United Nations
Educational, Scientific and
Cultural Organization

Man And
Biosphere
Programme

Establishment of the multiple zonation system for the biosphere reserves in Hungary

BUDAPEST
2013

Table of contents

I.

Background information about the biosphere reserves in Hungary

Hungary as an UNESCO member state joined the MAB program in 1970 as one of the first countries. The Hungarian Prof. János Balogh (from the Hungarian Academy of Science) was one of the worldwide known scientists who initiated the idea of the MAB program by drawing attention to some general problems of biodiversity. Four Hungarian biosphere reserves were designated by ICC MAB of UNESCO in 1979 and one in 1980, so they are typical "first generation" biosphere reserves, whereby the emphasis of the original nomination was to place international focus on the protection and scientific research of ecosystems that have a high natural value partly due to the extensive, long-lasting interactions between man and nature, in other words "Man and Biosphere".

Date of designation:

Aggtelek Biosphere Reserve	**1979**
Lake Fertő Biosphere Reserve	**1979**
Hortobágy Biosphere Reserve	**1979**
Kiskunság Biosphere Reserve	**1979**
Pilis Biosphere Reserve	**1980**
Mura-Drava-Danube Transboundary Biosphere Reserve	***2012***

Hungary gained the grant in 2012 to establish the sixth biosphere reserve. The new Mura-Drava-Danube Transboundary Biosphere Reserve, nominated by Hungary and Croatia, is the first transboundary biosphere reserve in Hungary. It is situated along the Hungarian-Croatian border and determined by three rivers: Danube, Dráva and Mura. This is a typical "new generation" biosphere reserve where the implementation of the Seville Strategy could be started with its nomination process.

These areas were also declared national parks or landscape protection areas in the same period of time as the first set of Hungarian biosphere reserves, during 1970s and 1980s. The national park directorates (hereinafter: directorates) have been the organizations responsible under Hungarian law for the biosphere reserves since the beginning. These directorates were established with the main objective to protect the natural values of the protected areas and in line with lower level of interaction with local communities than are nowadays in most biosphere reserves, situated outside the protected areas. This was the reason why strengthening the involvement of local communities was not an issue during the first decades. Practically, only the core zone and the buffer zone were designated in the biosphere reserves by law. Following the Madrid Action Plan and the Seville Strategy, the whole structure, as well as the new functions of areas and natural interactions between biosphere reserves and local people was scoped.

Based on the answers received from the Advisory Committee for Biosphere Reserves (SC/EES/MB/5864/515, 22 August 2007), in line with the Statutory Framework and the criteria stipulated in the Seville Strategy, a comprehensive revision

was started on these first five biosphere reserves in 2008. Referring to the 60th point of the final report created by the twenty-fourth session of the International Coordinating Council of the Man and Biosphere (MAB) Program, it has been decided to finalize this comprehensive revision till early 2013.

This report presents the main steps and results of the development process. The main goal was to establish the multiple zonation system. Great emphasis was laid on the designation of the transition zones to assign those areas which are suitable to ensure properly the development function.

The official website of the Hungarian Nature Conservation:
www.termeszetvedelem.hu

Hungarian National Commission for UNESCO:
www.unesco.hu

Aggtelek Biosphere Reserve – Aggteleki National Park Directorate
www.anp.hu
anp.nemzetipark.gov.hu

Lake Fertő Biosphere Reserve – Fertő-Hanság National Park Directorate
www.ferto-hansag.hu
fhnp.nemzetipark.gov.hu

Hortobágy Biosphere Reserve – Hortobágyi National Park Directorate
www.hnp.hu
hnp.nemzetipark.gov.hu

Kiskunság Biosphere Reserve – Kiskunsági National Park Directorate
www.knp.hu
knp.nemzetipark.gov.hu

Pilis Biosphere Reserve – Pilisi National Park Directorate
www.dinpi.hu
dinp.nemzetipark.gov.hu

Mura-Drava-Danube Transboundary Biosphere Reserve – Duna-Dráva National Park Directorate
www.ddnp.hu
ddnp.nemzetipark.gov.hu

II.
Special aspects taken into account in case of the establishment of the multiple zonation system

According to the Seville Strategy and the Statutory Framework, each biosphere reserve is intended to fulfil three complementary functions.

Conservation function: the biosphere reserves have to ensure the conservation of selected ecosystems, variety of landscapes, biological diversity and genetic resources;

Development function: to foster sustainable economic and human development, which are socio-culturally and ecologically sustainable as well; and which could be realized locally taking the traditions into consideration;

Education and logistic support function: to support demonstration projects, environmental education, training, research and monitoring related to local, national and global issues of conservation and sustainable development.

These functions are in line with and harmonized within the three determined zones which have to be designated inside each biosphere reserve:

Core zone: one or more core areas, which are strictly protected sites; these areas ensure the conservation of selected ecosystems, variety of landscapes and biological diversity, and undertaking non-destructive research and other low-impact uses; – *mainly to ensure the conservation function and controlled research within the education function*

Buffer zone: the clearly identified buffer zone usually surrounds or adjoins the core areas, and is used for cooperative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism, and applied and basic research; – *mainly to ensure the conservation, education and logistic support functions, development function with restrictions*

Transition zone: this is a flexible area, or area of co-operation, which may contain a variety of agricultural activities or other land uses, settlements and in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources – *mainly to ensure the development and logistic support functions*

In Hungary, these aspects have been implemented in different ways within the territory of each biosphere reserve in order to meet national and local needs, conditions and situations, but the general rules are the same. According to the Hungarian Act on Nature Conservation the core zone is strictly protected area. All the core areas and buffer zones are also protected by national law, being mainly national parks or landscape protected areas.

In case of Aggtelek BR, Lake Fertő BR and Hortobágy BR a part of the territory simultaneously overlaps with internationally recognized World Heritage sites. They are

especially important for the transition zone due to their high attraction for tourism. The cultural and natural values within the same area promote and demonstrate a balanced relationship between local people, visitors and the nature.

General aspects and rules:

- according to the Hungarian Nature Conservation Act *(Act No. LIII. of 1996 on Nature Conservation)* the whole core zone is strictly protected area;
- all the core zones have to be surrounded by buffer zones (deviation from this rule is allowed only in special cases);
- in the transition zone the development function should dominate, therefore the main aspect related to the designation of the transition zone is to ensure the implementation of the development function (tourism, recreation, agricultural and other land use and management activities, NGO activities, involvement of local people etc.);
- in the course of the designation of zones, existing Natura 2000 sites and other internationally recognized sites such as World Heritage Sites, Ramsar Sites, or other areas for example High Nature Value Areas should be taken into consideration as well;
- settlements may also be part of the biosphere reserve, but it is recommended to include them into the transition area;
- the local stakeholders, the municipalities, the NGO-s and the local development agencies should be involved in the revision process;
- it is highly recommended to cooperate with managers of the other biosphere reserves in the region and to collect international experiences and good practices.

National cooperation:

- the National MAB Committee was renewed in 2012; the new committee represents altogether 22 members from different background knowledge (scientists, researchers, organic farmers, landscape planners, local managers, tourism specialists, NGOs, all the directors of the relevant national parks who lead the management activities on the biosphere reserves as well etc.);
- meetings organized by the Ministry of Rural Development for the managers of the biosphere reserves;
- good cooperation exists between managers of the Hungarian biosphere reserves, so there were many negotiations, meetings for experience exchange during revision process;
- good-cooperation with local NGO-s, development agencies, municipalities, farmers etc.

International cooperation and experience exchange:

- Good cooperation with Slovak Karst Biosphere Reserve;
- Neusiedlersee-Seewinkel National Park;
- EuroMAB meeting in Sweden, Jönköping, 2012 (good opportunity for experience exchange with the representatives from the UK, Sweden, Israel, Canada, Republic of South Africa etc.);
- GreenBelt conference in FYR of Macedonia;
- other relationships.

III.

Designation of the zonation system, process and results

The Department of Nature Conservation in the Hungarian Ministry of Rural Development is responsible for national coordination issues of the biosphere reserves (hereinafter: BR). This coordinator body organized meetings with participation of every BR manager as the first step of the two years long designation process in 2011. The discussions during the first meetings focused on gathering all the main aspects and the UNESCO requirements. On the second stage the BR managers presented the actual states and the special situation one-by-one, examined the possible areas for the zones and concentrated on the progress to fulfil the requirements of the Seville Strategy and the Madrid Action Plan.

The summarized results were presented by the Ministry before the real designation process has started. Great emphasis was laid on determining the transition zones and ensuring the development function of the biosphere reserves as these were the issues that had been much debated. In 2012 each BR manager created a long-term report which focused on the progress and their experiences.

The first draft of the zonation maps were created on the basis of these discussions and source materials. This was the step when the BR managers turned to the relevant stakeholders with these draft ideas during 2012. Forums were held to discuss the views of the stakeholders. Non-governmental organizations, development agencies, municipalities and local farmers were involved. Some good ideas appeared and implemented during the process.

During 2012 the Hungarian MAB National Committee reestablished. Some of the members were also changed. The main aspect of the renewal was to involve the representatives of the most relevant stakeholders into the work of the committee. Scientists, forestry companies, NGOs, touristic experts, farmers etc. were invited to take part in the coordination of the BR as the members of the committe. The members of the new MAB National Committee are listed below.

The draft zonation plans were presented to the MAB National Committee at the end of the last year (in 2012). After the finalization process the multiple zonation system was supported and accepted by the committee. Each of these zonation maps are presented in the following chapters with comments representing each special situation for better understanding. Progress reports for every biosphere reserve were also prepared to represent an overview about the long-term implementation process of the Seville Strategy in Hungary and its actual state.

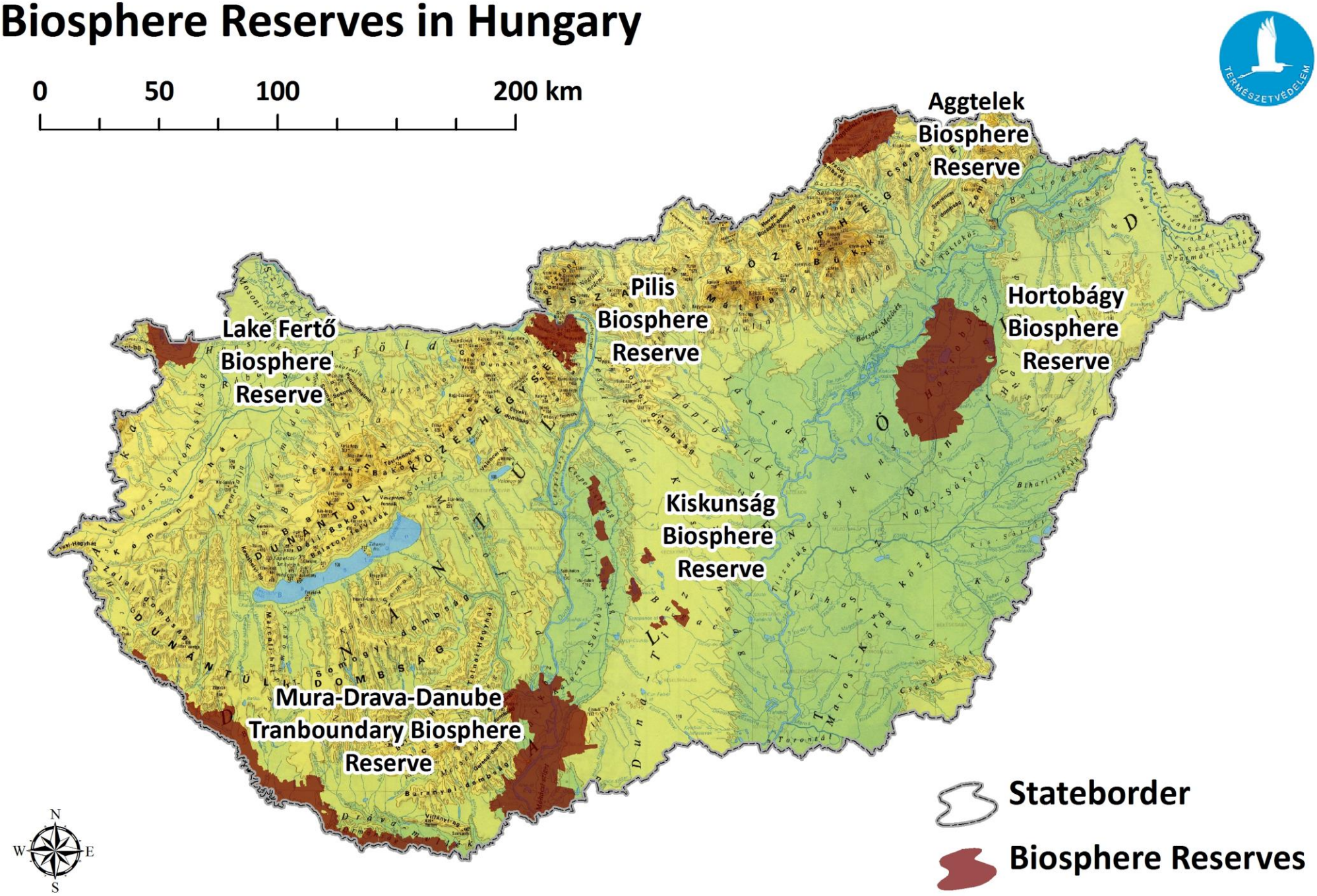
VIDÉKFEJLESZTÉSI MINISZTÉRIUM * 26. *

Rozália Érdiné Dr. Szekeres
Chair of the
Hungarian MAB National
Committee

The members of the new Hungarian MAB National Committee

Name	Organization	Position / Function
Chair		
Rozália Érdiné dr. Szekeres	Department of Nature Conservation, Ministry of Rural Development	Head of Department, Chair of the Committee
Secretary		
Szilvia Ádám	Department of Nature Conservation, Ministry of Rural Development	Ecological Councillor
Krisztina Koczka	Department of Nature Conservation, Ministry of Rural Development	Ecological Councillor (now on maternity leave)
Állandó meghívottak		
Ervin Balázs	Hungarian National Commission for UNESCO Committee for Natural Sciences	Chair
Katalin Csillag	Hungarian National Commission for UNESCO	Secretary-General
Bálint Hudecz	Hungarian National Commission for UNESCO	Programmes Specialist
TAGOK		
Balázs Veress	Aggteleki National Park Directorate	Director
Zoltán Puskás	Balaton Uplands National Park Directorate	Director
Szabolcs Závoczky	Duna-Dráva National Park Directorate	Director
András Füri	Duna-Ipoly National Park Directorate	Director
Gábor Reischl	Fertő-Hanság National Park Directorate	Director
Gábor Szilágyi	Hortobágyi National Park Directorate	Director
Emil Boros, Dr.	Kiskunsági National Park Directorate	Director
Attila Borhidi, Dr.	University of Pécs	Professor
András Báldi, Dr.	Centre for Ecological Research, Hungarian Academy of Sciences	Director-General
János Tardy, Dr.	Budapesti Business School, College of Commerce, Catering and Tourism	Professor
Katalin Török, Dr.	Centre for Ecological Research, Hungarian Academy of Sciences	Senior Member
Péter Zambó	Pilis Park Forestry Company Ltd.	Director-General
Dénes Bartha, Dr.	University of West Hungary, Faculty of Forestry	Professor
János Lerner	Islandia Travel Agency	Expert on Tourism
Szabolcs Lengyel, Dr.	Centre for Ecological Research, Hungarian Academy of Sciences	Senior Member
János Lingauer	Nature Conservation Office	Expert on Tourism
Dezső Szomor	Szomor Ecofarm	Farmer, Land Manager
Zsolt Tiffán	Baranya County Assembly	Chair of the Assembly
Ákos Fáth	WWF Hungary	Director

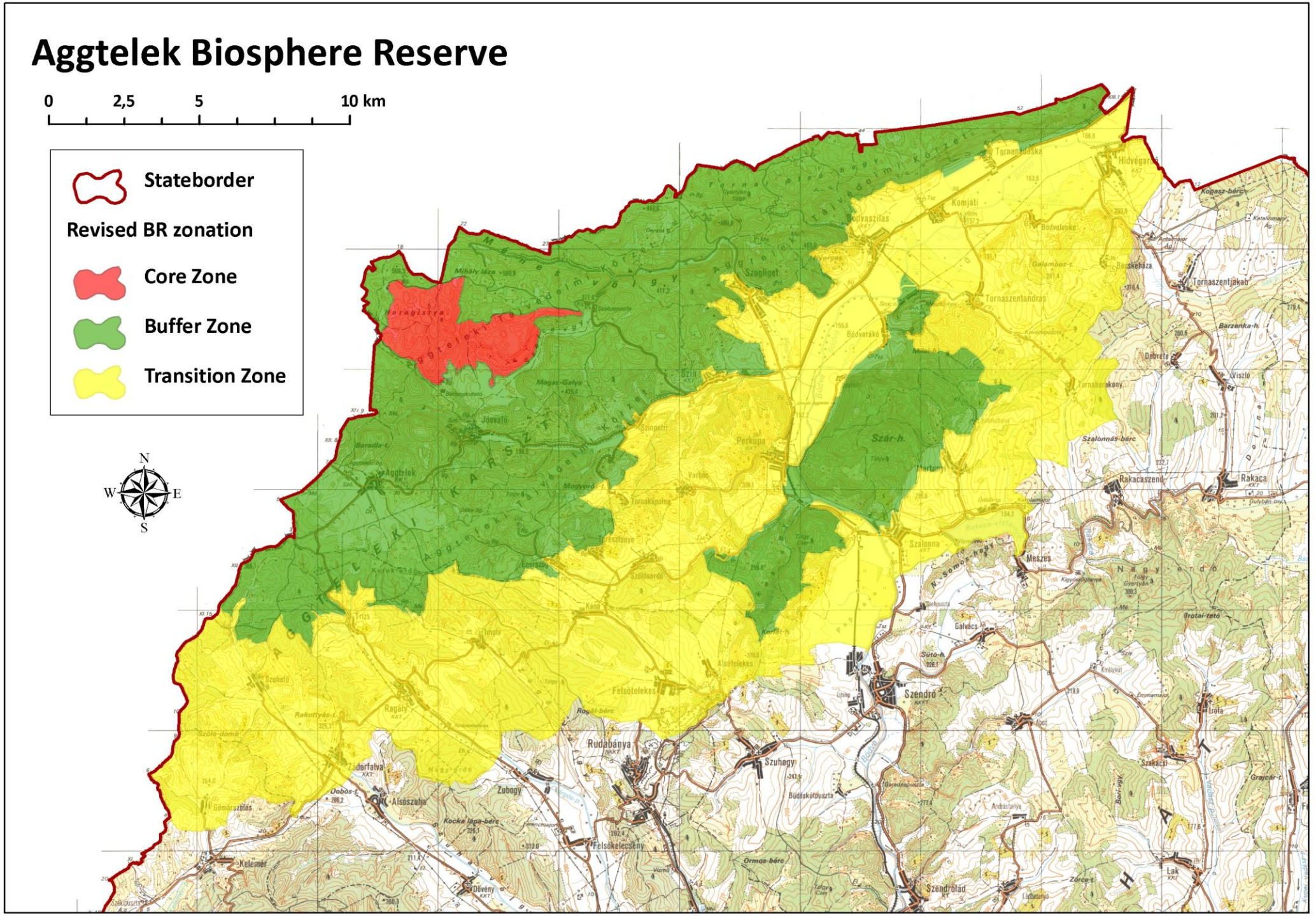
Biosphere Reserves in Hungary



AGGTELEK BIOSPHERE RESERVE

JÓSVAFŐ 2013

Aggtelek Biosphere Reserve



Aggtelek Biosphere Reserve

GENERAL INFORMATION

Aggtelek Biosphere Reserve – like all other Hungarian BRs – was a typical *„first generation*" BR designated in 1979. Its origin area was almost equal to the existing Aggtelek Landscape Protection Area which is nationally protected and was pronounced by the Hungarian law. The Aggtelek Landscape Protection Area became a national park in 1985. So the original core area and the buffer zone are under the highest national level of nature protection.

Topography of the region

Low, karstic mountain region with the altitude of 150-604 m. Topographically dominated by systems of karstic plateaus dissected by deep valleys of river Bódva and several streams (for example Jósva, Tohonya, Ménes, Telekes streams).

Climate

The climate is humid continental with long summers. The Carpathian Mountains have a relatively strong climatic influence upon the Aggtelek Karst. The average annual temperature is rather low, 8.2 °C and the average temperature is only 15.5 °C in the growth season, such value can be measured only in higher mountains in Hungary. The annual precipitation used to be between 600-700 mm but it significantly decreased last years, the average was about 400-500 mm. It is worth mentioning that the local

microclimates are strongly influenced by the relief. On sunny summer days, the ambient temperature on the plateaus is affected significantly by intensive insolation. Local inversions arise between the warmer, sunnier, and therefore drier summit plateaus, and the cooler, wetter valley bottoms, which remain in shadow for most of the day.

Geology, geomorphology

This is the most typical karstic area in Hungary. It is built up mainly of Triassic limestone with some dolomite, clayey shale and sandstone. Quaternary sediments have mainly accumulated at the base of plateau slopes. The area is showing all the typical features of karstic region of medium height: deeply incised valleys, perennial and large-discharge springs, brooks, scarcely forested or barren rocky mountain-sides and large dry dolinas, extended karstic plateaus. Subsurface karstic features are in extraordinary high concentration. The registered number of caves is more than 260, among which the large horizontal caves belonging to the water system of Jósva stream and the deep potholes of Alsó-hegy Plateau are the most impressive.

Soils

The variety of soil types reflects the region's heterogeneous geological composition. Limestone, dolomites and their talus at the base of slopes are covered by the product of long-term weathering and fossil soils (terra rossa). Brown rendzinas, common rendzinas and luvisols occur on the lower slopes of valleys, where gravels or clayey materials have accumulated through the weathering of limestones. Cambisols and rendzinas are characteristic of plateau sites with fewer fine karstic forms and with thicker weathering deposits, often continuously covered by oak-hornbeam forest. In the basins, brown soils are found on the margins, and hydromorphic floodplain and floodplain gley soils in the floodplains.

GENERAL INFORMATION ABOUT THE BIOLOGICAL DIVERSITY

Habitats within the whole territory of BR:

- Caves
- Springs, streams, river,
- Petrifying spring with tufa formations (Cratoneurion),
- Calcareous rocky slopes with chasmophytic vegetation,
- Sub-continental steppic grasslands,
- Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis),
- Medio-European calcareous scree of hill and montane levels,
- Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe),
- Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis),
- Mountain hay meadows,
- Molinia meadows on calcareous, peaty, or clavey-silt-laden soils,
- Alluvial meadows of river valleys of the Cnidion dubii,
- Alkaline fens,
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels,
- thickets,
- European dry heaths,

- Juniperus communis formations on heaths or calcareous grasslands,
- Pannonian spiraea scrub,
- Subcontinental peri-Pannonic scrub,
- Asperulo-Fagetum beech forest,
- Medio-Europaean beech forests of the Cephalanthero-Fagion,
- Tilio-Acerion forests of slopes, screes and ravines,
- Pannonic woods with Quercus petraea and Carpinus betulus,
- Hornbeam and oak forest with Waldsteinia geoides,
- Pannonian-Balkanic turkey oak-sessile oak forests,
- Pannonian woods with Quercus pubescens,
- Thermophilous oak forest,
- Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae).

ENDANGERED OR THREATENED PLANT SPECIES

Habitats Directive, Annex II.:

- Adenophora liliifolia
- Cypripedium calceolus
- Dracocephalum austriacum
- Echium russicum
- Eleocharis carniolica
- Himantoglossum caprinum
- Onosma tornense
- Pulsatilla grandis
- Thlaspi jankae

IUCN World Red Book (List of rare, threatened and endemic plants in Europe)

- Carex brevicollis
- Cypripedium calceolus
- Dracocephalum austriacum
- Eleocharis carniolica
- Onosma tornense
- Thlaspi jankae

Hungarian Red Book

- Achillea ptarmica
- Aconitum lycoctonum subsp. moldavicum
- Aconitum variegatum subsp. gracile
- Adenophora liliifolia
- Adonis vernalis
- Alchemilla vulgaris
- Alyssum montanum brymii
- Anacamptis pyramidalis
- Anemone sylvestris
- Anthriscus nitida
- Aquilegia vulgaris
- Asplenium viride
- Aster amellus
- Astragalus vesicarius subsp. albidus
- Asyneuma canescens
- Avenula compressa
- Calamagrostis varia
- Campanula latifolia
- Campanula macrostachya
- Cardamine glanduligera
- Carex brevicollis
- Carex buekii
- Carex caespitosa
- Carex hartmanii
- Carlina acaulis
- Ceterach officinarum
- Chaerophyllum hirsutum
- Chamaecytisus ciliatus
- Coeloglossum viride
- Corallorhiza trifida
- Cotoneaster integerrimus
- Crepis capillaris
- Crepis pannonica
- Cyclamen purpurascens
- Cypripedium calceolus

- Dactylorhiza incarnata
- Dactylorhiza maculata
- Dactylorhiza majalis
- Dactylorhiza sambucina
- Dianthus praecox subsp. praecox
- Dianthus superbus
- Dracocephalum austriacum
- Dryopteris dilatata
- Dryopteris expansa
- Echium russicum
- Eleocharis carniolica
- Epipactis atrorubens
- Epipactis leptochila
- Epipactis muelleri
- Epipactis palustris
- Epipactis purpurata
- Equisetum hyemale
- Eriophorum angustifolium
- Eriophorum latifolium
- Erysimum odoratum
- Erythronium dens-canis
- Fritillaria meleagris
- Gentiana cruciata
- Gentiana pneumonanthe
- Gentianopsis ciliata
- Geranium sylvaticum
- Geum aleppicum
- Glyceria declinata
- Gymnadenia conopsea
- Gymnadenia odoratissima
- Hypericum maculatum
- Inula helenium
- Iris graminea
- Iris sibirica
- Isatis tinctoria
- Jurinea glycacantha
- Lappula heteracantha
- Lathyrus pannonicus
- Lathyrus pisiformis
- Limodorum abortivum
- Linum flavum
- Medicago rigidula
- Moneses uniflora
- Muscari botryoides
- Onosma tornense
- Onosma visianii
- Orchis laxiflora subsp. palustris
- Orchis mascula subsp. signifera
- Orchis militaris
- Orchis morio
- Orchis purpurea
- Orchis tridentata
- Orchis ustulata
- Orthilia secunda
- Parnassia palustris
- Phegopteris connectilis
- Phlomis tuberosa
- Poa scabra
- Polygala major
- Polygonatum verticillatum
- Polystichum lonchitis
- Primula elatior
- Pulmonaria angustifolia
- Pulsatilla grandis
- Ranunculus lingua
- Ribes alpinum
- Ribes rubrum
- Rosa pendulina
- Rubus saxatilis
- Rumex aquaticus
- Salix aurita
- Saxifraga paniculata
- Sempervivum marmoreum
- Seseli peucedanoides
- Sesleria heufleriana
- Silene bupleuroides
- Silene nemoralis
- Sorbus ×rotundifolia
- Sorbus aria
- Sorbus bükkensis
- Sorbus danubialis
- Sorbus graeca
- Sorbus jávorkae
- Sorbus latifolia
- Sorbus pannonica
- Sorbus soói
- Sorbus thaiszii
- Sorbus zólyomii
- Stipa tirsa
- Tephroseris aurantiaca
- Thalictrum foetidum
- Traunsteinera globosa
- Viola collina

ENDANGERED OR THREATENED ANIMAL SPECIES

Habitat Directive, Annex II.:

- Barbastella barbastellus
- Barbus meridionalis petenyi
- Bolbelasmus unicornis
- Bombina bombina
- Bombina variegata
- Canis lupus
- Cerambyx cerdo
- Citellus citellus
- Cobitis taenia
- Coenagrion ornatum
- Colias myrmidone
- Dioszeghyana schmidti
- Duvalius hungaricus
- Erannis ankeraria
- Eriogaster catax
- Eudontomyzon danfordi
- Euphydryas maturna
- Euplagia quadripunctaria
- Isophya stysi
- Leptidea morsei
- Leucorrhinia pectoralis
- Lucanus cervus
- Lycaena dispar
- Lynx lynx
- Maculinea teleius
- Miniopterus schrebersi
- Misgurnus fossilis
- Morimus funereus
- Myotis bechsteini
- Myotis blythi
- Myotis dasycneme
- Myotis emarginatus
- Myotis myotis
- Ophiogomphus cecilia
- Paracaloptenus caloptenoides
- Pholidoptera transsylvanica
- Rhodeus sericeus amarus
- Rhynolophus euryale
- Rhynolophus ferrumequinum
- Rhynolophus hipposideros
- Rosalia alpina
- Sadleriana pannonica
- Stenobothrus eurasius
- Unio crassus
- Vertigo moulinsiana

Hungarian Red Book

- Ablepharus kitaibelii
- Amphipoea lucens
- Anax parthenope
- Apamea platinea
- Apamea rubrirena
- Apamea syriaca tallosi
- Apatura ilia
- Apatura iris
- Aquila chrysaetos
- Aquila heliaca
- Aquila pomarina
- Argynnis laodice
- Argynnis pandora
- Aricia artaxerxes issekutzi
- Aricia eumedon
- Barbastella barbastellus
- Barbus meridionalis petenyi
- Bielzia coerulans
- Bonasa bonasia
- Brenthis ino
- Bubo bubo
- Canis lupus
- Cerambyx cerdo
- Charissa pullata
- Chersotis fimbriola
- Ciconia ciconia
- Ciconia nigra
- Cinclus cinclus
- Circaetus gallicus
- Circus pygargus
- Coenagrion lunulatum
- Colias myrmidone
- Cordulegaster bidentatus
- Corvus corax
- Coscinia cribraria
- Coturnix coturnix

- Crex crex
- Cucullia campanulae
- Cucullia gnaphalii
- Cucullia lucifuga
- Cucullia xerathemi
- Dendrocopus leucotos
- Dendrocopus medius
- Dichagyris candelisequa
- Dichagyris musiva
- Drusus trifidus
- Dryocopus martius
- Dryomys nitedula
- Duvalius hungaricus
- Emberiza cia
- Ennomos quercaria
- Erannis ankeraria
- Eriogaster catax
- Euphya scripturata
- Euphydryas maturna
- Eupithecia denticulata
- Euxoa birivia
- Euxoa decora
- Euxoa distinguenda
- Euxoa hastifera
- Felis silvestris
- Furcula bicuspis
- Glis glis
- Hemaris fuciformis
- Hemaris tityrus
- Hesperophanes pallidus
- Isophya stysi
- Lanius minor
- Lanius senator
- Lasionycta proxima
- Leucodonta bicoloria
- Limenitis populi
- Lucanus cervus
- Luscinia luscinia
- Lynx lynx
- Maculinea teleius
- Marumba quercus
- Merops apiaster
- Monticola saxatilis
- Morimus funereus
- Muscardinus avellanarius
- Myotis bechsteini
- Myotis emarginatus
- Neptis rivularis
- Neptis sappho
- Notodonta torva
- Nyctalus leisleri
- Oligotricha striata
- Oria musculosa
- Otus scops
- Panchrysia deaurata
- Paracaloptenus caloptenoides
- Parnassius mnemosyne
- Parus cristatus
- Perdix perdix
- Pericallia matronula
- Pernis apivorus
- Phalera bucephaloides
- Pharmacis fusconerbulosus
- Pheosia gnoma
- Pholidoptera transsylvanica
- Photedes captiuncula delattini
- Phragmataphila nexa
- Pieris bryoniae
- Pieris manni
- Polyommatus admetus
- Potosia aeruginosa
- Proserpinus proserpinus
- Protolampra sobrina
- Regulus ignicapillus
- Rhinolophus euryale
- Rhyacia latens
- Rileyana favea
- Rosalia alpina
- Sadleriana pannonica
- Saga pedo
- Schizostege decussata
- Somatochlora metallica
- Spialia sertorius
- Staurophora celsia
- Stenobothrus eurasius
- Strix uralensis
- Sympetrum danae
- Tettigonia caudata
- Tyto alba
- Zerynthia polyxena

Species of traditional or commercial importance:

- flower of Tilia plathyphyllos, Tilia cordata,
- plant of Centaureum minus, Hypericum perforatum,
- fruit of Cornus mas, Crataegus monogyna, Prunus spinosa, Rosa spp.,
- seed of Alnus, Sorbus spp., Acer spp.,
- edible mushrooms,
- Helix pomatia

The following species are hunted in the BR only outside the core areas, and there are temporal and spatial restrictions in effect:

- Anas platyrhynchos
- Phasianus colchicus
- Lepus europaeus
- Cervus elaphus
- Capreolus capreolus
- Ovis musimon
- Sus scrofa
- Vulpes vulpes.

Forestry: 75% of the area of the BR is wooded. There are forestry activities restricted in time and spatial scale in 43% (6.500 ha) of the forest.

ZONATION DEVELOPMENT

According to the statutory framework, the zonation has been finished in the Aggtelek Biosphere Reserve (hereafter: ABR). During this procedure the originally 230 hectare large core area was enlarged to 1.168 hectares in 2007. The determination of the core area is promulgated by a ministerial decree (7/2007. (III. 22.) decree of KvVM). The buffer zone was reshaped and the transition zone was designated during a long-term process in the previous years.

The zonation of the biosphere reserve partly overlaps with the zonation of the national park (IUCN A, B, C, D zones), which is basically determined for natural values and the required management goals.

CORE ZONE
Size: 1,168 ha

Before the revision, the core zone was inside the IUCN A-zone, the buffer zone consisted of the remaining part of the A-zone and many parts of the B- and C-zones. The main goal, as basic activity, in each of them is conservation. In the territory of the core zone the preservation must assure the self-governing function of nature and some essential active management activities are also allowed. Originally the A-zone was bigger than the core area of the biosphere reserve, and it is separated into two subzones by management activities. A1-subzone met the criteria of a scientific reserve, where management is not allowed at all, this was mainly the core zone of the BR. In the A2-subzone some management activity is possible but only with conservation purposes. Now, after the revision, the core territory of the BR is extended to be equal to the A-zone (A1 and A2 subzones). The whole core zone is covered by Natura 2000 sites as well. Many parts of the core area are also designated as a Special Protection Area (under the Birds Directive) and as a Special Area of Conservation (under the Habitats Directive).

BUFFER ZONE
Size: 19,016 ha

The buffer zone was a variety of the IUCN zones as it was mentioned above. After the revision the A2-subzone part of the buffer zone has been shifted to the core zone. Now the buffer zone consists mainly of the IUCN B-zone and some part of the C-zone. The original designation of IUCN B-zone had the same purpose as the goal of the BR's buffer zone, in particular to preserve the core zone and mitigate the effects coming from outside, although the buffer zone is also very valuable itself. Because the management is done mainly with conservation purposes, all activities may strengthen the conservation function of the core zone. Beside this, its functions are research and preservation with professional and educational purposes. Specialized active nature management and research are supported. The practice of traditional forms of extensive farming is not only possible but also desirable here. The territory of the B-zone is smaller than the whole buffer zone of the BR. Some parts of the C-zone are also included in the modified buffer zone. Here we can find 2 settlements, tourist caves, information centers, so the tourism and recreation are also appearing here but not as the main function. The Baradla area (2075,3 ha) of the buffer zone was designated as Ramsar Site in 2001. The whole buffer zone is also part of the Natura 2000 network.

TRANSITION ZONE
Size: 25,127 ha

The transition zone is situated outside the national park and is almost equal to IUCN D-zone. It is not legally protected by national law but this area is also under a moderate control of the National Park Directorate. Sustainable cultivation in harmony with the aims of nature conservation is allowed, which is additionally supported by the Environmentally Sensitive Areas agro-environmental scheme. Some parts of the transition zone are also designated as Natura 2000 site. The implemented arrangements provide important conservation functions for these territories, as well. The development of the transition zone following the suggestions of the Advisory Committee for Biosphere Reserves was accomplished. The discussions with the stakeholders and public consultation have been ongoing for years.

The development function is basically connected to buffer and transitional zones in the ABR. Traditional forms of extensive farming, e.g. pasturing and mowing, are preferrable in these zones. The whole transition zone and some part of the buffer zone are within an agricultural program and designated as High Nature Value areas as well. The farmers have the opportunity to apply for money if they do their farming activities on a determined environment and nature friendly way. Settlements are also included in the transition zone. Forestry, pastures, hayfields, arable lands, old orchards, tourism activities can be pursued under control of nature conservation.

Research and education functions are related to all zones. Research activity can be carried out in all areas of the BR (of course only environment friendly methods); but in case of tourism and education programs it is more favorable if these are generally localized to buffer and transitional zones.

Progress on the implementation of the Seville Strategy

Management Plan

As it was mentioned before the territory of the ABR overlaps with the Aggtelek National Park which is protected by the Hungarian law. Because of this situation, a Nature Protection Management Plan is necessary to determine the conservation measures. This Management Plan has to be synchronized with the revised zonation system and the utilization plans of the BR.

The finalization of the management plan is almost compiled.

Cooperation with other Biosphere Reserves

ABR has specific agreement with the Slovak Karst Biosphere Reserve. Both BRs are in the Gömör-Torna/Gemer-Turna Karst area which is the southernmost part of the inner limestone zone of the Northern Carpathians. Although the two reserves are divided by the common border, they constitute an integral unit from geographical, geological, hydrological and cultural aspects. The whole protected area covers 560 square kilometers. The active cooperation basically targets synchronized research programs, monitoring and special management mainly against the invasive alien plant species.

Beside the nation-wide cooperation of ABR, it has continuous professional collaboration with other BR managing organizations in Hungary, further national park directorates and the Ministry of Rural Development.

The Framework Convention on the Protection and Sustainable Development of the Carpathians („Carpathian Convention") was signed in May, 2003 in Kiev. The ABR was involved in this Network of Protected Areas. The main goals of the convention are very similar to MAB purposes. The Directorate takes part in the elaboration of strategies and action plans.

A) Conservation Function

98.9 % of the core and the buffer zones are owned by the state and managed by Aggtelek Directorate (28.2%) and Északerdő Zrt. (forestry company). The most important habitat rehabilitation and restoration activities were carried out during the implementation of two Interreg projects.

The grants were used for the following activities in the last 5 years

Rehabilitation and restoration works on montane grassland habitats (hay meadows, pastures). 16% of the total area of the BR is covered by different grasslands. Most of these grasslands were created in the 17th-19th centuries by clear-cuts. Meadow steppe plant species formed valuable associations on the regularly managed (mowed, grazed) meadows. Several protected plant and animal species inhabit these lands therefore these are some of the most valuable habitats in the ABR. When the livestock grazing ended in the region, the traditional management also stopped and shrubs began

to occupy these open lands. Part of these projects dealt with the restoring of several meadows on 95.8 hectares.

Nowadays the removal of aggressively spreading invasive plant species (*Amorpha fruticosa*, *Ailanthus altissima, Solidago spp, etc.*) is a big challenge. The management of invasive species is a very complex and complicated task among conservation activities.

A big problem is that *Solidago* species spread on abandoned ploughlands and grasslands especially in the surroundings of settlements. The effective removal requires permanent management. The applied technologies are regular mowing and circumspect using of chemicals. This management is implemented on 500 hectares every year.

The forceful spreading of *Ailanthus altissima* causes problems especially on rocky slopes. As part of habitat rehabilitations we had got rid of graniferous individuals first then almost all spears were removed on the most important hillside (Alsóhegy) where the strictly protected endemic Tornaian yellowdrop (*Onosma tornense*) lives. According to the experiences, which are consistent with other observations collected from international and national publications, the exclusively applicable technology is the use of chemicals. For maintaining the actual supportable conditions further continuous management is needed.

The acceptable removing technology of *Amorpha fruticosa* (1-3 hectares) is similar to removing of *Solidago* species.

Another conservation activity is the replacement of non-native tree species (evergreens, *Robinia*) with native species (e.g. turkey oak, hornbeam). The coverage of evergreens was about 8.1% of ABR territory in 1979 which has been decreased to 5.12% by the restoration works. Robinia forms about 1.2% of the woods. The maintenance of this actual state can be regarded as a remarkable result because of the very strong spreading ability of this species.

There are also some restoration works to eliminate illegal waste disposals. During the implementation of this project several different illegal and 2 legal but not appropriately implemented waste depositions were removed from the territory of the BR. In the close vicinity of Szögliget and Jósvafő, in the buffer zone, depositions of inert waste and garbage (8000 m^3) were eliminated.

The only legal deposition in the BR also was closed and 15 000 m^3 waste was taken away in 2009-2010.

Saving and creating landscape values in the ABR

The Aggtelek National Park Directorate tends to save traditions and landscape values during its own conservation, management and development work. The restoration and the supporting of the traditional land use, which were introduced herein above, help to conserve landscapes and landscape values as well.

Another activity to save and create (or recreate) the landscape values is to preserve and renovate the traditional buildings connected to the original rural life. Most of the buildings belonging to the Directorate were renovated preserving the original structures. One of the biggest projects was the renovation of an old granary in Bódvaszilas. The old and abandoned building has gained similar appearance inside and outside like the original, and has got new function (exhibition) regarding the recent needs of tourism.

B, Development function

Population living in the BR

	permanently	*seasonally*
Core Zone:	0	0
Buffer Zone:	approx. 1000	approx. 1200
Transition Zone:	approx. 10.000	approx. 10.500

There are two small villages with approximately 1000 inhabitants inside the BR and 20 along the border of the BR. More than 40% of the population is unemployed. This high rate is due to the economic changes (collapsed industry and agricultural co-operatives). Generally the population is aging, young people move into the towns. Because of this fact the traditional cultivation methods are vanishing. This causes a lot of problems from the point of view of nature conservation, because hayfields, old orchards and pastures have become abandoned, that is why all the management activities connected with these species-rich habitats are in the responsibility of the national park. Due to the economic hardship, the poor families make a living from collecting firewood, and natural resources from the protected territory.

There are no major towns in the territory of the BR, the nearest one is Miskolc with approx. 200.000 inhabitants. Miskolc is situated 70 km from the BR.

Contact with local organizations, local governments and inhabitants

The national park directorate, local governments, alliances of settlements and local enterprises started cooperation for the development of the region. The aim of this cooperation is to promote the economic and social development of the region. The national park directorate intends to extend this cooperation in order to turn attention to nature conservation and to the biosphere reserve.

The directorate supports some activities for attracting tourism, which can somehow be connected to nature conservation and sustainable development (village days, artistic camps, nature conservation camps) by providing equipment, printed materials or specialists (lectures, field programs).

The directorate organizes courses for local people, where our experts train cave or field tour guides.

Sustainable, social and economic activities

The demand is continuously increasing from the non-governmental organizations, local people, visitors and economic stakeholders for the use of the territory of the BR. But regarding the main purposes of the protected area only environmentally sustainable activities are permissible in the BR.

Most of the tourist activities are concentrated on tourist caves which are situated in the buffer zone. The number of people who visit also other parts of the BR is much smaller.

Among the recreation and sport activities the most popular ones are orienteering and hiking on tourist trails. During the authorization process, the Directorate prescribes

spatial- (no entry into the core zone) and temporal restrictions (limitations during the vegetation period) for effective nature protection. E.g. the most significant tourist route which had crossed the core area was re-directed.

Tourist associations organize guided tours for their members 5-10 times a year. The number of non-organized visitors is not very significant, according to our estimation this number is about 8,000–12,000 annually. Because of the increasing prices, the number of visitors has been decreasing for years.

Enhancement of the traditional land use

The area of ABR is basically low mountain forest, so intensive farming (plough-land using, grassland farming) has secondary relevance compared to sylviculture. Agriculture is present especially on the surrounding areas of the two small settlements (Aggtelek and Jósvafő) which are wedged in the territory of the biosphere reserve. These two villages have very special situation due to the fact that they are completely surrounded by natural values. These villages are inside the buffer zone and were mentioned before.

The extent of grasslands has been decreased intensively during the last decades because of the decline of grazing animals. Without grazing the biological succession starts and shrubs overgrow the grasslands within some years. Therefore the National Park Directorate, similarly to other directorates in the country, would like to reintroduce grazing in cooperation with local farmers but these days it is hardly realizable. To maintain the most important grasslands, the Directorate manages many territories with mowing, shrub-shredding and grazing by hucul horses, and some local farmers also keep grazing animals in small numbers. But this activity would be required on a much bigger area in the BR.

A fairly new element in the management activities is the rehabilitation of abandoned orchards. These steppe woodlands like habitats are not only perfect habitats for vulnerable species but valuable landscape elements and good resources of local fruits, as well.

The habitat management carried out by the Aggtelek NP Directorate with conservation purposes has long tradition in ABR. The Directorate follows a strict and pre-planned scheme during the management activities. Because of the limited capacity, the Directorate manages only one-third of the 1300 hectare large managed territory by own staff and tools. The remaining 900 hectares are managed by contracted undertakers from the close surroundings. 280 hectares are rented by local people who generally manage the territories by grazing and/or mowing. Renting of woodlands is not allowed. The management activities of the leaseholders are strictly regulated in their contracts. The Directorate annually contracts with 15-20 persons in average.

Within the High Nature Value Areas (HNV) program, as members of EU's Agri-environmental Scheme, there is a designated HNV in the region which has the name of Észak-Cserehát HNV (legal designation in 2009). Its area is 53,712 ha but the Agri-environmental Scheme (AES) can be supported only on 27,534 ha. 10,641 ha located inside the ABR and many other remarkable territories are in the transitional area, as well. 15 farmers are involved into the program in the territory of the BR. The ratio of the privately owned land properties within the program is small in the BR, just around 1%. The Directorate manages 660 hectares within this HNV program. All agricultural management activities have to be consistent with the conservation task of the BR.

Two larger programs are implemented for grasslands (I, II) and one for arable lands (III).

I.) Grassland management with conservation purposes, especially for effective preservation of Corncrake (*Crex crex*) on grasslands. Measures include the limitation of earliest mowing; prohibition of any chemicals; regulation of grazing.

II.) Grassland improvement and grazing with conservation purposes. Measures include the limitation of first mowing; prohibition of any chemicals; regulation of grazing. Further goal is to create more suitable habitats for other threatened grassland species.

III.) Protection of game birds on arable land. Measures include the limitation of chemicals; prescription of types of growing, rotation of growing; limitation of timetable of harvesting; limitation of maximum field size etc. Further goals are the protection of birds of prey and partridge and maintaining high biodiversity in agricultural habitats.

The Directorate has held continuously developing intensive intercourse with land managers (farmers) for years. The busiest period is in spring and summer when most of the questions concern timing, methods of mowing and different requirements of licensing.

Professional dialogue in forest management planning processes

The dialogue and collaboration is progressive with the Forest Company which is the largest land manager in the BR. The professional staffs of the Directorate help the planning process and supervise the execution of sylvicultural activities.

The focus of forestry has become oriented to better management practices such as selective timbering, selective cutting and removing of non-native species in the BR. As a result, the area, which is not used for logging, has been increased, the size of the core area has been enlarged and the areas cultivated with selective timbering which result constant coverage with forest also has grown.

These considerations are also proceeding during forest management which is carried out by the Directorate.

Several special management activities are in process to improve the quality of habitats by both large forest managers (replacing of non-native species etc.).

Validation of landscape protection in different levels of plans

The Aggtelek National Park Directorate takes part in discussion and authorization of regional and local land use and architectural plans. During these consultations we stand for the national and international landscape protection directives and standards. The conservation of traditional structure of settlements and land use is a very important point of view, but – besides considering these – we are attentive to the need of sustainable development. In the planning process, we make regular consultations with the stakeholders and planner offices. This helps to find consensus among all the parties in many cases.

We take part many times in concrete procedures, when somebody would like to get permission to his investment. The main goal of this participation is to save the traditional structure of land use and settlements and adjust the new investments to the local natural and landscape values.

Culture

There is no outstanding cultural monument in the area of the BR, some historic buildings (castle-ruin, churches), rustic dwellings and old cemeteries are worthy of mention.

C) Research and educational functions

RESEARCH

National Biodiversity Monitoring System (NBmR)

There are many research programs in the BR. Several are included in the National Biodiversity Monitoring System (NBmR). The NBmR has got standard methods, protocols to investigate the different habitats, communities and species. The main aims of the NBmR programs are to follow the condition of protected and threatened natural values, to observe actual status of flagship species in different communities and to collect data on living resources of the country.

Research themes in the National Biodiversity Monitoring System are the followings:

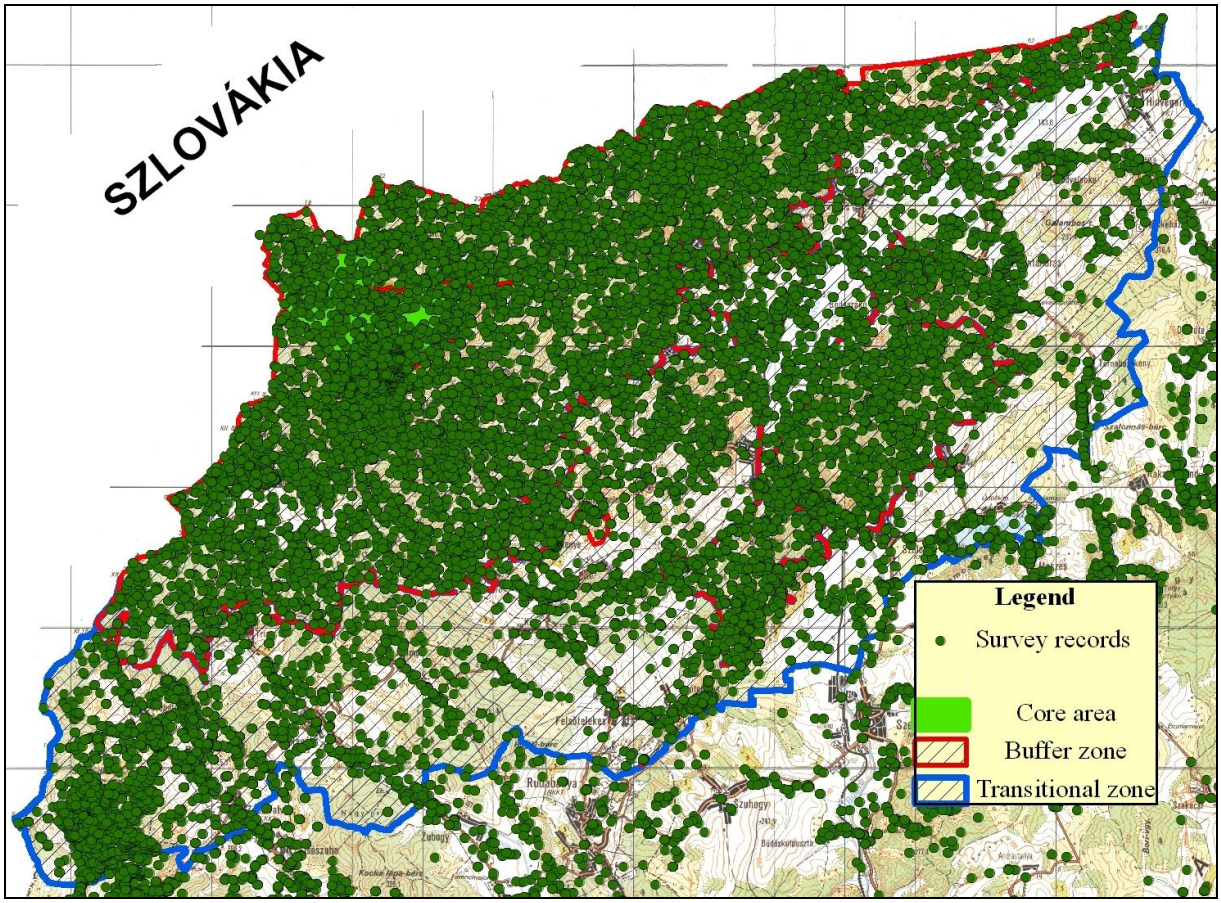
Project	Components	Taxon/research objects
I. Investigation of protected and threatened species	I/a. Vascular plant species	Aconitum variegatum subsp. gracile, Adenophora liliifolia, Astragalus vesicarius subsp. albidus, Campanula latifolia, Cypripedium calceolus, Daphne mezereum, Dianthus plumarius subsp. praecox, Dracocephalum austriacum, Echium maculatum, Eleocharis carniolica, Erythronium dens-canis, Gentiana pneumonanthe, Geranium sylvaticum, Himantoglossum caprinum, Iris sibirica, Lindernia procumbens, Onosma tornense, Parnassia palustris, Phlomis tuberosa, Pulsatilla grandis, Thlaspi jankae, Traunsteinera globosa
	I/b. Cryptogams	Dicranum viride
	I/c. Invertebrates	Lycaena dispar, Libelluloides macaronius, Paracaloptenus caloptenoides, Pholidoptera transsylvanica, Stenobothrus eurasius
	I/d. Vertebrates	Amphibia, Reptilia, Chiroptera, Citellus citellus
III. Different habitats of Hungary	III/a. Habitats	T5x5_055 – Aggtelek T5x5_069 – Jósvafő T5x5_094 – Tornanádaska
	III/b. Small mammals/ owl pellet analyses	All species.
IV. Invasive alien plants	IV/a. Plant species	Ailanthus altissima, Ambrosia artemisiifolia, Amorpha fruticosa, Asclepias syriaca, Cleistogenes serotina, Echinocystis lobata, Fallopia x bohemica, Solidago canadensis,

		Solidago gigantea
IX. Dry meadows	IX/a. Plant associations	Campanulo-Festucetum pallentis, Seslerietum heuflerianae
	IX/b. Invertebrates	Aranea, Blattodea, Formicidae, Gastropoda, Heteroptera, Lepidoptera, Orthoptera
X. Mountain hay meadows	X/a. Plant associations	Luzulo-Callunetum, Polygalo-Brachypodietum
	X/b. Invertebrates	Aculeata, Aranea, Coleoptera, Heteroptera, Lepidoptera, Orthoptera
	X/c. Orthopteran assemblages and connected plant associations	Orthoptera Pulsatillo-Festucetum rupicolae Arrhenatheretalia
XI. NATURA 2000	XI/a. Molluscs	Vertigo angustior, Vertigo moulinsiana
	XI/b. Lepidopterans	Leptidea morsei, Colias myrmidone
	XI/c. Dragonflies	Leucorrhinia pectoralis
	XI/d. Orthopterans	Pholidoptera transsylvanica, Isophya stysi, Paracaloptenus caloptenoides, Stenobothrus eurasius, Isophya costata
	XI/e. Beetles	Rosalia alpina, Morimus funereus
	XI/g. Dormouse monitoring	All species.
	XI/h. Plant species	Adenophora liliifolia, Cypripedium calceolus, Dracocephalum austriacum, Echium maculatum, Eleocharis carniolica, Himantoglossum caprinum, Galanthus nivalis, Onosma tornense, Pulsatilla grandis, Thlaspi jankae
	XI/i. Habitats	3150, 3270, 4030, 4030, 40A0, 5130, 6110, 6190, 6210, 6230, 6240, 6410, 6430, 6440, 6510, 6520, 7220, 9130, 9150, 9180, 91E0, 91G0, 91H0, 91M0
Others	Butterflies of wet meadows	Maculinea teleius, Aricia eumedon

The Directorate keeps good connections with scientists working in the area of the BR. Many different programs have been carried out and many others are in process. One of the most important programs is carried out by the researchers of Debrecen University.

The Directorate also initiates and performs research programs: investigations of large carnivores, effects of artificial lighting on bats, monitoring of birds (white stork, corncrake, birds of prey and migration of passerines), bats and synanthropic species, invasive plants and effective defences against them, general state assessment on 100 quadrates by making coenological observations. The habitat map of the biosphere reserve also has been completed in the near past.

Researches of forest reserves are also carried out in the territory of (I) Alsóhegy, (II) Haragistya – Lófej and (III) Nagy-oldal Forest Reserve (the last two partly overlap with the core area of the BR).



Survey records of different species in the Aggtelek BR.

By the result of different researches, the territory of the ABR is one of the most investigated and well-known protected territories in the country. There are approx. 200 000 biotic data which have been collected in the BR.

EDUCATION

Visitor centers and their programs

The Aggtelek National Park is suitable for various types of tourism, such as excursion, recreation, adventure tourism, active (sports) tourism, ecotourism, cultural and artistic tourism, medicinal tourism.

The tourism of the national park is concentrated in three visitor centers of primary importance: (I) Aggtelek, surrounding of the main entrance of the Baradla Cave, TOURINFORM Information Center (information point, gift shop), Baradla Restaurant, Baradla Hostel and Camping; (II) Jósvafő, surrounding of the entrance of the Baradla Cave (information point, gift shop), Tengerszem Hotel and Restaurant, headquarters of the Aggtelek National Park Directorate; (III) Vörös-tó Visitor Center (information point, gift shop, lecture room, exhibition).

Visitor centers of secondary importance: (I) Bódvarákó, entrance of the Rákóczi Cave (information point, gift shop); (II) Szögliget, Salamander house; (III) Jósvafő, Kúria Education Center; (IV) Bódvaszilas, NaturArt Granary

Typical leisure time activities:

Cave tours:

(I) standard tours (several times a day):

Baradla Cave (entrances: Aggtelek, Vörös-tó),
Vass Imre Cave,
Rákóczi Cave

(II) special tours (occasionally)

(III) sport tours (occasionally for caving groups).

Surface hiking

tourist trails

Study trail tours

Baradla study trail,
Tohonya-Kuriszlán study trail

Riding (occasionally)

Cultural, artistic events (10-15 programs annually)

Wedding in the cave (8-10 weddings annually)

Ecotourism

Baradla Cave (Aggtelek - Jósvafő): The majority of the tourists of the national park visit first of all the Baradla Cave, developed for the entertainment of the general public, and can be visited all the year round with guides. Considering the average of the last ten years, 130 000 tourists visited the cave annually.

Hucul stud (Jósvafő): The basic task of the stud is to preserve the genepool. The stud also has an important role in conservation processes. Nowadays the horses of the National Park take part in equestrian competitions, education, tourism, traditional shows. The Park organizes children camps, mounted tours, „shadow ranger" tours all the year round.

Baradla Study Trail: This is a 7.5 km surface trail connecting the entrances of the Baradla Cave situating in Aggtelek and Jósvafő. In this trail the visitor can get geographical, zoological, botanical and cultural information on the national park from 18 information boards.

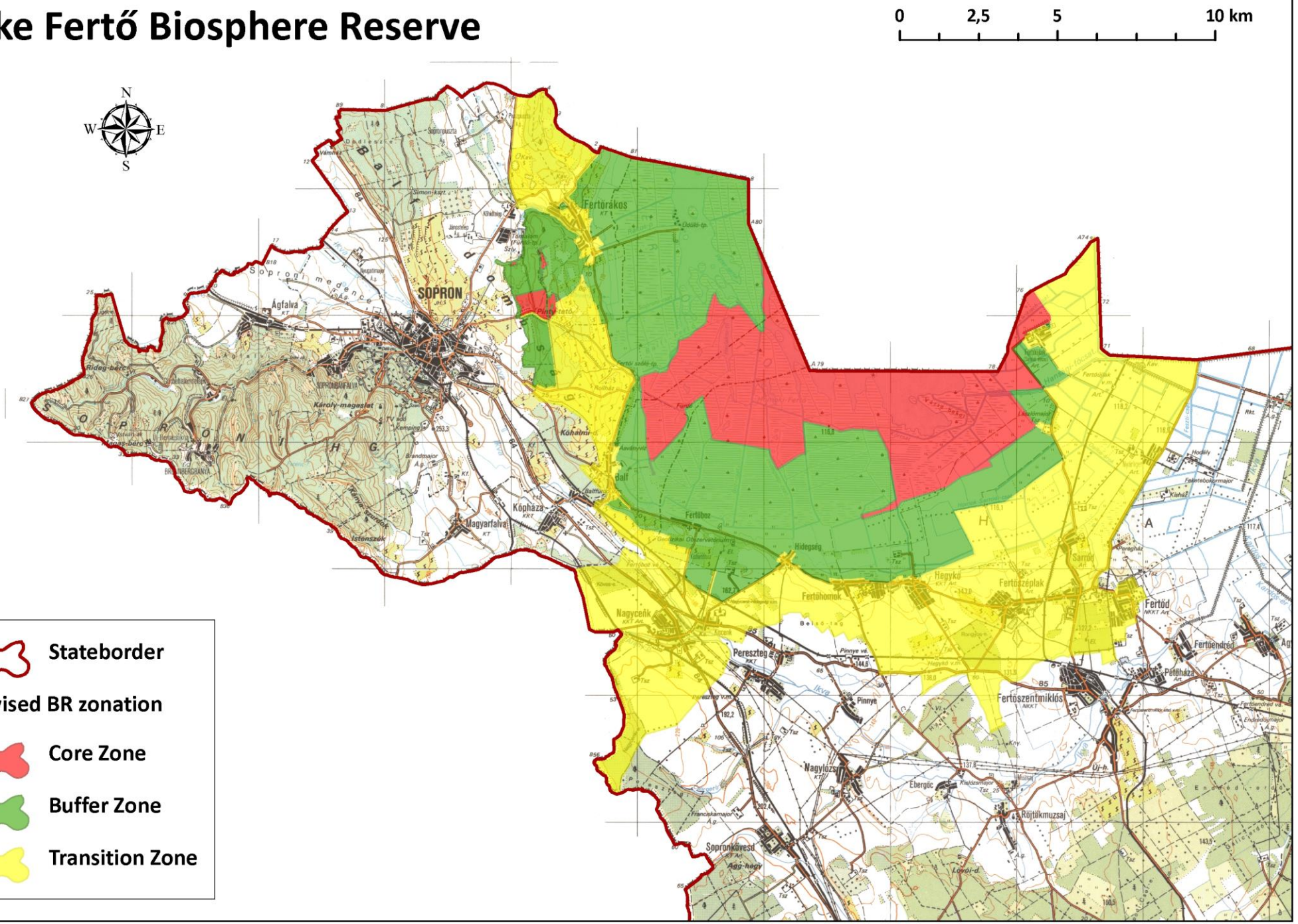
Tohonya-Kuriszlán Study Trail: This is a 9 km circuit around Jósvafő, introducing mostly the geographical assets of the national park, with the help of 26 information boards.

LAKE FERTŐ
BIOSPHERE RESERVE

Fertő-Hanság
Nemzeti Park

SARRÓD
2013

Lake Fertő Biosphere Reserve



Lake Fertő Biosphere Reserve

GENERAL INFORMATION

Lake Fertő Biosphere Reserve (hereinafter FBR) – like most other Hungarian BRs – is a typical „*first generation*" BR, designated mainly for the conservational purpose. Setting up the FBR far preceded the organizing of the Lake Fertő National Park (later extended to: Fertő-Hanság National Park covering the whole Fertő-Hanság wetland basin) and served as the main issue of nature conservation near and behind the iron curtain. The area behind the iron curtain was a nearly abandoned territory, a no man's land between Hungary and Austria. It was completely intact for nearly 40 years entered only by border guards and very few civilians with specific licenses to do works with reed management, some fishing, hunting and – exceptionally – birdwatching or other research. Outstanding natural values, mainly nesting and migrant bird fauna developed on the undisturbed, huge reed habitats. After the time of change (1990) the iron curtain has been removed and a newly organized local nature conservation body was set up, with a staff responsible for preserving the site, the Lake Fertő National Park.

A national park directorate was established to manage the Fertő-Hanság National Park and other protected areas in the region. The legal and on-the-spot protection of sites is the main priority of the daily activity of the staff, through management as well as taking part in consultations on local development plans, land use changes, etc.

On the other hand, the inner sites of the lake, through the wide (reaching locally several km-s) reed belt cannot be accessed easily: there is no route, path, navigation facility, channels, so the intact, undisturbed state of the great egret and heron nesting colonies (which is essential for conservational aspect) can be achieved with alternative

attractions: guided tours to the less sensitive but wild enough sites and easily accessible habitat restoration sites with touristic facilities.

Topography of the region

The area is a saline lake with huge reedy areas, and saline meadow, xerophilous oak forest associations are found in its surroundings.

Lake Fertő is the second largest lake in Hungary (the fifth in Europe). Its area is 309 km^2 but only 75 km^2 belongs to Hungary. The water level of this steppe-lake is fluctuating, and it is less than 1 meter deep on the average. The lakebed is flat and only the middle of the lake is deeper by 50-60 centimeters. When the water level is at 115.50 m above sea level, the length of the lake is 35.5 km and its average width is 8.2 km, the total length of the lakeshore is 67.4 km in Austria and 24.7 km in Hungary. The water catchment area of the lake is 1244 km^2. The biggest part of its water content originates from rainfall and groundwater but two small streams (the Rákos-stream in the Hungarian part and the Wulka in Austria) bring some water to the lake too. The average amount of water of the lake is 400 million m^3 at 114-115 m above water level.

Climate

Dry continental climate with semiarid influence.

Conditions:

- Average rainfall / year: 629 mm
- Average temperature / year: 10.1 ^{0}C
- Average temperature in January: -1.5 ^{0}C
- Average temperature in June: 18.7 ^{0}C
- Prevailing wind: N, NW
- Windiest months: April - June

Geology, geomorphology, soils

The lake is situated in a depression of the Kisalföld region connecting to the deeper Hanság-basin in the East. The original surface of its basin had been created by the sediments of an ancient, huge, naturally desalinating lake-basin during the late Pliocene age, but it was formed by the wind later and the Ancient Danube and Lajta rivers brought and deposited layers of gravel and clay.

The Fertőmelléki Hills run along the western shores of the lake. Their bedrock consists of Lajta limestone. A layer of Sarmatian rock lies on this Lajta limestone, originating from the early Miocene age. At places there are layers of pebble, sandstone and loess, too. At the eastern shores of the lake some boggy and sedimental soils have also been formed.

One of the most important character of the lake's water is the high alkaline and hydrocarbonate content. The high natrium- and magnesium carbonate and natrium- and magnesium sulphate contents make the water so rich in life. The age of the lake is approx. 20,000 years.

GENERAL INFORMATION ABOUT THE BIOLOGICAL DIVERSITY

Habitats within the whole territory of BR:

- **alkaline lake:** On the Hungarian part there are two large bays (Fertőrákos and Madárvárta bays) and several small inlets and creeks. Open water forms about

20% of the whole surface. The water is opalescent and its hydrocarbonate content is high. The water is not deeper than 1.5 m, and the lakebed is covered by thick mud.

- **reedbeds:** One part of the reed belt is harvested annually (it is advantageous from nature conservation point of view because the natural sedimentation processes are slowed down by the reed harvesting) although reed harvesting is declining.
- **wet and dry alkaline meadows:** These are flooded by natural waters for shorter or longer periods especially during springtime, except for some areas located on higher ground level. Sometimes these floods remain in the deeper areas for the whole year.
- **xerophilous forests**

ENDANGERED OR THREATENED PLANT SPECIES:

- Cephalanthera damasonium
- Cephalanthera rubra
- Cypripedium calceolus
- Dactylorhiza incarnata
- Dactylorhiza majalis
- Dactylorhiza sambucina
- Epipactis atrorubens
- Epipactis helleborine
- Epipactis palustris
- Gymnadenia conopsea
- Iris graminea
- Iris pumila
- Iris sibirica
- Iris variegata
- Limodorum abortivum
- Liparis loeselii
- Listera ovata
- Neottia nidus-avis
- Ophrys insectifera
- Ophrys sphegodes
- Orchis laxiflora
- Orchis militaris
- Orchis morio
- Orchis purpurea
- Orchis ustulata
- Pinguicula vulgaris
- Platanthera bifolia
- Platanthera chlorantha
- Potamogeton pectinatus
- Pulsatilla grandis
- Pulsatilla pratensis ssp. nigricans
- Spiranthes spiralis

ENDANGERED OR THREATENED ANIMAL SPECIES:

- Accipiter gentilis
- Acrocephalus arundinaceus
- Acrocephalus melanopogon
- Acrocephalus palustris
- Acrocephalus schoenobaenus
- Acrocephalus scirpaceus
- Alauda arvensis
- Anas acuta
- Anas clypeata
- Anas platyrhynchos
- Anas strepera
- Anguis fragilis
- Anser albifrons
- Anser anser
- Anser fabalis
- Ardea purpurea
- Ardeola ralloides
- Athene noctua
- Aythya ferina
- Aythya nyroca
- Bombina bombina
- Botaurus stellaris
- Branta ruficollis
- Bufo bufo
- Bufo viridis
- Buteo buteo
- Calosoma sycophanta
- Charadrius alexandrinus
- Chlidonias hybridus
- Chlidonias leucopterus
- Chlidonias nigra
- Circus aeruginosus

- Circus pygargus
- Citellus citellus
- Coronella austriaca
- Crex crex
- Crocidura leucodon
- Cyprinus carpio
- Dendrocopos medius
- Dryocopus martius
- Egretta alba
- Elaphe longissima
- Emberiza schoeniclus
- Esox lucius
- Falco cherrug
- Falco peregrinus
- Falco subbuteo
- Falco vespertinus
- Fulica atra
- Glis glis
- Grus grus
- Haliaeetus albicilla
- Haliaetus albicilla
- Himantopus himantopus
- Iphiclides podalirius
- Lacerta agilis
- Lacerta viridis
- Lacerta vivipara
- Larus melanocephalus
- Larus ridibundus
- Limosa limosa
- Locustella fluviatilis
- Locustella luscinioides
- Locustella naevia
- Lucanus cervus
- Luscinia megarhynchos
- Luscinia svecica
- Martes martes
- Merops apiaster
- Misgurnus fossilis
- Motacilla flava
- Mustela erminea
- Mustela nivalis
- Natrix natrix
- Netta rufina
- Numenius arquata
- Ondatra zibethicus
- Panurus biarmicus
- Papilio machaon
- Perdix perdix
- Pernis apivorus
- Platalea leucorodia
- Podiceps cristatus
- Podiceps nigricollis
- Podiceps ruficollis
- Porzana parva
- Porzana porzana
- Rallus aquaticus
- Rana dalmatina
- Rana kl. esculenta
- Rana lessonae
- Recurvirostra avosetta
- Remiz pendulinus
- Saxicola rubetra
- Sorex araneus
- Sterna albifrons
- Sterna hirundo
- Strix aluco
- Tringa stagnatilis
- Tringa totanus
- Triturus cristatus
- Triturus vulgaris
- Umbra krameri
- Upupa epops
- Vanellus vanellus

Species of traditional or commercial importance:

- Fishing of some species (Cyprinus carpio, Esox lucius, Stizostedion lucioperca) by traditional way.
- Harvesting of reed. Several reed products are made in Fertőszentmiklós and in the surrounding areas of the BR.
- The traditional processing of bulrush has almost entirely disappeared by now.

ZONATION DEVELOPMENT

Originally the territory of the FBR was almost equal to the previous designated Lake Fertő National Park (1991), so the core zone and the buffer zone are under the highest national level of nature protection. The designation of the transition zone and the revision of the zonation system have already been finished. The designation of IUCN zonation (A, B, C, D zone) for the Lake Fertő National Park is still in process, so there is smaller emphasis on this kind of harmonization as it is mentioned in the case of other Hungarian biosphere reserves.

The maintenance of the values of the BR was once unintentionally supported by the former strong military status of the area (iron curtain). The importance of the National Park is overriding because it prevents over-exploitation, and strives to maintain the sensitive swards and other biotopes, as well as to regulate and manage tourism.

CORE ZONE

Size: 4.126 ha

The biggest part of the core zone is situated in the central parts of the reed belt and the very sensitive alkaline swards. The most important goal during the designation of the core zone was to preserve the high diversity of several biotope-types. Here are the westernmost occurrences of the characteristic alkaline steppe-like associations in the Carpathian Basin, side by side plant and animal species representing the flora and fauna of the Alps. The core zone includes small open water surfaces within the reedbeds, locally known as internal lakes, the untouched central part of the reedy areas, the alkaline swards, and the steppe meadow of the Szárhalom Forest with its relict species. This zone is in a very special situation, it is protected in several ways for different reasons at the same time. Almost the whole core zone and half of the buffer zone were designated as Ramsar Site in 1979 (and was enlarged to 8432 ha in 1997). The edge of the Ramsar Site followed the “theoretical shoreline” of the lake (it does not exist in practical meaning, as the Southern part of the lake looks like an extreme wide littoral zone without sharp shoreline) which means legal consequences only.

Here the Natura 2000 network incorporates the protected area fully and to some extent reaches beyond it, but the legal framework (EU Habitats Directive and EU Birds Directive) does not allow any kind of changes in the ecological status of the designated site, since 2004. Moreover it is part of a World Heritage site, but this is more important in the functioning of the transition zone. According to the Hungarian Act on Nature Conservation the core zone is strictly protected area, so the main aspects of the management would focus on conservation activities, but here there is no need for any habitat management, just small-scale reed harvesting is usual inside the zone in order to maintain that habitat.

BUFFER ZONE

Size: 8.522 ha

The buffer zone is in the outer parts of the reed belt and in the Szárhalom-forest. As it was mentioned above half of the buffer zone is part of a Ramsar Site simultaneously. The whole zone was designated as Natura 2000 site and its boundary matches with the edge

of the Fertő part of the Fertő-Hanság National Park. Inside the zone some human activities are allowed. Traditional activities are fishery, sylviculture and reed harvesting but it has spatial, temporal and technological restrictions. There are habitat restoration projects in progress to re-establish the ancient small alkaline lakes which were characteristic of the area before drainage canals were built. To maintain grasslands and to prevent the natural expansion of reed and forest extensive grazing by traditional animal breeds and mowing are also usual. The most important impact is disturbance by agriculture which is in some places the main activity in the buffer zone. The introduction of fish species is not supported because of its well-known disadvantageous effects. The area is more and more popular among visitors, especially during the vegetation season. The infrastructure of tourism will be developed. The disturbance by the traffic crossing the state border is negligible. One village is situated within the Buffer-Zone: Fertőboz

TRANSITION ZONE
Size: 10.545 ha

The transition zone includes some outer marsh areas with reed vegetation, agricultural lands, and the places involved in recreation and tourism. It practically means that the transition zone was set up out of the above mentioned, dedicated conservational territories. The transition zone is not part of the national park, it is not under legal protection in sense of nature conservation (no conflict with conservational issues). This was the reason why the transition zone was designated on the Hungarian part of the existing joint Hungarian-Austrian Fertő – Neusiedler-see World Heritage (cultural landscape) site consisting of some settlements with traditional management activities.

The development processes are still under the limited control of conservational bodies (Green Authority and national park directorate) and the authorities responsible for regional and local developments, and national monuments. Settlements are within the zone, the local population is involved in the conservational and development issues. The main economic activity was previously related to agriculture – including vineyards (traditional local sorts of wine are: “Soproni Kékfrankos – Bluefrankish of Sopron and Tramini) and small local factories. Recently activities related to tourism have developed more intensively. Some people work temporarily or regularly in Austria. Typical local activities are reed harvesting, fishery, sylviculture and different agricultural activities (as animal husbandry, mowing and cultivation of plants, etc.). Several villages are situated within the zone.

Progress on the implementation of the Seville Strategy

Management Plan

The whole area of the Fertő part of the sites of Fertő-Hanság National Park (hereinafter FHNP) is within the FBR, so managing requirements referring to the FHNP partly overlap with the rules relevant to the FBR.

All Hungarian national parks have to develop management plans and have to work within its framework. Management plans deal with the conservation related topics mainly, because they are Nature Protection Management Plans. This Management Plan – due to the partial territorial overlap – has to be synchronized with the zonation and the utilization plans of the BR.

The Fertő World Heritage Site is incorporated into the transitional zone of the FBR, so new management plan required which deals with the local development, cultural heritage, traditions beside the natural values. This management plan has almost been completed.

Cooperation with other Biosphere Reserves

The Lake Fertő is a transboundary wetland lying between Hungary and Austria. It forms a bilateral national park (Fertő-Hanság NP and Neusiedlersee-Seewinkel NP), and a joint Hungarian – Austrian World Heritage site. It is also important from the point of view of Ramsar Convention as a transboundary Ramsar site. It is obvious that the most important international cooperation and connections are between the two parts of the Lake Fertő/Neusiedler-see. Of course there are other important connections with wetland related protected areas all along Europe, among others the Danube Delta BR and especially protected areas along the former Iron Curtain. The IUCN initiative Green Belt of Europe (nature protection along the former Iron Curtain) was started at Sarród, in the Heron Castle (headquarter of the Fertő-Hanság National Park Directorate) and the Central-European Green Belt Office was hosted for several years by the FHNPD (now it is in Beograd). There is occasional cooperation with staffs of national parks and protected areas in Poland, Lithuania, Ukraine, Austria, Germany, Slovenia, etc.

A) Conservation Function

There are grassland rehabilitation projects along the lowlands around the lake. Rehabilitation activities are in process on the surrounding hills as a part of the management. Some other projects are under planning as larger scale rehabilitation programs.

Habitat rehabilitation on the area

There is a special biogeographical situation: Lake Fertő is the last piece of the shallow (70-80 cm in average, 130-160 cm max.), alkaline, temporary wetland series from Western Asia to Central Europe. It means, there is no more typical steppic like, quickly warming and strongly fluctuating wetland further west. Its area is relatively

large (in European level) but the reed belt on the Hungarian side is outstanding (see map or Google Earth). That is why the public access to the sites is not too easy or not relevant at all (for water sports, sport fishing, swimming, etc.).

While the western part of the open water of the Hungarian part of the lake (Fertőrákos-bay) is open for public access, the rest of the reed belt and the small open waters within the reed zone are mainly closed areas or accessed only with professional guidance.

At the eastern part of the lake outside the artificial dyke built in the past century, there are alkaline meadows where habitat restoration program started more than 20 years ago. The small beds of some ten hectares are flooded in alternative years (to halt reed expansion by grazing) to follow the natural dynamics of the shallow alkaline water bodies that offer nesting and resting sites for great populations of shore- and water birds.

Those areas with easy and safe public access are the most important eco-touristic attraction of the whole of the Fertő area without any risk of damage to the nesting colonies. Study paths, visitors' centre and other facilities are grouped at that part of the national park.

Saving and creating landscape values in the BR

As the FHNP is mainly a wetland type national park and BR, the most important natural values – including the landscape – are related to the water body and especially the vast reed zone. The mission of the FHNP is to preserve it, through the legal protection and management, furthermore enhance it with site rehabilitation, habitat restoration, public involvement, etc. On the other hand there are other important ecological and landscape values related to the Fertő-basin, namely the grasslands around the lake and specific vineyards along the limestone hills right beside the Western part of the lake surrounded by xeroterm forests and slope steppes.

The grasslands owned by the FHNPD itself are grazed by Hungarian grey cattle herds, or, where short grassland is required for suslik (*Spermophilus citellus*) colony, by racka sheep. In some wet places water buffalo is used to control reed expansion.

B, Development function

Population living in the BR

	permanently	***seasonally***
Core Zone:	0	0
Buffer Zone:	626	approx. 27 000
Transition Zone:	approx. 16 600	approx. 150 000

Contact with local organizations, local governments and inhabitants

The national park directorate has recognized that simple law enforcement is insufficient to preserve the natural values of the area alone, without the understanding and support of the local people. In order to have the nature conservation and related "green ideas" understood, agreed and accepted, the staff of the FHNPD try to take all available opportunities to communicate and cooperate with local inhabitants, land owners, local governments, alliances of settlements and local enterprises to distribute

ecological knowledge, management practices, and other related topics on different levels depending on the target groups. It means opening the "Heron Castle" (headquarter of the FHNPD) for social and cultural events of local relevance, invite target groups to special "green" events, and finding other ways of communication with local stakeholders through the national park staff personally.

The directorate supports and participates in certain local initiatives for attracting tourism, which are connected to nature conservation, traditional life and sustainable development (village days, art camps, nature conservation camps) by providing equipment, printed materials or specialists (lectures, field programs).

There have been specific courses organized for local people about management practices, active conservational works for better understanding the activity of the national park. The ecological and practical explanation of the agri-environmental schemes, the main goals and problems of the EU CAP supporting system has got common interest among different groups of land users.

Recently the consultation between the local communities and the Fertő-Hanság National Park Directorate (the responsible body for the habitat management) focuses on consultation of the development plans with the local communities.

The better understanding of "green ideas" including acceptance of the natural values as a part of common heritage, conservational and environmental issues should be provoked by the continuous presence of the NP staff in the public life, media, etc. (It is not enough to wait for visitors passively, proactive steps are needed.)

Sustainable social and economic activities

Some of the most closely related direct and indirect positive effects of the existence of a nature protected area (national park) to the local population is regarded to be the nature related tourism.

The guest houses, hostels, restaurants are in connection with the national park administration, the system of information exchange is under way. Providing "organic food" from the national park stocks has got into practice (grey cattle) which means a special brand of dishes; further steps are planned for mutual benefits.

The first group of local guide course trained by the professionals of the national park directorate started in 2011 to enhance the quality of information distributed among organized visitors, visitor groups of the protected sites.

The fishery right of the Hungarian part of Lake Fertő was inherited by the FHNPD. The restoration of the natural state of the fish community of the lake required serious efforts from the directorate, as in the past time non-indigenous fish species were introduced for economic purposes and it had a strong impact on the natural submerged vegetation of the lake. Nowadays the directorate invested a lot in the rehabilitation of original fish fauna by spreading local fish brood. The extensive fishing practice has been preserved through leasing the fishery to local traditional fishermen groups.

Enhancement of the traditional land use

The area of FBR is basically wetland, reed bed, open water and the surrounding lowlands with some limestone hills. Main activities on the aquatic habitats are restricted to the extensive fishery with more or less traditional ways applied by local fishermen's groups. It is rather low intensity of exploitation.

Another low scale utilization of the resources of the lake is the reed harvesting, management of the reed zone. It is carried out by a local firm derived from the previous state-owned reed company by privatization. Other, smaller parts of the reed vegetation (out of the "theoretical shoreline" of the lake) are harvested by small local manufacturers which use the material in traditional ways.

The grasslands around the lake were used traditionally for grazing and/or hay production. Recently the animal husbandry is not very profitable way of land use, prices of the products are pressed but the energy costs are extremely high, so the local people gave up milk-production and cattle husbandry in large scale. The cooperatives have stopped to work any longer, infrastructure decayed or became old. Nowadays hardly any cattle are kept in the villages for private use or milk-production, grazed areas and hay meadows are increasingly abandoned.

The FHNPD started to use Hungarian grey cattle and racka sheep to re-establish the traditional grasslands which remained in state property to keep the traditional landscape, rehabilitate grasslands and hay meadows at the Fertő area. It happened in parallel with the gene-reserving program of the old domestic animal breeds, which do not need intensive husbandry. The Hungarian grey cattle is a rather robust animal that is tolerant against climatic affects, it is not too selective in foraging, prefers fresh reed and utilizes the lower quality grass of the alkaline, sodic soils too. The products of its meat are quite valuable and sought after as bio-food. On the other hand the herds of grey cattle are – among others – a touristic attraction as well.

The interest in breeding traditional extensive breeds of domestic animals (like grey cattle, racka sheep, water buffalo) is growing among the local land owners following the practice of the national park management so exchange of know-how is growing, the market and the interest are expected to increase.

Another traditional use of the limestone hills around the lake is viticulture. There is a dedicated wine region around Sopron famous for mostly characteristic tannic red wines (Kékfrankos). The vineyards around the lake present a special landscape element to the view and the borderlands can be valuable habitats for plants, invertebrates and birds too. Viticulture is managed mostly by local vintners and smaller or bigger enterprises of local investors.

The ESA (=environmentally sensitive areas) scheme incorporated the Fertő High Nature Value area from the beginning in Hungary (late nineties) in order to decrease the nutrient load of the lake, decrease the intensity of land use, and enhance the biodiversity of agrarian lands by preserving natural elements, borderlands, shrubberies, tree lines and groups within the cultivated lands through a suitable, acceptable and competitive supporting system. The first plans were prepared and submitted by 2003, but – because of lack of funds – they have not been implemented. The preparation was developed by the staff of the FHNPD.

Professional dialogue in forest management and exploitation planning processes

The dialogue and collaboration is progressive with Forest Company of the Sopron region (which is one of the largest land managers in the area). The professional staff of the Directorate is involved in the planning process and supervises the execution of sylvicultural activities, following the legal framework of the management rules of the protected forest sites.

The focus of forestry has become oriented to better management practices such as selective timbering, selective cutting and removing of non-native species in the BR.

These considerations are also applied during forest management which is carried out by the Directorate.

Validation of landscape protection in different levels of plans

The professional staff of the FHNPD participates in discussion and authorization of regional and local development plans covering land use and architectural plans. During these consultations the national park is responsible for keeping the rules of the national and international landscape protection directives and standards. The conservation of the traditional structure of settlements and land use is a very important point of view, but the need of sustainable development should be kept in mind. In the process of making a plan, we are in close connection with the local municipalities, stakeholders and planning offices. This helps to find consensus among all the parties in many cases.

Culture

Lake Fertő was declared part of the World Cultural Heritage in 2001. Cultural values of the biosphere reserve include historic land uses, such as reed harvesting and processing, traditional fishing methods, etc. These crafts have almost disappeared by now, but can be studied at the exhibition at the visitor centre of the National Park Directorate in Sarród.

There are characteristic popular architectural houses in some villages around the Fertő (Fertőrákos, Balf, Hegykő, Fertőszéplak, Sarród). There is a popular village museum in Fertőszéplak. The castles of Nagycenk and Fertőd - which belonged to Hungarian families of noble ancestry - have important architectural and cultural-historical values.

In memory of Joseph Haydn, who was musician in the castle of Fertőd, concerts are organized in Fertőd every year. There are also museums in both castles.

C) Research and educational functions

RESEARCH

National Biodiversity Monitoring System (NBmR)

There are many research programs in the BR. Several are included in the National Biodiversity Monitoring System. The NBmR has got standard methods to survey the different habitats, communities and species. The main aims of the NBmR programs are to follow the status of protected and threatened natural values, to observe actual status of flagship species in different communities and to collect data on living resources of the country.

Selected monitoring themes started in the NBmR:

Start	Experts	Target
1998	Takács Gábor, Horváth Gyula, Bodonczi László, Kozák Gábor	monitoring of protected plant species (I.)

1998	Keszei Balázs, Takács Gábor	Habitat mapping I. (T5x5_066 Fertő 5x5km square vegetation mapping)
1999	Ambrus András	monitoring of protected dragonfly species
1999	Király Gergely	monitoring of protected plant species in the Szárhalom (population data of 1997-99)
1999	Takács Gábor, Szinetár Csaba (2002), Farkas Sándor, Kenyeres Zoltán	studies on the effects of management on the grassland vegetation and invertebrate community (I.)
2000	Ambrus András	monitoring of protected butterfly species (Lycaena dispar)
2000	Ambrus András	monitoring of protected dragonfly species (HD Annexes)
2000	Dankovics Róbert	monitoring of the protected herpetofauna
2000	Keszei Balázs, Takács Gábor	habitat mapping II. (R5x5_109 Fertőd 5x5km square vegetation mapping)
2000	Keszei Balázs, Takács Gábor	monitoring of invasive plant species (Eleagnus angustifolia, Ailanthus altissima, Solidago gigantea, Amorpha fruticosa, Asclepias syriaca, Reynoutria japonica)
2000	Keszei Balázs, Takács Gábor	monitoring of plant associations
2000	Nyugat-magyarországi Egyetem Vadgazdálkodási Intézet	Barn Owl pellet studies for small mammal community
2001	Király Gergely, Keszei Balázs, Takács Gábor	monitoring of plant communities (Phragmitetum communis; Succiso-Molinietum; Calamagrostio-Salicetum cinereae; Salicetum albae-fragilis; Puccinelietum limosae
2001	Takács Gábor, Németh Csaba, Szabó Imre, Laczik Dénes	monitoring of protected plant species II. (Cirsium brachycephalum; Cypripedium calceolus; Eleocharis carniolica; Liparis loeselii; Thlaspi jankae)
2001	Takács Gábor, Váczi Miklós, Németh Csaba	monitoring of small mammals (Spermophilus citellus) I.
2002	Ambrus András	monitoring of protected butterflies IV.
2002	Ambrus András	monitoring of HD dragonflies V.
2002	Dankovics Róbert	monitoring of the herpetofauna III.
2002	Király Gergely, Keszei Balázs, Takács Gábor	monitoring of invasive plant species
2002	Király Gergely, Keszei Balázs, Takács Gábor	monitoring of plant communities (Salicetum albae-fragilis; Puccinelietum limosae; Nymphoidetum peltatae)

2002	Takács Gábor, Németh Csaba, Szabó Imre, Laczik Dénes	monitoring of protected plant species II. (Cirsium brachycephalum; Cypripedium calceolus; Liparis loeselii; Ophrys insectifera; Ophrys sphecodes; Parnassia palustris; Pinguicula vulgaris; Pulsatilla grandis; Pulsatilla pratensis ssp. nigricans)
2002	Takács Gábor, Szinetár Csaba, Farkas Sándor, Kenyeres Zoltán, Bérczes Sándor, Kovács Éva, Szita Éva	studies on the effects of management on the grassland vegetation and invertebrate community (II.)

The Directorate keeps good connections with scientists working in the area of the BR. Many different programs have been carried out and many others are in process.

One of the most important programs is the waterbird and shorebird monitoring program which needs regular synchronous censuses carried out by the expert staff of the national park, the Game Management Institute of the West Hungarian University, the Sopron Branch of the Hungarian Ornithological and Nature Conservation Society and other experts. Wild goose nesting and migrant communities are in the centre of the interest, too.

Other specific target groups include the bird species which are involved in the countrywide program of Rare and Colonial Nesting Bird Survey. In Lake Fertő great egret and purple heron nesting colonies are the most important species of this survey.

Specific color ring marking and some radio telemetry collaring are applied to investigate the migration routes of selected species of these groups listed above involving countrywide and international study programs.

Special attention is directed to the highly threatened birds of prey species and owls. Artificial nest boxes and nests are erected at suitable sites (including high voltage electric pylons) in cooperation with the energy supplier companies.

Some butterfly species having high priority at the hay meadows are investigated with capture-mark-recapture methods to acquire data on population densities, tendencies, evaluate management techniques, and so on.

EDUCATION

Visitor centers and their programs

The Fertő-Hanság National Park has got a specific visitor centre in the field, close to the alkaline wetland restoration site. It has accommodation possibility for groups and other facilities to organize workshops, conferences and free time activities too. There are brochures, booklets, books about the FHNPD and other relevant nature conservation topics. An exhibition installed with interactive screens is open to visitors.

Regular summer nature conservation camps, bird watching events and other specific programs are announced and some more are available on demand.

The list of programs is available every year in the program brochure and available to download from the website of the national park: http://www.ferto-hansag.hu/

Special events are announced in local newspapers, on the radio, in the newspaper of the national park (two issues per year reaching all families within the national park area) and on the facebook profile of the FHNPD.

Ecotourism

The most frequently used programs are the guided canoe tours at the Fertő reed zone, birdwatching tours, and beginner ornithological training tours (programs for groups and families are listed in the brochure on 26 pages).

Usually, the tourists' aim is to see the natural and cultural values, for example Mekszikópuszta is typically visited for birdwatching. At Fertőrákos - which is the only beach on the Hungarian side of Fertő - the number of people coming for bathing, surfing and sailing is significant especially in summer. Bathing is permitted only in the bay of Fertőrákos which is located on the western shore of the lake.

The area (Austrian and Hungarian parts together) is a World Heritage site since 2001 as well, so tourism is affected by this fact too.

The National Park has two buildings to accommodate visitors and researchers: the Kócsagvár of Sarród and the Research House of Mekszikópuszta. Besides this, the Park has accommodation in the Sailing House of Fertőrákos (from spring to fall). The Directorate organizes guided tours to the protected but visitable areas of Fertő and Hanság. The Directorate sells brochures about the region and other protected areas of Hungary at the above-mentioned information places.

Larger and qualified hotels are in Sopron and in Castle of Nagycenk. Campsites are in Sopron, Balf, Hegykő and Fertő settlements, and new campsites will be opened in the immediate future. Pensions are widespread and typical in the region. Later it can develop into rural tourism.

Regular programs and events in the national park

Regular events and programs are listed in the brochure containing the most important festive days of the nature conservation and national parks, the common holidays with specific programs. Most recently the local folk art market during the Lent with the "Open gates" cultural and social programs started.

Training and public awareness programs

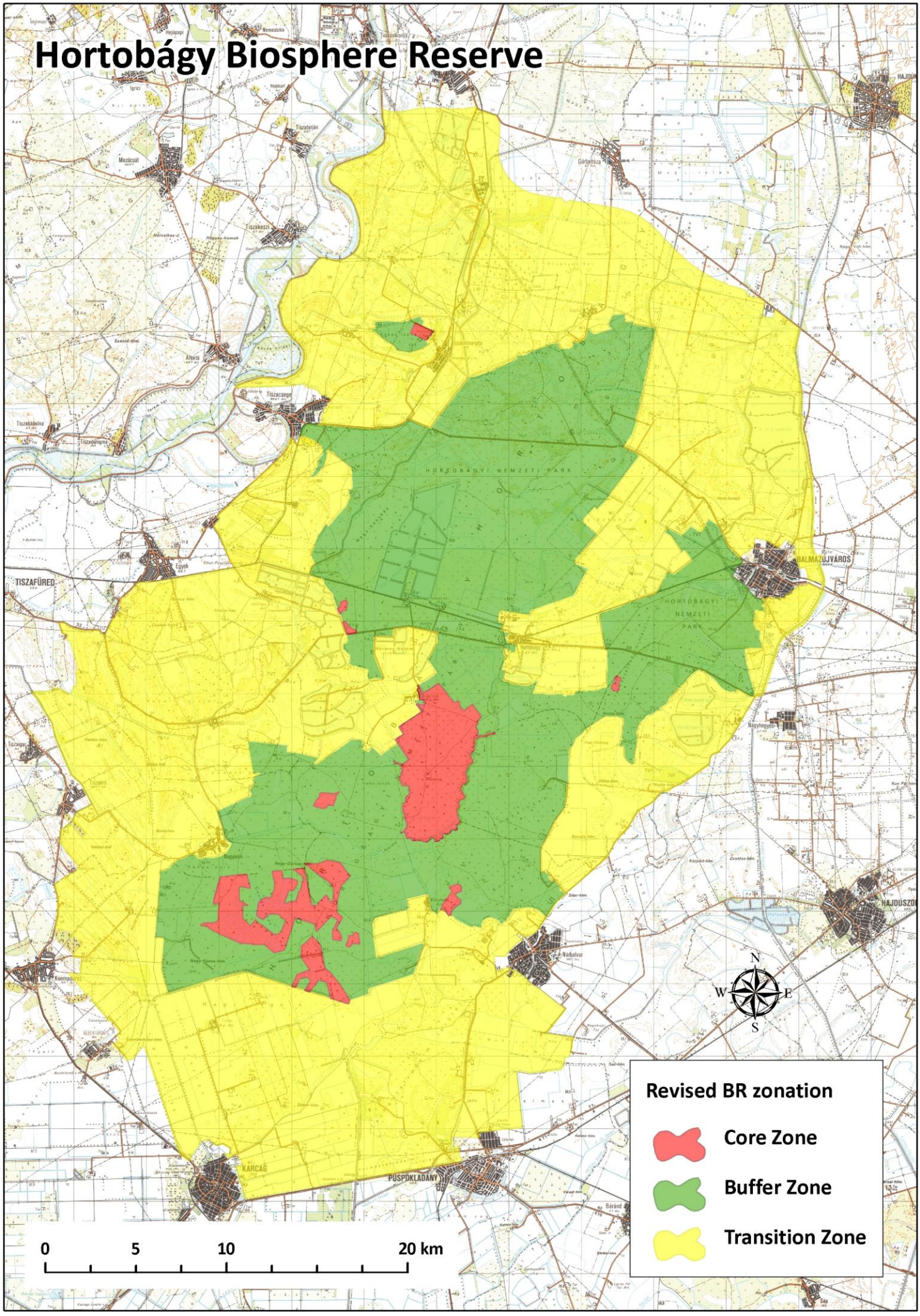
The national park staff is involved in the practical training of the high school education giving lectures, holding practices at the field and supervising thesis and dissertation works (selected topics are announced on the website of the NP).

The staff of the national park receives students for internship and trained volunteers for some management and research activities. There are among others regular guest volunteers from the Butterfly Conservation (Dorset, UK)

There were conferences of different topics of the conservation activity organized by the FHNPD, some of them jointly with public bodies, such as the Hungarian Ornithological and Nature Conservation Society and also frequently hosted field trips of national and international meetings of biologists. On the other hand, the studies and research carried out at the Lake Fertő area are represented by local experts at different conferences and workshops.

HORTOBÁGY
BIOSPHERE RESERVE

DEBRECEN
2013


Hortobágy Biosphere Reserve
HORTOBÁGYI NEMZETI PARK
HORTOBÁGYI NEMZETI PARK
TISZAFÜRED
BALMAZÚJVÁROS
HAJDÚSZOBOSZLÓ
KÁRCAG
PÜSPÖKLADÁNY
N
W
E
S
Revised BR zonation
Core Zone
Buffer Zone
Transition Zone
0
5
10
20 km

Hortobágy Biosphere Reserve

GENERAL INFORMATION

The Hortobágy Biosphere Reserve is a typical „first generation" BR as in case of most other Hungarian biosphere reserves. Its area completely overlaps with the originally designated Hortobágy National Park (in 1973).

Located in the Great Hungarian Plain, Hortobágy Biosphere Reserve is a vast flat edaphic steppe landscape (archetype of Hungarian Puszta) which recalls features of the central Asian steppes in central Europe. Hortobágy is not only a short grass alkaline steppe but also comprises marshes, fishponds and small patches of forests and tree-plantations. It comprises the most important bird migration site in the Carpathian Basin (perhaps in the whole continental part of Europe, beside marine shores and estuaries). Many parts of the BR's territory are designated as a Ramsar site as well.

Although man played a dominant role in the formation of the Hortobágy landscape, the treeless character, the landscape dominated by alkaline grasslands, originates from the end of the Pleistocene. The recent open landscape is not a simple result of the land use activity of the nomadic pastoral societies that populated the region during the last four thousand years: they settled here because of the already existing open character of the Hortobágy, suitable for their grazing practices.

The alkaline habitats, grasslands and marshes used to be under the influence of the Tisza River that meandered north of the area since 20.000-30.000 years ago, and seasonally flooded it, but not in every year. River regulation works (shortcuts of the meanders, creation of dikes) caused major changes of the landscape, significant part of alkaline marshes became dry or degraded since the 19th century.

Today, the landscape is maintained by the combined efforts of nature conservation and traditional farming. The traditional semi-nomadic animal husbandry declines, however, traditional Hungarian livestock like grey cattle, racka sheep, mangalica pig etc. are still kept for gene preservation and tourist attraction, but not only for these purposes.

Topography of the region

An extensive flat lowland (originally seasonally and occasionally flooded area) dominates the landscape in the Hortobágy which consists of the remnants of the ice-age cone. Abandoned, marsh-covered river beds and micro-topographic features are typical with the dominance of *Festuca pseudovina* grass. They form together a conspicuous mosaic structure of habitats. Dominant types of soils are different alkaline formations. This is the largest occurrence of continental sodic and alkaline soils in Europe (except for the semidesert region around lower Volga river), moreover the biggest continuous natural-seminatural grassland of the mentioned part of the continent. Recently the landscape is treeless grassland with extensive patches of alkaline marshes, mostly affected by traditional, extensive shepherding.

Climate

Temperate continental forest-steppe climate (Köpchen-code is CFBX), with an average temperature of -2.5 – -3.2 ^{o}C in January and 21.5 – 22.2 ^{o}C in July. The average precipitation varies between 500-550 mm. Extreme values of the yearly rainfall are: 280 mm and 900 mm. These features show transition to the cold continental climate. Another transition appears to the temperate steppe-climate, as there is a short arid period in late summer in the western part of the area.

Geology, geomorphology

Although the main watercourse of the eastern part of Carpathian-Basin, the Tisza river moved laterally towards Northwest in the late Pleistocene, it did not erode most part of the former, slightly undulating fluvial deposits of fluvial cone sloping from north. The residual surfaces of this cone are low loess-ridges, small sand-dunes and parallel, abandoned beds.

Soils

The seasonal, flat flood plain was originally typical, before river regulations in the 19th century. This is the "locus classicus" of the alkaline and non-coastal sodic and saline soils in Europe. Not only the largest but the most diverse occurrence of sodium rich soils are here considering their types and subtypes, special micro-geomorphologic conditions, erosional forms, microhabitats etc. As an example of this diversity one can mention the vertical size of the erosional benches ("padka" in Hungarian term) varying from 1-2 cm to 120-150 cm in their height.

GENERAL INFORMATION ABOUT THE BIOLOGICAL DIVERSITY

Habitats within the whole territory of BR

- Treeless alkaline pastures and meadows are predominant. The habitats of orographical series of zonation are:
    - Open water surfaces: just in the deepest parts of marshes and oxbow-lakes, riverbeds, covered by different size pondweed species or rarely without any vegetation (Lemnetea).
    - Duckweed covered water-surfaces Lemnion minoris association group. Important or characteristic vascular plant species are: Common Duckweed (Lemna minor), Fat Duckweed (Lemna gibba), Rootless Duckweed (Wolffia arrhiza), Salvinia natans.
    - Lemno-Utricularietum floating hair-weed association. Important or characteristic species are: Common Duckweed (Lemna minor), Greater Bladderwort (Utricularia vulgaris), Utricularia neglecta.
    - Hair-weed vegetation with the dominance of Rigid Hornwort (Ceratophyllum demersum) and Water Soldier (Stratiotes aloides) (**Hydrocharition association groups**).

- Rooting hair-weed associations (**Potametea**): These communities occur on the same places where the open water surfaces, surrounding the former ones.
    - Shining Pondweed dominated pondweed association (**Potamogenetum lucentis**)
    - Curled Pondweed dominated pondweed association (**Potamogenetum crispi**)
    - Fennel Pondweed dominated pondweed association (**Potamogenetum pectinati**)
    - Horned Pondweed dominated pondweed vegetation (**Parvopotamo-Zannichellietum palustris**)
    - Water chestnut rooting hair-weed association (**Trapetum natantis**)
    - Fringed Water-lily covered hair-weed vegetation (**Nymphoidetum peltatae**)
    - White and Yellow Water-lily's rooted hair-weed vegetation (**Nymphaeetum albo-luteae**)

- Uliginous vegetation, occurring primarily in well-vegetated salt marshes and on the fringe of more sodic stagnant waters with larger open water (**Isoeteo-Nanojuncetea**, **Phragmitetea** and **Magnocaricetalia** communities).
    - Dwarf vegetation on muddy surfaces (**Elatini alsinastri-Lindernietum procumbentis**). Other important species are (other than the main association species): Mudwort (Limosella aquatica), Hungarian Waterwort (Elatine hungarica), Elatine triandra.
    - Alkaline reeds (**Bolboschoeno-Phragmitetum**)
    - Alkaline bulrush vegetation (**Schoenoplectetum tabernaemontani**)
    - Alkaline low-vegetated marsh (**Bolboschoenetum maritimi**)
    - Alkaline sedge associations (**Caricetum gracilis, Caricetum melanostachyae** and **Caricetum acutiformis**)
    - Pondweed vegetation of ephemeral sodic and alkaline ponds (**Najadetum minoris** and **Ranunculetum aquatilis-polyphylli**).

- Meadows, alkaline meadows occurring primarily at the edges of salt marshes and in shallow depressions, and covering abandoned ice-age streamlet-beds

(**Beckmannion eruciformis** type vegetation). The feature of these associations is a medium tall grassy vegetation, often with tussocks of grasses (but never of sedges).
    - Alkaline meadow vegetation dominated by tall grass species: (Agrostio albi-**Alopecuretum pratensis, Agrostio-Glycerietum poiformis** and **Beckmannietum eruciformis**).
    - Hay-meadows on flooding areas of rivers (**Carici vulpinae-Alopecuretum pratensis**, **Agrostio-Phalaridetum arundinaceae** and **Ranunculetum repentis**). Important species are: Marsh Gentian (Gentiana pneumonanthe), Hungarian Horse-radish (Armoracia macrocarpa), Hungarian Rivershore Daisy (Leucanthemum serotinum), mostly outside of the BR.

- Bare or less vegetated alkaline and sodic surfaces with seasonal flooding and desiccation (**Thero suadetea** and **Puccinetalia** associations). These associations are species-poor, often only 1-2 species occur here.
    - Annual Camphorosma community on drier bare surfaces (**Camphorosmetum annuae**)
    - Sand Spurrey's and Continental Seablite's association (**Spergulario marginatae-Suadetum prostratae**)
    - Seablite's association (**Suaedetum salinariae**)
    - Sodic Saltwort's association (**Salsoletum sodae**)
    - Continental Glasswort's association (**Salicornietum prostratae**)
    - Pondbed vegetation of desiccated sodic lakes (**Crypsidetalia aculeatae**)
    - **Pholiuro pannonici-Plantaginetum tenuiflorae** association
    - Puccinellia grass covered vegetation on wetter surfaces (**Puccinellietum limosae**)
    - **Bassietum sedoidis** association

- Alkaline pasture communities (**Artemisio-Festucetalia pseudovinae**). Feature: short grassy (up to 20-40 centimetres but generally less than 10 centimetres high) pastures with low production usually. These communities are dominated by Fescue grass. These communities form huge pastures in the biosphere reserve.
    - **Artemisio santonici-Festucetum pseudovinae** pasture community, on lower surfaces usually with an early spring water-cover. It is similar to the Artemisia-steppes and semi-deserts of Central Asia. This association covers the greatest areas of the Hortobágy BR (cca. 25-30 %). Characteristic species are: Slender Hare's-ear (Bupleurum tenuissimum), Schwarzenberg's Plantain (Plantago schwarzenbergiana), Alkaline Viper's-grass (Scorsonera cana), Hungarian Sea-lavender (Limonium gmelinii ssp. hungarica).
    - **Achilleo-Festucetum pseudovinae** pasture community, mainly on clayey soils with 10-30 cm humus layer, characteristic sneezewort species of which are Achillea setacea and A.-collina.

- Tall-grassy native loess-steppe grassland (**Salvio nutanti-nemorosae-Festucetum rupicolae**), dominated by Steppe Fescue (Festuca rupicola), Wild Sage (Salvia nemorosa), Austrian Clary (Salvia austriaca). This association *can be used as* pasture and haymeadow also, but in dry years the production is low.

- Residual forest-steppe associations (**Peucedano-Asteretum sedifolii** and **Galatello-Quercetum roboris** communities)
    - Peucedano-Asteretum sedifolii dry meadow community with a medium tall grassy structure, primarily in the clearings of oak forests on alkaline soils covered by water in early spring. A species-rich association where elements of meadows, dry grasslands and alkaline areas can also be found. This association has its origin in the ages of the early Holocene or late Pleistocene.
    - Relic oak forest on alkaline soils (Galatello-Quercetum). It occurs always as a mixture with the Peucedano-Asteretum association. The upper canopy is dominated by Pedunculate Oak (Quercus robur), and by Turkey Oak (Quercus cerris). Typical species of the bush-layer are Tartar Maple (Acer tataricum), Field Maple (Acer campestre) and many other species, the undergrowth is a mixture of forest and alkaline grassland elements. The richness of the Oak species is remarkable: Q. petraea, Q. pubescens, Q. virgiliana still occur.

- Oak-Ash-Elm gallery forest (**Fraxino pannonicae-Ulmetum**). This native type of forest occurs only along River Tisza, close to the recent BR but not inside it. The canopy is closed and the dominant species are Quercus robur, Smooth-leaved Elm (Ulmus minor) and Hungarian Narrow-leaved Ash (Fraxinus angustifolia ssp. pannonica).

  Willow forest on the flooding areas of rivers (**Leucojo aestivi-Salicetum albae**). A species-poor forest association close to the riverbeds, close to the recent BR but not inside it. The characteristic species are Salix alba and Populus x canescens.
- Less than 10 percent of the area of Buffer Zon**e is extensive arable land (mai**nly crop and alfalfa). In the proposed transitional area the ratio of the ploughlands is 60-70 %.

- Tree plantations occur everywhere, but their total area is not significant. Dominant selected species are Poplar hybrids, Quercus robur and Robinia pseudoacacia.

ENDANGERED OR THREATENED PLANT SPECIES:

- Aegilops cylindrical
- Agropyron elongatum
- Armoracia macrocarpa
- Bassia sedoides
- Carex acuta
- Carex distycha
- Carex pseudocyperus
- Carex secalina
- Cirsium brachycephalum
- Cirsium furiens
- Doronicum hungaricum
- Elatine alsinastrum
- Elatine hungarica
- Heliotropium supinum
- Iris spuria
- Lindernia procumbens
- Marsilea quadrifolia
- Plantago schwarzenbergiana
- Ranunculus polyphyllus
- Rumex pseudonatronatus
- Salsola soda
- Salvinia natans
- Trapa nanans
- Trifolium vesiculosum
- Verbena supine

Habitats Directive, Annex II:

- Cirsium brachycephalum
- Marsilea quadrifolia

Other characteristic plant species of the BR:

- Achillea setacea
- Alopecurus pratensis
- Artemisia santonicum
- Aster sedifolius
- Beckmannia eruciformis
- Bolboschoenus maritimus
- Camphorosma annua
- Festuca pseudovina
- Festuca sulcata
- Limonium gmelinii ssp. hungarica
- Phragmites australis
- Puccinellia limosa

ENDANGERED OR THREATENED ANIMAL SPECIES:

- Acrocephalus paludicola
- Aeshna viridis
- Anser erythropus
- Ardeola ralloides
- Branta ruficollis
- Buteo rufinus
- Calosoma auropunctatum
- Chlidonias leucopterus
- Coscinia cribrum pannonica
- Emys orbicularis
- Glareola pratincola
- Gortyna borelii lunata
- Haliaeetus albicilla
- Leucorrhinia caudalis
- Leucorrhinia pectoralis
- Lutra lutra
- Lycaena dispar hungarica
- Otis tarda
- Phalacrocorax pygmeus
- Plegadis falcinellus
- Podarcis taurica
- Poecilus kékesiensis
- Proserpinus proserpina
- Sicista substilis trizona
- Tringa stagnatilis
- Zerynthia polyxena

Habitats Directive, Annex II:

- Bombina bombina
- Cerambyx cerdo
- Cobitis taenia
- Emys orbicularis
- Gortyna borelii lunata
- Lucanus cervus
- Lutra lutra
- Lycaena dispar
- Misgursnus fossilis
- Mustela eversmannii
- Rhodeus sericeus amarus
- Sicista subtilis
- Spermophilus citellus
- Triturus cristatus dobrogicus

Birds Directive Annex I species:

- Acrocephalus melanopogon
- Acrocephalus paludicola
- Anser erythropus
- Anthus campestris
- Aquila heliaca
- Aquila pomarina
- Ardea purpurea
- Ardeola ralloides
- Asio flammeus
- Aythya nyroca
- Botaurus stellaris
- Branta ruficollis
- Burhinus oedicnemus
- Buteo rufinus
- Charadrius morinellus
- Chlidonias hybridus
- Chlidonias niger
- Ciconia ciconia

- Circaetus gallicus
- Circus aeruginosus
- Circus cyaneus
- Circus macrourus
- Circus pygargus
- Coracias garrulus
- Crex crex
- Dendrocopos syriacus
- Dryocopus martius
- Egretta alba
- Egretta garzetta
- Falco cherrug
- Falco columbarius
- Falco vespertinus
- Grus grus
- Haliaeetus albicilla
- Himantopus himantopus
- Ixobrychus minutus
- Lanius collurio
- Lanius minor
- Luscinia svecica
- Mergus albellus
- Milvus migrans
- Numenius tenuirostris
- Otis tarda
- Pandion haliaetus
- Pernis apivorus
- Philomachus pugnax
- Platalea leucorodia
- Plegadis falcinellus
- Pluvialis apricaria
- Porzana parva
- Porzana porzana
- Porzana pusilla
- Recurvirostra avosetta
- Sterna hirundo
- Tringa glareola

Other characteristic animal species of the BR:

- Anser albifrons
- Anser anser
- Anser anser
- Calcarius lapponicus
- Calidris alpina
- Calidris ferruginea
- Capreolus capreolus
- Citellus citellus
- Cledeobia moldavica
- Cryptocephalus gamma
- Dociostaurus brevicollis
- Epacromius coerulipes
- Gampsocleis glabra
- Lepus europaeus
- Microtus arvalis
- pannonicus
- Saragossa porosa
- Sus scrofa
- Sympetrum depressiusculum
- Tringa eyrthropus
- Tringa totanus

Species of traditional or commercial importance:

- collecting of mushrooms (Agaricus bernardii mainly) and chamomile
- Hunting: Anser anser, Anser albifrons, Lepus europaeus, Capreolus capreolus, Sus scrofa, Vulpes vulpes, Pica pica
- Fishery: Esox lucius, Rutilus rutilus, Abramis brama, Cyprinus carpio, Silurus glanis + many introduced alien species

ZONATION DEVELOPMENT

The Hortobágy National Park was established in 1973 by a Ministerial Decree no. 185-51/1972 of the National Authority for Nature Conservation. The designation is currently laid down in the Ministerial Decree No 134/2007. The territory of the national park has been extended several times.

The Hortobágy BR designation was proclaimed by the Ministerial Decree no. 2100/1980 of the National Authority for Nature Conservation and Environmental Protection. The currently valid declaration is the Decree No 7/2007. of the Ministry of Environment and Water. The designation of the transition zone and the revision of the zonation system have already been finished. The designation of IUCN zonation (A, B, C, D zone) for the Hortobágy National Park is still in process, so there is smaller emphasis on this kind of harmonization than it is mentioned in the case of other Hungarian biosphere reserves.

CORE ZONE
Size: 5,126 ha

The core zone represents the typical series of habitats from the open water surfaces of alkaline marshes to the dry loess-ridges and oak steppe-woodlands. The basis of selection was the absence of human disturbance or any recent human impact. The other important cause of the selection was the occurrence of rare and endangered species.

The enlargement of the Pentezug core zone was carried out. This area was designated to re-introduce Przewalski's horses into the semi-wild, but in much more natural conditions than in any other European wild horse semi-reserves. Wild horses existed some 2-5.000 years ago here natively. Number of horses in Pentezug was more than 170 individuals in 2012.

All the core areas are strictly protected inside the Hortobágy National Park, and have been completely inside the Natura 2000 network since 2004. These areas were designated under both the Birds and the Habitats Directives. This is a typical area of the national park, where the goals of the nature protection have absolute priority. In 1979 the area was designated as part of a Ramsar sites as well, then 20 years later, in 1999 the whole territory of the BR was internationally recognized as cultural World Haritage, but this is more important in the functioning of the transition zone.

In the core zone forestry activities are not allowed. Fishery is also prohibited but these activities would not have real relevance there.

BUFFER ZONE
Size: 49,961 ha

The buffer zone contains the remaining part of the Hortobágy National Park, outside the core zone. Here (but not everywhere) other land use types are allowed. Reed-cutting is partially allowed, but not in every year, only in small patches and under strong supervision of the nature conservation authorities. On the marshes, meadows and pastures a supervised mowing or grazing activity by cattle is allowed partially, but also not in every year.

Almost the total area is state-owned and managed by the Hortobágy National Park Directorate. The directorate manages this area on nature conservation purposes and makes agricultural activity on a large part of this zone. The two supervisory practices are the rangers' control on field, and the supervision of the contracts between other landusers and the Hortobágy National Park Directorate.These areas are also inside the Natura 2000 network, some parts are Ramsar sites simultanously.

The dominant type of land use is extensive pasture (more than 70%). Most of the marshes are mown, and so is in extremely wet years a significant part of the pastures. The marshes cannot provide for hay-making in dry periods and/or locust increasing. Traditionally stocks graze on the pastures from April to October-November because of the snow-cover in wintertime and the melting after it. Tussock-forming marsh vegetation types are normally unexploited. The deeper marshes (reeds vegetation) are used for reed-harvest. Artificial fish-ponds and channels are used for fishery (in this case they are working places for local people too) and angling (but not in the native marshes), the shoreline vegetation for reed-harvest.

Less than 10 percent of the area of the buffer zone (2,517 ha-s) is extensive arable land (crop and alfalfa are dominant). The use of chemicals and fertilizers here is not allowed, except in case of outbreak or danger of outbreak of pests on arable lands.

Hunting is allowed because of the control of the population of certain species mainly (Vulpes vulpes, Sus scrofa, Pica pica, Corvus corone cornix). The hunting activity is the reponsibility of the Directorate of Hortobágy NP.

TRANSITION ZONE

Size: 99,504 ha

Here more intensive landuse types are possible, e.g. controlled using of chemicals, fertilizers, except on those areas which are protected by law. Mainly private-owned area, but a significant part is state-owned and legally used by the Hortobágy National Park Directorate. These areas appear in the development plans for local authorities of the neighbourhood as controlled agricultural zones, where for instance the density of buildings (one farm per sq km) and their size is limited. The BR's manager, (Hortobágy National Park Directorate) systematically reconciles and harmonizes the new versions of these plans with the local authorities and the designers of these materials. The state-owned areas are under closer supervision of course.

Some part of the buffer zone and almost the whole transition zone are within the agricultural program and designated as High Nature Value areas as well. The local farmers have the opportunity to apply for payments if they do their farming activities on a determined environment- and nature-friendly way. Four small villages are situated inside the transitional zone.

The dominant landuse type here is arable land. Extensive agricultural activity is typical. Frequently cultivated species are: cereals, maize, alfalfa, sunflower. Rape plays a very important role in the conservation of the great bustard, because it provides the best winter food during strong wintry periods. The other extensive fields are good feeding habitats for instance for geese or cranes.

The use of native species is significant here. Sporadic collection of mushrooms and chamomile is regular mainly. These activities often threaten the nesting birds in springtime. Hunting and fishery are allowed.

Beside the natural values of the area, the fact that it overlaps with a cultural World Heritage site, is attractive for other visitors as well.

Progress on the implementation of the Seville Strategy

Management plan

Many parts of the BR area forms part of the Natura 2000 network of the European Union. This protection - with the legally designated nationwide ecological network - ensures an adequate framing inside the BR.

Based on the national World Heritage Act of 2011, a new management plan is under elaboration. This new management plan will include the buffer zone of the Hortobágy National Park World Heritage Site which is almost equivalent with the transition zone of the BR.

A) Conservation Function

Projects in the last 10 years

- Landscape rehabilitation on lakes: dredging of channels, creating habitats for fish species, creation of breeding islands (2002).
- Restoration of Pannonic steppes, marshes of Hortobágy NP (LIFENAT07/H/000324).
- "Vókonya LIFE" (LIFENAT2002/H/8638, Hortobágyi Természetvédelmi Egyesület). Restoration of habitats for birds.
- Anser erythropus LIFE (2005-2009).
- Restoration projects for the Pannonic steppes and marshes:
  - KIOP 2005-2007;
  - KEOP I., 2010-2013;
  - KEOP II., 2011-2014.
- Anser erythropus LIFE+ (2010-).
- Rehabilitation project on the North-hortobágy alkaline lakes, LIFENAT07/H/000324.
- Projects in the frame of Accessible Sky concept. Burial of electricity power lines into the ground.
  - I. phase: 30km inside the BR (2006-2008)
  - II. phase: 50-60 km inside the BR (2010-2015)
- New LIFE+ project was granted in late 2012 which is completely harmonized with the goals of the BR. Main activities:
  - To increase the number of domestic animals,
  - To motivate animal husbandry,
  - To directly manage wetlands as habitats etc.

The conservation function is mainly fulfilled by the function of the Hortobágy NP, because recent core areas and buffer zones overlap with the BR.

In everyday practice the National Park Directorate calls the attention of the local communities to the international importance of the BR. The conservation function focuses on the unique natural values inside the protected area. The zonation helps in the management planning. The ecological investigation and monitoring of the different zones from external sources are funded.

From the opposite point of view, the national park legislation and the state ownership with NP Directorate responsibility are the main guarantees of the efficient protection. Some parts of the core zone are totally free of human impact.

B) Development Function

Population living in the BR

	permanently	***seasonally***
Core Zone:	0	0
Buffer Zone:	approx. 200	approx. 400
Transition Zone:	approx. 7.000	approx. 8.000

The whole territory of the BR's core zone and almost the whole buffer zone are owned by the state and managed by the Hortobágy NP Directorate (HNPD), so the HNPD owns the land management right on cca 93% of the property (core and buffer zones). The transition zone is situated outside the state-owned territory. HNPD implements the management by contracts with livestock-owners of the surrounding localities.

Structure of land usage (rounded figures):

Contractor:	*Sum (ha)*	*Grassland (ha)*	*Arable land (ha)*	*Other (ha)*	*No of contractors*	*Aver. land unit of a contr. (ha)*
Private	12.500	11.000	200	1.300	200	65
Company	18.500	13.000	1.100	4.400	43	435
Hort. Ltd.	14.600	11.800	1.400	1.400	-	-
(Hort. NP)	-	2.450	200	-	-	-

The area which is not suitable for agriculture (forest, marshes, alkaline areas, reeds, barren land etc.) is managed by the HNPD directly.

Private contracted companies also have local interests and they are mostly located in the region (more than 98 %).

In order to maintain the traditional land use practices, especially common grazing (organized as common grazing companies, around the localities in the ancient times), review of the land rentals and farming contracts is essential, especially with regard to areas under 100 ha (these small areas in fact are not suitable for traditional grazing). Another main objective is to decrease the ratio of hay cutting in favour of the traditional grazing activities (in buffer zone). Under- and overgrazing must be avoided together with intensive hay farming due to their damaging effects on the grasslands.

The transitional zone could remain the location for the more modern arable and grassland farming practices, but large constructions that disturb the landscape should be avoided there as well.

The unfavourable modernization of stock keeping farms mandated by domestic and international laws and regulations needs to be prevented by the derogation of the relevant EU regulations, especially concerning concrete manure storage facilities.

Structure of cultivation types (rounded figure):

Type of land using:	*Ratio of area (%):*
Grassland	75.0
Arable land	3.5
Fishpond	2.5
Forest, tree-plantation	1.5
Reeds	1.5
Other (open water, marsh, abandoned military area etc.)	16.0

High Natural Value Areas (HNV), as members of EU's Agri-environmental Scheme

The BR partly connects to a HNV namely the Hortobágy HNV which was legally designated in 2009. Its area is 70,268 ha (27,671 ha located inside of the BR). The Agri-environmental Scheme (AES) has practically started on 27,123 ha (13,418 ha located inside of the BR). Most of the remaining part is situated in the transitional zone.

Aspects of delimitation of HNV area were:

- inclusion of unprotected grassland patches surrounded by intensive arable lands,
- inclusion of existing extensive grazing areas still not protected,
- inclusion of all important and still unprotected habitats of great bustard and red-footed falcon.

Five larger programs are implemented here:

1. Great bustard (*Otis tarda*) protection on arable land. Consists of:
   - limitation of chemicals,
   - prescription of types of growing, rotation of growing,
   - limitation of timetable of harvesting,
   - maximum field size.
2. Great bustard (*Otis tarda*) protection on grassland. Consists of:
   - limitation of earliest mowing,
   - prohibition of any chemicals,
   - limitation of timing of grazing.
3. Red-footed falcon (*Falco vespertinus*) protection on arable land. Consists of:
   - limitation of chemicals,
   - prescription of types of growing, rotation of growing,
   - ratio of mowing on a certain field is maximized,
   - maximum field size.
4. Crane and wild goose protection on arable land. Consists of:
   - certain ratio remains unharvested, and kept for birds,
   - tolerance of springtime grazing of these species on fields.
5. Protection of winged game on arable land. Consists of:
   - limitation of chemicals,
   - prescription of types of growing, rotation of growing,
   - limitation of timetable of harvesting,
   - maximum field size.

Some data of the programs (for the whole working HNV, where ratio of BR is 49.5 %), subsidy-data are rounded figures:

Program:	*Supported area (ha)*	*Number of partners*	*Aver. subsidy (EU/ha)*
1.	7.204	88	300
2.	18.170	118	130
3.	386	6	260
4.	90	2	170
5.	779	19	300

Culture

The earliest remains of the human activity are tumuli (kurghans). In the territory of the Hortobágy National Park, there are still about 70, approximately 5% of the total remaining tumuli in the Carpathian Basin (additional 100-150 ones are in the Transition Area). Their diameter is usually about 30-60 m and their height about 4-7m. Some of them have a flat shape; these are the dwelling tumuli ("tell") from the late Neolithic Age (5,000-4,000 B.C.). Most of the tumuli are burial mounds (2,100-1,100 B.C.) of a nomadic tribe from the East ("Tribe of the Pit-grave Culture") who were the first nomads that reached the Carpathian Basin. They are better known as Kurghans, their Turkish name. The shape of the Kurghans is more peaked than the others from the Neolithic Age.

There are no settlements remaining from the Middle Ages except for some ruins and one small early Baroque castle close to the BR.

After the Turkish wars important trading roads passed through the Hortobágy due to the economic development. That is the reason bridges and road-side inns (csárda, whose name has an Iranian origin) were necessary. The number of inns in the beginning of the 19th century in the territory of Hortobágy was around 40, most of which have been destroyed. Most of the remaining ones, after much reconstruction and renovation, are now of Classic, provincial Classic or Baroque styles. Many inns and these bridges can be regarded as relics of the 18-19th century way of life on the Great Plain and of the often inefficient transportation system of that time (poor roads and poor public security).

The Nine-Arch Stone Bridge over the River Hortobágy. Length: 92.14 metres, height: 7.90 metres, width: 8.85 metres. Classic style, built in 1825-33. It is the longest stone bridge in Hungary and carries a major road of the area. It was reconstructed in the past years.

The Large Hortobágy Csárda. It has the largest base area of the inns in HNP. The first part of the present building was built in 1781. Since then, some parts have been added to it. Its basic style is Classic. On its southern facade, there are thirteen arches built in the beginning of the 19th century.

In the last cca. 2000 years the dominant land use type was the extensive pasture (periodically nomadic or semi-nomadic). High density of localities was not established in the early Middle Ages (as in other parts of Hungary). Later the permanent wars in the 16th and 17th century caused the total disappearance of former human populations in the area.

The using of the pastures continued. In the last 100-150 years, before the legislation of NP, the ratio of arable lands was increased.

C) Research and educational functions

RESEARCH

Brief description of on-going research and monitoring activities:

Abiotic:
Quarternary geological research, not regular

Biotic:
Between 1996 and 2006 sporadic investigations (some of them are not included in bigger research projects).

- general management: 1
- species management: 2
- geology: 1
- microbiology: 1
- botany: 4
- zoology: 14

Most of them (15 projects) were located directly inside the BR, and the remaining 8 small-scale research programs are only partially situated in BR.

National Biodiversity Monitoring System

Three 5 x 5 km quadrates were selected here for monitoring (123 in Hungary):

1. In ET05 (-D4, -C3, -B2, -A1) UTM quadrate, H05300360 CORINE site.
2. In DT95 (-A4, -B3, -C2, -D1) UTM quadrate, H05200042 CORINE site.
3. In DT77-D4, DT78-C3, DT87-B2 and DT88-A1 UTM quadrates, H05200046 CORINE site.

Main activity is vegetation-mapping.

There are selected habitats and species in the BR also included in this Monitoring System. Here stable plots and points are used in a systematic survey.

Habitats:

Galatello-Quercetum forest steppe
Artemisio santonici-Festucetum pseudovini alkaline pasture
Achilleo setaceae-Festucetum pseudovini semi-alklaine pasture
Agrostio-Alopecuretum pratensis alkaline meadow
Agrostio-Beckmannietum eruciformis alkaline marsh
Peucedano-Asteretum sedifolii alkaline meadow
Pholiuro-Plantaginetum tenuifolis pan
Camphorosmetum annuae pan
Puccinellietum limosae ecoton
Orthoptera communities in Artemisio-Festucetum and Achille-Festucetum

Species:

Plants:
Marsilea quadrifolia
Cirsium brachycephalum

Birds:
Extensive monitoring started in 2012 after a year long preparation of observing sites and methods. This monitoring involves the rangers of the Hortobágy NP (all of them are professional or amateur ornithologists).

Monitoring of Natura 2000 habitats (Habitats Directive Annex II) started 3 years ago, but was temporarily interrupted last year.

Facilities for researchers:
The researchers use mainly the National Park Directorate's accommodations for lodging.

How the results of research programs have been taken into account in the management:
The scientific results are utilized mainly through the management plans. Researchers often discover important values or appearance of endangering factors that require immediate action.

Public relations, NGOs, local authorities

Important aspects are:
- Relationships with local NGOs and schools, cultural institutes to organize touristic and folklore events, as well as training on traditional handicrafts work;
- Relationship with local municipality of Hortobágy village to develop public ground and building site for craftsmen colony;
- Relationship with local people and craftsmen to organize manual exercises and traditional games in Craftsmen's Yard with folk musicians.

EDUCATION

Visitor Center

The Visitor Center opened in 2007, in the centre of the area, in Hortobágy village. It is the main stage of the organized programs within the BR.

It includes: 2 conference halls for 30 and 90 people; exhibition on two floors (for 40-60 persons simultaneously, part of it interactive); a shop of publications, information materials, books and handmade traditional products; information desk and office; educational room equipped with technical tools (microscopes, projector etc.) for max. 35 students.

The most important surfaces are:
- tourist information at information desk;
- booking guided nature tours and field study education programs;

- organization of professional courses in conference and meeting rooms;
- souvenirs;
- playground;
- Craftsmen's Yard: mission is to unite craftsmen of Hortobágy and of the geographically connecting regions under the brand of World Heritage title of Hortobágy, Craftsmen's Yard is organized many times per year

Regular programmes and events in the national park:

- National Fair of the Eco-products on Saint George Day
- European National Parks' Day
- National Herdsmen Competition and Shepherds Meeting
- International Horsemen Festival
- Hungarian National Parks' Week
- Hortobágy Bridge Festival
- Hunting and Fishing Day
- Festival of the migrating Cranes

Ecotouristical programmes

Demonstration Areas and Nature Trails:

- Szálkahalom: burial mound „Szálkahalom", flora and fauna of the alkaline and loess vegetation, wind-brake forest.
- Malomháza: exhibition (like a safari) of wild animals that lived here before human history: wolves, jackals, Przewalski's horses, wild asses, Heck cattle (a „replica" of the extinct aurochs), vultures, pelicans. Some of them like white-tailed eagle, black stork and other wild animals still live in the protected areas.
- Hortobágy Great-Fishpond's trail, rich avifauna, watchtowers and hides, Bird-ringing Station). Part of it is equipped with narrow gauged railway. Hortobágy Great Fishponds' Narrow Gauge Railway: One of the most important waterfowl habitat in Central Europe can be explored with help of narrow gauge railway (on the main dike) and watchtowers, hides, board-walk into wetlands of the lake.
- Most professional and most popular attractions are guided birdwatching tours by companies, NGOs and a small portion is performed by rangers of HNPD.

Environmental education programs (2005-2011) in the Hortobágy BR

Contributors: environmental educator, rangers, craftsmen, volunteers

Field Study Centre of Hortobágy National Park „Fecskeház" (Swallow House) was established in 2007, and successfully accredited in 2008. It functions as a type of student hostel as accommodation, with a capacity of 36 beds.

It can receive 2000 persons per year. HNPD organizes programs for 5 days detailed in the followings:

Day 1 – Ethnographical values and ancient domestic animals, demonstration of shepherd-life in the Hortobágy

Day 2 – Wetlands' day: Introduction to the birds' life of the Hortobágy fishponds. In the evening astronomical presentation and observation (PART OF HORTOBÁGY IS A DESIGNATED DARK SKY RESERVE /STARRY SKY PARK/).

Day 3 – Day of the Puszta: Studying the vegetation of the steppe along a nature trail by the river Hortobágy

Day 4 – Day of river Hortobágy and Craftsmanship: Boat tour on the River Hortobágy and learning about local crafts at the visitor centre of HNPD

Day 5 – Puszta Safari – Wild Animal Park of Hortobágy.

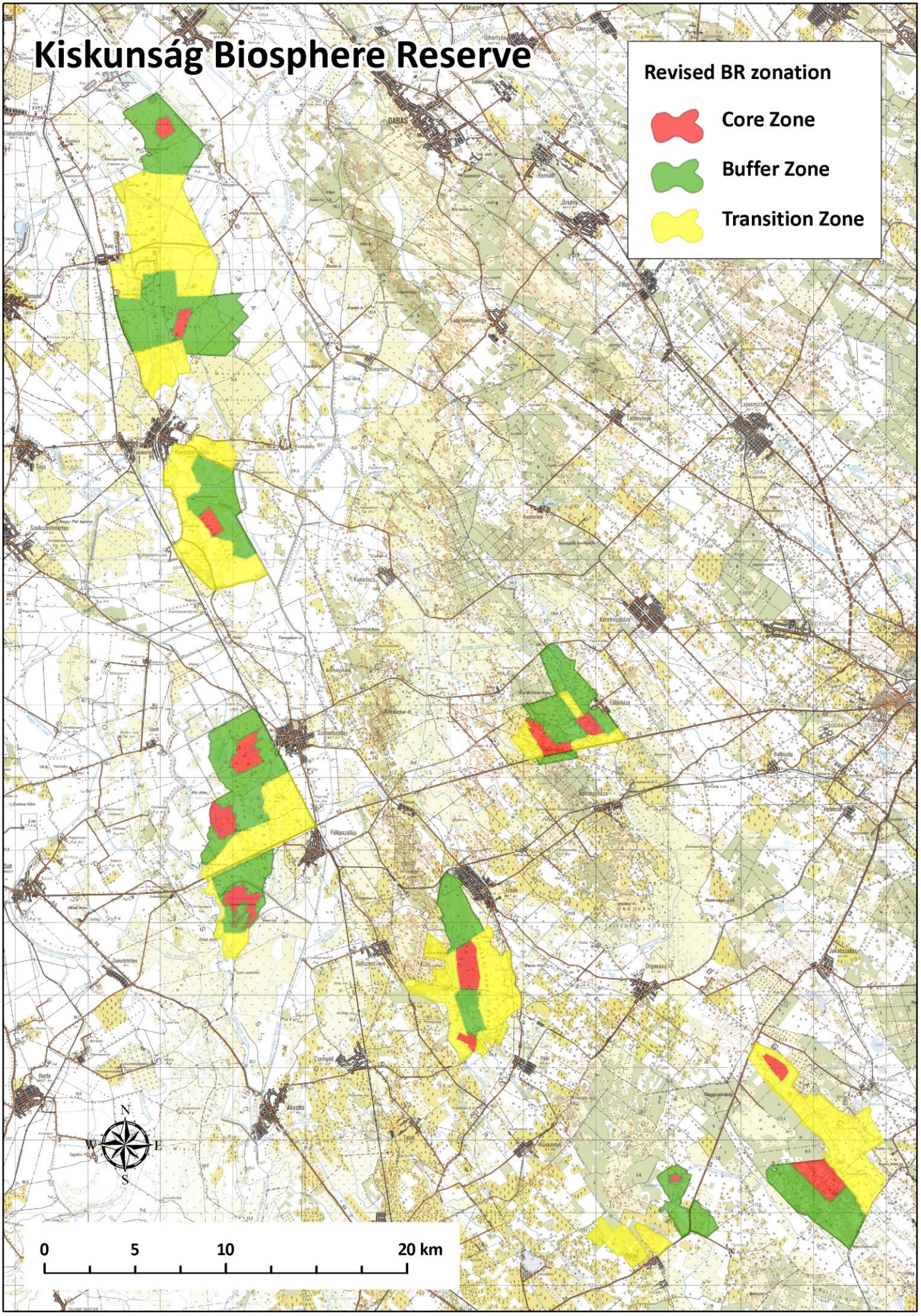
The basic goals of the environmental education program are to introduce participants to the natural and cultural values of the Hungarian Puszta as part of the World Heritage.

Other important tasks of environmental education

- Production of thematic leaflets, nature trail guiding booklets and exercise books for students about the three existing nature trails
- Competition for primary school children with title „Shepherds life in the Hortobágy", in topics of „Shepherds and their herds", „Shepherds buildings, inns, bridges and routes", „Bridge fairs, Shepherds' art, handicrafts". Children can apply with figures, buildings' model and puppets. The winner teams could take part in adventurous field trips.
- „Crane" fine arts application for children at the age of kindergarten and primary schools. Children can apply with their graphics and poems related to cranes as the symbol of the Hortobágy National Park.
- Presentation series for children, students and pensioners posted in advance
- Hortobágy ecotourism course in co-operation with Applied Ecology Department at the University of Debrecen.
- Training for nature trail guides at Lake Tisza
- Nature conservation summer camp for students
- Summer professional practice for students

KISKUNSÁG
BIOSPHERE RESERVE

KECSKEMÉT
2013


Kiskunság Biosphere Reserve
Revised BR zonation
Core Zone
Buffer Zone
Transition Zone
N
W
E
S
0
5
10
20 km

Kiskunság Biosphere Reserve

GENERAL INFORMATION

The Kiskunság Biosphere Reserve and National Park are of priority importance with regard to conservation of biological diversity in the Pannonian Biogeographical Region. The territory of the BR had been designated as a national park in 1975; three parts of the Biosphere Reserve are wetlands of international importance, according to the Ramsar Convention, since 1979, 1997 and 2006; and comprises several Natura 2000 sites under the EU Birds Directive and Habitats Directive since 2004. The Kolon-tó at Izsák is a Biogenetic Reserve since 1995.

The diverse terrestrial and aquatic habitat mosaics support a rich flora and fauna including a number of species which are otherwise endangered, threatened, or rare in Hungary.

Topography of the region

The Kiskunság Biosphere Reserve is located in a sand dune region formed by two rivers, the Danube and the Tisza. These completely lowland areas consisted of wetlands (flooded and marshy areas, salt-affected temporary wetlands, alkaline lakes), sand dunes and alkaline plains. Lowest and highest elevation above sea level: 92 – 130 meters.

Climate

The region has temperate continental climate. Its unique features are limited cloud cover, a relatively high number of sunny hours, high daily and annual temperature

variation, relative dryness and very low humidity values. This is one of the warmest areas in the country. The annual average temperature is between 10-11°C. The mean temperature of the coldest month (January) is between -1,5 and -2°C, in the warmest month (July) it is 21-22°C. Under normal conditions the annual precipitation is between 500-600 mm. This is further intensified by low humidity values, with an annual average of many years at 71-74%. The balance of precipitation and evaporation is negative. The wetlands are mainly influenced by the subsistence of water (e.g. ground water).

Geology, geomorphology

The ancient Danube and the Tisza rivers played an important role in the formation of the Kiskunság region. The previous lake sediment (originating from Pannon Sea in late Miocene) was replaced by river sedimentation (primarily by the Danube).

This sedimentary layer consists of blown sand, which was structured as a series of sand piles on the north-south direction according to the dominant wind direction, as well as of loess developed during the ice formation periods, their transformed (e.g. soil) varieties and sediments washed out by local precipitation.

Geological situation developed on the smaller eastern section of the region where the River Tisza, through its westbound movement, entered the alluvial fan of Danubian origin and in certain locations cut up and destroyed the surface of Danubian origin from the late Pleistocene period and enriched it with its own sediments.

Based on geological evolution, the geological structures covering the surface and the morphological conditions, the region can be divided into three major geological units:

- Danube Valley (a tectonic and erosional depression along the Danube river in a width of some 20-30 km) with an average height of 90-100 m above sea level,
- Danube-Tisza Interfluve Ridge. An area with a varied surface protruding some 30 m above the Danube Valley and almost 40 m above the Tisza sedimentary layer smoothing into the loess Bácska plain on the SW direction. Due to its position and surface features this is also the natural divide of the region, which is roughly sketched going from north to south by a line between the communities of Ladánybene, Fülöpháza, Helvécia, Bócsa, Tázlár, Kéleshalom and Bácsalmás. Its average height above sea level is 110-135 m.
- Tisza Valley, which is the lowest situated unit of the region. Its height above sea level is below 90 m.

Soils

- Chernozem meadow soil types, which are surfaces developed on a sandy loess base situated on the highest level layers, with high humus content. Their layer thickness varies 20-40 cm. Generally the salty ground water already does not impregnate these layers. In cases where these highest locations are relatively expansive, they are cultivated, and if they are smaller in size (a few 100 m^2), they form isolated patches on the saline steppe, partly conserving the old sand and loess steppe flora of these areas.
- Solonetz meadow or carbonated solonetz soils, which appear in non-classical forms, in patches, and are more of a transition between the meadow and alkaline soils in various combinations.

- Solonchak-solonetz soils, alkaline solonchak soils, solonchak soils of eroded salt berms. Among these, calcareous-saline solonchak-solonetz soils are the most common, giving the character of the saline plains found here.

The cause of salination in all cases is the salty ground water with a high $Na(Mg,Ca)HCO_3$ content.

GENERAL INFORMATION ABOUT THE BIOLOGICAL DIVERSITY

Habitats within the whole territory of BR

- **Grasslands:**
  - salt steppes
  - Pannonic loess steppic grasslands
  - Pannonic sand steppes
  - Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
  - Grasslands of intensive agricultural use
- **Natural and semi-natural woodlands**
  - Pannonic inland sand dune thicket
  - Riparian mixed forests of Quercus robur, Ulmus laevis and Ulmus minor, Fraxinus excelsior or Fraxinus angustifolia, along the great rivers (Ulmenion minoris)
  - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion-incanae, Salicion albae*)
  - Euro-Siberian steppic woods with *Quercus* spp.
- **Planted forests:**
  - Non-native poplar stands
  - Pine plantations
  - Black locust plantations
- **Wetlands:**
  - Marshes and alkaline lakes
  - Alkaline fens
  - Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*–type vegetation
  - Natural dystrophic lakes and ponds
  - Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea-uniflorae* and/or of the *Isoëto-Nanojuncetea*
  - Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation
  - Riverine: oxbow lakes
  - Canals

ENDANGERED OR THREATENED PLANT SPECIES:

- Astragalus dasyanthus
- Astragalus excapus
- Botrycium lunaria
- Epipactis bugacensis
- Eryophorum angustifolium
- Gentiana pneumonanthe
- Gladiolus palustris
- Iris humilis ssp. Arenaria
- Iris sibirica
- Leucojum aestivum

- Linum hirsutum var. glabrescens
- Menyanthes trifoliata
- Onosma arenaria
- Ophrys insectifera
- Urtica kioviensis

Other characteristic plant species of the BR:

- Alkanna tinctoria
- Anemone sylvestris
- Arum orientale
- Astragalus asper
- Cephalanthera longifolia
- Cephalanthera rubra
- Cladium mariscus
- Clematis integrifolia
- Colchicum arenarium
- Colchicum autumnale
- Dactylorchiza incarnata
- Dianthus diutinus
- Dianthus serotinus
- Dianthus superbus
- Ephedra distachya
- Epipactis atrorubens
- Epipactis helleborine
- Gallium palustre
- Hottonia palustris
- Iris arenaria
- Iris pumila
- Iris spuria
- Iris variegata
- Nymphaea alba
- Ophrys sphegodes
- Orchis coriophora
- Orchis militaris
- Orchis morio
- Plantago schwarzenbergiana

ENDANGERED OR THREATENED ANIMAL SPECIES:

- Ammobiota festiva
- Ardeola ralloides
- Asio flammeus
- Burhinus oedicnemus
- Charadrius alexandrinus
- Chlidonias hybrida
- Ciconia nigra
- Circus pygargus
- Coracias garrulus
- Coronella austriaca
- Crex crex
- Egretta garzetta
- Falco cherrug
- Glareola pratincola
- Haliaeetus albicilla
- Lanius minor
- Luscinia svecica
- Lutra lutra
- Misgurnus fossilis
- Mustela eversmanni
- Otis tarda
- Platalea leucorodia
- Rana arvalis
- Rhyparoides metelkanus
- Saga pedo
- Staurophora celsia
- Umbra krameri
- Vipera ursini rakosiensis

Other characteristic animal species of the BR:

- Acrida hungarica
- Anisus vorticulus
- Anser anser
- Athene noctua
- Aythya nyroca
- Buteo buteo
- Carabus hungaricus
- Cucujus cinnabarinus,
- Dorcadion fulvum cerveae
- Egretta alba
- Emys orbicularis
- Falco subbuteo
- Falco tinunculus
- Falco vespertinus
- Himantopus himantopus
- Lanius collurio
- Larus melanocephalus
- Leucorrhinia pectoralis

- Limosa limosa
- Lycaena dispar
- Mantis religiosa
- Merops apiaster
- Mustela erminea
- Myotis dasycneme
- Numenius arquata
- Oriolus oriolus
- Picus canus
- Picus viridis
- Recurvirostra avosetta
- Strix aluco
- Turdus philomelos
- Upupa epops
- Zerynthia polyxena

Species of traditional or commercial importance:

- **Agriculture:** Maize, wheat, rye, barley, oat, alfalfa, sunflower.
- **Ancient domesticated animals:** Grey cattle, Mangalica pig, Cigája sheep, Hungarian half-breed horse, Kuvasz, Puli and Komondor dog races. Striped bare-necked hen.
- **Forestry:** Oak, poplar, black locust, pine, ash
- **Reed harvesting:** Reed
- **Medical plants:** Juniper

ZONATION DEVELOPMENT

In Hungary certain uses, such as agriculture and forestry, can be carried out in protected areas as well, but in a controlled way. Farming and ranching, which have the potential to become more sustainable, are vulnerable to the effects of climate change and global economic costs and demands for products.

Compromises must thus be made in managing such uses, compromises that take account of both the areas' protective function and their role in developing a sustainable regional economy. Such compromises are achieved through the areas' zonation as both national parks and biosphere reserves.

A special aspect of the Kiskunság Biosphere Reserve needs to be emphasized with regard to the areas' zonation: like the approach taken for other Hungarian biosphere reserves, in the Kiskunság Biosphere Reserve almost the entire area has been set aside as a protected area.

The Kiskunság National Park was established in 1974 by Ministerial Decree no. 1800/1974 of the National Authority for Nature Conservation. It was repeated with a currently valid declaration (Decree No 134/2007.). The territory of the national park has been extended several times.

The Kiskunság BR was established in 1979. The currently valid declaration is the Decree No 7/2007. of the Ministry of Environment and Water. The designation of the transition zone and the revision of the zonation system have already been finished. The designation of IUCN zonation (A, B, C, D zone) for the Kiskunság National Park is still in process, so emphasis is laid down on the harmonization of these two zonation systems.

CORE ZONE

Size: 2,275 ha

Basically the core zone includes natural and semi natural systems (dry and wet grasslands, wetlands and forests) with minimal human impact.

The whole core zone is part of the Kiskunság National Park. These are strictly protected areas, and are covered by Natura 2000 sites as well. Many parts of the core area are also designated as Special Protection Areas (under the Birds Directive) and as Special Area of Conservation (under the Habitats Directive). The zone almost completely overlaps with the National Park A-zone according to IUCN zonation system. Some parts of the core and the buffer zones are important wetlands recognized by the Ramsar Convention so they are Ramsar sites since 1979. There are no settlements inside the zone. The whole core zone is state-owned.

According to the Hungarian Act on Nature Conservation the core zone is strictly protected area, so the main aspects of the management would focus on conservation activities. Uses or activities in the core zone are biological inventories, long-term biological monitoring, conservation management practices, controlled hunting and some agricultural (grazing) and forestry activities, wildlife watching.

BUFFER ZONE
Size: 10,277 ha

The whole zone was designated as Natura 2000 sites and its boundary matches with the edge of the Kiskunság National Park. Inside the zone human activities are allowed. These areas are used extensively by different agricultural activities (grazing, mowing), and forestry in accordance with the conservation management strategy, controlled hunting, research, environmental education, some tourism (hiking, wildlife viewing), but it has spatial, temporal and technological restrictions. There are habitat restoration projects in progress e.g. establishing open water surfaces in the Lake Kolon which were characteristic of the area before drainage canals were built. To maintain grasslands and to prevent the natural expansion of reed, extensive grazing by traditional animal breeds and mowing are also usual. The most important impact is disturbance by agriculture which is in some places the main activity in the buffer zone. The buffer zone is to mitigate the outer impacts affecting the core zone.

TRANSITION ZONE
Size: 11,209 ha

The transition zone mainly includes man-made landscapes, for example agricultural areas, arable lands, areas of touristic importance. In contrast to the biosphere reserve's core and buffer zones which are mainly owned by the state, the transition zone is mostly privately owned. The most extensive form of use of the area is agriculture. Some areas of the biosphere reserve are to promote extensive management of the meadows and plough fields' in the frame of an agricultural scheme. Some part of the core and buffer zones and the whole transition zone are within the agri-environmental program and designated as High Nature Value areas. The local farmers have the opportunity to apply for payments if they do their farming activities on a determined environment and nature friendly way.

Land use is sustainable and is in compliance with the requirements for a transition zone. In addition, there is a high number of contracts serving the purpose to improve the ecological, economic and social situation in the area. Perspectives for the future are being created via sustainable regional development, revitalization of rural areas and protection of local residents' living standards.

The development processes are still under the limited control of the conservational bodies (Green Authority and national park directorate) and the authorities responsible for regional and local developments, and national monuments. The local population of the settlements nearby the zone is involved in the conservational and development issues.

The area is more and more popular for visitors, especially during the vegetative season. The infrastructure of tourism will be developed.

Progress on the implementation of the Seville Strategy

Management plan

The territory of the Kiskunság Biosphere Reserves totally includes the Kiskunság National Park area which is protected by the Hungarian law. Because of this situation, a Nature Protection Management Plan is necessary to determine the conservation measures. This Management Plan has to be synchronized with the zonation system and the utilization plans of the BR.

The finalization of the management plan is almost completed.

Cooperation with other biosphere reserves

Beside the nation-wide cooperation of KBR, it has continuous professional collaboration with other BR managing organizations in Hungary, further national park directorates (mainly with the Hortobágy Biosphere Reserves) and the Ministry of Rural Development.

KBR has not yet settled a bilateral or any other specific agreement with BRs outside Hungary, but there is occasional cooperation with staffs of Biosphere Reserves (Germany, Rhön Biosphere Reserves), national parks and protected areas in Kazakhstan, Serbia, England, Ireland, etc.

A) Conservation Function

The biosphere reserve's size, along with the important fact that the reserve's core areas and buffer zones, and the transitional zones as well have been legally protected and set aside as a national park, enable the fulfilment of the protection function very effectively. In addition, the protection function is fulfilled especially well in a strictly protected "zero-use" zone within the core zone. Protection measures are implemented to a high level in the buffer zone as well. A range of agreements, contractual arrangements and cooperation additionally help ensure that development is sustainable.

In the biosphere reserve's core area and buffer zone, which are also parts of the national park, natural development predominates. Conservation aspects play an especially strong role in the core area, while in the buffer zone the primary focus is on sustainable uses. In the transition area, more intensive uses, including traditional uses, take place. Here as well, development is now largely sustainable.

The national park directorate has a responsibility as a state nature conservation manager with sovereign competence. Volunteer cooperation is strongly promoted and welcomed, and it is becoming increasingly important as a management mechanism. The biosphere reserve's development and logistical functions extend far beyond the boundaries of the biosphere reserve itself, thanks to the governmental agri-environmental scheme "High Nature Value Area". The region’s sustainable development is promoted via voluntary agreements, cooperation, applications for joint projects, support programs.

Nowadays the removal of aggressively spreading invasive plant species (*Asclepias syriaca, Amorpha fruticosa, Solidago spp, etc.*) is a big challenge. The management of invasive species is a very complex and complicated task among conservation activities.

The biggest problem is caused by the aggressive alien species, the milkweed *(Asclepias syriaca),* which spreads mainly on sandy soil on abandoned plough fields, forest plantations and overgrazed grasslands especially in the surroundings of farms and settlements. The effective removal requires permanent management. The applied technologies are regular mowing and circumspect using of chemicals. This management is implemented on 100-300 hectares every year. According to the experiences, which are consistent with other observations collected from international and national publications, the exclusively applicable technology is the use of chemicals. For maintaining the actual supportable conditions further continuous management is needed.

The forceful spreading of *Ailanthus altissima* causes problems especially on sandy areas. As part of habitat rehabilitations we had got rid of graniferous individuals first then almost all spears were removed on the most vulnerable sandy areas.

Another conservation activity is the replacement of non-native tree species (evergreens, *Robinia*) with native species (e.g. white poplar). The coverage of evergreens and Robinia plantation was very high even in the territory of the BR. It is a long process to completely eliminate these alien plantations from the BR. According to the financial resources of the Directorate year by year 5-25 ha of alien plantation has been replaced by native forest.

There was a large scale habitat reconstruction project on the alkaline grassland of the Upper Kiskunsag area. The main goal of the project was to eliminate channels (28 km) and to remove sluices, and as a result recreation of temporary waters in the saline grassland.

An important project was the restriction of illegal traffic in BR territory. There is a network of dirt roads and tracks in BR for agricultural and forestry purposes. The easy accessibility of these roads has given rise to frequent illegal deposition of waste materials, damaging of habitats by off road cars and bikes and recreational activities causing harm to the environment. As part of the project the roads of the core zones were secured by more than 50 strategically placed gates.

B) Development Function

Population living in the BR

	permanently	***seasonally***
Core Zone:	0	0
Buffer Zone:	approx. 500	approx. 600
Transition Zone:	approx. 2.000	approx. 3.000

Sustainable development

The majority of the Biosphere Reserve area is a less favorable area for intensive agricultural perspectives due to its poor soil conditions. There is a high diversity of large-scale and semi-subsistence farms in the region. The National Park has well-established contacts with the major land users, which gives a good opportunity for sharing information about practical conservation measures.

Traditionally, the area used to be a grazing land with cattle, sheep and horses, but from the 1950s the population of grazing animals started to decrease, which led to inappropriate use of lands, which finally caused the serious degradation of grasslands. In

general, a special socio-economic space exists about the sustainable use of land, and the national park makes all attempts to find the good balance between the social, economic and nature conservation aspects.

A wide range of interactions with surrounding areas takes place, with the result that the biosphere reserve's socio-economic impacts reach far beyond its boundaries and, thus, can contribute to integrated management for the region. In short, within the core areas and buffer zones of a biosphere reserve designated as a national park, the biosphere reserve's protective functions receive special attention, while in the transition area and the large surrounding areas a special emphasis is put on people and on the sustainable development of their region.

One such action of cooperation relates to sustainable agriculture in the buffer and transition zones where there are a number of governmental schemes available for giving financial supports, advice and assistance to individual farmers, directed mainly to individual farm conditions. The national park directorate has contributed mainly by hosting community meetings and exhibitions or events that help to promote sustainable land use or farming practices.

In the Biosphere Reserve and the neighboring areas, 4 different types of payments are available for local farmers, and 2 of these support directly nature conservation aims.

These payments are:

1. *Measures targeting the sustainable use of agricultural land*
2. *Payments to farmers in areas with handicaps, other than mountain areas*
3. *Natura 2000 payments on agricultural areas*
4. *Agri- environmental payments*

The first two are connected with the sustainable use of agricultural land via supporting the traditional way of farming, including the maintenance of grasslands and indirectly supporting the transformation of the production structure to the one based on livestock.

As the second measure supports farming in areas with handicaps, this payment is available only in areas with special conditions, and the generally poor quality of soil and the high natural value within the Biosphere Reserve definitely fulfils the criteria of these special conditions.

The last two measures directly target nature conservation aims with special requirements and as a consequence access to these payments is limited.

The Natura 2000 payments are directly connected to Natura 2000 sites: the farmers claiming support for Natura 2000 grassland areas obtain it if they meet the requirements of the scheme according to the Hungarian government decree No. 269/2007. (X.18.).

Above all, the highest payments can be reached by joining the agri-environmental scheme, which opportunity is available for 25 areas in Hungary. The scheme in general supports the protection of soil, the surface- and groundwater, the reduction of air pollution and is in line with genetic and nature conservation principles. These payments encourage agricultural producers to adopt farming and production methods which are compatible with the sustainable use of environment, landscape, natural resources and with the preservation of genetic resources.

This measure can be divided into 4 sub-measures on the basis of agricultural land use: arable plant production, grassland management, plantation farming (fruit and grape production) and wetland management. Within the Biosphere Reserve there are two

special areas nominated as Areas with High Natural Value (HNV); the Dunavölgyi-sík (Plain of Danube-Valley) and the Homokhátság, where the so called zonal nature conservation schemes are defined, and the zonal specifications, according to the ministerial decree FM 61/2009. (V.14.) can be applied and integrated into everyday farming.

The schemes can be divided into the following three groups:

1. Arable farming for nature conservation
2. Grassland management for nature conservation
3. Conversion of arable lands into grasslands

These schemes, which are obtainable only on the special areas of High Natural Value, and which are strongly connected to the Biosphere Reserve support the conservation of endangered bird species directly or indirectly related to agrarian habitats, like the Great Bustard (*Otis tarda*), the Stone-curlew (*Burhinus oedicnemus*), the European Roller (*Coracias garrulus*), the Saker Falcon (*Falco cherrug*), the Montague's Harrier (*Circus pygargus*) or the Red-footed Falcon (*Falco vespertinus*). The regulation and the extra specifications improve the quality of environment and habitats in general as well.

The farmers that joined the special and optional programs have involved these extra payments, as kind of compensation for the requirements into their annual calculation, as in some cases it can reach up to 50% of their total budget. Although the agri-environmental scheme is not compulsory, participation is very high, especially on the Plain of Danube-Valley, where the positive attitude has already produced results in development of natural and semi-natural habitats, and species connected to agrarian environment.

National Park Products

At the same time, for purposes of marketing the region to the world at large, especially with regard to tourism, it is important to concentrate on some unique features (e.g.: inland shifting sand dunes; vast, "endless" grasslands, rich bird fauna). The national park's explicit goals include protecting nature in order to promote tourism and enhance the region's image – to support sustainable development that can improve living and working conditions for the people living in the area. There is a relatively new project for certification of "National Park Products". Packaging and labeling requirements and the definition of the relevant criteria of the products and services will be announced soon. It can be used for advertising the products of local inhabitants in the national park and biosphere reserve and the inhabitants of the surrounding areas as well, generating more income from the protected status of the area.

C) Research and educational functions

RESEARCH

Universities, museums and research centres which have had individual faculty members or graduate students conducting work in the KBR in recent years include: University of Szeged, University of Debrecen, Corvinus University of Budapest, Eötvös

Lóránd University (Budapest), Hungarian Academy of Sciences Institute of Ecology and Botany (Vácrátót), University of West Hungary (Sopron), Móra Ferenc Museum (Szeged), Mátra Museum (Gyöngyös), Hungarian Natural History Museum, Hungarian Academy of Sciences Institute for Soil and Agricultural Chemistry, Hungarian Hydrological Society.

The most important topics are the followings:

- carrying out vegetation mapping,
- soil mapping,
- biological surveys,
- geological and geomorphologic studies,
- wildlife population dynamics,
- inventories on numerous taxa of wildlife.

National Biodiversity Monitoring System

There are three permanent stations for biological monitoring activity at the Sand Dune region of Bugac and Fülöpháza. These stations belong to the University of Szeged, to the Eötvös Lóránd University (Budapest) and to the Hungarian Academy of Sciences Institute of Ecology and Botany (Vácrátót).

There is a very detailed monitoring system for the protected areas and Biosphere Reserves in Hungary. The name is: National Biodiversity Monitoring System (NBmR). Most of the research and monitoring activities have been carried out by the guidelines and protocols of the NBmR.

The Hungarian Academy of Sciences (HAS) first drafted a biodiversity conservation strategy, which identified the accomplishable tasks and stressed the importance of continuous national monitoring. The Institute of Ecology and Botany of the HAS elaborated the theoretical basis of monitoring activities, and the Hungarian Natural History Museum collected the already existing scientific knowledge pertaining to biodiversity monitoring. The introduction of the National Biodiversity Monitoring System was initiated and organized by the Authority for Nature Conservation of the Ministry of Environment and Regional Policy in 1995 (now it is coordinated by the Department of Nature Conservation of the Ministry of Rural Development). To carry out this monumental project, the PHARE Program of the European Union contributed substantial financial assistance. This program enabled the creation of the program of a national monitoring network that might serve as a reference for other countries. A series of 11 manuals was published in Hungarian by the end of 1996.

There is a network of 5 by 5 km sampling quadrates in Hungary. Mapping in these quadrates at landscape level yields the framework within which the more detailed, community-oriented and repeated investigations can be carried out.

The first year in the operation of the system was 1997, when a Central Coordination Unit was formed, mainly to fulfil the project management duties by employing two experts. Since 1998 one full-time staff member in each of the ten national park directorates has been devoted to implement local tasks, to coordinate and supervise the monitoring activities within the area of jurisdiction of the given directorate.

Development and coordination of the national programs are provided by the Central Coordination Unit, while local tasks are coordinated regionally by each national park directorate. Guidance is also provided by an independent Advisory Committee

comprising acknowledged experts of different taxa/disciplines. The service also welcomes the contribution of institutes, universities or non-governmental organizations that can assist the Central Coordination Unit or the regional teams. Those tasks that do not require expert input may be carried out by volunteers from nature conservation societies or schools. The service also plays an important role in raising the awareness of the general public. Sampling has been running with an increasing number of components in 10 projects since 1998.

Monitoring projects of the NBmR

Monitoring activities have been clustered into 10 groups (projects). The projects have been formulated by definition of the objectives and the exact description of the tasks as follows:

I. Monitoring of protected and threatened plant and animal species (including NATURA 2000 species)
II. Monitoring of aquatic and wetland habitats and their communities.
III. Monitoring of habitat types in Hungary.
IV. Monitoring of populations of invasive plant and animal species.
V. Monitoring of selected sites of the Hungarian Forest Reserve Network.
VI. Regional monitoring of the biota of the Kis-Balaton wetlands.
VII. Regional monitoring of the Szigetköz wetlands.
VIII. Monitoring of salt-affected habitat types.
IX. Monitoring of dry grasslands.
X. Monitoring of mountain hay meadows.

Parallel with NBmR local monitoring has been carried out by the staff of the national park on a variety of target species:

- Monitoring of rare and protected plant species
- Monitoring of rare and protected bird species
- Monitoring of endangered fish species.
- Monitoring of rare and protected amphibian and reptile species.
- Monitoring of rare mammal species.

In the Kiskunság Biosphere Reserve there is a Bird Monitoring and Ringing Centre at Lake Kolon. It was established by the Kiskunság Bird Protection Society together with the Directorate of the Kiskunság National Park 10 years ago. It has been producing long term data about breeding and migratory reed bird populations.

EDUCATION

Training and public awareness programs

Environmental education and tuition are core activities of the Kiskunság National Park Directorate which has a unit designated for these tasks.

House of Nature

The Biosphere Reserve has a visitor centre in the city of Kecskemét, called House of Nature. Dioramas depict a picture of the flora and fauna as well as the protected habitats of the BR such as natural forests in flooded areas and alkaline lakes. Another exhibition displays traditional jobs of the Kiskunság region that used to be really distinctive, such as furrier, fisher, quarryman, miller, dyer, etc. Lectures on conservation are held according to a timetable. Groups are welcome by prior arrangements. Trips are organized for groups on the basis of dates chosen in advance. Individual visitors can come on most weekends (it means more than forty times a year). Visitors are able to gain information about those parts of the National Park and Biosphere Reserve which are open for tourists. Brochures, postcards and books are also available.

- The exhibition of the building introduces the Hungarian nature conservation and natural values of the land between the Danube and Tisza Rivers.
- It serves as an information center that expands the social base of nature conservation by giving programs, lectures, and issuing publications.
- Environmental education for young children and students to enhance classroom environmental science curriculum, and the dissemination of scientific knowledge to students, teachers, and researchers.
- A starting point and information center for tourists visiting the Kiskunság National Park and Biosphere Reserve.
- The House serves as a place for conferences and seminars.
- In the House, there is a library of nature conservation documents and relevant data on the region between the Danube and Tisza rivers including photos, films, video tapes, scientific papers, technical books, maps, etc.
- a 'Green Point' information service outlet on nature conservation regulations and actions.

The Field Study Center at Fülöpháza

This study center is the core of the environmental education program at Kiskunság BR. It provides an area for the park to be used as an educational tool for students of all ages, and also a place from which scientific research can be conducted. The center receives groups of students from primary and secondary schools from throughout the area, as well as university classes that would like to conduct week long field studies in the park. The center has also been used as the venue of a training camp for teachers wishing to learn more about outdoor environmental education techniques.

Bird Monitoring Center in Izsák

The Bird monitoring observatory, located at the Lake Kolon part of the BR, is run by KNPD and the Kiskunság Bird Protection Society. Alongside with the ongoing bird research, there are several field study programs, night tours, summer camps and exhibitory bird ringing for the visitors. The most important target group is the population of Izsák and the neighboring settlements. "Kolon café" program series are also organized by the Society, where nature protection, environmental and ecological issues are discussed.

Public relations, information service, social connections

- Creation of database made accessible to the public.
- Information service related to ecotourism (Connected with Hungarian national parks and other protected areas, and visit to KNP.)
- Maintaining relations with nature conservation and environmental associations, and providing venue and technical equipment to their programs.
- Organizing permanent and periodic nature protection exhibitions.
- Aiding nature conservation associations.
- The Nature Conservation House serves as a place for professional forums.
- Organizing open days of the national park (European day of Parks, 24th May)
- Organization of paid courses initiated by external partners – renting the venue. Organization of city and county nature conservation and environmental programs.
- Managing of the National park's website.
- Supporting the work of nature protection service in the MAB territories with the he**l**p of fifteen volunteer rangers.

Training programs for specialists:

There are ad hoc training courses for specialists from other Hungarian biosphere reserves with particular attention to problems like the management of burnt areas, or recently rehabilitated areas.

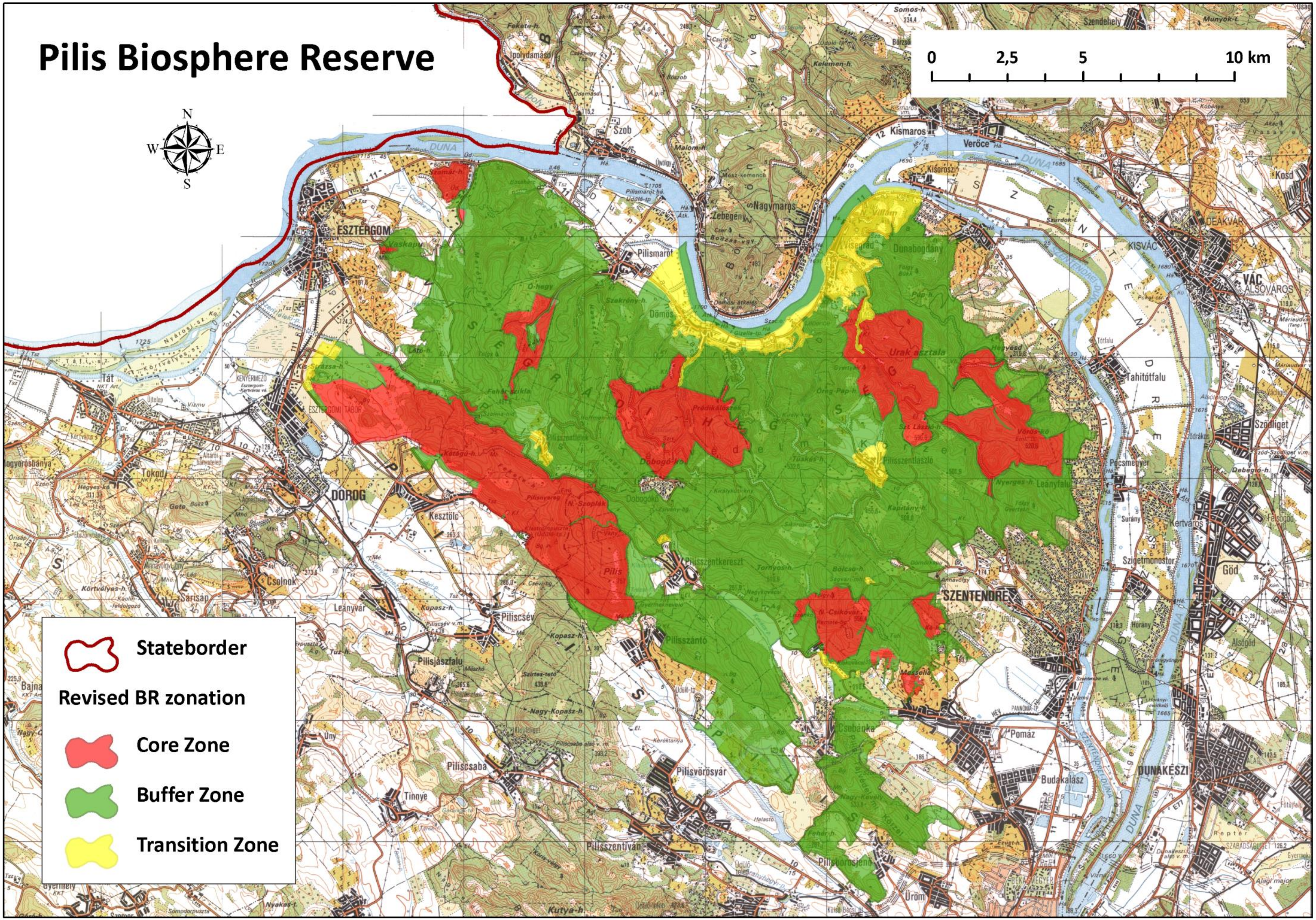
There are one education and four visitor centres in the reserve. One education centre is located in Fülöpháza with 30 beds for students and tourists and one in Bugac with 20 beds.

The visitor centres are the following:

- Shepherd's Museum and Visitor Centre at Bugac
- Virágh Kúria Museum and Visitor Centre at Kunszentmiklós
- House of Nature, Kecskemét

PILIS
BIOSPHERE RESERVE

BUDAPEST
2013


Pilis Biosphere Reserve
0 2,5 5 10 km
N
W
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Stateborder
Revised BR zonation
Core Zone
Buffer Zone
Transition Zone
ESZTERGOM
DOROG
SZENTENDRE
VÁC
DUNAKESZI
DUNA

Pilis Biosphere Reserve

GENERAL INFORMATION

Northwest from Budapest, forced by the andesite block of Börzsöny and Visegrád Hills the Danube flows in a narrow, meandering valley – almost like a U-turn, called the 'Danube Bend'. The scenery was described by Bernard Newmann as 'one of the grandest' stretches of the 2000 miles long river.

The Pilis and Visegrád Hill ranges on the west bank of the Danube – once a royal hunting ground – were designated a Landscape Protection Area in 1978 in order to conserve the landscape and its abundant natural values. Due to these values and the remarkable possibilities for environmental education it was recognized as part of the International Network of Biosphere Reserves by UNESCO in 1980.

An unique feature of this biosphere reserve is its diversity. The range of hills, cut across by valleys due to tectonic forces and erosion, is made up of more than ten types of rocks, involving Dachstein Limestone, Andesite tuff, etc. On this variable surface, according to the relief and aspect, several plant and animal communities have formed.

This Biosphere Reserve offers excellent facilities to escape from the polluted air of Budapest. It is easy to reach from the capital. Nature conservation takes the responsibility of making use of these advantages for environmental education. We are primarily engaged in teaching pupils from the age of ten to fourteen but we also assist at the education of secondary school and university students. Such groups investigated the flora of Szamárhegy (near the town of Esztergom) and the stone crayfish population of Apátkút stream (next to Visegrád). Children in our holiday camps are given

opportunities both for on-site learning and for becoming involved with practical nature conservation projects in the field.

Topography of the region

Medium height hills (average altitude 450-500 m), in between basins (mean altitude 250-300 m), deep valleys with streams, in the north and east bordered by the River Danube (Danube Bend). Considerable differences in relief is characteristic (mean relative relief 130 m/km^2). Highest elevation above sea level is 757 m (Pilis tető); lowest elevation 106 m (Danube).

Climate

Temperate warm, above altitude 600m moderately cool. The annual precipitation varies between 500-600 mm.

Geology, geomorphology

The north-western units, the Visegrád Hills are built up of Andesite (Middle-Miocene, Badenien –Mátra Andesite Formation), the south-eastern units, the Pilis Hills are composed of Upper-Triassic sedimentary rocks: dolomite and limestone (Dachstein Limestone Formation, Hauptdolomite Formation).

Soils

- forest soil,
- erubase,
- ranker.

Main areas of the BR

Szamárhegy és Kerektó (Esztergom)

The southern rocky slope of Szamárhegy-hill and its surroundings are a very good place to see rock and steppe vegetation. Different types of brush-forests, and dry oak-forests can be found here along with oak-hornbeam which exists in cooler and mistier valleys of the hill. An endemic plant, Horánszky's milfoil (*Achillea horánszky*) is only known from here. Besides this plant there are numerous species which are rare throughout the midlands. Many various protected vascular plants can also be found here (e.g. feather-grasses, irises, pasque-fowers, spring adonis – *Adonis vernalis*, Hungarian leopardsbane – *Doronicum hungaricum*, jurinea – *Jurinea mollis*. etc.). Kerektó is the only place in this area where moorland still exists surviving destructive human activities. It is a remnant of a disappearing – once rich – flora. But there is still a refuge for protected (e. g. early marsh orchid – *Dactylorhiza incarnate*, marsh helleborine – *Epipactis palustris*, bog orchid – *Orchis laxiflora* ssp. palustris, bogbean – *Menyanthes trifoliate*, marsh lousewort – *Pedicularis palustris, Thelypteris palustris*, etc.) and rare species (e. g. microspecies of purple moor-grass). Sporadic studies of insects have brought about some significant data (e. g. new species for the Hungarian fauna).

Vaskapu-hegy (Esztergom)

On the northern side of the mountain, 2-300 meters above sea level, plant species typical of the plains can be seen, e.g. dwarf almond (*Amygdalus nana*).

On the hill-sides (the former Duna-terrace /plateau/) alternating spots of sand and loess form the bedrock, with *Cerasus fruticosa* bushes and dry oak forests on it. On the mountain top *Ceraso - Quercetum pubescentis* forests and rocky grassland patches are located. *Pulsatilla grandis* is common (frequent) in the grass-layer, in some places *Aster amellus* can be found.

Nyírvölgy (Nyír-valley) és Hamvaskő (village of Pilismarót)

Wide valley bottom encircled by steep hill-sides characterizes the area. Wild grape (*Vitis sylvestris*) can be found in the beech forests of the northern side, the longhorn beetle species Morimus funereus and Rosalia alpina are common. Along the brook Alnus incana specimens (which are rare in the higher regions) are mingling into the communities formed by *Alnus glutinosa*.

In the valley (Nyírvölgy) sound population of hart's-tongue fern (*Phyllitis scolopendrium*) lives on the limestone, which is unique in the Visegrádi-mountain formed by volcanic bedrock. In the forests of the valley-sides rare *Epipactis* species and other orchids can be seen.

The ridge of the Pilis (Esztergom, Kesztölc, Pilisszentkereszt, Pilisszántó)

The northwest-southeast mountain ridge extends from the forests of the former military shooting ground in Esztergom through the Fekete- and Kétágú-mountain to the summit of the Pilis. This is the biggest core area of the BR, which represents almost all the habitats of the area, with rich fauna. The summit of the Pilis is the highest element of the range formed by limestone, with different vegetation than of the volcanic area. Due to the great altitudinal differences zonally and extrazonally located but same associations may occur. The most important value of the area is the rock vegetation with southeastern exposure on that the most numerous population of the strictly protected endemic pannon ferule (*Ferula sadleriana*) can be found (the whole Hungarian population is seriously endangered). Many various protected plants can also be found here, e.g. *Stipa spp., irises, Pulsatilla spp.,* snowdrop windflower (*Anemone sylvestris*), pallid orchid (*Orchis pallens*), spring adonis (*Adonis vernalis*), as well as rocky plant communities (*Crataego-Cerasetum fruticosae and Waldsteinio-Spireaetum mediae*) with an isolated population of ramsons here (*Allium ursinum*) (which is wide-spread throughout Transdanubia). Due to its numerous micro-habitats formed by dolomite surface many plant species can live here (e.g. common rockrose (*Helianthemum ovatum*), *Fumana procumbens*, silvery paronychia (*Paronychia cephalotes*), *Globularia punctata*).

Prehistoric settlement (stone cabin at Pilisszántó) and unique rock formations (Éles-kő, Vaskapu rock) occur in the core area, with rare flora and fauna colonised on the latters.

The unique *Seslerio sadlerianae-Fagetum* association in the Transdanubian region lives only on the rocky slopes of Vaskapu rock, in which the edificator Carpatian endemic Sadler's moorgrass (*Sesleriana sadleriana*) can be found and this is the habitat of many protected alpine species (e.g. nodding wintergreen - *Orthilia secunda*, three-leaved valerian - *Valeriana tripteris*).

The western – south-western slopes of the Kétágú-hill are covered by karstic scrub and steppic grassland. There is zonal oak-hornbeam forest at the top and plant communities of sand vegetation occur at the bottom. The latter is a very special feature of this area. Protected and rare plant species are abundant (e. g. houseleeks, hen-and-chickens-houseleek – *Jovibarba hirta*, woolly milk-wetch – *Oxytropis pilosa*, Austrian

milk-wetch – *Astragalus austriacus*, sand milfoil – *Achillea ochroleuca*, Venus' looking-glass – *Legousia speculum-veneris*, sand everlasting – *Helichrysum arenarium*, *Gypsophila paniculata*). This sandy area at the bottom of the hill is very important to conserve the species of the sand vegetation (this area can be considered as a genetic reserve). The large patches of former gardens have remained here between the foothill of Kétágú-hegy and the village of Kesztölc. They have to be conserved as important elements of the landscape. The forms of terraces made from loess and clay have interesting features from the point of view of geomorphology. They are the last stands of loess vegetation here.

Beech forests (*Seslerio-Fagetum*) and forests of *Mercuriali-Tilietum* cover the northern slope and rock vegetation – with many fern species – does the same on the steep rock faces of Fekete-hegy mount, close to the Háromszáz-Garádics. A lode of andesite lies at the bottom of the limestone cliff and gives geological importance to this area. The group of Fehér-szikla (near to this place) has the same feature too. The northern slopes on the rock-faces give the opportunity for formation of unique flora and fauna.

The area of Cserepes-valley (where the latter limestone formation comes to the surface 200 meters below and 400 meters further) is situated on the border of sedimentary and volcanic formations, characterized by specific communities of *Luzulo-Quercetum subcarpaticum* and *Genisto piosae-Quercetum petreaeae* live here on the steep crumbling rocky slope with poor quality soil. The specialty of this area is its situation between the limestone and the volcanic ground, which enriched the biodiversity here. The Feketekő is the only formation of dolomite rocks which is situated on the northern slope in the Pilis range. Because of its isolated situation it is the only shelter for many species in the range e. g. *Dianthus plumarius ssp. regis-stephani*. The most important plant associations here are *Mercuriali-Tilietum, Tilio-Fraxinetum, Stipo-Festucetum pallentis*. The association of *Fago-Ornetum* is also significant and this is its northernmost stand. Commo columbine (*Aquilegia vulgaris*), long-leaved hare's-ear (*Bupleurum longifolium*) and white sedge (*Carex alba*) live here. A northern relict fescue species (*Festuca pallens*) is also important to be mentioned, it's a Carpathian diploid taxon living in the opened or closed dolomite vegetation.

Prédikálószék-Rám-hegy (village of Dömös)

This is the main model-site for PBR research where complex research has been going on. The vegetation map of this area was also completed during the 1950s so there is a remarkable possibility to do comparative research by using aerial photographs. The area has rich flora, fauna and diversified soil types. Because the great altitudinal differences, there is a place here for zonal, extrazonal and edaphic plant associations, too. One of the richest rock vegetation (*Minuartio-Festucetum pseudodalmaticae et Poëtosum scabrae*) can be found here on the ridges of Vadállókövek. Important plant species (rare or protected) are pannon thistle (*Carduus collinus*), burning brush (*Dictamnus albus*) spring adonis (*Adonis vernalis*), a subspecies of Dame's violet (*Hesperis matronalis ssp. candida*), *Carex brevicollis*, feather-grasses and irises. Rarities and new species of soil-dwelling animals have been discovered in recent years. Here lives the biggest stock dove - *Columba oenas* population of the BR. In the northern side of the BR, in the valley of Szőke-forrás (spring) lives a little population of European fire salamander - *Salamandra salamadra* which is missing elsewhere in the ridge. In the local brook many protected fish species (e.g. European weatherfish - *Misgurnus fossilis*) and

stone crayfish –*Austropotamobius torrentium* can be found. Besides this, new species of microscopic fungi have been discovered here too.

Apátkúti-bérc – Őrhegy – Kis- Pap-hegy (Visegrád, Pilisszentlászló)

The examined and mapped part of this area is very diversified. The area goes up to the oak-hornbeam belt. Different soil formations caused the formation of mosaic-like vegetation here. Almost all forest associations of the Pilis range can be found. In the areas that are difficult to reach, old and diverse associations can be found which can be kept as experimental primeval-like forests set aside for research by reason of its settings and poor quality of the soil. Associations of *Meltti-Fagetum*, *Quercetum petraeae-cerris*, *Inulo-Festucetum pseudodalmaticae, Mercuriali-Tilietum, Tilio-Sorbetum* signify the main value of the site. Besides this, one can find planted pine forests and the Botanical Garden of Visegrád in the area. The most important protected plants are pannon thistle (*Carduus collinus*) and *Carex brevicollis*. There is a good example for Mercuriali-Tilietum and *Corno-Quercetum pubescenti-petraeae* (this one has a continental character). The latter ones were recorded from here for the first time. There are excellent possibilities to examine the influence of man on native meadow vegetation and to make a comparison between zonal and extra zonal oak-hornbeam forests. The meadows among wooded areas are very important.

On the Kis-Paphegy the *Quercetum pubescentis* oak forests with submediterranean character and - on the areas which are hard to renew after forest clearings - secondary steppe vegetation can be found. Remarkable values of the hill are pannon meadow-grass - *Poa scabra*, pannon thistle - *Carduus collinus*, feather grasses like *Carex brevicollis, Stipa* and *Iris spp.,* and new species of soil-dwelling insects (unknown to science up to now).

Tahi-oldal–Vöröskő–Nagy-Berseg–Sztaravoda (Tahitótfalu, Leányfalu, Szentendre)

The extensive core area can be separated into many small parts. A whole sequence of vegetations between places with different extreme microclimate is represented here in transition from the southern slopes to the northern ones. Besides extrazonal beech forests there are oak-hornbeam forest brushwood and *Sorbo-Quercetum petraeae* association, which lives on steep and rocky ridges in this area. Many protected vascular plants can find refuge here (e. g. irises, orchids, one subspecies of whitebeam – *Sorbus aria ssp.*, spring adonis, etc.). Meadows of this hill are significant because a few species of plants live here which prefer acid soil (e. g. *Nardus stricta*, *Danthonia alpina, Ophioglossum vulgatum*) and plants that are rare in Hungary (orchids and marsh gentian – *Gentiana pneumonanthe*). Among wood-associations the most important one is the *Caricetum humilis-Quercetum*). The relict appearance of this association is rare not only here, but everywhere on volcanic soils.

On the silicate rock vegetation of Vöröskő lowland species live 500 meters above sea level, e.g. populations of *Achillea ochroleuca*. In the grass-layer of the forest pannon endemic species live like *Vicia sparsiflora* and *Lathyrus pannonicus*, and species with submediterranean character like burning bush - *Dictamnus albus*. *Hepatica nobilis* reaches here the eastern border of its spread. The eastern side of the hills is ideal nesting place for birds of prey. According to previous hstorical data, all the bird species typical to this habitat have nested here. Because the favorable conditions still exist, it is important to preserve this place undisturbed.

On the ridges and at the foothills numerous natural and man-made ponds (size of several 10-100 square meters) offer habitat and reproducing possibilities for the

amphibian fauna. Some species can be found here (e.g. common frog - *Rana temporaria* and spadefoot toad - *Pelobates fuscus*) that are primarily not specific in the medium-high mountains. In the south side of the core area, on the hill cone of the Nagy-Berseg, associations of *Querco petraeae-Carpinetum* and *Quercetum petraeae-cerris* can be found, that are giving way to Mercuriali-Tilietum associations on the steep northern hillsides and to *Corno - Quercetum pubescenti-petraeae* associations on the extreme habitat of the plateau.

These forests are the best habitats for the beetles developing in large trees, especially the stag beetle - *Lucanus cervus*, the great capricorn beetle - *Cerambyx cerdo*, or the rare violet click beetle - *Limoniscus violaceus*.

Kőhegy (Szentendre-Pomáz)

The tectonically emerged pieces of the rock formed by the Baden volcanism are characterized by steep sides, low plateaus and to the north deep, steep-walled valleys. In the foreground of the relatively low hill secondary steppes and *Sorbo-Quercetum petraeae* communities are found with rich flora. In the vegetation one can still find some mediterranean weed species like sea barley - Hordeum marinum, brought here by the Serbians in the 18th century. The plant species of *Stipa longifolia* and *Campanula macrostachya* are common here. On the steep southeastern hillside unique rock formations dominate the landscape, formed by andesite tuff and agglomerates. On the plateau *Quercetum petraeae-cerris* wood associations and *Festuco rubrae* – Cynosuretum hayfields can be found. On the rock wall archaeological monuments (carved niches in the rock towers, so called „beehive stones") can be seen, whose origin and function are still debated. At the lowest point of the plateau the rainwater forms little pools, which provide habitat for amphibians and some water-based plant species (e.g. waterwort - *Elatine spp*.) that are rare in the mountains. The volcanic layers of the northern valleys enhance the geological importance of the area, on them species-rich Inulo - Festucetum pseudodalmaticeae rock vegetation can be found. Due to this area's marginal position the flora is very rich.

Messalia – Kartália (Pomáz)

The names of these places show the strong relationship between the history of this area and the immigration of Serbians in the 18th century, who – with the Slovaks and the Germans – play an important role in the ethnical consistency of this region till the present day. Place names like these commemorate the settling Slavonics during the fights against the Turkish army. The little island-like massif of Messalia is the easternmost part of the mountain range, its formation was similar to Köhegy's formation process described above. The place was an intensively cultivated area, covered with plantations until the infection of Phylloxera (or vine-pest), and was turned into grassland after the abandonment of the cultivation. The resettlement of the natural vegetation was helped by the building of so called „obalas" which means piling up the little rocks as stone walls on the landborders. This way the development of the species-rich steppe meadows known today was relatively quick. These meadows provide habitat to numerous protected plant species. In the wood associations of dry oak forests (*Quercetum petraeae-cerris and Quercetum pubescentis*) *Orchis* and *Dactylorhiza* species are frequent, in the forest edges some elements of the submediterranean flora – like *Campanula macrostachya* and burning bush - *Dictamnus albus* – can be found.

The steep, southern side of the hills of Csikóvár is covered by a thick layer of loess from the Pleistocene. Deep, north-south running valleys were cut into the quickly

eroding mineral, thus the surface is very fragmented. This makes the approach and traverse very difficult, so there is almost no human impact on this area, e.g. the planned afforestation could not be implemented. The valley bottoms are dominated by species-rich *Phyllitidi – Aceretum*-like forests, the ridges are dominated by shrubbing steppe meadows. Among the shrubs it is worth mentioning the snow pear - *Pyrus nivalis* and the sorb tree - *Sorbus domestica* species, the meadows are dominated by *Stipa* species, among the protected ones *Irises, Pulsatillas* and *Adonis vernalis* can be found. The peculiar andesite lava formations enhance the geological importance of the area, on them the Inulo - *Festucetum pseudodalmaticae* rock vegetation has significant botanical value.

Nagy-Csikóvár – Holdvilág-árok – Salabasina (Pomáz)

This core area was assigned on the highest part of the south-eastern range of the Visegrádi-mountain. On the steep slopes the series of zonal oak forests can be studied, on the mountain top and on the northern valley-sides beech forests can be found. As the effect of the bedrocks material, forests formed here which prefer acid soil. Their characteristics are the white wood-rush - *Luzula alba* and in some spaces the dyer's broom - *Genista tinctoria*.

The two deeply cut epigenetic valleys of Salabasina and Holdvilág-árok show the geology of the early (dacite) and the second (andesite) phase of the Baden volcanism. The mines that can be found here in several places preserve ancient relics of archaeological significance. On the rockwalls rare moss and fern species live.

GENERAL INFORMATION ABOUT THE BIOLOGICAL DIVERSITY

Habitats within the territory of the BR:

- Turkey oak and sessile oak forest (*Querco petraeae-cerris*)
- Hornbeam and oak forest (*Querco petraeae-Carpinetum*)
- Extrazonal beech forest (*Melitti-Fagetum*)
- *Mercuriali-Tilietum*
- *Phyllitidi-Aceretum*
- Karst scrubs on limestone and dolomite (*Orno-Quercetum, Corno Quercetum*)

ENDANGERED OR THREATENED PLANT SPECIES

- Amygdalus nana
- Campanula macrostachya
- Dictamnus albus
- Digitalis lanata
- Ferula sadleriana
- Gentiana pneumonanthe
- Gentianopsis ciliata
- Helleborus purpurascens
- Hepatica nobilis
- Iris spp.
- Orchideaceae
- Phlomys tuberosa
- Physospermum cornubiense
- Pyrus magyarica
- Pyrus nivalis
- Sesleria sadleriana
- Thlaspi montanum

Other characteristic plant species of the BR:

- Acer campestre
- Acer platanoides
- Acer pseudoplatanus
- Aegopodium podagraria
- Anemone ranunculoides
- Anthriscus sylvestris

- Asarum europaeum
- Asperula odorata
- Campanula persicifolia
- Carex pilosa
- Carpinus betulus
- Cerasus avium
- Chrysanthemum corymbosum
- Cornus mas
- Corydalis cava
- Crataegus monogyna
- Crataegus oxycantha
- Cyclamen purpurascens
- Digitalis grandiflora
- Euonymus europaeus
- Fagus sylvatica
- Festuca heteropylla
- Fraxinus excelsior
- Galanthus nivalis
- Geranium lucidum
- Hepatica nobilis
- Isopyrum thalictroides
- Lathyus niger
- Ligustrum vulgare
- Lilium martagon
- Lunaria rediviva
- Luzula albida
- Melica uniflora
- Mellitis grandiflora
- Mercurialis perennis
- Oxalis acetosella
- Parietaria officinalis
- Phyllitis scolopendrium
- Poa nemoralis
- Quercus cerris
- Quercus petraea
- Ribes grossularia
- Sambucus nigra
- Staphylea pinnata
- Tilia cordata
- Tilia platyphyllos
- Ulmus glabra
- Ulmus minor
- Urtica dioica

ENDANGERED OR THREATENED ANIMAL SPECIES

- Ablepharus kitaibelii
- Accipiter gentilis
- Alcedo atthis
- Athene noctua
- Arctia festiva
- Asio otus
- Austropotamobius torrentium
- Barbastella barbastellus
- Barbus meridionalis petényi
- Bubo bubo
- Calopteryx virgo
- Cerambyx cerdo
- Certhia brachydactyla
- Certhia familiaris
- Chiroptera species
- Cinclus cinclus
- Coronella austriaca
- Corvus corax
- Cucujus cinnaberinus
- Dorcus parallelepipedus
- Falco cherrug
- Falco peregrinus
- Falco subbuteo
- Felis silvestris
- Isophia costata
- Jolana jolas
- Limoniscus violaceus
- Lucanus cervus
- Lullula arborea
- Maculiena alcon
- Mantis religiosa
- Martes martes
- Megopis scabricornis
- Miniopterus schreibersi
- Milvus migrans
- Morimus funereus
- Motacilla cinerea
- Myotis bechsteini
- Myotis blythii
- Myotis dasycneme
- Myotis emarginatus
- Myotis myotis
- Neomacheilus barbatulus
- Papilio machaon
- Paracaloptenus caloptenoides
- Parnassius mnenosyne

- Pernis apivorus
- Phoxinus phoxinus
- Rana dalmatina
- Rana temporaria
- Rhinolopus ferrum-equinum
- Rhinolopus euryale
- Rhodeus sericeus amarus
- Rosalia alpina
- Saga pedo
- Stenobothrus eurasius
- Synodendron cylindricum
- Tyto alba
- Vanessa atalanta
- Vertigo angustor
- Zerynthia polyxen

Species of traditional or commercial importance:

- Adonis vernalis (herb),
- Helix pomatia.
- Game species are: red deer, roe deer, wild boar and moufflon.
- Hunting has a tradition in the Pilis Hills.

ZONATION DEVELOPMENT

According to statutory framework the zonation system of Pilis BR has been finalised in 2012. Stakeholders were involved during spatial planning discussions. The different zones of the biosphere reserve have been identified and mapped, buffer and transition zones have been replanned to promote sustainable development and preservation of the core area. The revision of the zonation system was started by the feedback of the forestry stakeholders. A proposal to develop the transition zone has been suggested by the Advisory Committee for Biosphere Reserves, but because of the substantive questions and the expected discussions of the stakeholders, the draft version for public argument was implemented just in 2012.

The zonation of the biosphere reserve overlaps with the zonation of the national park (IUCN A, B, C, D zones), which is basically determined for natural values and the required management goals.

CORE ZONE
Size: 6,274 ha

The main goal, as basic activity, in the zone is conservation. The whole core zone is part of the Duna-Ipoly National Park. These are strictly protected areas, and are covered by Natura 2000 sites as well. Many parts of the core area are also designated as Special Protection Areas (under the Birds Directive) and as Special Area of Conservation (under the Habitats Directive). The zone almost completely overlaps with the National Park A-zone according to IUCN zonation system. There are no settlements inside the zone. Almost the whole core zone is state-owned forest. Silvicultural use is only for the preservation of the natural wealth. Besides this there are few hiking trails leading through these areas.

BUFFER ZONE
Size: 19,603 ha

These areas are also covered by state-owned forests. Forestry is controlled and supervised by the professional staff of the protected area. Conservation is the main

objective during forest management planning. The designation of IUCN B-zone had the same purpose as the goal of the BR's buffer zone, in particular to preserve the core zone and mitigate the effects coming from outside, although the buffer zone is also very valuable itself. Because the management is done mainly with conservation purposes, all activities may strengthen the conservation function of the core zone. Its functions are research and preservation with professional and educational purposes. Specialized active nature management and research are supported. Some parts of the C-zone are also included in the modified buffer zone. Here we can find 5 settlements, which are surrounded by the buffer zone. The area is a very famous target to make excursions from the capital. Many tourists and hikers come here for recreation every day, but especially on the weekends.

TRANSITION ZONE
Size: 1,204 ha

The transition zone is also situated inside the national park. The main land use is forestry, but viniculture, fruit production, grazing and plant cultivation are also important activities. Hunting and silviculture are the first to be mentioned among the historical land uses. Throughout this hilly region there was a vast hunting ground reserved for royalties and later for the State. The Catholic Church owned forests here in the past too. Viticulture and wine-growing is the second to be mentioned, which had flourished from medieval times till the turn of this century (in that time Szentendre – Buda wine-growing region was well known and appreciated in Europe). Then there was a major set-back caused by a pest. It played an important role in this region from the beginning of this century to World War II. After World War II fruit-production was finished. Secondary steppes were formed at the place of abandoned orchards, and small gardens and holiday camps were established in the 1960s and 1970s at the place of steppes.

The discussions with the stakeholders for public consultation have started for years. Four settlements are completely situated inside the zone. The BR is one of the most visited tourist destinations (besides Lake Balaton and Budapest) in Hungary, so tourism is a major type of land use.

Progress on the implementation of the Seville Strategy

Management plan
(Improved biogeographical system developed)

The whole area of the PBR at the time of the establishment (in 1980) was given national protection by the Hungarian law, named Pilis Landscape Protection Area. The Pilis Landscape Protection Area became part of the Duna-Ipoly National Park in 1997. The whole area of the PBR overlapped with the nationally protected area so due to this special situation, a Nature Protection Management Plan was necessary and determined by the law. This Management Plan has to be synchronized with the zonation system and the land use policy plans for the PBR. This work needed a big amount of basic data and a finalised zonation system. Now the zonation system of the PBR has already been finalized.

More visible PBR
(Information and promotional materials developed for individual biosphere reserves.)

Communication and information projects have taken place first of all in Hungarian language, aiming to enhance visibility of the Pilis Biosphere Reserve among local target groups. Apart from the Directorate's own home page (www.dinpi.hu), there is the www.termeszetvedelem.hu operated by the Ministry of Rural Development, which also provides some information about the site. In the last years (after the last report) the PBR featured in all lectures and conferences organized by the Duna-Ipoly National Park Directorate (12 occasions) and the PBR was a separate topic on two forums organized by the forestry. Naturally, summaries of the PBR were part of Guide training (2 times) and the Teacher training (6 times) courses as well. Duna-Ipoly National Park Directorate (hereinafter DINPD) manages the functions of the PBR and the Directorate will launch a site in English in 2013, due to the high number of international applications, partly by way of its own homepage and partly making a mobile roll-up.

Cooperation with other Biosphere Reserves
(Mechanisms developed to foster twinning between biosphere reserves)

PBR has not yet settled a bilateral or any other specific agreement with BRs outside Hungary, however, it was provided an opportunity to collaborate with other current and planned BRs as a part of the South-East Europe project starting in 2011 until 2013. The BIOREGIO project basically targets the environmental management organizations' combined efforts under the Convention on the Protection and Sustainable Development of the Carpathians. The 6th workpackage of this project is meant to strengthen transboundary collaboration. This workpackage is coordinated by Duna-Ipoly National Park Directorate and there are many participants including the Carpathian Biosphere Reserve (Ukraine) and ROMSILVA Maramures Mountains Nature Park Administration among others. One planned objective of this project is the assembly and submission of the documents needed to create a BR in the Maramures Mountain. Duna-Ipoly National Park Directorate will be able to contribute its PBR experiences toward the successful completion.

There is continuous professional cooperation between BR managing organizations within Hungary, i.e. other National Park Directorates as well as the Ministry of Rural Development.

A) Conservation Function

Habitat restorations within the PBR

(Factors leading to environmental degradation and unsustainable use are identified)

83% of PBR's territory is owned by the state and managed by Pilisi Parkerdő Zrt. (Pilisi Parkerdő Closed Joint Stock Company, hereinafter PP Zrt.). There is good, continuous cooperation between PP Zrt. and the National Park Directorate, since PP Zrt is the territory's largest manager. The PP Zrt. spent approximately 1 million HUF on habitat preservation and restoration between 2009 and 2013 with the professional support of DINPD from Operative Program grants.

Main activities in the last 3 years

- *Replacement of foreign tree species (evergreens, locusts) with native species such as turkey oak- oaks and hornbeam- oaks.*

  The evergreens took up about 5% of PBR territory. After the restoration works the ratio decreased to 4%. The robinia species took up about 3% of the woods, but after the grant money was used for the restoration of the habitats the percentage decreased to 2.5%.
- *Restoration of forest pond habitats*

  Over one hundred lakes can be found on PBR territory, including both natural and small artificial (10 m^2 to 1 ha) ponds. The natural ones were created by earthquakes, tectonic movements and mud slides; the artificial ones were created by the damming of river valleys. These little ponds served as water reservoirs for wildlife and for grazing animals in the forests. By now even the artificial ponds present a natural view, their flora and fauna are very valuable. These small ponds are exceptionally important to BR's herpetofauna, they provide places for reproduction to amphibians. Unfortunately many of these ponds have been completely filled with sludge. As part of this project 14 small ponds were restored.
- *Restoration of mountain meadow habitats*

  Meadows in the PBR were created between the 17th-19th centuries by clear cutting of woods. Meadow steppe plant species appeared and formed valuable associations on the regularly mown meadows. A lot of protected plants inhabit these grasslands. As the livestock grazing declined in the region the mowing stopped and shrubs began to overtake the grasslands. One part of the project dealt with the revitalization of 16 meadows (approx. 20 with combined area).
- *The reduction of aggressively spreading invasive tree species (Ailanthus altissima)*

  Ailanthus altissima was introduced to Hungary in the mid 19th century but its aggressive spreading in BR became noticeable from the 1990s. Today A. altissima grows uninhibited in gardens and roadsides in areas neighboring BR and it can be found in great numbers in newly cut clearings. As part of the project we got rid of the individuals found on roadsides in the woods and on the edge of the woods. In accordance with the requirements of the grant the manager takes responsibility

of the activity's continuation beyond the grant's timeframe, for at least 5 more years. The national park managing PBR also takes care of the seed producing individuals growing in settlements outside the country's borders.

- *Restriction of illegal traffic in BR territory*

  There is a network of forest roads and tracks in PBR for forestry purposes. The easy accessibility of these roads has given rise to frequent illegal deposition of waste materials, damaging of habitats by wood and stone stealing and recreational activities causing harm to the environment. As part of the project 340 km of the road system were secured by 18 strategically placed gates.

Professional dialogue in the forest management planning
(Survey made of stakeholders' interests)

The experts of PBR help to plan and to supervise the forestry projects. The existing cooperation developed into a new phase since 2005. The focus of forestry became oriented to the best management practices such as selective timbering, selective cutting and new tree planting. As a result the area of forests not utilized for logging has increased. Also the areas cultivated with selective timbering increased, which resulted in areas permanently covered with forest. Rearrangements to improve the quality of habitats are also under construction. The 10-year-plan of three forestry-management units was established and one was modified in the last three years. These changes affected 20 900 ha out of a total of 25 216 ha area of forest, that is about 80% of the overall forested area.

B) Development Function

Population living in the BR

	permanently	***seasonally***
Core Zone:	0	0
Buffer Zone:	0	0
Transition Zone:	approx. 2.000	approx. 3.000

In the area of PBR only a few people live, villages are mainly outside the area (4 small villages are part of transition zone). Visitors arrive mainly from Budapest and its surroundings, from villages and towns along the Danube. The DINPD constantly cooperates with local governments, municipalities during spatial planning processes and has good relations with the local non-governmental nature conservation societies as well (Magyar Madártani és Természetvédelmi Egyesület Helyi Csoportja, Pilisi Természetvédelmi Egyesület, Csobánkai Értékőrző és Községszépítő Egyesület, Mackó-barlang Környezetvédő és Természetjáró Egyesület Csobánka, Erdei Iskola Alapítvány, Szentendre, Élő Táj egyesület, Szentendre). The DINPD also cooperates with the Pilis-Dunakanyar Regional Association (Pilis-Dunakanyar Többcélú Kistérségi Társulás). The above mentioned institutions organize together 10-15 programs per year with the cooperation of the DINPD.

Professional discussion of development ideas of settlements in the area of PBR
(Factors leading to environmental degradation and unsustainable use are identified)

Duna-Ipoly National Park Directorate is usually involved in local spatial planning from the begining inside the territory of the PBR. Its main role is to provide data, construct and supervise development plan of the area. With the aim of supporting the biodiversity of DINPD and PBR, it also helps to strengthen the connection between the local people and the protected area as well as to improve sustainability. The following agreements were drawn in the last three years:

Dömös (whole town is a part of PBR):

Many recreational areas, sport facilities, lodgings, historical sites were created and renewed during 2010 as a result of the cooperation between the local government of Dömös and the National Park Directorate. A plan for a new educational center was accepted and its implementation is going to begin in the near future. However a non-mutual agreement was settled between Dömös and Duna-Ipoly National Park Directorate regarding a trade facility.

Pilisszentkereszt (whole settlement is part of PBR.)

The approved spatial plan is expected in 2013 where (similarly to Dömös) some areas have been designated for tourism and for settlement expansion in harmony with nature protection (suburban living space with gardens, holiday houses, special recreation areas). A Pálos monastery ruin gives a special development possibility in Pilisszentkereszt, the Local Government in collaboration with the National Park Directorate plans a traditional land use technology for this area without any buildings. Sites for the local economic and commercial functions have been set aside within the administrative area of the settlement. These accepted development areas of the spatial plan are going to be part of the transition area of PBR's zonation system.

Pilisszentlászló (whole settlement is part of PBR.)

The 2009 academic regulation of the settlement classifies the PBR's close to natural areas into protection forests and does not incorporate them in the agricultural zone. This is favorable to protect the biodiversity in the region. The settlement development demands of Pilisszentlászló first of all aimed to expand urban living space. A compromise was found partly by using areas adjacent to the settlements.

There were technical discussions of the spatial plan revisions between the National Park Directorate and the overlapping settlements of the area of PBR, in the case of Kesztölc, Tahitótfalu, Szentendre, Csobánka and Pomáz between 2007 and 2011. Forest within the PBR became protection forests under the regulation. Our main effort is to restrict infrastructure developments to areas directly adjacent to the settlements, which are not close to natural areas.

Selection forest plot due to sustainable forest management
(Conservation and sustainable use activities identified and promoted)

The Pilisi Parkerdő Closed Joint Stock Company (PPZrt.), the most important land user of PBR PPZrt., designated 2,391 ha selection forest between 2007 and 2011. These forests are on the most valuable parts of the PBR and responsible for the permanent

forest cover program. Selection forests are in larger blocks. In these blocks there are not only old trees and presently a huge amount of living stock, but also young stands. In these stands tending cuttings help the development of the stand structure of selection forest. The land user (PPZrt.) and the Conservation Manager (National Park Directorate) selected the forest blocks and the returning dates together. The land user does not make any felling during the vegetation period at the area of PBR. The selected forest block is not only one of the first experimental plot in the PBR, but also in Hungary, where more sustainable sylviculture is practised.

Enhancement of the traditional land use
(In situ conservation plans for genetic resources in biosphere reserves)

The area of PBR is basically low mountain deciduous forest, so grasslands and arable farming play just a secondary role compared to sylviculture. Nevertheless the agricultural use is present on the mountain fields and on the small inclusions of grasslands, so there is a local possibility of introducing nature-friendly agricultural methods. In the north-western part of the PBR, on the periphery of Esztergom City, there is a state property grassland, where the present form of grassland farming is not sustainable. Long time habitat maintenance is not guaranteed because of the intensive shrub spreading and the very extensive mowing, which is not in connection with livestock farming. Thus, the Directorate cooperates with local farmers who would like to reintroduce sheep grazing, which would enhance the population of native Hungarian sheep breeds (for example: racka).

The Directorate started to prepare an infrastructure development plan (building restoration, fold system, water supply of sheep etc.) in 2011, and intends to apply for a grant in the Environment and Energy Operative Program.

Sustainable social and economic activities
(Private sector initiatives to encourage, establish and maintain environmentally and socially sustainable activities.)

The main goal is to increase the participation of non-governmental organizations and the economic activities which do not threaten biodiversity protection. Among the recreation and sport activities the most popular ones are orienteering and hiking on the tourist trail system. 5 or 6 big (2-300 participants) orienteering competitions and about 8-10 hiking tours have been organized by Sport and Tourist Associations annually in the region. During the authorization procedures, PBR stands for the interests of nature protection by the spatial (no entry into the core zone) and temporal restrictions (limitations during the vegetation period).

Rules of the protected areas are known by the organizers of the sport competitions.

Tourist associations organize guided tours for families on easy trails, 5 or 6 times a year. It is possible to visit the whole area of PBR (the core zone can be visited on the marked trail system). So the number of non-organised visitors is significant (1,5-2 millions annually). Because of the descending net incomes, people prefer the cheap recreation possibilities, presumably there were more visitors in the last two years, but no statistics exist.

Other companies also have eco-tourism profile in the region, for example: Pilisi Zöld Út movement, but we have to mention the Mária-út, too. This is a representative,

religious nature trail without guide. The National Park Directorate helped to shape the trail system. Other similar initiative is a planned representative tour in the region, which will focus on monuments of Hungarian based Pálos order.

The valuable natural landscape attracts the representatives of movie industry. In the last 3 years 6 feature films and annually approximately 5-6 short films (mostly advertisements) have been made in the region.

Cultural significance of the site

This region has played an important and specific role in Hungarian history from the Hungarian Conquest till now, but the size of this report is too small even for the brief introduction of the region. The BR lies among three major towns (Esztergom, Visegrád, Buda – all were residing cities of Hungarian kings) with numerous sites and monuments of historical, cultural and archeological importance. Esztergom is the seat of the Catholic Archbishop. There are many archeological sites from the Later Stone Age, Bronze Age, Iron Age, Ancient Times (the Danube was the eastern border of the Roman Empire), times of the Great Migration and from the Middle Ages.

Several ruins and archeological discoveries, protected buildings, and historic monuments illustrate its rich and eventful past. This area used to be the heart of the country during the Middle Ages: although after two hundred years the royal court abandoned Esztergom for Buda, the former town remained the centre of the Hungarian Catholic Church. Later Visegrád became the capital. The castle built here was originally founded by the Angevin King Charles Robert, and was the setting for the Visegrád Congress of 1335, attended by the monarchs of Central Europe and the Grandmaster of the Teutonic Knights. Emperor Sigismund and King Mátyás Corvinus also ruled the country from this town.

C) Research and educational functions

RESEARCH

National Biodiversity Monitoring System
(Biosphere reserves are integrated into national monitoring programmes which are linked to similar monitoring sites and networks)

Within the PBR, there are several research programmes including the National Biodiversity Monitoring System. The NBMS has got standard methods to investigate the different parts of ecosystem, systematically. It monitors the condition of protected and threatened natural values, observes the flagspecies of typical communities and living resources of Hungary, human activities and direct or indirect effects of environmental factors.

Research themes are the next on the area of PBR:

Research topic	Year of the data collection
Investigate the vegetation change by 5X5 km plots (Pilis tető és Dömös)	2006, 2009
Pullsatilla nigricans stockmonitoring	2006

Himantoglossum caprinum stockmonitoring	2009, 2010, 2011
Pulsatilla grandis stockmonitoring	2009
Ophrys apifera stockmonitoring	2009, 2011
Thlaspi montanum stockmonitoring	2010
Ferula sadleriana stockmonitoring	2010
Pyrus magyarica stockmonitoring	2010
Echium russicum stockmonitoring	2010
Iris arenaria stockmonitoring	2011
Lamium orvala stockmonitoring	2011
Achillea horanszkyi stockmonitoring	2009
Fungi communities monitoring on Pilis tető	2009
Morimus funereus stockmonitoring	2010, 2011
Bat communities stockmonitoring	2009, 2010
Rosalia alpina stockmonitoring	2010, 2011
Paracaloptenus caloptenoides stockmonitoring	2008

Beyond the systematic monitoring investigations, the National Park Directorate liaises with scientists working in the area of PBR, by the help of grants starts programs for status surveys. As a result of this work, there are habitat maps close to two-thirds of the area of PBR, or big amount of biotic data available by nowadays.

Biodiversity day 2011
(Local stakeholders are included in education, training, research and monitoring programs)

Biodiversity days were organized 10-12 June 2011 in order to draw attention to the biodiversity of Esztergom region's mountain grasslands and forest margins together with importance of natural science investigations. On that weekend representatives of 15-20 natural sciences (zoologists, botanists, geologists) attended a predetermined investigation plot and with different methods tried to register as many species as possible. The location of this program changes every year, free for visitors, results are published in leaflets and there is media interest of this project. This project started by an NGO (Magyar Biodiverzitás Kutató Társaság Egyesület). This Association organized the program in Esztergom and the National Park Directorate gave some financial and professional support.

Develop a multifunctional forest survey method
(Coordinated research and monitoring plan implemented)

PBR as the part of Duna-Ipoly National Park is an important area of the study of the effects and the development of sustainable forestry. In Hungary there are two distinct methods for forest measurements: one measure from the point of view of nature conservation, which emphasizes the importance of the selection of habitats/ floral associations and preparation of lists of species living in the area. The other type of forestry data collection focuses on timber and fiber production and solely on the diversity and age distribution of woody plant species in the area. Both methods have the drawback to be based on polygon data collection and disregard important ecological factors, like microhabitats, damages caused by wild animals, fine scale leveling. A new,

so called grid-system method is currently under development, which combines the requirements of both nature conservation and forest management. This new technique is based on the measurement of all the quality and quantity traits of a forest on a simplified scale and their GIS analysis.

The newly developed methods for data collection of forest measurements will start in 2012-13 financed by Bioregio SEE project. Meetings and debates with the interested organizations (forest managers, non-governmental organizations, researchers, and education centers) will also start in 2012-13. The main goal is the examination of the relationship of environmental factors, natural forestry factors and that of forest utilization.

EDUCATION

Operation of an Educational Center at Esztergom

(Ecology field center developed at the biosphere reserve)

Currently the Duna-Ipoly National Park Directorate has an education centre in Esztergom on PBR territory. Besides showcasing the protected territory, the centre's program includes educational tours for elementary schools. Furthermore there is a trail next to the centre where guided tours are available. We organize accredited teacher training in environmental studies twice a year and we also have an educational summer camp for children. The visitor centre collaborates closely with the Danube Museum in Esztergom. This collaboration involves continuous information sharing, combined distribution of publications, teacher training, and shared organization of events such as the World Water Day, World Environmental Protection Day, and Day of Trees and Birds. The education centre also takes part in the training of ELTE (Eötvös Lóránd Science University) students majoring in Geography or Environmental Studies.

Operation of a Sylvan Community Centre at Visegrád

(Ecology field centre developed at the biosphere reserve)

PBR's other significant education centre is the Visegrad Sylvan Community Center under the management of Pilisi Parkerdő Zrt. The house and the camping site next to it serve the cause of environmental education. The centre provides educational activities appropriately adjusted to the age level of the participants. The centre has environment related activities for all age groups. We maintain strong ties with the institution. In 2009 for example with our help the centre won a grant worth 60MFt for innovation.

Operation of educational nature trails

(Ecology field centre developed at the biosphere reserve)

There are 19 educational trails in PBR (Esztergom 1, Pilismarót 1, Dömös 1, Pilisszentkereszt 1, Dobogókő 1, Csobánka 2, Pilisborosjenő 1, Szentendre 9). The main aim of educational trails is to show the most representative protected species of the local flora and fauna. One out of the 19 educational trails is maintained by Management of Duna-Ipoly National Park, 2 are maintained by local government, 1 by private constitution and 12 by non-governmental organizations (NGO-s). Grants were awarded

for the set up of the educational trails in each case and the management of Duna-Ipoly National Park was responsible for the professional execution.

Conduct tour guide training programs
(*A local educational and training programme is in place)*

Following MAB's instructions management of DINPD supports all initiatives that focus on sustainable area management and environmental education. We cooperated with non-governmental organizations twice to offer a tour guide training program for individuals. The training provided knowledge about the teaching methods on geographical, geological, floral and faunal features of the preserved areas. In classes it was also emphasized that a tour guide plays a role model and is provided with an influential position in modifying and correcting visitor behavior to ensure that it is environmentally responsible. Altogether 30 individuals participated in the two programs, which were conducted by Duna-Ipoly National Park Directorate together with the Erdei Iskola Alapítvány (Forest School Fundation).

Develop a multifunctional educational and visitor center at Dömös
(Ecology field centre developed at the biosphere reserve)

Hundreds of thousands visit villages along the Danube each year to relax. For this reason, educational centers built at the area of Danube Bend as well as PBR have outstanding importance in environmental education. Pilisi Parerdő Zrt. runs nature education centres for children around Visegrád, but these centres do not really serve the function of general exhibitions because their location requires visitors to make a detour and their programs are usually for education only. After long preparations in 2011, a former hotel at Dömös came into the possession of Duna-Ipoly National Park Directorate. This house (see photo) is located very close to the Danube and has exceptional infrastructural potential for showcasing the region's complex natural and cultural values. In 2012 plans were started for the badly needed renovation and rebuilding of this house, provided that financial assistance will be available. There would be sections of the building dedicated to the protected regions in the riparian zone of the Danube, to Duna-Ipoly National Park, to Pilis Biosphere Reserve and to the Carpathian Region. Exhibitions will be presented in both Hungarian and English language.

Tourism
(Indicate the number of visitors coming to the Biosphere Reserve each year)

The estimated number of foreign and national visitors is around two million per year. There is no regular statistical study about the number of visitors. The estimations concern the Transition Area and the nature trail of BR.

- **One day tour** – the most significant type (estimated 150000 visitors)
- **Weekend recreation** (only in favorable season) – mainly in adjacent area of the BR but in the Transition Area it is also significant (est. 300000 visitors).
- **Hunting** – mainly for big game (wild boar, deer, mouflon) in both state-owned and private land.
- **Camping** – there are four campsites in the BR and additionally 20 outside the border of the Transition Area.

- **Camping for EE** – there are about 20 places where nature conservation and environment protection is taught to 10-14 year-old children in a week long camp. One of the most important is Nature and Forest Protection Camping (Mogyoróhegy forest school in Visegrád) operated by Park Forestry Pilis Ltd. (abbreviated as PP).
- **Horseriding** – it is not permitted in the Core Areas and Buffer Zones. It is organized and operated by privately owned clubs around the Transition Area. For the most time it is linked to other recreational activities (e.g.: one day tour, weekend camping etc.).
- **Rock climbing** – it is not significant because the suitable places are usually strictly protected areas (Core and Buffer Zones) for the conservation of rare geological formations, plants and animals.
- **Mountain biking** – it has become very popular in recent years. The impact has not been assessed yet, it mainly depends on the measure of land-using, but this activity is not a welcomed type of tourism from the point of view of nature conservation.
- **Para-gliding, hang-gliding** – they cause severe damage to Pilis-tető Core Area by trampling or the vegetation at set-off points and by disturbing animals.
- **Observation of plants and animals** – the activity is mainly organized, as in the nature conservation camps, on the permitted areas.
- **Fishing – there are two** lakes in the Transition Areas. Among them Kerektó connects to the Core Area, here it is important to supervise the fishing activity.