

Hortobágy Biosphere Reserve Management Plan



Debrecen
2015.

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Introduction

Based on the 2013 report and UNESCO's recommendations, it has become obvious that the Hortobágy BR lacks an important and effective management tool, namely a dedicated biosphere reserve management plan since its establishment in 1979. While there are other management plans in effect for the BR, and in many ways they are in line with the BR management efforts, they do not cover the whole area (missing parts of the transitional zone), and definitely their focus is different to some extent. The advantage of the situation is, however, that harmonization with these different management documents could be achieved, and the overlapping themes and tasks gain even more importance.

The Hortobágy BR is a first generation biosphere reserve, and the notion and practices of biosphere reserves have changed to some extent during the nearly 40 years of its designation. The management of the BR has been diligent to adopt these changes, but this important link has been missing. Thus it is also a tool to implement the *Seville Strategy* and the *Statutory Framework of the World Network of Biosphere Reserves* on local level.

The results of the document elaboration process and the major conclusion are that the sustainable development approach and stakeholder involvement are the greatest challenges in the BR, and definitely something to reinforce in the period of 2015-2025, and the planned management actions try to address these issues.

1. UNESCO MAB Programme

1.1. UNESCO Man and Biosphere Programme

Launched in 1971, UNESCO's Man and the Biosphere Program (MAB) is an Intergovernmental Scientific Program that aims to establish a scientific basis for the improvement of relationships between people and their environment. The MAB Program develops the basis within the natural and social sciences for the rational and sustainable use and conservation of the resources of the biosphere and for the improvement of the overall relationship between people and their environment. It predicts the consequences of today's actions on tomorrow's world and thereby increases people's ability to efficiently manage natural resources for the well-being of both human populations and the environment.

By focusing on sites internationally recognized within the World Network of Biosphere Reserves, the MAB Program strives to:

- identify and assess the changes in the biosphere resulting from human and natural activities and the effects of these changes on humans and the environment, in particular in the context of climate change;
- study and compare the dynamic interrelationships between natural/near-natural ecosystems and socio-economic processes, in particular in the context of accelerated loss of biological and cultural diversity with unexpected consequences that impact the ability of ecosystems to continue to provide services critical for human well-being;
- ensure basic human welfare and a liveable environment in the context of rapid urbanization and energy consumption as drivers of environmental change;
- promote the exchange and transfer of knowledge on environmental problems and solutions, and to foster environmental education for sustainable development.

1.2. BIOSPHERE RESERVES IN HUNGARY

Hungary as a UNESCO member state joined the MAB program in the 1970s as one of the first countries. Five biosphere reserves were designated by the UNESCO until 1980, 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 the Biosphere". The sixth biosphere reserve (Mura-Drava-Danube Biosphere Reserve) was established in 2012.

Date of designation:

Aggtelek Biosphere Reserve	1979
Lake Fertő Biosphere Reserve	1979
Hortobágy Biosphere Reserve	1979
Kiskunság Biosphere Reserve	1979
Pilis Biosphere Reserve	1980
<i>Mura-Drava-Danube Transboundary Biosphere Reserve</i>	2012

The “first generation” biosphere reserves were established with the main objective to protect the natural values of the protected areas and with a lower level of interaction with local communities than is general nowadays in new biosphere reserves situated outside the legally protected areas. Following the Madrid Action Plan and Seville Strategy of the UNESCO it has been a challenge to review the management, but this revision has led to the establishment of a new zonation system, assignment of new functions to certain zones and a renewal and increase of interactions between biosphere reserves and local people. Strengthening the involvement of local communities and other stakeholders is an essential role of biosphere reserves.

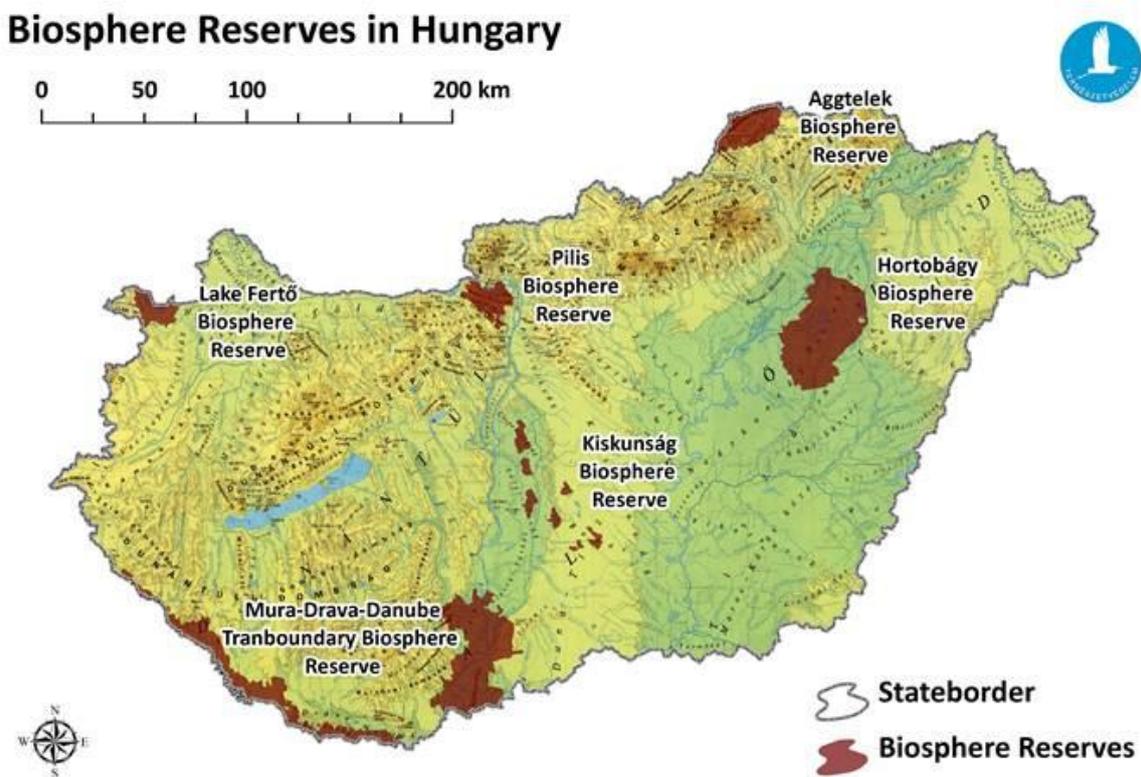


Figure 1: The map and geographical situation of Hungarian biosphere reserves

2. The Hortobágy Biosphere Reserve

The Hortobágy Biosphere Reserve is situated in the Great Plains of Hungary, east of the Tisza River.

2.1. LOCATION MAP

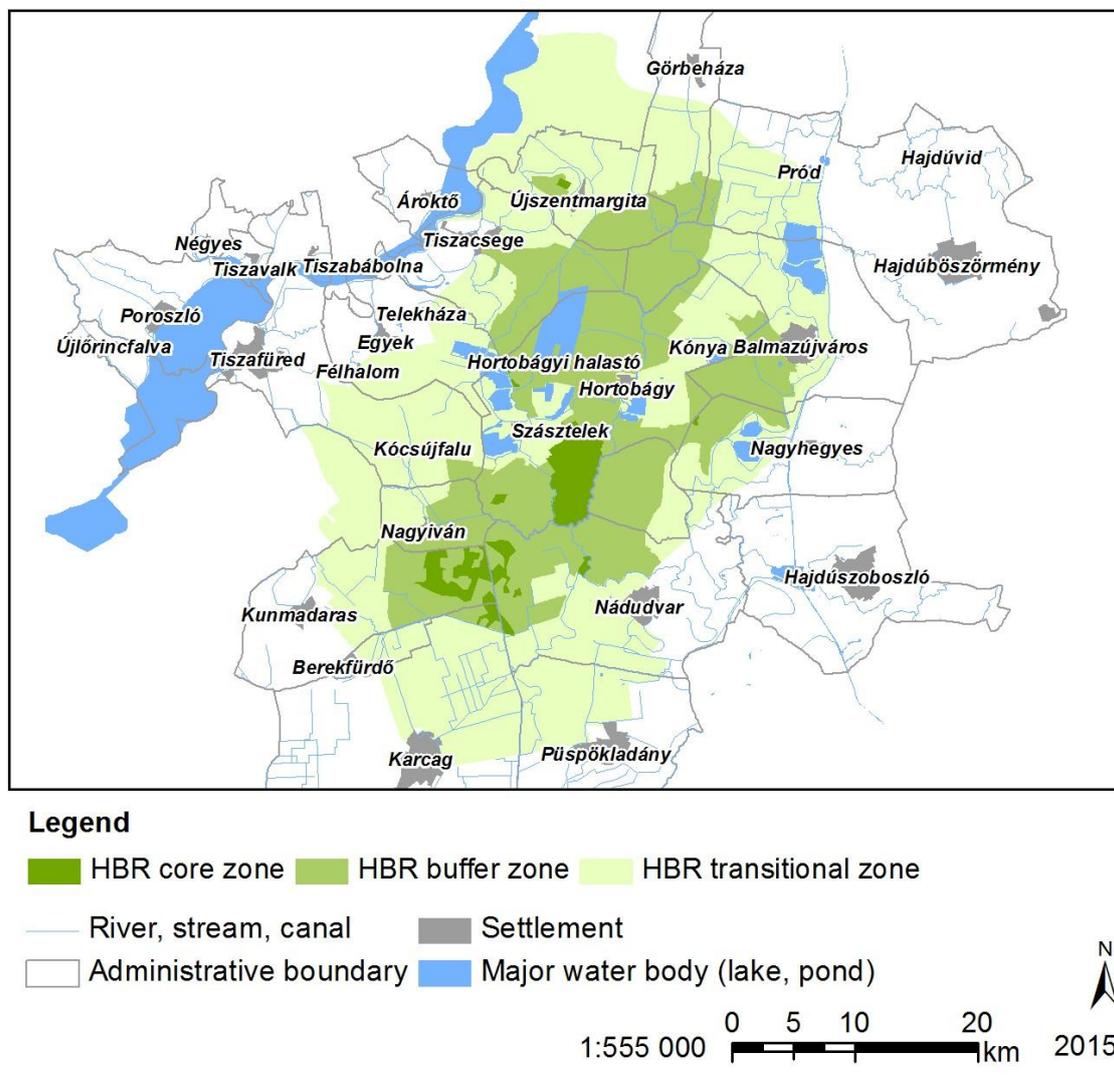


Figure 2: Map and zonation of the Hortobágy Biosphere Reserve

2.2. LEGAL STATUS

The designation and protection of biosphere reserves has been integrated into the Hungarian law. In Hungary, the minister responsible for nature conservation can classify an area as a biosphere reserve (Act LIII. of 1996 on Nature Conservation). The law also provides that areas with high nature values within the biosphere reserves must be designated as core areas, and in addition, core areas are strictly protected.

The relevant national park directorates are responsible for the management tasks of the biosphere reserves, and nature conservation authoritative tasks are carried out by the regional nature conservation authority.

The main responsible organisation of the MAB program in Hungary is the MAB National Committee, which holds its meetings once or twice a year. The Committee consists of 24 members, including the representatives of the Ministry of Agriculture (which is responsible for technical supervision of the MAB Programme), and the Hungarian UNESCO National Commission, academic researchers, organic farmers, tourism entrepreneur, ecotourism expert, NGO representative, leaders and managers of each biosphere reserve as well. The required management activities of the biosphere reserves are carried out by the related national park directorates by involving the local stakeholders.

2.3. MAIN ASSETS AND CHARACTERISTICS OF THE BR

The most unique habitats of the Carpathian Basin are the alkaline ones. The Habitats Directive of the European Union has defined this habitat as “Pannonic salt steppes and salt marshes”.

The Hortobágy is the most prominent and largest representative of these areas. It is mostly the result of natural processes. Its edaphic character has played a key role in sustaining the open forest-steppe vegetation for the past 20-40000 years.

The genuine open character of the area is well supported by the number of endemic species that is fairly high in the temperate zone and also by the remains of the steppe dwelling Kurgan People (most obviously the burial mounds of the kurgans), representatives of an eastern nomadic culture intruding westward as far as the Carpathian Basin 2600-3300 B.C.

The different grassland and wetland habitats of the Hortobágy form a complex mosaic structure. In fact, the solonetz alkaline areas feature the highest habitat diversity in the Carpathian Basin. This structure is best maintained and managed by grazing. Fortunately, grazing has been a millennia long activity that has also shaped the landscape. The unique nature of this landscape, the tangible evidence of the harmonious co-existence of man and nature are the main reasons for the area be designated as a World Heritage Site, too. Of course, the pastoral culture that is still present is a great intangible heritage and object of the conservation efforts.

The Hortobágy is also notable for its rich birdlife, both the number of species and that of individuals. While nesting species are of great importance, the large number of migrating species and individuals are of exceptional value.

The Hortobágy has been designated under several national and international conventions (with overlap of different levels) making it a high-profile area.

Table 1: Designations of the area

Designation	Year of designations
National Park	1973
Biosphere Reserve	1979
Ramsar Site	1979
World Heritage Site	1999
NATURA 2000 Site	2004
Silver-tier International Dark Sky Park	2011

2.4 ZONATION

2.4.1. Core zone

The role of the core area is to protect biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact uses (such as education). In addition to its conservation function, the core area contributes to a range of ecosystem services. Employment opportunities can also complement conservation goals (e.g. environmental education, research, environmental rehabilitation and conservation measures, recreation and eco-tourism).

Area: 5,169 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 two main principles of selection were the absence of human disturbance and any recent human impact, and the presence of rare and endangered species.

The Pentezug core zone is a semi-reserve dedicated to the Przewalski's horses.

All the core areas are strictly protected and within the Hortobágy National Park, and part of the Natura 2000 network (under both the Birds and the Habitats Directives). This is an area where the goals of nature conservation have utmost priority. It is also part of the World Heritage Site.

Basically, no human interference and management activity is allowed, thus forestry, fishery activities, haymaking as well as reed cutting are not allowed, either.

2.4.2. Buffer zone

The buffer zone 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. They also have an important connectivity function in a larger spatial context as they connect biodiversity components within core areas with those in transition areas.

Area: 49,961 ha

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

2.4.3. Transitional Zone

Transition area with a central function in sustainable development which may contain a variety of agricultural activities, settlements and other uses 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.

Area: 99,504 ha

The transitional zone comprises parts of the Hortobágy National Park (15 000 ha), the NATURA 2000 site (under both the Birds and the Habitats Directives), but it is mostly arable land. As a result, its assets are of very mixed nature. The areas that are managed similarly to the protected areas are in good ecological condition (alkaline and loess pastures and meadows, small patches of natural forest stands). However, even the more intensively used arable lands are of great importance, too. They often provide food source and breeding sites for the wildlife, particularly birds. The transitional zone is important to produce the winter fodder for and to hold the winter stables of the livestock. As opposed to the core and buffer zone, this zone includes several small settlements and is bordered by major towns and further villages. Thus, this zone particularly functions as an interface area of nature conservation and local development.

2.5 MAIN STAKEHOLDERS AND OWNERSHIP IN THE REGION

This section will give an insight into the ownership structure of the HBR and its transitional zone. Also the main, most relevant stakeholders are described and listed.

2.5.1. Ownership and management

The core zone and buffer zone area of the HBR is overwhelmingly (93 %) in state ownership and managed by the Hortobágy National Park Directorate. Only 7 % of the area is privately owned and managed, mostly meaning small hold farms comprising of animal stables, living quarters and a yard, and their average size is between 1 and 2 hectares. The ownership structure of the transitional zone is more colourful with low level of state ownership, notable owners include (main stakeholders in bold):

- **municipalities**
- **businesses** (agricultural, industrial and commercial)
- private
- church
- state
- other

2.5.2. Inhabitants and settlements

The BR is very sparsely populated with the average of 37 inhabitants per square kilometres, with the total of ca. 6000 inhabitants. The core zone has no human inhabitants, approx. 400 people live in the buffer zone, and the transitional zone has most of the inhabitants (while also being the largest area). The BR is situated in the administrative area of the following 32 settlements:

Ároktő, Balmazújváros, Berekfürdő, Egyek, Folyás, Görbeháza, Hajdúböszörmény, Hajdúszoboszló, Hortobágy, Karcag, Kunmadaras, Nagyhegyes, Nagyiván, Nádudvar, Négyes, Polgár, Poroszló, Püspökladány, Sarud, Tiszabábolna, Tiszacsege, Tiszaderzs, Tiszadorogma, Tiszafüred, Tiszaigar, Tiszakeszi, Tiszaörs, Tiszaszőlős, Tiszatarján, Tiszavalk, Újlőrincfalva, Újszentmargita

Only small(er) settlements, and satellite settlements are situated within the BR. All the major towns (i.e. Balmazújváros, Hajdúböszörmény, Hajdúszoboszló, Karcag, Nádudvar, Püspökladány, Tiszafüred) are, in fact, outside the BR, but with a significant influence on it.

The two major activities and sources of income are agriculture and tourism. Extensive animal husbandry (grazing livestock) dominates the buffer zone with very little arable land, while (more) intensive technology is prevailing both in animal husbandry and crop production. Arable lands predominate in the transitional zone.

Beside nature-based tourism, thermal spas are the biggest attractions of the region. There is a mutual benefit for these two types of tourism, having the potential of overnight stays much higher than the national average.

2.5.3. Cooperation with local governments

They are key stakeholders and cooperation partners in the BR management. Since they have the power to define the long term development strategies and short term actions, it is mutually important to share information and knowledge to make informed decisions.

2.5.4. Hortobágy National Park Directorate

The HNPД is the key governmental organization that practices land ownership on 93 % of the combined core and buffer zone. It has an already complex and many-fold PR system including the following means and tools:

- The Visitor Centre in Hortobágy village is the hub of NP activities. It does not only serve tourism purposes, but also houses programmes and events targeting local audiences. It also provides a significant number of jobs (information service, guiding, handicrafts, etc.)
- Interpretation: while it is an important means to convey the conservation message, it is limited in terms of two-way communication.
- Environmental education: it targets the youth 3-18 years of age within and around the BR. It also has a knock-on effect as children form the link with their parents and broader family. Teachers are a special target group and play an important role in the dissemination of information and active involvement of children.

The HNPД's participation in other initiatives:

- Member of the Hajdú-Bihar County Treasure Committee
- Member of the Association of Grey Cattle Breeders and of the Association of Racka Sheep Breeders
- Associate member of the Debrecen-Hortobágy Tourism Destination Management Organization
- Member of the „Alföldi Legendárium” tourism cluster
- Member of the National Park Label Scheme and coordinator of the regional division
- Member of National World Heritage Committee

2.5.5. Authorities

While authorities are to safeguard legal activities in every field of life, due to the characteristics of the BR, nature conservation, agriculture and building authorities are the most dominant.

Building authorities have a great responsibility to issue building permits that are in line with national, county and local regulations. These regulations safeguard that landscape values are not compromised and light pollution is minimized (two important approaches in the open landscape). On the other hand alternatives have been negotiated that will hopefully lead to a comprehensive compensation and cooperation system on the long- term.

2.5.6. Tourism organizations

Tourism is not only an important economic activity, but heritage tourism is also an important means of free time education. Fortunately it is not only the Hortobágy National Park Directorate that promotes heritage tourism, but many tourism businesses. This can be enhanced, but it is very fortunate that regional self identity is heavily connected to heritage

(both natural and cultural). So far, the tourism brand of “Hortobágy” has not been created, but some initiatives indicate that tourism providers are willing to gather under this umbrella brand. Beside the National Park Directorate tourism some specialized travel agencies (Saker Tour, Aquila Tours, BirdLife Hungary) are present in nature-based tourism. Larger tourist agencies usually offer nature-based programmes as optional ones to complement spa holidays. Those interested in the traditional Puszta life and animal husbandry usually attend the interpretive sites and programmes of the Hortobágy Nonprofit Ltd.

There are 5 offices of the national tourist information network (Tourinform – Hortobágy, Hajdúböszörmény, Hajdúszoboszló, Poroszló, Tizacsege) offering a plethora of publications, personal and on-line information service, as well as some booking (accommodation, programmes) services.

2.5.7. NGO's

There is a diversity of NGO's with different profiles. The smaller ones mainly provide a valuable contribution to grass-roots data collection initiatives on environmental and nature conservation issues (e.g. www.vadonleso.hu). Bigger ones are able to launch full-sized research and/or development projects.

Nature conservation

The most active ones are:

- Hortobágyi Természetvédelmi Egyesület / Hortobágy Nature Conservation Association (their programmes are of high professional quality, and in line with the HNPDP's principles, also well filling the service gaps within the region)
- Zöld-kör Egyesület/ Green Circle Association
- Rónaőrző Természetvédelmi Egyesület / Rónaőrző Nature Conservation Association
- TerepSzemle Stúdió / TerepSzemle Studio
- Bakcsó Egyesület/ BAKCSO Association
- MME / Bird Life Hungary (particularly the bird-watching programmes are popular; they have a strong international network capital)

The geographical scope of their activities is not restricted to one settlement, even exceeds the BR area.

Local economy

Economy-focused NGO's are few and they are either associations (local or micro-regional) dealing with regional development issues or those of livestock breeders. The most important ones are:

- Hortobágy Fejlesztéséért Egyesület / Hortobágy Development Association, Hortobágy
- Regionális Fejlesztési Egyesület / Regional Development Association, Tizafüred
- Magyar Rackajuhtenyésztő Egyesület / Association of Hungarian Racka Sheep Breeders
- Magyar Szürke Szarvasmarhát Tenyésztők Egyesülete / Association of Hungarian Grey Cattle Breeders

- Összefogás a Sárréti Kistérségért Egyesület / Cooperation for the Sárrét Microregion Association, Püspökladány
- Poroszló Turizmusáért Egyesület / Association for the Tourism of Poroszló, Poroszló

Folk art and craftsmen NGO's

Nurturing traditions and cultural heritage is very often among the activities of NGO's and local initiatives. However, few organisations are dedicated to this. The most important ones are:

- Hajdú 400 Hagyományőrző, Kertészeti és Kulturális Egyesület / Hajdú 400 Folk Tradition, Horticultural and Cultural Association, Hajdúböszörmény,
- Szülőföldünk Nádudvar Öröksége és Jövője Alapítvány / The Heritage and Future of Nádudvar, Our Native Land Foundation,
- Közgyűjteményi Alapítvány / Public Collection Foundation, Nádudvar
- Nonius Lótenyésztő Országos Egyesület / National Association of Nonius Horse Breeding.

2.5.8. Businesses

Besides the several small-hold owners and private businesses of grazing livestock (e.g. Nagyiváni Mezőgazdasági Kft., Tornyidomb Mezőgazdasági Kft., Hortobágy) or crop plant cultivation (e.g. Brig-Sugar Mezőgazdasági Kft., Hajdúszoboszló), two major firms have to be mentioned in the core and buffer zone. The Hortobágy Nature Conservation and Gene reservation Non-profit Ltd is an important stakeholder and a major role player in sustaining traditional breeds of cattle (Grey Hungarian Cattle), sheep (Racka) and horse (Nonius), as well as the linked pastoral culture, while they also provide tourism services and programmes. The Hortobágy Fishery Company is one of the biggest such firms in Hungary and the fishponds they manage are also important waterbird habitats, too. In the transitional zone there are numerous, mostly agricultural firms of different sizes.

2.5.9. Public collections and institutions

Museums are of great importance in this respect, since they not only collect and catalogue the objects of the cultural and natural heritage, but also play an important role in interpretation. With few exceptions, most museums are, in fact, situated outside the BR. The relevance of the Hortobágy is indicated by the fact, that the original archaeological collection of Déri Museum in Debrecen originated from the Hortobágy, and the ethnographic collection also features several items from here. Other major collections and museums (with the themes of their collections):

- Bocskai István Múzeum / Museum, Hajdúszoboszló (anthropology - ethnography)
- Györffy István Nagykun Múzeum / Museum, Karcag (natural history, landscape history and use, archaeology, anthropology - ethnography)
- Karacs Ferenc Múzeum / Museum, Püspökladány (anthropology - ethnography)
- Kiss Pál Múzeum / Museum, Tiszafüred (handicrafts)

- Pásztor múzeum és Kőrszín / Museum of Pastoralism and Round Barn, Hortobágy (the previous exhibits objects and complex dioramas of the life of herdsmen in the Hortobágy, the latter one is dedicated to handicrafts connected to pastoralism)
- Semsey Andor Múzeum / Museum, Balmazújváros (Humans and their environment in the Hortobágy)

Other cultural institutions organize Hortobágy related events sporadically.

2.5.10. Research and education

As a result of a written agreement, the Hortobágy National Park Directorate houses the Nature Conservation Zoology Department of the Debrecen University. Students actively participate in the activities of the Department mostly in field research programmes.

The BR also offers education opportunities for primary and secondary level pupils. These include thematic competitions, summer camps, live-in heritage education programmes, so-called “forest schools”.

To sum up, the current situation is something to build upon, but there is a lot to do in the future. Cooperations include few permanent (formal or informal) partnerships. The most recognisable ones are in the fields of livestock grazing, environmental education and tourism. There are also project related cooperations that do not last beyond the project period, and there are situations where the individual, often parallel activities are not coordinated and they do not communicate. The reason for the latter can be the lack of a common forum to share ideas, or just get to know each other (the size and geographical situation, as well as infrastructure of the BR is a major factor).

2.5.11 Public involvement

A fine example for the involvement of volunteers and local people is the Vadonleső (“Nature-watcher”) Programme. This Internet based programme collects distribution data about 16 carefully selected (plant and animal) species of Hungary (e.g. hedgehog, pond turtle, mole, squirrel, snowdrop), which are common and more or less easily detectable, but need protection or are endangered for some reason. The programme works since 2009, using GoogleMap based interface, in on-line mode. The program is very popular, in the region of the biosphere reserve (mainly in touristically popular regions) as well.

In the large pastures of the BR’s area there are still many isolated populations of the strictly protected European ground squirrel. Volunteers can help a lot to recognize and report small but important occurrence of the species.

Sustainable land-use is very important in this case: without proper management which means grazing by sheep, cattle or horses the ground squirrel populations are going to disappear.

3. Management Concept

3.1. VISION OF THE MANAGEMENT CONCEPT

In line with the Seville Strategy, it is envisaged that the harmonious co-existence of the preservation of natural assets and human use can be reinforced, respecting cultural heritage, as well. The conservation of the landscape and connected natural assets, particularly the mosaic of alkaline habitats and its biota is of utmost importance. It should be safeguarded by sustainable agricultural practices mostly based on grazing. Awareness raising is to be achieved by comprehensive education and outreach programmes and high quality tourism.

Landscape values are particularly important in the case of the Hortobágy BR. Its international recognition relies on two distinct features, i.e. the open landscape (Puszta) and its rich birdlife. These assets can only be sustained by traditional land management of herding-grazing, while the conservation of the ornithological assets (waterfowl and shorebirds) requires proper water management, too.

Further research is much needed in the Pannonian and especially on the local endemic species, particularly insects and flowering plants, to enhance conservation efforts. This is particularly important to be in line with the Rio Convention.

The transitional zone is particularly sensitive in this respect, and management efforts should focus on awareness raising (education, PR activities) and influencing regional policies and subsidies. The seemingly colliding interests have to be harmonized:

Heritage perspective:

- Environmentally unsound agricultural practices (e.g. large monocultures, usage of pesticides, large intrusive buildings, light pollution, etc) both ruin the landscape and interfere with its character; it also threatens the integrity of the major bird migration route (of the Baltic – East Poland – Carpathian Basin – East Balkan). Besides, these practices impact species with large spatial needs like Great Bustard, Jackal, large birds of prey.
- The intangible heritage of the traditional herding-grazing pastoralism is diminishing.

Local economic perspective:

- Viable local economy is needed to provide jobs and sufficient income.
- Modern technology and knowledge offer more effective solutions.

To reconcile the two approaches and address the problems, a methodology and interventions are necessary to increase the interest of local people to apply traditional agricultural methods, while sustaining their culture.

3.2. SWOT ANALYSIS OF THE HORTOBÁGY BR (current situation in the BR)

The SWOT analysis takes the approach to investigate these issues according the main functions of the biosphere reserve.

Conservation			
Strengths	Weaknesses	Opportunities	Threats
C1. Effective legal protection in the core and buffer, and partially in the transitional zone.	C1. - Lack of proper leverages of protection (of some level) in parts of the transitional zone. - Special regulations and legal exemptions have not been or only partially introduced.	C1. The need has been identified; decision and policy makers have been convinced.	C1. - Legal obstacles and prolonged action lead to loss of assets.
C2. - Institutional framework is in place. - Experienced and professional staff.	C2. Capacity and resource utilization.	C2. Rearrangement of capacities and resources.	C2. Economic and political pressure takes over conservation interests.
C3. Rich and diverse ecological values.	C3. There are still the remains of buildings and structures that interfere with the natural systems and impact species and habitats.	C3. - There are experiences of how to best mitigate these and there are funds available to complete the work. - International programmes and initiatives exist.	C3. - New challenges occur that cannot be handled on local level (e.g. climate change) - Migration routes and ecological corridors diminish. Habitat isolation.
C4. A distinct cultural heritage.	C4. Lack of concerted efforts and action to sustain both the tangible and intangible cultural heritage.	C4. - The cultural World Heritage status of the core and buffer zones. - Strong local identity taking pride in the cultural heritage.	C4. Loss of living traditions and traditional knowledge.

Sustainable development			
Strengths	Weaknesses	Opportunities	Threats
S1. Diversity of stakeholders	S1. Limited means of communication without a structural framework.	S1. - Mutual interests exist; common platforms can be found/created. - Joint efforts, concerted actions have better results.	S1. - Uneven power of stakeholder groups. - Refusing taking responsibilities, lopsided responsibility share.
S2. <i>Agriculture</i> Animal husbandry (stock grazing) provides jobs and employment for locals, while part of the heritage resources.	S2. - Reduced ability to rethink the old contents in a new form to adapt to modern day requirements – it results in a gap between heritage and economic requirement. - Low level of market (development)	S2. - Adaptive approach to a rich heritage. - Strong local identity taking pride in the cultural heritage.	S2. - Modern, intensive technologies are more profitable and outperform traditional ones. Without a proper compensation system, a degradation of traditional knowledge. - The national framework of state land lease is not/little adapted to local needs.
S3. <i>Tourism</i> A diversity of assets that attract visitors.	S3. - Lack and insufficiencies of tourism products. - Insufficient institutional framework, lack of a tourism management plan. - Decreasing domestic market.	S3. - There is a growing demand of nature-based and agro-tourism, organic products. - Government incentives and available funds.	S3. - Potential partners (tourism businesses) do not cooperate. - Disadvantageous spatial and temporal distribution of tourists.

Research			
Strengths	Weaknesses	Opportunities	Threats
R1. - Bio-monitoring system is in place. - Specialists are available.	R1. Certain (necessary) topics have little or no research history, or no monitoring follow-up.	R1. Needs have been identified.	R1. - No/limited financial sources. - Research results are little/not translated into management activities.
R2. National level tourism research exists.	R2. No site specific and systematic research on carrying capacities, visitors have been carried out	R2. Needs have been identified.	R2. - No/limited financial sources. - Research results are little/not translated into management activities.
Education			
Strengths	Weaknesses	Opportunities	Threats
E1. - Environmental education for 3-18 years old children; field study and internship, thesis opportunities for students. - Teachers of local educational institutions are thoroughly involved.	E1. - Insufficient human capacities (number of staff). - Lack of an education management plan.	E1. Increasing interest and popularity of these programmes.	E1. Budget cuts usually affect this field in the first place.
E2. Herdsman training – knowledge is available, institutional background exists.	E2. - No vocational training exists to satisfy the needs of extensive grazing. - Low prestige of herdsmen	- E2. Strong local identity taking pride in the cultural heritage. - Government support.	E2. Failure of launching an education scheme, and give a rebirth opportunity to this historic occupation – it might even lead to the loss of a tradition. It would have an impact on the ecological state of the BR.

Summary:

The Hortobágy BR is an example of millennia long co-existence of man and nature that is fundamentally determined by agriculture: grazing livestock in the core and buffer zones and mixed (i.e. arable land and pasture) in the transitional zone. This is also reflected in the different ownership structure, as well as the number of stakeholders. The better and more structured and regular stakeholder involvement in planning and implementation could reinforce conservation efforts. There are also unutilized potentials in tourism, while this is one of the pioneer areas in regional cooperation. Another field that can contribute to making more and better informed decisions and having better planning procedures is research in various topics from ecology to social sciences.

3.3. MANAGEMENT OBJECTIVES OF THE HORTOBÁGY BIOSPHERE RESERVE

This section aims to address the issues that have been identified in the SWOT analysis. It also follows the concept of biosphere functions and wherever it is possible the objectives and tasks are broken down into zones.

3.3.1. Conservation

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 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.

3.3.1.1. Core zone

The priority is to safeguard natural processes and sustain a reserve state, and that the only management activity is research and monitoring. The area of the Pentezug has to be the long-term site of the Przewalski's Horse project.

3.3.1.2. Buffer zone

- The large scale landscape rehabilitation programmes (elimination of irrigation canals and dykes, water management objects, aerial power lines) have been partially completed. Several grasslands that were transformed into arable lands before legal protection have been reconstructed. These should be continued and completed.
- Revision of the lighting system and improvements at the BR farms and settlements in order to make lighting compatible with the designated Dark Sky Park requirements.
- Enhancement of the eradication efforts against invasive alien species.
- Increase of grazing livestock to achieve 0.4-0.6 animal unit/ha.

- Promotion and introduction of a more flexible and adaptive grazing structure to better suit habitat management requirements.
- Rehabilitation of traditional structures and buildings using traditional materials, craftsmanship and technologies has to be carried out.

3.3.1.3. Transitional zone

- Achieve consensus for the protection of the whole zone, since the open character of the landscape makes the core and buffer zones more vulnerable to visual disturbances (linear structures, forestation, tree plantations, buildings and structures above 7-8 metres of height, and light pollution). Thus, restrictions and regulations would be important. Today this seems feasible without the compromise of economic interests and disadvantages to stakeholders. This does not necessarily mean only restrictions (in fact the necessary restrictions have been negotiated with and agreed by the concerned municipalities), but can become a special agricultural zone also for the benefit of the core but particularly the buffer zones. Further discussions are necessary to achieve mutually beneficial results.

3.3.2. Sustainable development

The key activities are sustainable agriculture and tourism. In agriculture, livestock grazing in the buffer zone and in the transitional zone, while crop plant cultivation with some livestock grazing form the system. Nature-based tourism and spa tourism are the two flagship genres, but horse-riding and cultural tourism forms are also present. While this is a good and desirable structure, it is mainly quality and cooperation that require improvement.

3.3.2.1. Core zone

Since it is a dedicated reserve area that is strictly protected, sustainable development is not a primary issue.

3.3.2.2. Buffer zone

- Livestock grazing is the predominant activity. Numbers of animals should be increased.
- In order to maintain the traditional land use practices, especially common grazing, the main objective is to decrease the ratio of hay cutting in favour of the traditional grazing activities. Under- and overgrazing must be avoided together with intensive hay farming due to their damaging effects on the grasslands.
- Cooperation with farm owners and tenants of the state-owned pastures is to be enhanced.
- Development of marketable local agricultural products – mostly meat and dairy products and the system of market development (see also Hortobágy Brand)
- Tourism:
 - o The Hortobágy Brand is to be established with the cooperation of tourism businesses.

- On the market side the number of visitors is to be increased by 15-20 percent but their annual visitation curve should be optimized so the number of high pressure peak days is reduced by 20 percent.
- On the offer side it is mostly the content and standard of tourism that have to be enhanced.

3.3.2.3. Transitional zone

Agriculture:

- It could remain the location for the more modern arable and grassland farming practices, but large constructions and linear infrastructures that disturb the landscape should be avoided there as well. The projects to eliminate such structures are to be continued.
- The unfavourable modernization of stock keeping farms mandated by domestic and international laws and regulations needs to be prevented by derogation from the relevant EU regulations, especially concerning concrete manure storage facilities. Some changes to the legal leverages should be initiated, so the special character of the BR could be maintained.
- High Natural Value Areas (HNV), as part of EU's Agro-environmental Scheme:
The BR partly connects to a HNV namely the Hortobágy HNV which was legally designated in 2009. Its area was 70,268 ha (27,671 ha located inside the BR) then. The Agro-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, crane, wild geese and red-footed falcon.

The preparation of the new version of Agro-environmental Scheme in Hungary is ongoing. It is pivotal to include special regulations that consider the unique character of the area.

- Development of marketable local agricultural products (meat and dairy products, fruit and vegetable products, bakery products) and the system of market development (see also Hortobágy Brand). A pilot initiative is already in place, supported by the Ministry of Agriculture. In fact, it is also a platform of stakeholder cooperation, since it includes not only branding and quality insurance, but support to market the products (webpage, events and fairs, souvenir shop, etc.).

Tourism:

The heritage based tourism trends can be evaluated partly by visitor numbers. The following figure shows annual visitation to key interpretive sites, however the total visitation is somewhat more. The below numbers are good indicators, though.

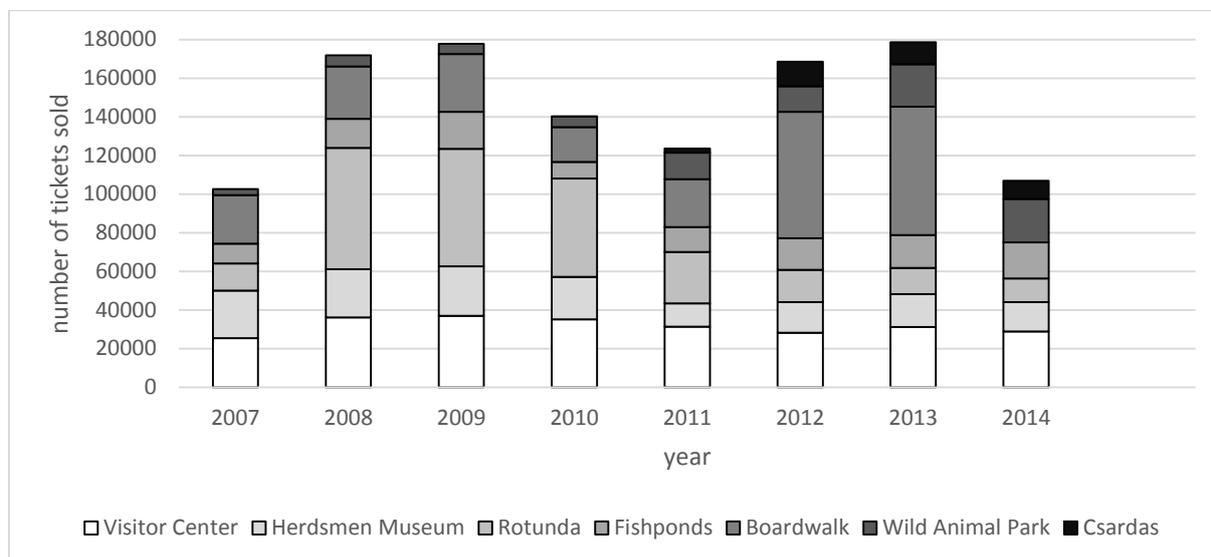


Figure 3. Visitor numbers to main interpretive sites of the Hortobágy BR bw. 2007 and 2014

As it can be seen, the peak and low numbers range between 180,000 and 100,000 with the changing proportion of the different sites. While there are factors beyond the control of the BR management, to make the system more accountable, the following aims have been formulated:

- The Hortobágy Brand is to be established with the cooperation of tourism businesses.
- Nature based tourism, particularly birding is to be improved with capacity building and infrastructure development.
- Cultural heritage and heritage products have to gain more importance in the tourism offer – enhancement of quality and quantity.
- An increased promotion of the BR (see also Hortobágy as a brand name) is to be achieved.
- A complex tourism management plan for the BR is to be elaborated.

3.3.3. Research and education

Research and education programmes best work if they are not divided into zones in a rigid way, as these should mostly be overarching and (in some cases) comparative in nature.

Research

Below are the defined key research topics:

Nature and landscape conservation:

- Study of the water regime of the alkaline habitats (ground water, surface water, and precipitation).
- Survey of alkaline grassland microforms.
- Experimental research on fire management.
- Study of natural disturbance processes and their effect on the mosaic structure – also in relation with climate change issues.
- Continuing the research and sampling projects within the Hungarian Biodiversity Monitoring System.
- Research of grazing patterns and their ecological effect.
- Survey of artificial objects that are obtrusive in the landscape and impair the view (location, nature, owner, manager, etc. of the objects).
- Local effects of climate change (with respect to natural assets and resources, socio-economic outcomes – models and mitigation plan).

Cultural heritage:

- Scientific and engineer survey of buildings and structures (location, type, state of conservation, suggested action, etc.).
- Full scale and systematic archaeological survey with different methods.

Sociology:

- Current state of affairs of herdsmen through different variables.

Tourism:

- Carrying capacity survey at selected sampling sites.
- Visitor studies (incl. motivations, preferences and satisfaction; attitude change; effect of interpretation services, etc.).

Education

Core zone:

- It is the site of only scientific research, but this way it is possible to involve university and college students for internship programmes.

Buffer zone:

- This is and should continue to be the area of on-site education programmes.
- A more subtle age and target group structure is to be elaborated
- The selection of topics is already diverse, the depth and quality of these programmes have to be enhanced by more hands-on educational objects.

- Elaboration and launch of a herdsmen's training scheme – with a focus on practice and internships in this zone (as part of a dual education programme).

Transitional zone:

- Via the establishment of “Train the trainers” programme, the education capacities can be multiplied.
- On-line education programmes and competitions have to be established for the primary and secondary school age pupils, these should be carried on, and new themes are to be introduced.
- The webpage content constantly needs supervision and up-date.
- Educational programmes at community festivities have to be continued and increased.
- Elaboration and launch of a herdsmen's training scheme – with a focus on theory (as part of a dual education programme).

3.4. COOPERATION IN THE BIOSPHERE RESERVE

There are several levels of stakeholders related to the HBR issues, and it is pivotal that these levels are conscious of their role and responsibilities and that these levels communicate. The following section pictures the future system of stakeholder cooperation.

Proposed means and tools to be established:

Since the Hortobágy has several designations, and the related activities, goals and objectives very much overlap with the BR approach, it is to avoid redundancies, so stakeholders do not lose interest and do not feel over-exercised (e.g. too many workshops, meeting, documents). The following suggestions are in line with the goals and objectives of other, parallel initiatives, like the World Heritage designation.

- *Hortobágy Forum*: In order to bring together the various stakeholders, and strengthen networking, as well as creating a platform for sharing ideas, discuss problems, and jointly work towards solutions. It is also an opportunity to report on progress and outcomes. It should have four divisions: economy – NGOs – municipalities – science and education. It also elects the members of the Hortobágy Council.
- *Hortobágy Council*: its main functions are to advise and consult on particular issues. While its decisions are not obligatory for the decision makers, it helps them to make informed decision that most serves the public good.
- *Herdsmen's Guild*: while it is an umbrella organization for the Hortobágy herdsmen, it should accept members from all walks of life willing to promote and actively working for the pastoral traditions. An elected representative should be automatically delegated to the Hortobágy Council.
- *Utilizing communication tools*: internet and the HNPD website have to be improved to include a BR micro site. E-newsletter has to be launched.

3.5 FUTURE PLANS

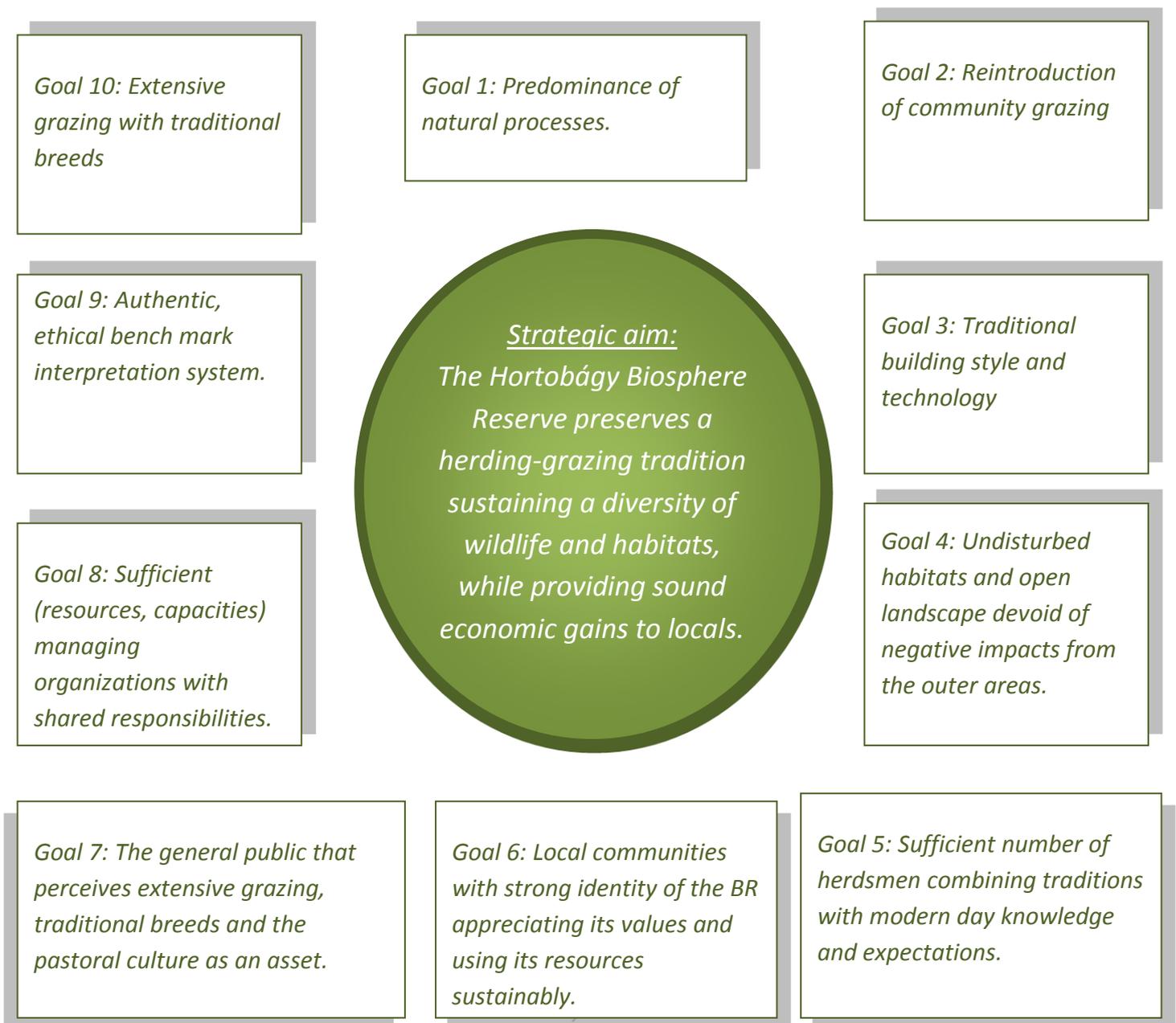
3.5.1. Carrying-on with good practices

In the field of nature conservation landscape and habitat rehabilitation programmes, as well as species conservation programmes should be continued. These programmes cannot lack proper and regular monitoring.

To improve cooperation in the field of agriculture, since this is the field with the highest number of stakeholders, a platform of communication has to be established. The Hortobágy Forum is meant to be a key instrument in this.

In awareness raising the education and tourism cooperations should be reinforced, maybe a number of formal agreements can help this process especially to launch joint projects.

3.5.2. Setting goals for the future is summarized in the below graph



Appendix 1. ABBREVIATIONS

BR – Biosphere Reserve

HBR – Hortobágy Biosphere Reserve

HNP – Hortobágy National Park

HNPD – Hortobágy National Park Directorate

HNP WHS – Hortobágy National Park – the Puszta World Heritage Site

Appendix 2. THE PHOTO INVENTORY OF THE HORTOBÁGY BR ASSETS

Natural assets forming the landscape



Soda lakes with unique physical-chemical attributes and wildlife



Egyek-Pusztakócs marshes in the transitional zone – designated under the Ramsar Convention



Hortobágy Fekete-rét in the transitional zone



Mosaic pattern of micro habitats from barren sodic soil patches to open water coverage –
Balmazújváros pasture



A former aerial bombing site – nature healed the land scars, and currently a special rehabilitation programme is going on

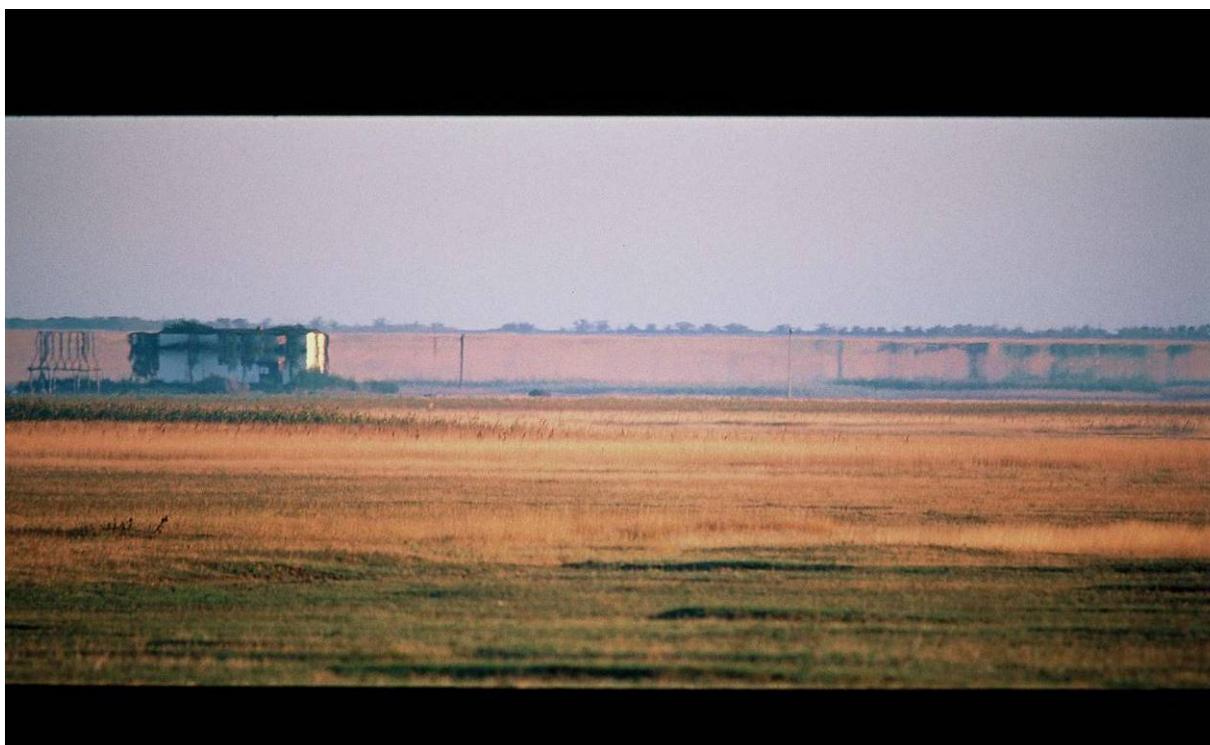


Dry grassland habitats and also typical pastures

Landscapes and views



A draw-well in a flooded area



Mirage



Szálkahalom and the adjoining shade forest



Sunsets are quite spectacular, and scattered objects like this draw-well enhance the effect -
Angyalháza



Autumn sunset over a herdsman's shelter, and reflections over the sea of cobwebs



Micro-landforms and spring thaw



Winter landscape with wells and wild geese

Landuse



The Máta Stud



The stud at the drinking site



Driving the Stud

Aerchological sites



The kurgans are mostly remains of cultures and people roaming the Puszta between 3300-2600 B.C



Ploughing used to be a major threat to the kurgans

Listed monuments



The former carriage stand (now Museum of Pastoralism) and the Nine-arch Bridge at Hortobágy



Hortobágy Mátá: a herdsman's shelter and Hungarian grey cattle



The Nine-arch Bridge over the Hortobágy river – once the longest stonebridge in the country



The Meggyes Inn, now an interpretive site on the former salt trading route



The Meggyes Inn



The Great Hortobágy Inn is a gemstone of authentic inns, still welcoming guests

Tangible and intangible heritage



Open-fire meals cooked in a cauldron provided simple, but filling food for the Puszta people, and still are popular in Hungarian cuisine



The Hajdú Folk Dance Group during the „Driving-in Festival”, i.e. when livestock is driven to the wintering stations



Only the bravest can perform the Puszta Five



The six-oxen carriage during the Driving-out Festival, i.e. when the livestock is driven out to the summer pastures



The sooty bull and herdsman in traditional costume



At the bull fair



Racka sheep and shepherd



Teaching local dances for locals and tourists



One of the biggest events is the Bridge Fair that is also an opportunity for local folk groups to perform



A small exhibition within the Hortobágy Inn – learning while eating



Nádudvar black pottery – today makes mostly to the shelf of homes as decorative objects



Shepherds wearing their richly decorated fleece cloaks the so-called „cifraszűr”



Celebrating the herdsmen of Hortobágy



Artefacts of older times at the Kadarcs Inn exhibition



Traditional costumes of different trades and social standing 1



Traditional costumes of different trades and social standing 2



Handicraft sessions are a good way to reach out to children while teaching about local assets



Local products in the souvenir shop of the Visitor Centre at Hortobágy