment.

#### 3.2. Outcomes and perspectives

In total, data of 11 questionnaires from 7 countries have been analyzed (Austria (1), Bulgaria (1), Greece (1), Hungary (2), Italy (3), Romania (2), Serbia (1)).

##### 3.2.1. Assessment on legal implementation

In all countries (except Serbia), the legal implementation process is done, but in many cases deficits are still distinguishable, see [13-19]. In Italy and Austria the implementation is done at the level of federal states or provinces respectively, while in the other countries this is done at national level. The spatial dimension of the designated sites is defined in the laws by list of parcels (except Romania) and maps in the scale from 1:5.000 to 1:25.000. In the Habitats Directive no standard for the resolution of distribution maps of habitats or species is given, but the more accurate these maps are, the bigger is the benefit for further investigation and protection efforts.

In many countries, Natura 2000 is also affecting the laws of "Hunting and fishery" and "Spatial planning". Slightly more than the half of partners reported that Natura 2000 is also

implemented in the laws concerning “Agriculture and forestry” or “Water management”. In Austria Natura 2000 legislation is also implemented in several other thematic laws on the level of provinces (e.g. rural development, waste management, environmental protection).

Handling Impact Assessments (IA) of plans and projects at national level is the responsibility of the Ministry of Environment or a similar governmental department in most cases. Focusing on local responsibilities, there are only authorities in Austria, Romania, Greece and Veneto Region in Italy. The integration of local stakeholders as part of the governance system is still established insufficiently in most countries. The reported numbers of IAs according to Article 6 of the Habitat’s directive are very heterogeneous, so there is no clear pattern to be observed. Only few partners were able to provide data on this question. The number of IAs and their results would actually be very interesting for the Natura 2000 network at EU level, as they are good indicators on threats to individual sites and could help developing reference decisions as well as a proper methodology for certain impacts.

### 3.2.2. *Assessment on site management*

There appears to be a significant lack of responsible managers in charge of the Natura 2000 sites. According to [13] in many countries, one person or institution is responsible for the management of several sites [13]. Therefore, the needed presence at the site level to be aware of ongoing processes at the site per se and to be at disposal for stakeholder’s discussions is not given.

In only about 20 % of Natura 2000 sites there is a management plan available, taking most of the partner regions into account. According to [14] only Austria’s number of management plans for Natura 2000 sites is significantly higher with about 70 % [14]. An additional deficit is the absence of mechanisms to approve the effectiveness of management plans. Only Italy, Romania and Bulgaria do have such structures, but even in those cases, the needed actions to improve site selection or management are missing, see [15].

Comparing the different degrees of involvement between the countries, it is apparent that the involvement of the stakeholder groups is the strongest in Italy, and in Greece and Austria this aspect also plays a certain, but minor role. There was good involvement of NGOs in Hungary in the designation period of Natura 2000 sites, but involvement has decreased in the ongoing management of the sites according to [16]. In other countries analyzed participative strategies and stakeholders involvement is rather unusual.

There are stakeholder groups that are obviously stronger involved than others. Farmers, hunters and foresters have a big influence on species composition and biodiversity of habitats due to their activities, which turns them into indispensable partners for a sound management of protected areas. Unfortunately, assessments on the degree of stakeholder acceptance are very rare throughout EU.

There is comprehensive information material about all aspects of the Natura 2000 sites in all EU-member states available on various levels. Online information is most frequently available, whereas printed materials such as booklets or leaflets are rather underrepresented. Expensive

approaches of visualisation such as special booklets interpretative trails are expensive and their existence depends on the actual funding situation.

General difficulties and goals correspond to the findings of the European Environmental Bureau in [13], referring to an inconsistent mapping without any “common direction” and a lack of financial means as well as human expertise to handle the implementation of Natura 2000 guidelines.

### 3.2.3. *Ecological assessment*

Most partners can rely on interpretation manuals containing a national specification of the habitats and species. Only in Greece such a national specification of the habitats and species of the Habitats Directive is missing. National monitoring concepts exist however the implementation in the countries is not satisfying. National programmes for the coordination of activities in Natura 2000 sites would ensure the favourable state of species and habitats considerably. In addition, national projects would help to develop concerted actions all over a country for specific species or habitats.

Regarding the outcomes of BeNatur analysis, there are quite few programmes and projects on the national level reported by the partners, referring to a huge gap. There might be several reasons for that:

- There are simply no current national programmes and projects available.
- There are hardly any programmes and projects on the national level, maybe due to the fact that nature conservation is not the duty of national administrations but in the responsibility of the administration on province level.
- The access to information on the national level is limited, suggesting that national programmes and projects have not been successfully communicated to the regions and responsible site managements.

The results in terms of projects on site level are characterized by a very high variety among the different partners (from zero to more than hundred); probably due to the different stages of implementation of the Natura 2000 network. In some countries, administration is still in the process of nominating and designating sites by national law or developing first management plans. In this phase, hardly any projects dealing with concrete protection measures are implemented (Austria, Greece, Bulgaria). Other countries or provinces are one step ahead, having their management plans completed and already started implementing protection measures.

### 3.2.4. *Socio-economic assessment*

Regarding the socioeconomic part the results show that the BeNatur partner countries are facing huge “informational gaps”. The assessment of actual and the estimation of needed expenditures to ensure an effective management of the sites was difficult or impossible for a significant number of project partners. This outcome suggests that the institutional as well as the human resource capacities of those authorities dealing with the management and

planning of Natura 2000 sites are still not that strong as desirable. Partner regions indicated that the funding base for Natura 2000 network is very limited, regardless of the broad range of potentially available financial for the sites. The application and management of funds requires firm capacities, which appear to be insufficient in partner regions, referring to deficits at the institutional level. EU as well as national / regional funds play a key role. Private financing is very limited for Natura 2000 sites.

### *3.2.5. Best and bad practices*

To sum up the best practices part of the analysis, it is apparent that especially the LIFE project framework comprises efficient project management, viable monitoring methods and beneficial project outputs in most of the cases. Thus, valuable experiences, creation of useful data bases and knowledge exchange are ensured. In addition, bad practices provide various lessons to be learned. According to the examples collected deficits in communicational activities, lack of adequate research and education structures in the field of biodiversity and nature preservation as well as the aspect of high administration costs are the main difficulties.

### *3.2.6. Conclusion*

Gap analysis has proven to be a useful assessment tool within BeNatur project framework. As the results have highlighted, the current state of Natura 2000 management and implementation is heterogeneous and complex in the participating SEE countries. Manifold gaps have been identified in all fields assessed by the gap analysis questionnaire tool, requiring further analysis and interventions. Based on the gap analysis, important next steps will come into action to optimize implementation structures and management strategies of Natura 2000 sites.

## **4. Management of nature protection in Hungary**

### **4.1. Biodiversity preservation**

The National Biodiversity Strategy sets the general objectives for biodiversity conservation as well as for sectoral integration related to land use, water management, agriculture, forest management, fisheries, tourism, hunting and mining. In line with the objectives related to agriculture the National Rural Development Strategy was approved by the Government in 2012. In order to assist and complement in situ species conservation activities the so-called Pannon Seed Bank project was initiated in Hungary for the long-term ex situ conservation of the Pannonian biogeographical region's flora. This unique project establishes a joint seed bank for the agricultural and wild flora, meaning that the genetic diversity of the wild species as well as plants serving human nutrition are aimed to be conserved at one place.

### **4.2. Species conservation**

According to our present knowledge, in Hungary there are approximately 600 moss species, 2,200 vascular plant species, 2,500 mushroom species and 42,000 animal species. The

protection of flora and fauna is one of the important areas of nature conservation. Recently, new species to the flora and fauna of the country, or even to science have been discovered in Hungary (e.g. *Hammarbya paludosa*, *Nepeta parviflora*, *Epipactis tallosii* as well as the Vojvodina mole rat (*Nannospalax (leucodon) montanosyrmiensis*). Numerous new sites have been discovered for already known protected plant species. The population or habitat of some plant species of outstanding importance for nature conservation including e.g. Dolomitic Flax and *Dianthus diutinus* have been stabilised thanks to EU-supported projects.

At the moment there are 997 protected animal species in Hungary, of which 137 are strictly protected, while there are 720 species of protected plants, among them 71 strictly protected. The population of certain threatened species has been stabilised or even increased thanks to focussed conservation measures. For example, the Hungarian populations of Imperial Eagle, Saker Falcon, Red-footed Falcon and Great Bustard have increased significantly thanks to EU-supported LIFE projects. The ex situ breeding of Danubian Meadow Viper has proved to be very successful and natural populations are now regularly re-inforced with artificially bred specimens. Future priorities include site designation for the Vojvodina mole rat (*Nannospalax (leucodon) montanosyrmiensis*), as well as further genetic study of the mole rat species.

### 4.3. Agriculture and nature conservation

Hungary can be considered as an agricultural country not only with regard to its history, but also to its present land use figures. The great majority of our natural values is linked to ecosystems created and maintained by agricultural activities, which is well represented by the fact that out of the 846,537 hectares of protected areas 26% is grassland, and 12% is arable land. The same parameters for the 1.99 million hectares of Natura 2000 sites are 25% and 27%. Sustainable farming on salt steppes, wet meadows, wetlands and forested pastures is also a precondition for preserving the unique natural values of the Pannonian biographic region. Grazing and mowing methods, pesticides, fertilization and crop rotation all determine whether the given farmland can fulfill its role as nesting, feeding and living habitat for a great variety of protected species. The dramatic decrease in grazing animal population in the last few decades – which indirectly led to the decrease of grasslands as well – means a serious challenge for nature protection, despite the great richness of natural values preserved to this day. In connection with farming practices, some of the main objectives are to prevent the spread of invasive species and to preserve tree lines, hedges, green infrastructure and temporarily flooded wetland habitats. Hungary is in a special situation as 289,383 hectares of the protected areas (34%) is in state hands and managed by national park directorates, in the case of agricultural areas mainly through the involvement of local farmers. Through national park directorates nature protection plays a crucial role in the preservation of protected traditional breeds of livestock, which are fundamental from the perspective of high nature value farming systems as well. In addition to the strict legal regulation and ownership structure (72% of protected areas is owned by the state), Hungary can successfully exploit opportunities offered by the rural development funds. The compensation of farmers' obligations, and the success of voluntary programmes introduced

in order to develop habitats resulted not only in increasing public awareness, but in the positive population trends of some target species (i.e. Great Bustard). Within the framework of the agri-environmental programmes of High Nature Value Farmland Areas currently more than 2,200 farmers fulfill the land use commitments voluntarily undertaken for nature protection purposes, altogether on 204 thousand hectares. As a compensation for the obligations of farmers utilizing Natura 2000 grasslands, in 2011 area-based payments were distributed covering more than 250,000 hectares.

#### **4.4. Management plans of protected natural areas**

The basic elements of Hungarian conservation planning system are the management plans of protected natural areas. While the National Conservation Plan refers to the whole territory of Hungary during a five-year period and regional conservation plans (“landscape protection plans”) cover the territory of several counties, the management plans of individual protected sites apply to areas from 1 ha to 80,000 ha. The period of validity is ten years. Conservation management activities are defined by the Act on Nature Conservation (1996) as surveying, registration, protection, guarding, maintenance, interpretation and restoration of protected natural values and areas. According to the Act on Nature Conservation every protected area has to have a management plan which is part of conservation legislation, as management plans are given out in a ministerial decree by the minister responsible for nature conservation. New protected areas can be designated only with complete management plans. The management plan documentation consists of three main parts: the supporting documentation, which contains the physical, economical features, the conservation status of the protected area and the conservation objectives; the detailed management plan with the conservation strategies and detailed description of conservation measures, restrictions and prohibitions; and a short version of the detailed management plan which is part of the ministerial decree mentioned above. The table of content and the preparation (the process of conciliation on local level etc.) of the third part is determined by a ministerial decree, while the requirements of the first and second part are issued in a ministerial ordinance. Preparation (and realization) of management plans of protected areas is one of the most important tasks of the ten national park directorates in Hungary. At the present time there are 211 protected areas (national parks, landscape protection areas, protected areas and natural monuments) in Hungary, among them 73 protected areas have a management plan issued in a ministerial decree.

#### **4.5. Ecotourism in protected natural areas**

Interpretation of natural and cultural values in protected natural areas is primarily attained by ecotourism, with respect to local conditions reducing the environmental effects to a minimum. Approximately one-tenth of Hungary’s territory is classified as a protected natural area. There are ten National Parks, 38 Protected Landscape Areas and several Nature Conservation Areas: they hold dense hillside forests, rolling hills, wild rivers, wide plains and areas where limestone rocks and caves conceal amazing arrays of hidden treasures. In these beautiful protected areas there are 27 visitor centers providing special

information about the sites, including interactive exhibitions on the natural and cultural heritage, also considering the achievements reached by nature conservation.

Environmental education is a high priority question in ecotourism. Its most important goal is to enhance a positive attitude towards nature conservation among the youth, to bring nature closer to them, and helps to get them acquainted with its values. The Ministry of Rural Development, responsible for nature conservation and tourism, plays an important role in organizing ecotourism activities in protected areas with co-operation of national park directorates. The federal ministry annually organizes the Week of Hungarian National Parks with a workshop on ecotourism and a wide range of ecotourism programs for the public. In 2012, the workshop will focus on the (eco)tourism of World Heritage Sites. We also organize The Heritage Interpretation Sites of the Year competition in two categories (visitor centers and nature trails) with co-operation of the ministry responsible for tourism and the state-owned company responsible for tourism marketing.

#### **4.6. Geological values of protected natural areas**

Geological objects have been regarded as part of our natural heritage from the very first attempts at the comprehensive regulation of nature conservation.

The Act on Nature Conservation provides the possibility for protection of practically the whole range of elements of geoheritage. Under the Act, protected status shall be given to: geological formations and key sections, minerals, mineral associations and fossils; important sites of protected minerals or fossils; superficial or geomorphologic formations and the ground surface above caves; typical and rare soil profiles; which deserve such protection out of scientific, cultural, aesthetic, educational, economic or other public interest. On the other hand the law broadened the scope of ex lege protection of caves to major springs, as well as to sinkholes; the latter two qualify as protected areas of national importance. Caves, minerals, mineral associations, fossils are defined as protected natural assets, and are in state ownership.

The first national inventory was made on the ex lege protected items. Inventory of caves was compiled in 1977, and up to now the National Cave-Cadastre contains 4,120 elements. Similar registrations for sinkholes and springs could only be started in 2002, with elaboration of the methodology. Up to now, 795 sinkholes and 2,732 springs have been registered.

Geoscientists have played a significant role, not only in laying out the concept of nature conservation, but in its implementation as well as by developing the facilities of protected geosites and launching the 'Key-section Programme'. As a result of further research, the Stratigraphic Commission of Hungary listed 485 surface key sections, however, it does not mean that all of the key-sections are protected.

From among the scientific societies providing an important contribution to geoheritage conservation, the Hungarian Geological Society, the Hungarian Geographical Society, the Hungarian Karst and Speleological Society and the Hungarian ProGEO Association should be mentioned.

## **5. Túrkeve landscape development program as best practice example for the reintegration of unemployed people**

In the focal point of the Túrkeve Landscape Development Program stands the man who lives together with the countryside and landscape; the local community and its changes, which fundamentally define the development of the natural values.

In 1995 after the regional nature conservation committee's advice, the association at first time had the opportunity to establish a wider and regional organisation. One of the biggest social problems of the region is the high rate of the unemployment, the lack of job opportunities for less educated people, minority and elders and the migration among the youth which is caused by the narrow living possibilities.

The project tries to find new social solutions as the previous experiences show that recent approaches use 'end of the pipe solutions' rather than cure the root of the problems. In our vision the cause of the problems should be found in the improper landscape management. The program combines the sustainable use of the local resources with the local human background which is completely new in this structure. Farming on 300 ha with 27 horses, 17 cattle and approximately 100 sheep considering the viewpoints of the nature-friendly grassland management and traditional grazing methodology we can provide job opportunity for 20-30 people in season which is equal to a several thousand ha' intensive farm's capacity. The income provided by the farm contribute to the development of the region, to the decrease of the poverty and at the same time the degradation of the natural resources is missing, the development happens in a sustainable way. A farm which is managed according to this philosophy can count in a long-term as it ensures the living of the local people throughout generations without the degradation of the arable lands.

The emphasized target groups of the project are local and regional people with lower academic levels, old and unemployed people and the members of the minorities whose job opportunities are limited due to the negative prejudices and their decreased abilities. Indirectly those young people are also our target group who cannot see their future ensured in Túrkeve or in the region. For the poorest individuals accommodation in the farm buildings is provided, furthermore trainings for the workers who apply for a job are realised. Moreover we are continuously apply to the town's communal work program, occasionally we can hire 3-5 persons for several months or even for a year and it is nor rear that from them someone will get a permanent job at our association. Within the frame of the compulsory volunteer program – which is necessary for the social security benefit – we host men and women almost as an exception in the town.

The project gives long-term benefit for the involved target group as the farm gives occupation throughout the year and provides ensured living for them. At the same time they keep the functional capacity of the ecological services, treat the land, graze the animals sustainably and do not exploit the natural resources, moreover, thanks to the re-establishment of the traditional farming methodology the flora and fauna of the area has been growing, rare and locally extinct species appeared again. Seeing the results of their

work they feel the town and landscape as their own, which raises linking and keeps the youth here. The permanent income often makes people more open, self-confident, gives them enthusiasm and persistence. They can use the obtained knowledge elsewhere, in their own farm or at their future employer where they can count the time spent in our association as an experience. Farmers who agreed with the association's aims and ambitions let their land by lease which helps them concerning the management of their land. More and more inhabitants, seeing the aims and goals of the effort, let by lease, sell their land or farm in agreement with the association.

In the future we would like to improve our possibilities with further areal expansion and ecotouristical investments. Our most important plan is the improvement of the employment rate. Employment programs have started with touristic improvements, trading activities based on local products and developments such as areas of work which are independent from educational level (e.g. growing herbs, proceeding fruits, horticulture). We are trying to find small-scale traders and provide them platform where they would be able to sell their products easier. Firstly it has a positive effect on the standard of living, secondly it makes stronger the identity, thirdly it pretends the small plots' diverse habitat structure.

With the area we continuously apply for European Union and national funds which covers the expansion of the employment possibilities and contribute to the ecotouristical developments. At the moment the organisation has an approved LIFE Nature project which started in September 2012 and will last until December 2014. In the frame of this initiative we are going to renovate the existing farm house, purchase animals such as Furioso North-Star horses, Hungarian cattle, racka sheep which are all Hungarian endemic breeds, prepare the Natura 2000 management plan for the site, establish a nature friendly water management in the area. Nevertheless one of the most important objectives of the project is to collect the owners of the area and try to organise a board of landowners in which the farmers vote together and manage their land in cooperation with each other.

According to the organisational aspects, one person leads the farm theoretically, direct the activities out of the fields. One member of the staff maintains the administrative side of the farm, apply for funds, organise the selling of the offspring, provide the financial background for the investments. The third pillar of the organisational graph is the practical coordinator who divides the tasks among the workers and check whether the exercise has been done.

The program combines the social and nature conservation approaches as today's sectoral thinking tries to solve environmental and social problems with several branches which have different and most of the times opposite effects from each other.

In the protected area the ruling principle is the reserve-theory: the state maintains the area and rule out the local community from there. The labour market desperately tries to grab such sectors which are harmful for nature or do not serve sustainability, based on external resources and finally ends with the destruction of our own natural resources whilst the poverty is growing and the 'social scissors' is getting wider. This is why we consider important to harmonize the landscape features with the human activity which partly makes the living independent from the changes of the economy as self-sufficiency means

independence. As the area which is farmed is under EU protection it is not threatened by the risk that the long-term use of the land would change. Furthermore the treated land belongs to the association or is let by lease with long-term contracts. The permanent employment is ensured as the land is managed by the association. The livestock is also in the organisation's hand. There is a good relationship with the other farmers as well with those who maintain their land in line with the objectives.



**Figure 2.** Traditional horseman from Túrkeve

Also for Austria agriculture plays an important role in Natura 2000 areas. Many agricultural sites, especially in peripheral grassland areas like for example the Enns Valley, are directly located in Natura 2000 areas where often conflict potentials between land owners and nature protection arise. State funds should serve as first approach to solve the problems and promote extensive agriculture.

## **6. Agriculture and nature protection in Austria – Interventions as example for Natura 2000 funding**

In 2008 the Austrian Court of Audit remarked that only a part of the necessary ordinances of Natura 2000 management were put into force. Management plans were available in different scope, content and quality and not legally binding. The list of recommendations includes clear priorities and implementation in guidelines. A comprehensive supervision and monitoring system of the protected sites under the aspect of long-term financing and available resources should be installed, see [20].

In Austria there are 220 identified Natura 2000 sites, which account for 14.7 percent of the state territory. At least 148 of them have also been legally enacted. The majority of the sites

have been enacted according to both the Habitats Directive and the Birds Directive. Due to the federal character of Austria, there are nine different Province laws about nature protection in each federal state, but there is no national, common law. According to [21] in total, about 50 percent of the areas in Austria are used for agricultural purposes [21].

However, intensive agricultural usage of the areas is often not compatible with the objectives of nature conservation. The potential for conflict arose due to both the expulsion of the protected areas without involvement of the land manager as well as the provisions of nature conservation laws for a careful subsistence strategy for the conservation and improvement of the protection objectives in accordance with the FFH- and Bird Directive. From the agricultural viewpoint, nature conservation often represents a management difficulty. The various interests between land use and conservation constraints and the associated loss of earnings are the cause. The lack of information and involvement of all stakeholders in the implementation process of the EU regulations through a top-down process and the contradictory recommendations and advice of their own interest groups further exacerbate the conflict.

Solutions are being sought out with the objective of creating a multifunctional agriculture in which farmers function simultaneously as conservationists and sustainers of the cultivated landscape. Various assistance programmes are being offered for the implementation of the Natura 2000 goals in Austria, which can be quite lucrative for the land managers. Depending on the programme, desired achievements of the farmer (e.g. landscaped structured in small sections, the disposition of deadwood, biodiversity, etc.) that can positively affect the conservation status of the area are financed.

### **6.1. Austrian programme for environmentally friendly agriculture (ÖPUL)**

In reference to [22] with the Agricultural-environmental programme [22], the Austrian Programme for the advancement of environmentally friendly, extensive and habitat-protecting agriculture, an environmentally sound management of agricultural areas is championed. Included in the more detailed goals are the advancement of environmentally friendly agriculture (and pasture farming of low intensity), the preservation of traditional and especially valuable agriculturally used cultivated landscapes, the conservation of the landscape, the advancement of the inclusion of environmental planning in agricultural practise, payment for the realisation of national and societal agricultural and environmental policies through the advancement of contractual nature conservation and measures to protect of waterways, soil, and groundwater, in addition to the advancement of organic subsistence strategies and the securing of suitable compensation for the offered environmental services.

Compared with some other EU countries, which offer their environmental programmes only in marked-off, environmentally sensitive areas, an integral, horizontal approach was chosen for ÖPUL. The legal basis is a special guideline in which general and provision-specific eligibility criteria are set. In 2011, € 549.2 million was paid to 114,508 enterprises for ÖPUL services over 2.2 million hectares. 114,508 enterprises, representing 74 per cent of all

agricultural enterprises and 89 per cent of agriculturally used areas, participated in ÖPUL. With this high rate of participation in an environmental programme, Austria lies in the forefront of the EU countries. The areas contained in ÖPUL (excluding alpine pastures) account for about 2.20 million hectares. The average aid per ÖPUL enterprise was € 4,795.

## **6.2. Biotop conservation and aid programm (BEP)**

Contractual nature conservation lies at the forefront of protection of species and habitats. Landowners work on a voluntary basis with environmental protection authorities. In places where the stipulations of nature protection laws cannot be implemented, many cultivated landscapes are in danger and on the decline. The conventional usage is no longer economical, the areas become increasingly overgrown, and biodiversity disappears. In order to keep these ecologically valuable areas safe, the land managers receive aid from the provincial government. People should be made aware of the ecological value of the meadows and pastures. In 1987, the Styrian Province Government, working together with the chambers of agriculture, already implemented the Biotop Conservation and Aid Programme as a specific conservation aid programme. The primary goal is the conservation of valuable, extensively farmed grasslands. They are no longer fertilised and are only mowed one to two times per year. The cutoff of yield is compensated for only following certain regulations. With this programme, habitats diverse in species are preserved as the last remnants of the original flora and fauna and a progressive depletion of the natural features of the agricultural production area is simultaneously counteracted.

## **6.3. Austrian programme for the development of rural areas 2007-2013**

Objectives for the conservation and improvement of the rural legacy – protection of nature is the conservation and development of resources valuable to the field of environmental protection and the regional uniqueness of the cultivated landscapes, especially that of habitats and species, supporting local stakeholders in order to take advantage the full potential for natural spaces in society. The preservation of region-specific landscape qualities is understood to be a service to society; good conditions for value added afford the development of competences for management of natural areas by providing services in nature conservation. The establishment of national parks or nature- and biosphere reserves are examples of sustainable development. Projects for protection and development of biotopes for the conservation and development of habitats and protected species are financed, including those for land restoration projects for valuable wetland habitats as well as the creation and conservation of landscape structures, e.g. dry stone walls. Even the costs of land acquisition and the management and support of the protected sites are covered.

These aid programmes are partially tied with great bureaucratic costs, and success is not always ascertainable. Moreover, some programmes run until 2013 and will be redrawn after evaluation and to conform with the new Common Agricultural Policy.

Further important for the conservation and the management of nature protection sites is the realization of national and international cooperation projects. For Austria the LIFE Project in

the National Park Gesäuse was a significant impulse for nature protection measures in the Natura 2000 sites “Ennstaler Alpen – Gesäuse” and “Pürgschachen Moos und ennsnahe Bereiche zwischen Selzthal und Gesäuseeingang”. Through collaboration of different institutions dealing with nature protection a significant improvement was able to be reached in both sites.



**Figure 3.** The Natura 2000 site “Ennsaltarme bei Niedersuttern” in the Styrian Enns Valley is managed after ÖPUL guidelines.

## **7. LIFE project: Conservation strategies for woodlands and rivers in the Gesäuse National Park**

The EU’s LIFE Nature Programme is a funding instrument primarily dedicated to the implementation of the Flora-Fauna-Habitat guidelines. It deals with the establishment of the NATURA 2000 nature conservation network in the EU and also concretely the introduction of provisions for the protection and conservation of endangered and protected species and habitats. Even in the new financial period from 2014 until 2020, the funding programme is to be strengthened in line with environmental, nature and biodiversity protection projects within the member states. Within the Gesäuse National Park an important Life Project for conservation of woodland and natural rivers was implemented.

The Gesäuse National Park was founded in 2002 and is located in the Alps of the Enns valley. Approximately 50 per cent of the region is covered by forest, predominantly by spruce, fir, and beech. According to [23] the national park serves as a primary habitat for

many species important to conservationists [23]. The approval and the reestablishment of the natural dynamic, predominantly the river dynamic of the Enns River and the Johnsbach, the largest feeders to the Enns River in the Gesäuse, are counted among the most important tasks of nature protection. In the Natura 2000 sites “Ennstal Alps – Gesäuse” and “Pürgschachen Moos and areas between Selzthal and Gesäuseeingang close to the Enns river” important measures for the conservation and protection of habitats and species were implemented in accordance with the LIFE Project. The objective was to improve and upgrade the habitats for target species as well as target habitats along the waters of the rivers Enns and Johnsbach. Measures were implemented for the bordering mountain forests and alpine pastures in the form of management plans. The spruce forests (foreign to the area) were converted into predominantly hardwood mixed forests.

Composition of sectoral management plans:

- Management plan Johnsbach, see [24]
- Forest management plan, see [25]
- Alpine pasture management plan, see [26]
- Visitor direction concept, see [27]
- Neophyte management plan, see [28]
- Management for debris accumulating in the area

Furthermore, the population was also integrated in the project (e. g. surveys about Enns guidelines, see [29], as well as participation processes, workshops, excursions). Another form of contribution was also the extensive public relations work (events, informative materials, information boards, educational trails, visitor direction concepts).

The most meaningful goal was the restoration of an ecologically functional continuum of waterways of the Enns and the connection to its main feeders, Johnsbach and Palten. The deconstruction causes the reintegration of floodplain regions and aids the natural habitats such as areas covered by pioneer vegetation and *Alnetum incanae* according to [24]. The target species along the Enns and Johnsbach are *Lutra lutra*, *Eudontomyzon mariae*, *Cottus gobio*, *Leuciscus souffia agassizi*, and *Alcedo atthis*. Through habitat conservation measures on alpine pastures, the habitats for *Tetrao tetrix* and amphibians (*Bombina variegata*) were able to be enhanced and expanded. The cooperation with neighbouring natural forests (Kalkalpen National Park, Dürrenstein Wilderness Area) should be strengthened. An ongoing evaluation of the measures serves to safeguard the goal standards in the course of the project. The measures for protection against natural hazards along the Johnsbach can be fit to the new ecological demands and be optimised for the target species (EU Water Framework Directive). The cooperating partners of the project were the Department of Flood Protection of the Styrian Province Government, the Austrian Service for Torrent and Avalanche Control, district office Enns- and Paltenal.

## 7.1. Results and outlook

In reference to [30] the following data should briefly summarise the results of the project [30]:

Regarding the Enns, improvements of the ecological state of a total of 105 kilometres of the river are planned (implementation EU Water Framework Directive). Between the Enns and Palten, an area of five hectares was restored and left to its own natural dynamic. In the area of the mouth of the Palten (into the Enns), about one kilometre of the river was restored. About five kilometres of new pioneer habitats were created on the torrent Johnsbach, which was also once again made passable for fish. The forest management plan encompasses a total area of 5,500 hectares. Until now, over 300 hectares of spruce forest was thinned out for the development of mixed forest. The pasturing concept for the alpine pastures encompasses 700 hectares in total and will be realised in steps. The already realised provisions were confirmed by the supplementary monitoring, which will continue to be conducted in the future. The new LIFE+ project “Flusslandschaft Enns” (“River landscape Enns”) of the Styrian Province government puts the restoration of the Enns in motion. The Gesäuse National Park has already taken further steps towards a networking of biotopes in the region Northern Kalkalpen/Eisenwurzen through cooperation on the Alpine Space Project “ECONNECT” , see [31], with partners National Park Upper Austrian Kalkalpen and the Wilderness Area Dürrenstein. Main goal is the development of a region for nature and culture for the benefit of its residents and visitors.



**Figure 4.** Johnsbach River in the Gesäuse National Park

Another important project for conservation of habitat and species is realized in Italy with the tourist management in natural beaches, where the illegal frequentation for bathing of natural protected seashores affect the conservation of the fragile ecosystem of beach and dunes and the preservation of rare species such as Little Tern and Kentish Plover. After fifty years of tolerance the situation became deep-rooted and the tourist management is now the main threat for the most important natural seashore of Emilia-Romagna region. The Province of Ravenna is trying to face the problem by new specific rules and by a project of sustainable development in the beach, to turn the commitment in a resource.

## 8. Tourist management in natural beaches in Emilia-Romagna in Italy

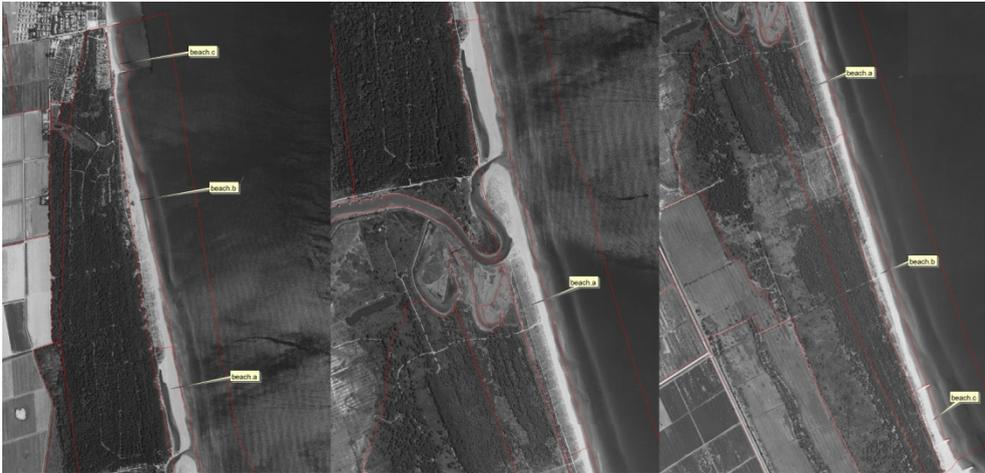
The Emilia-Romagna region has 150 kilometers of seashore along the north Adriatic Sea, from the Po di Goro mouth (Ferrara) to Riccione (Rimini). Only 15 kilometers (10%) are protected as Natural Reserves and are now included in the Natural Park of the Po Delta, but are however used for bathing tourism, in spite of the no entry in force. The most important natural beach in the province of Ravenna is called "Stream Bevano Mouth Beach", because it is around the last natural river mouth of the North Adriatic Sea. This beach is long about 6 kilometers (3 km north and 3 km south of the river mouth) and there are two small towns with bathing beaches at the north and south ends. The beach has been protected since the 1979, but the bathing tourism continued undeterred till few years ago, when started the activity here described. Stream Bevano Mouth Beach is very important for nature conservation because there are very good examples of some rare habitats protected by the directive 92/43/EEC, such as 1210 "Annual vegetation of drift lines" (locally characterized by the *Salsolo kali-Cakiletum maritimae* Costa e Manzanet 1981); 1320 "*Spartina* swards *Spartinion maritimae*", locally characterized by the endemic *Limonio narbonensis-Spartinietum maritimae* Pignatti 1966 - Beeft. & Géhu 1973); 2110 "Embryonic shifting dunes" (locally characterized by the *Echinophoro spinosae-Elymetum farcti* Géhu 1987); 2120 "Shifting dunes along the shoreline with *Ammophila arenaria*" (locally characterized by the *Echinophoro spinosae-Ammophiletum australis* Br.-Bl. 1933); 2160 "Dunes with *Hippophae rhamnoides*" (locally characterized by the endemic *Junipero communis-Hippophaetum fluviatilis* Géhu & Scoppola in Géhu et al. 1984), according to [32]. Bathing tourism is a heavy threat for the conservation of habitats and species, because people walk over the dunes, trampling upon the fragile sand-specific vegetation and because they scare birds, stopping their nesting in the breeding season or stopping over during the migration, all over the World, see [33, 34].

The bathing tourism is devastating for beach and dune ecosystem and the situation in the "Stream Bevano Mouth Beach" was more and more deteriorating, till the finally death blow caused by the mechanical cleaning, started in the middle '90 by the local Municipality, unbelievably asked by the unauthorized tourists. Both the high disturbance of the surplus of people standing on the beach each day from late April to the beginning of October and the weekly transit of large tractors for mechanical cleaning caused the destruction of habitats 1210 "Annual vegetation of drift lines" and 2110 "Embryonic shifting dunes", the erosion of 2120 "Shifting dunes along the shoreline with *Ammophila arenaria*" and caused also the local extinction of some nesting birds protected by the directive 09/147/EU, many years ago, such as for the Stone Curlew *Burhinus oedicephalus* that nested last time in 1949 according to [35] or during the last years, for Little Tern *Sternula albifrons* (last nesting in the middle '90) and Tawny Pipit *Anthus campestris* (last nesting in 2000) or caused the remarkable reduction of Kentish Plover *Charadrius alexandrinus*, passed from about 30 pairs in the '80, to 8-10 in 2004, 14-18 in 2005 and 0 in 2006 in reference to [36]. Moreover, the beach cleaning unbalanced the ecosystem, collecting the fundamental organic substance settled by the sea and breaking the food chain at its base. The Province of Ravenna is responsible for the Land Plan of this part of the Park of the Po Delta since 1988. The procedure started in 1991,

without an office in charge of parks management. The first Land Plan was rejected by the Region Emilia-Romagna in 1997, because it was deficient about nature conservation. The Province of Ravenna set up the Parks Office in 2000 and the new Land Plan had been elaborated in 2004, adopted in 2006 and now, finally approved by the Region in April 2012. The Land Plan is about a wider area, called “Classe Pinewood and Cervia Saltpans”, including large pinewoods and some brackish marshes and saltpans. The natural beach is part of a complex with the native ecological succession from the foreshore to the inland woodlands, with humid dune slacks, grey dunes, lagoons. This plan faces the problem of the unlawful bathing tourism and tries to solve it, considering its endorse by the local municipality and the long lasting custom of tourists. First, the Land Plan strictly orders protection of this precious beach: each change in morphology and hydrology of dunes and beaches; any kind of human construction; pits and dumps; hunting, fishing or other kind of animals trouble; plants damaging; road traffic; flying over; camping; trampling in dunes; dogs introduction; lightings. Here are only allowed: the hand cleaning of beach from man-made waste; possible rebuilding of dunes using natural engineering. The beach is divided in three zones, with different levels of allowed access. The first 750 meters close to the north and south small towns are “beach.c” and here are allowed also the mechanical cleaning, the access and the bathing tourism. The two central parts, among the towns and the river mouth, each of 1.5 kilometres, are “beach.b” and here are forbidden the access from April, 1 to July, 15 (to preserve nesting birds), the mechanical cleaning, the sea-settled woods removal and are allowed the access and bathing tourism from July, 15 to March, 31. The inner zone of 1.5 kilometres around the natural river mouth is the “beach.a” and is strictly protected also about human presence: the access to the beach is completely forbidden all over the year and the same is for beach cleaning.



**Figure 5.** The habitat 2110 “Embryonic shifting dunes” (locally characterized by the *Echinophoro spinosae-Elymetum farcti* Géhu 1987)



**Figure 6.** The beach zoning from North to South

To make the plan acceptable to the local community and tourists, this project for sustainable tourism development of the accessible beach was processed. The objective is to establish a “Park’s Beach” in the first 750 meters close to the small towns and, after the July, 15 also in the two parts of 1.5 kilometres in the middle part of the protected seacoast and a “Wild Seashore” in the beach around the Stream Bevano Mouth (1.5 kilometres). The “Park’s Beach” should be a bathing beach different from the other “normal” and very artificial beach of the Emilia-Romagna coast, that everywhere have flattened sand, fixed beach umbrellas, bathing resorts. This beach should have dunes at the back, irregular sand, more presence of organic substance settled by the sea (from the first 750 meters regularly cleaned to the central 1.5 kilometers where only human waste should be collected) and should be free from fixed beach umbrellas and bathing resorts. Only a small and temporary building at the entrance of the beach is provided for toilet facilities and in order to rent traditional beach tents and to sell cold drinks and ice creams. Also the introduction of a controlled number of people (maximum 300 people per day) aids to create the impression of a special beach and is very important to preserve the ecosystem. The “Wild Seashore” is even more natural, it is not at all bathing beach, but a completely natural ecosystem where the only aim is to preserve wildlife and where man is just a watcher. The visit of the area is only possible by guided tours. The beach should also be interesting from a cultural point of view, because it should be a real example of the local seashore landscape and habitats before the bathing tourism boom of the Fifties. At the end, both the kind of beach could become an economic resource; the “Park’s Beach” by the introduction of an entrance ticket and thanks to the rentals and sales (with a 3.00 euro entrance fee the assessed annual gain could be about 54,000.00 euro); the “Wild Seashore” organizing the guided hikes to watch the natural landscape and habitats and to observe the wildlife of a unique kind of beach. Together with these new rules, the Corpo Forestale dello Stato (National Forest Rangers) and the AsOER (NGO Association of Ornithologist of Emilia-Romagna) started a campaign of information, to explain to bathing tourist and local people the importance of dune habitats and of some

birds nesting on the beach and why it's vital to let some parts of the seashore free from human presence; the AsOER also started in 2008 a monitoring of the Kentish Plover nesting population.

### 8.1. Conclusion

The Plan was adopted by the Province of Ravenna in 2006, but a real control of the people along the protected beach started cooly in 2010, together with the interruption of mechanical cleaning and only from 2012 the no entry is actually enforced, because the Region Emilia-Romagna conclusively approved the Land Plan of the Park last April, 2012.

The first results arrived immediately: the habitat 1210 "Annual vegetation of drift lines" and 2110 "Embryonic shifting dunes" immediately re-colonized the beach, by growing of *Cakile maritima*, *Salsola kali*, *Euphorbia peplis*, *Medicago marina*, *Eryngium maritimum*, *Echinophora spinosa*, *Calystegia soldanella*, *Agropyron junceum ssp. mediterraneum* (= *Elymus farctus ssp. farctum*), between the white dunes and the foreshore.

The nesting population of Kentish Plover started forthwith to increase (5-6 pairs during the 2011 breeding season) and the Little Tern is really now trying to settle in again with a new nesting colony (breeding rituals recorded) at the beginning of May 2012.

Ovcar-Kablar in Serbia has been defined as "landscape of outstanding features". In the protected area education and awareness rising activities concerning topics like environment, ecology or healthy lifestyle are of high importance. Regularly there are several programs, projects, seminars, workshops and campaigns for the ecological education of the population.

## 9. Environment protection in Serbia

Nature protection systems in Serbia, as well as the basic categorization of protected areas are defined by Law on Environmental Protection (2004, 2009) and by Law on Nature Conservation (2009). Categories of protected natural areas are in accordance with the categories regulated by the International Union for Conservation of Nature.

Total area of protected areas (classified into 7 categories) is 518,204 ha that is 5.86% of the territory of Serbia. One of area protection categories is Landscape of outstanding features. It is an area of distinguishable visual aspect with significant natural, bio-ecological, esthetic and cultural-historical values which has been developing over time as a result of interaction between nature, natural potentials and traditional way of life of local population (Law on Nature Conservation 2009, Article 33). Up to now, sixteen areas have been classified as Landscapes of outstanding features and Ovcar-Kablar gorge is one of them.

### 9.1. Ovcar-Kablar Gorge landscape of outstanding features

Ovcar-Kablar Gorge was declared a protected area of the category Landscape of outstanding features by the Regulation of Serbian Government in 2000, and protection measures were closely determined by the Act on Proclamation of Protected Area. Area under protection is

2,250 ha and Tourist Organization of Cacak was given the role of administrator. Primary natural feature of the gorge is landscape diversity, impressive Ovcar and Kablar massifs and West Morava, which separates them, and which has formed unique meanders that represent geomorphologic phenomenon known as "incised meanders". Gorge length is 20 km and it is deepest in the middle part where the depth, in relation to Kablar peak, is 620 m and in relation to Ovcar peak – 710 m. The gorge boasts a significant number of surface and underground karsts formations.

Diversity of landscape, geological substratum and land, climate of the area and microclimate of some gorge parts conditioned a large number of various habitats, thus richness of flora and fauna. There are terrestrial and aquatic ecosystems with distinctive flora and vegetation that are often of relict character. With regard to the total number of species registered in Serbian Flora, there are about 600 species registered in Ovcar-Kablar gorge, which is 19.2 % of plant species. About 160 bird, more than 30 mammal, 10 reptile and 21 fish species have been registered on the territory of Ovcar-Kablar gorge. Best examined fauna species on the territory of Ovcar-Kablar gorge are birds. Due to a large number of bird species, particularly a great number of internationally significant species, this area has IBA status.

## **9.2. Development of educational contests on the territory of the city of Cacak**

In 2005, Development Strategy of the Cacak Municipality and Local Ecological Action Plan were accepted. Education of population and positive development of environmental awareness stand out as a significant aim in these strategic documents. Having these documents accepted, we started an intensive work on the development of educational contents on the territory of Cacak, in terms of both creating and increasing the variety of educational contents and on strengthening the institutional capacities needed for their realization.

Educational contents are realized on several levels and through several programs. Education of citizens, out of educational system is realized through informal forms of education which includes projects, seminars, workshops, actions, campaigns etc. These forms of educational programs have been developing for years and a number of institutions took part in their creation (Local government, schools and pre-school institutions, NGO, media etc.)

The most significant educational programs which have been continually realized on the territory of Cacak year after year are realized through Program for Environmental Protection Fund Usage of the City of Cacak. Particular item of the Program is related to ecological education of the population. Education of the population is carried out on two levels.

The first level of education is realized in pre-school institutions, with an aim to develop a concept of healthy living, positive attitude towards the environment, nature and life in accordance with natural environment. This program is predominantly aimed at generating ecological awareness and developing healthy lifestyle habits with pre-school children.

Ecological education of pre-school children is carried out in several steps and lasts for entire years. The first step is concerned with the education of kindergarten teachers who develop professionally for the work with children through accredited ecological seminars. After that, kindergarten teachers organize thematic workshops in their groups. Some of the topics of organized workshops have been: "Let's establish Ecological Code of Conduct", "How we pollute water, air, the Earth", "Let's save birds", "Recycling in the kindergarten", etc. Besides ecological workshops pre-school institutions also organize excursions into nature, ecological patrols and collection of recyclables.

The second level of education is realized for primary and secondary school students. Schools are given funds for the realization of educational projects through Program for Environmental Protection Fund Usage. Basically, each project is realized through several major activities. First activity includes seminars lasting for several days, organized for the groups of 20-25 students in Eco-educational Center Rosci located on the border of protected area. Seminars consist of workshops which can be divided into theoretical (organized in the camp facilities) and practical (organized in the field- in nature). After that, field activities are organized- practical work. Location for the practical work depends on the seminar topic. At the end, promotional materials are prepared and distributed as a part of campaign that is organized in a school and/or some public institution. During 2011, among others, the following thematic projects were realized: " Monitoring of birds' state in the protected area Landscape of outstanding features Ovcar-Kablar gorge", "Remove ragweed and tree of heaven" and "Small Petnica in Rosci".

Apart from educational seminars and workshops for pre-school and school children, several actions are also organized every year. Almost all schools and pre-school institutions from the territory of the City of Cacak as well as entire citizenship take part in these actions.

- Within the action "Let's Clean up Serbia", on the occasion of the World Environment Day, on June 5th, Ministry of Environment, Mining and Spatial Planning in cooperation with Local governments, organizes "Big Cleaning of Serbia" - a big cleaning up action on the RS territory. Over 70 % of local educational institutions take part in the campaign every year. Teachers and students of participating schools organize the cleaning up and/or collection of recyclables.
- On the territory of Cacak, on the occasion of the World Environment Day, School for Catering and Tourism organizes, has organized ECO FEST three years in a row. All schools from the city territory can take part in the FEST and the theme of the FEST is chosen by the organizer. The main event at the last year's ECO FEST was the proclamation of the best arranged school yard on the territory of Cacak.
- Mountaineering club "Kablar", has been organizing the action "Big Mountain Race" for 15 years, through Ovcar-Kablar gorge, for cyclists, marathon runners and walkers. The race is of national character and all "nature lovers" have the right to participate.

Such projects like those taking place in Austria, Italy and Serbia can serve as best-practice examples for other regions or countries with similar structures and problems. Within BeNatur best-practice projects were collected and exchanged between partners as well as

know-how about management of protected areas transferred. A good example for management is the Danube Delta Biosphere Reserve, which is classified as World Natural Heritage.

### 10. Management for Danube Delta biosphere reserve

Danube Delta Biosphere Reserve Authority (DDBRA) is a public institution under the coordination of the Ministry of Environment and Forests, responsible for the management of reserve, including the conservation and protection of the existing natural heritage; promote and support the sustainable use of the natural resources; provision of support, based on the results of research, for management, education, training and services.

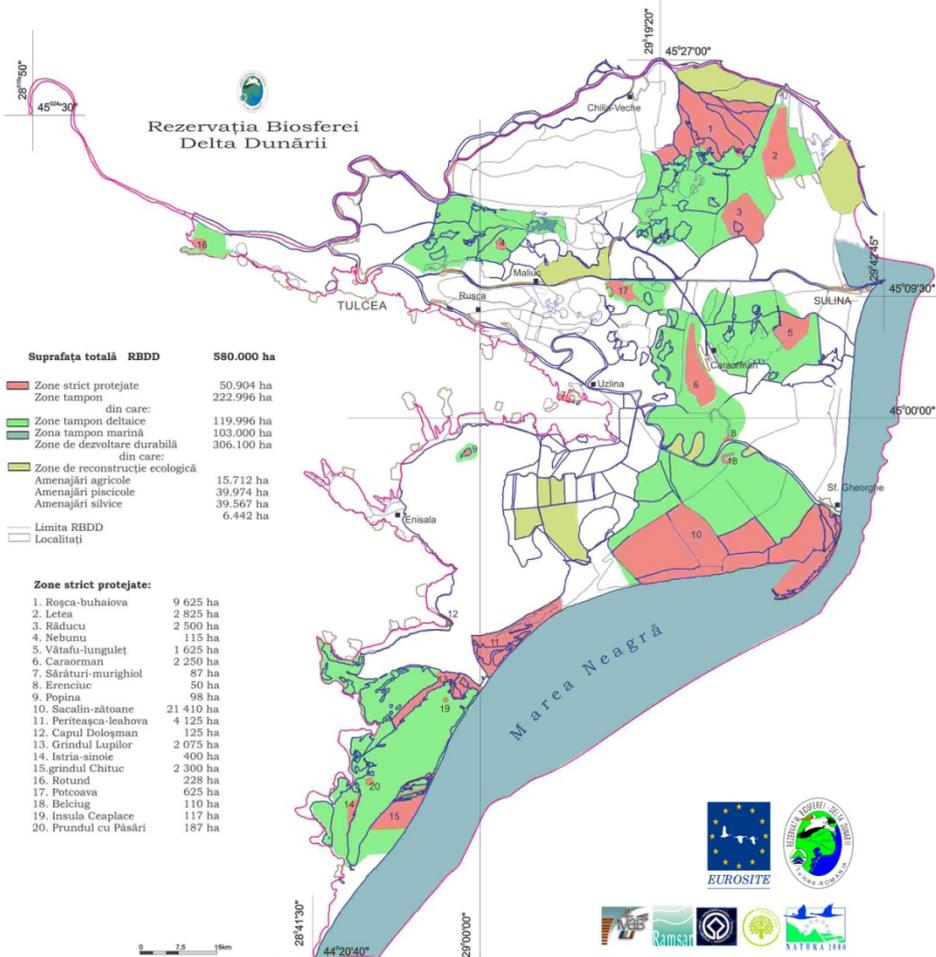


Figure 7. Map of the Danube Delta Biosphere Reserve

Danube Delta was declared a biosphere reserve in 1990 by the Government of Romania and by the Romanian Parliament through the special Law 82/1993 on Danube Delta Biosphere Reserve (DDBR) establishment modified and completed and its international importance is confirmed by its present status.

### **10.1. General presentation of the area**

The surface is about 580,800 ha. By its dimensions, the Danube Delta Biosphere Reserve is the third area in the world in terms of biological diversity with over 5,400 species of plants and animals. It is the most important wetland area in the South-Eastern Europe, having an important contribution to the regional and global water cycle and a unique place where the people are living in isolated settlements spread in the area, close dependent on the natural resources. Danube Delta Biosphere Reserve is a large refuge for migratory birds as a nesting, wintering or resting place, in their way from the Northern Europe to Africa: most of the European population of Common Pelican (*Pelecanus onocrotalus*) and Dalmatian Pelican (*Pelecanus crispus*), 60% from world population of Pygmy Cormorant (*Phalacrocorax pygmaeus*), 50% from world population of Red-breasted Goose (*Branta ruficollis*), during winter season.

Components: Danube Delta (4,178 km<sup>2</sup> Romania 82%, Ukraine 18%), Razim-Sinoie complex lagoon, Coastal Black Sea up to 20 meters isobaths, Isaccea - Tulcea sector of Danube floodplain, Danube River sector between Cotul Pisicii and Tulcea, Saraturi-Murighiol

Functional areas: Strictly protected areas: 50,904 ha, Buffer zones: 222,996 ha (marine buffer zone: 103,000 ha), Economic zones: 306,100 ha (ecological restoration: 15,712 ha, agricultural polders: 39,974 ha, fish ponds: 39,567 ha, artificial forests: 6,442 ha).

### **10.2. The international recognition**

The universal value of the reserve was recognized by the Man and Biosphere (MAB) Programme of UNESCO in 1990, through its inclusion in the international network of biosphere reserves. DDBR is listed in 1991 both as a wetland of international importance especially as waterfowl habitat under the Ramsar Convention (1991) and as a world natural heritage under the World Cultural and Natural Heritage Convention. Furthermore it received the World Wetland Network Blue Globe Award 2010 for best practice in wetland management (Nagoya, Japan) as well as the QualityCoast Gold Award 2011 for excellence in Nature and Identity a great recognition for Danube Delta Biosphe Reserve, a beautiful area rich in nature, biodiversity and cultural heritage (May 2011, Kouklia, Cyprus).

### **10.3. The European value**

The value of its natural heritage and the efficiency of the management plan applied in the Danube Delta Biosphere Reserve (DDBR) was recognised by the Council of Europe in 2000 who awarded it the European Diploma for Protected Areas, distinction renewed in 2005 and 2010. Besides its inclusion, since its creation, in the information and exchange programs of these networks, the DDBR became member of the EUROSITE who awarded in 1995 for

restoration works and in 2001 for management and public awareness. Furthermore it became EUROPARC member and Natura 2000 Site (SPA and SCI).

#### 10.4. Management strategies

The strategy is part of the management plan that deals with the problems of preparation, planning and development for integrating the objectives of the biodiversity's conservation with the implementation of the policies regarding socio-economic systems (SES). The Master Plan regards the integration of the actions for each problem identified in a global strategy that ensure the synergic realization of all the actions to achieve the proposed objectives and goals. The Master Plan's measure of success is given by the implementation degree of the proposed actions.

Action plan to achieve the management objectives in Danube Delta Biosphere Reserve:

- a. Management of species and habitats protection
- b. Integrated Monitoring
- c. Natural resources, sustainable use
- d. Tourism and leisure
- e. Cultural Heritage
- f. Community development and involvement of local population in order to increase their life standard
- g. Awareness, Information and education public
- h. Cross border cooperation, international cooperation and programmes

An efficient management supports the conservation and sustainable management of the natural resources of the Danube Delta, improving socio-economic benefits for the local population in the Danube Delta, and the financial sustainability of DDBRA, the implementation of the activities for conservation, management and monitoring of Natura 2000 sites and last but not least the improvement of the DDBRA institution capacity and adapted integrated management methods.

Strategic Objectives for 2007 to 2015 are the creation of an integrated monitoring system, an improved public infrastructure, the development of alternative economic activities, the conservation of the rural landscape and the promotion of alternative energy and the restoration of the ecosystem. Further important objectives will be the development of trans-boundary cooperation in the Lower Danube Euroregion and an adaptive management for a better biodiversity conservation.

### 11. Overall conclusion

In some EU countries provisions for protecting Natura 2000 habitats and species have already been successfully implemented in combination with funding programmes.

Agricultural systems with high natural value (HNV) can aid biodiversity and rural areas. About 25 per cent of agriculturally used areas in the EU (about 27 million ha) are potentially

suitable for the designation of HNV, especially EU states with small-structured agriculture. Biological diversity is a public good, therefore farmers must receive a sort of basic pay for the conservation of their bio-inventory according to [37].

The expense of effective implementation of Natura 2000 management is estimated at € 5.8 billion annually at the EU level. The investment should also, however, bring in a high yield of about € 200 billion to € 300 billion per year for the ecosystem services.

The objective should be to integrate the management needs for Natura 2000 starting in 2014 into the Fund for Rural and Regional Development and Fisheries. Some projects were already rudimentarily implemented in the partner countries. The funding programme Life+ will also play a decisive role in the implementation of the Natura 2000 objectives.

It is important that also other policy areas from EU include and support appropriate approaches for nature protection. The basic work for the implementation of requirements from FFH and Birds Directive should be created on a superior level. The management of Natura 2000 has to provide homogenous, comprehensible guidelines as well as measurable criteria for the monitoring of the habitats and species. A comprehensive transnational management of Natura 2000 will be implemented through BeNatur project, which can serve also for other regions as best practice approach for the implementation.

Convincing projects must be developed so that the financing is used optimally. Essentially is the creation of synergies of Natura 2000 with the other land use areas. In reference to [38], the need of management for the Natura 2000 areas must be integrated into agricultural policy so that the added value also can increase in these areas [38].

According to [38] the new Common Agricultural Policy and the agricultural-environmental provisions must steer in the direction of including concerns of biodiversity so that farmers implement environmentally beneficial provisions on the basis of voluntary contracts and also receive appropriate compensation.

The EU countries and regions are invited to adapt their own national and regional funding and management programmes to these new challenges for the integrative Natura 2000 management.

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