Information Sheet on Ramsar Wetlands (RIS) – 2006 version

Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

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DD MM YY

Designation date | Site Reference Number

2. Date this sheet was completed/updated:
5 February 2007

3. Country:
Hungary

4. Name of the Ramsar site:
The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Hortobágy

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only)**:**
a) Designation of a new Ramsar site ❑; or
b) Updated information on an existing Ramsar site ☑

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged: ❑

or

If the site boundary has changed:
i) the boundary has been delineated more accurately ☑; or
i) the boundary has been extended ❑; or
iii) the boundary has been restricted** ❑

and/or

If the site area has changed:
i) the area has been measured more accurately ☑; or
ii) the area has been extended ❑; or
iii) the area has been reduced** ❑

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:
The area size on the RIS follows the officially (nationally) designated Ramsar site size (which is based on the land registration data). Unfortunately the map submitted previously was rather poor and the outlines did not follow precisely the land parcel boundaries. So only the map was improved and the area size did not change.
A major change in the ecological character of the Ramsar site is the habitat restoration project in the Egyek-Pusztakócs marshes (financed by the EU LIFE Nature Fund).

7. Map of site:
Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:
i**) a hard copy** (required for inclusion of site in the Ramsar List): ☑;

ii**) an electronic format** (e.g. a JPEG or ArcView image) ❑; X

iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** ❑;

b) Describe briefly the type of boundary delineation applied:
e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.
The Ramsar site consists of several units that comprise the most important wetlands within the Hortobágy National Park, including artificial wetlands (fishponds and the Lake Tisza reservoir) as well as natural marshes. The units have been outlined following the boundaries of these wetland areas.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):
Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

47^{o} 34' N, 20^{o} 55' E

9. General location:
Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.
County of Hajdú-Bihar, around the Hortobágy village, in some parts adjacent to River Hortobágy. Situated in the middle of the southern grasslands of the national park.

Two parts of the site, the Middle Part of Kisköre Reservoir (Poroszló-basin) and Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve) are located in the County of Jász-Nagykun-Szolnok, 5-10 km west of Tiszafüred.

10. Elevation: (in metres: average and/or maximum & minimum)
85-95 m

11. Area: (in hectares)

Total: 23918ha

1986 ha (Hortobágy-Halastó)
2821 ha (Zám-puszta)
4219 ha (Pentezug-puszta)
3566.7 ha (Angyalháza-puszta)
4202 ha (Egyek-Pusztakócs Marshes)
3475 ha Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve)
3648 ha Middle Part of Kisköre Reservoir (Poroszló-basin)

(new calculation of the area following the original site boundaries: 23 918 ha as calculated from the more accurate map, but the designated area in legislation is still 23 121.4 ha)

12. General overview of the site:
Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Hortobágy consists of a mosaic of wetlands, dry and semidry steppes and small steppic woods. Of this habitat complex, some of the most important wetlands were designated as Ramsar sites in 1979, to which the Lake Tisza areas, an artificial reservoir were attached in 1997. The Ramsar site thus consists of disjunct units, of which a general overview is given below.

Hortobágy-Halastó: An artifical, man-made fishpond system in relatively natural status, the largest one in the region. It was created on the place of a former alkaline marsh. Very significant breeding, feeding and migrating site. Wintering place for White-tailed Eagles.

Zám-puszta: This area belongs to the deeper located, more alkaline parts of the southern Hortobágy, diversified with many marshes. They were supplied with precipitation waters from a large catchment area. The largest semistatic alkaline marshes in rather good condition have remained here, the catchment area of which is covered partly by unique halophytic plant communities. The approximately 10 km long alkaline marsh system is surrounded with seasonally wet meadows, alkaline short grasslands and loess grasslands in the best condition in the southern Hortobágy.
Pentezug-puszta A vast natural grassland area with three large alkaline marshes without outlet and few other smaller ones running to River Hortobágy.
Angyalháza-puszta is a typical astatic-semistatic natural marsh system with marshy meadows.

Egyek-Pusztakócs Marshes A restored alkaline marsh system, which was once a flood plain of the River Tisza. After the river regulations it became gradually drier and drier which during the 1940s and 50s was drained and dried up.

Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve)
Northern third of Kisköre Reservoir. Its dikes surround the floodplain of River Tisza, which has a diversified scenery with open water surfaces, floating vegetation, islands, mudflats, meadows and

forests, representing a landscape feature typical before water regulations. Internationally important for breeding waterfowl and wetland related birds of prey, also for wintering and migratory waterfowl. In springtime the mudflats covered by shallow water offer a rich food basis for migrant birds.

Middle Part of Kisköre Reservoir (Poroszló-basin)
The site is part of a large reservoir created on the former floodplain of River Tisza, filled up with the early spring floods of the river and drained before freezing. In winter the reservoir stands dry. The original gallery forests were cut when the reservoir was created, but some smaller patches of willow-poplar forests can still be found. The mudflats covered by shallow water make a very rich food resource for migrant waders and other birds in spring.

13. Ramsar Criteria:
Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	2	3	4	5	6	7	8	9
☑	☑	☑	☑	☑	☑	❑	❑	❑

14. Justification for the application of each Criterion listed in 13 above:
Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

1: The Hortobágy is the single largest alkaline wetland complex in the Carpathian Basin, that is, within the Pannon Biogeographic region. On the basis of its sheer size, it can be considered rare and even unique within the Carpathian Basin, but it also represents perfectly some of the easternmost members of the alkaline steppe – alkaline lake habitat complexes that stretch from Central Asia along the southeastern plains of Europe to Lake Neusiedl on the border between Austria and Hungary. A large proportion of its habitats have been preserved in good, natural condition, particularly the marshes that have been least affected by anthropogenic impacts. Thanks to this, it still holds the characteristic fauna and flora elements of the alkaline marshes and steppes in stable populations.
Most important habitats listed on Annex I of the Habitats Directive (data from the Natura 2000 database)1530 Pannonic salt steppes and salt marshes
representativity: excellent; conservation status: good; global assessment: good. 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition type vegetation:
representativity: excellent; conservation status: good; global assessment: good. 6250 Pannonic loess steppic grasslands:
representativity: significant; conservation status: average; global assessment: good.

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Within the Ramsar site, the rare or unique character of the separate units can be described as follows:

Hortobágy-Halastó is a near-natural fishpond system, with valuable flora and fauna characteristic for ancient alkaline marshes of the region. These fishponds boast the longest list of observed bird species in any site in Hungary.

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Zám-puszta is a good example of rare shallow ephemer water bodies and natural semistatic marsh type. It holds a part of the only population of Aquatic Warbler (Acrocephalus paludoicola) within the Carpathian Basin. This species is listed on Annex I of the Birds Directive.
Pentezug-puszta are typical alkaline temporary marshes and meadows. It holds

representative stands of *Artemisio-Festucetum* and *Alopecuretum* grasslands, with the largest *Orchis morio* population of the Hortobágy with around 1500 stems. *Elatine alsinastrum* is an IUCN Red Data Book species.
Egyek-Pusztakócs Marshes Hagymás is a marsh in natural status representing a temporary marsh type, Jusztus is an astatic marsh type, Fekete-rét and Meggyes-lapos represent a permanent marsh type.
Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve) and the Middle Part of **Kisköre Reservoir (Poroszló-basin)** have preserved the flora and fauna of floodplains and oxbow lakes of River Tisza, with masses of White Water Lily *(Nymphaea alba)*, Yellow Floating-heart *(Nymphoides peltata)* and IUCN Red Data Book species Water-chestnut *(Trapa natans)*.

2:
Data on the most important vulnerable, threatened or endangered species from the Natura 2000 database for the Hortobágy site:

Habitats Directive Annex II species:

Butterflies and moths:

Large Copper (Lycaena dispar) 50 000 imagoes
Fisher's Estuarine Moth (Gortyna borelii lunata)

Fishes:

Cobitis taenia (over 2% of the Hungarian population)
Misgurnus fossilis (over 2% of the Hungarian population)
Rhodeus sericeus amarus (over 2% of the Hungarian population)
Gobio albipinnatus
Gymnocephalus schraetzeri
Gymnocephalus baloni
Umbra krameri

Amphibians:

Crested Newt (Triturus cristatus) (over 2% of the Hungarian population)
Fire-bellied Toad (Bombina bombina) (over 2% of the Hungarian population)

Reptiles:European Pond Terrapin (Emys orbicularis) (over 2% of the Hungarian population)

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Mammals:

Otter (Lutra lutra) 100-500 individuals (over 2% of the Hungarian population)
European Souslik (Spermophilus citellus)

Birds (Birds Directive Annex I species):

Pygmy Cormorant (Phalacrocorax pygmeus): 60-80 pairs

Little Bittern (Ixobrychus minutus): 40-120 pairs
Night Heron (Nyctocorax nycticorax): 300-600 pairs
Squacco Heron (Ardeola ralloides): 40-100 pairs
Little Egret (Egretta garzetta): 40-80 pairs
Great White Egret (Casmerodius albus): 600-1200 pairs
Purple Heron (Ardea purpurea): 150-200 pairs
White Stork (Ciconia ciconia): 10-20 pairs
Black Stork (Ciconia nigra): autumn peaks of 50-100 migrant individuals in the Ramsar site
Spoonbill (Platalea leucorodia): 200 pairs
Glossy Ibis (Plegadis falcinellus): 0-20 pairs
Lesser White-fronted Goose (Anser erythropus): 50-70 migrant individuals
Ferruginous Duck (Aythya nyroca): 30 pairs
Smew (Mergus albellus): 100 migrant individuals
Black Kite (Milvus migrans): 1-2 pairs
White-tailed Eagle (Haliaeetus albicilla): 2 pairs, 40-70 overwintering individuals
Marsh Harrier (Circus aeruginosus): 80 pairs
Hen Harrier (Circus cyaneus) 100 wintering individuals
Montagu's Harrier (Circus pygargus): 10-20 pairs
Red-footed Falcon (Falco vespertinus): 25-50 pairs
Common Crane (Grus grus): 50000-100000 migrant individuals
Little Crake (Porzana parva): 20-40 pairs
Spotted Crake (Porzana porzana): 20-25 pairs
Stone-curlew (Burhinus oedicnemus): 2-3 pairs
Dotterel (Charadrius morinellus): 150-350 migrant individuals
Golden Plover (Pluvialis apricaria): 1000 migrant individuals
Ruff (Philomachus pugnax): 50 000 migrant individuals
Wood Sandpiper (Tringa glareola): 5000 migrant individuals
Common Tern (Sterna hirundo): 10-20 pairs
Whiskered Tern (Chlidonias hybridus): 200-300 pairs
Black Tern (Chlidonias niger): 0-100 pairs
Bluethroat (Luscinia svecica): 130-200 pairs
Moustached Warbler (Acrocephalus melanopogon): 100-120 pairs
Aquatic Warbler (Acrocephalus paludicola): 10-40 singing males
Red-breasted Goose (Branta ruficollis): 20-40 migrant individuals

Plants:

Habitats Directive Annex II species (from Natura 2000 database):

Marsilea quadrifolia 1000-4000 individuals
Cirsium brachycephalum 3 000 000 individuals

Other international protection :

Orchis morio 1500 individuals (B-II)
Trapa natans (Bern Convention Appendix I.)
Elatine alsinastrum (IUCN Red Data Book)

3. Alkaline marshes have almost disappeared from Europe, but these marshes have preserved their typical flora and fauna. The natural habitats (see Criterion 1) as well as many of the species are important to maintain the biological diversity of the Pannonic Biogeographic region. Here are the most important strongholds of Pygmy Cormorant (Phalacrocorax carbo) and Spoonbill (Platalea leucorodia) within the biogeographic region. The site also holds a part of the only Aquatic Warbler (Acrocephalus paludicola) population in the Carpathian Basin. Angyalháza-puszta is the most important autumn migration stopover site of the Dotterel (Charadrius morinellus) in the Carpathian Basin, while Hortobágy-Halastó is the most outstanding staging site of the Lesser White-fronted Goose (Anser erythropus) in the region.
The plant communities preserve remnant populations of numerous, formerly more widespread species, such as Phlomis tuberosa, a characteristic species of loess grasslands, or Plantago schwarzenbergiana, which is endemic to alkaline steppes in the eastern half of the Carpathian Basin.
4. The site supports especially waterbirds during their breeding, migration and wintering period. The most noteworthy examples include the breeding populations of species listed under Criterion 2, but it is important to mention that the Hortobágy also provides refuge to several non-breeding birds in the migration period. Angyalháza-puszta is the most important autumn migration stopover site of the Dotterel (Charadrius morinellus) in the Carpathian Basin, while Hortobágy-Halastó is the most outstanding staging site of the Lesser White-fronted Goose (Anser erythropus) in the region. The Hortobágy holds the largest concentrations of Common Crane (Grus grus) in Europe, with 60-82 000 individuals in recent years (peaks are in late October/early November). The wetlands of the Hortobágy, especially in Hortobágy-Halastó, Zám and Angyalháza are very important roosting sites for the cranes. Ruff (Philomachus pugnax) and White-Fronted Goose (Anser albifrons) also number tens of thousands in each year on migration, so the Hortobágy is important for them to refuel before moving on to their breeding or wintering grounds. The Hortobágy-Halastó is an important wintering site for dozens of White-tailed Eagles (Haliaeetus albicilla), partly due to winter feeding carried out by conservationists.
Naturally, the site is also important for many other species than birds (as listed under Criterion 2), but most of the other taxa are resident, and are thus present throughout the year, and not just in a certain period of their lifecycle.

5: The following information has been compiled from a recently published book on the birds of the Hortobágy (Ecsedi Z. (szerk.): A Hortobágy madárvilága. Hortobágy Természetvédelmi Egyesület, Balmazújváros, 2004. 588 p.). Data refer to the whole of the Hortobágy, which includes wetlands outside the Ramsar site, but the most important staging sites, notably the Hortobágy-Halastó, Lake Tisza and Zám are within the Ramsar site.

White-fronted Goose (Anser albifrons):

Peak numbers in the last ten years covered by the book:

1994: 100 000; 1995: 80 000; 1996: 20 000; 1997: 200 000; 1998: 8 000; 1999: 33 000; 2000: 160 000; 2001: 40 000; 2002: 100 000; 2003: 21 500

The most important roosting site for this species is the Hortobágy-Halastó.

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Teal (Anas crecca):

In autumn, the main staging site within the Hortobágy is Hortobágy-Halastó. Peak numbers often reach 5000-7000 individuals there.

Common Crane (Grus grus):

Peak numbers in the last ten years covered by the book:

1994: 42 000; 1995: 50 900; 1996: 38 296; 1997: 42 496; 1998: 64 850; 1999: 54 525; 2000: 64 100; 2001: 61 781; 2002: 69 955; 2003: 82 000

The most important roost is the Hortobágy-Halastó, where annual peaks are around 30 000 – 40 000.

Ruff (Philomachus pugnax):

Symultaneous counts (estimates) provide annual peaks ranging from 50 000 – 200 000 in the whole of the Hortobágy. The most important staging sites include the Hortobágy-Halastó, Zám, Angyalháza and Egyek-Pusztakócs, with flocks of 1000-10 000 on each.

Black-tailed Godwit (Limosa limosa):

In wet years, spring peaks reach 70 000 – 100 000, while in dry years spring peaks are around 15 000 – 20 000 for the whole of the Hortobágy. The Hortobágy is also an important summer staging site, with peaks up to 10 000 – 15 000. On autumn passage, 5 000 – 15 000 birds pass through.

Black-headed Gull (Larus ridibundus):

Spring peaks are estimated at 40 000 – 60 000, while autumn peaks range from 80 000 – 120 000 in the whole of the Hortobágy.

6. The peak numbers of waterbirds as described under Criterion 5 reach 1% of the European population in the following cases. Data for the European population are taken from BirdLife International (2004): Birds in Europe: population estimates, trends and conservation status. Cambridge, UK: BirdLife International, while data for the Hortobágy population are taken from the same source as under Criterion 5.

White-fronted Goose (Anser albifrons):
Hortobágy: 21 500 (9%)

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Common Crane (Grus grus):

European breeding population 110 000 pairs (in autumn, approximately 385 000 individuals, counting with 2 adults and 1.5 individuals per family – estimate by Ramsar Focal Point of Hungary). As the European population has largely increased recently, percentages can only be given correctly for the last few years. :

Hortobágy: 2000: 64 100 (17%); 2001: 61 781 (16%); 2002: 69 955 (18%); 2003: 82 000 (21%)

The 30 000 – 40 000 Common Cranes annually using the Hortobágy Halastó for roosting in autumn represent 8-10% of the European population.

Ruff (Philomachus pugnax):

Annual (spring) peaks in the whole of the Hortobágy (50 000 – 200 000 individuals) represent 5-13% of the European breeding population (200 000 – 510 000 pairs).

Black-tailed Godwit (Limosa limosa):

Annual (spring) peaks in the whole of the Hortobágy (15 000 – 100 000 individuals) represent 7-35% of the European breeding population (200 000 – 510 000 pairs).

Black-headed Gull (Larus ridibundus):

Annual (spring) peaks in the whole of the Hortobágy (40 000 – 60 000 individuals) represent 26% of the European breeding population

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):
Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:
Pannonic biogeographic region.

b) biogeographic regionalisation scheme (include reference citation):
European Commission DG Environment webpage

16. Physical features of the site:
Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The Hortobágy is basically a flat, temporary inundated floodplain located on an alluvial fan that has been eroding continuously since the end of the last ice age. It is covered by continental alkaline alluvial soil. Heavy clay soils, in which there are layers with enrichment of Na-salts. The flat surface is diversified with some small tumuli, so called “kurgans”.
Before regulation of waterways in the 19th century, the Hortobágy received spring floods of River Tisza, but never directly flooding the area. The flood reached the Hortobágy flowing in a southerly direction along former tributary beds, mainly along River Hortobágy, the largest water course of the area. An extended marsh system running from north to south had received the floods. The major part of alkaline steppes of Hortobágy are located in the drainage area of River Hortobágy, which is the hydrological axis of the area. The river crosses the national park from north to south in a length of 55 km. When naturally functioning in the past, the river regularly flooded and drained the steppe. During floods the river overflowed its bed

through small natural arms of the river, called "fok" and after recession these arms drained naturally the floods. These small arms can be seen even today. This process sustained an extremely rich diversity of dry and wet habitats of alkaline steppe and maintained the natural surface erosion processes developing small surface sink depressions, depressions without an outlet, and a special surface erosion of alkaline soils forming benches and barren surfaces. But the bed of River Hortobágy was dredged in the 1960s and today the water level of the river during medium annual water level is lower, than the bottom level of the bed of the natural arms flooding previously the steppe, consequently the river cannot supply with water the marshes anymore.
Soils in these areas are largely solonetz (black alkali soils) with an A-horizon of approximately 0-25 cm. The B-horizon of these soils has been formed due to the accumulation of mainly Na-salts ($NaHCO_3$, Na_2SO_4, NaCl, Na_2CO_3) due to leaching (in periods of precipitation) and capillary rise of groundwater and salts (in dry periods). When infiltration is very small, which is the case for trampled (or another surface erosion process affected) barren soils eliminating the A-horizon of the soil, or when there is an excess upward seepage (and this with the strong evaporation concentrates the salts), salts concentrate on the surface or just beneath it. The soil and groundwater bodies are rich in Na-salts. To illustrate how rich is the soil in Na-salts it is enough to mention, that the saturated soil extract of the upper 50 cm layer has 10-70 mS conductivity. Salt concentration of the groundwater varies between 2000 and 20000 mg/l. This process has led to the formation of impermeable subsoils and in general to a decreased infiltration making overland-flow the most important hydrological pathway. Larger loess ridges can be found in the eastern part the of the area. Marshes are collecting water from the surrounding grasslands. Marshes normally dry out after mid-summer at latest. Their waterdepth changes between 20 and 80 cm. Many canals were constructed for irrigation and amelioration purposes or rice-fields, but were all eliminated in 2002-2004.
Climate: semi-arid, semi-humid forest steppe, with average annual precipitation of 550 mm, the mean annual temperature is about 10 °C. The annual evaporation loss is about 200 mm.

The most important wetlands of the Hortobágy are the permanent and the temporarily inundated marshes, several fishpond systems created in the place of former marshland, and the Kisköre (Lake Tisza) reservoir.

The best example for permanent marshes in the Hortobágy Ramsar site is the Egyek-Pusztakócs Marshland. Earlier it was regularly flooded by River Tisza, but was later cut down by regulation works. After this it was drained for agricultural purposes, but it did not succeed. During 1980-82 it was partly restored, the restoration of the total area finished in 1997. Now the marsh system receives watersupply from River Tisza, which has very good water quality. Waterdepth varies between 0,5-2,5 m. The area is flooded at the end of winter, during the year marshes gradually dries out to different degree. The fluctuation of waterlevel is around 0,5 m. At the end of the Pleistocene silty-loamy material accumulated on the surface. These alluvial materials originate from depositions of different rivers from today’s Tisza river and its tributaries. The Egyek-Pusztakócs marshes represent the deepest part of an ancient, large marsh system. The area was formed by the alluvial materials of the local waterways, its deposition kept the feature of the landscape in a permanent change. The differences can reach 6-10 metres, which is rather significant compared to other places of the Hortobágy: deeper marshes in ancient riverbeds, shallow astatic marhes, natural levees, some nice surface erosion forms of alkaline soils.

Temporarily inundated wetlands exist in the Zám-puszta, Pentezug-puszta and Angyalháza-puszta units of the Hortobágy Ramsar site. Their maximum depth is around 1 m. By the end of summer they become dry, in dry years even the deepest marshes dry out. Marshes were developed from beds of ancient watercourses, which derived the water of the floods to the south. There are some marshes without any outlet. Higher elevations are covered by loess covers 2-2.5 % of the total area.

Hortobágy Halastó is a fishpond system built in 1914-18 by war prisoners by hand on a very poor quality land which earlier was marshy area. The pond system consists of 11 units and the smaller wintering ponds. The fispond gets the water supply from River Tisza through the Western Main Canal by gravitation. This canal has very good water quality. The ponds are drained to Árkus Canal, at the south it runs into River Hortobágy.

Kisköre (Lake Tisza) Reservoir (Tiszafüred Bird Reserve and Poroszló-basin)
The area is a floodplain of the Tisza River, covered by alluvial deposit. The reservoir is supplied with water from the Tisza River. The average water depth is between 1 and 1.5 m. Water quality by Hungarian standards II/III. (good/acceptable). The reservoir is dried up for each winter, and filled up for the end of each March according to its management plan.

17. Physical features of the catchment area:
Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

As a result of the regulation works during the last century the natural catchment area of the marshland and steppe units of the Hortobágy Ramsar site were fragmented and the natural watercourses flooding the marshes were cut off. The various agricultural projects implemented in the 1950-ies seriously decreased the local catchment areas to a further reduction of the already limited marsh area. Recently the natural water supply is impossible.
Nowadays the Hortobágy receives water in the following way:
Tisza River -- Western Main Channel -- Árkus canal -- supply canals and - feeding canals.
River Tisza originates outside the boundary of Hungary, collects the water arriving from the eastern part of the basin surrounded by the Carpathians. The total catchment area of the Tisza River covers approximately the half of the Carpathian Basin (157 200 km²), from which Hungary has 47 000 km².
The restoration of the local catchment area of the Egyek-Pusztakócs marshes was started in 2004. The physical features of its local catchment are same as of the site.
As wetlands of the marshland and steppe units of the Hortobágy Ramsar site (Zám-puszta, Pentezug-puszta and Angyalháza-puszta units) collect water naturally only from the local catchment area, physical features are same as under point 16. General landuse of the local catchments: partly extensive grazing (cattle), partly hay cutting and partly unmanaged. Catchment restoration was carried out in 2002-2005 for Pentezug-puszta and Angyalháza-puszta units.
The Hortobágy Halastó is a dammed fishpond system without any natural catchment area.
The pond basins receive controlled flooding and are drained regularly.

Kisköre (Lake Tisza) Reservoir (Tiszafüred Bird Reserve and Poroszló-basin)
The site is part of a dammed reservoir with controlled flooding and without any natural catchment area. The reservoir is situated between the length sections 404-440 km of River Tisza. Total surface area of the reservoir: 127 km². Total length: 27,7 km. Total water

volume: 155 million m³, maximum water discharge for utilisation: 25 million m³. It is flooded regularly in early spring from River Tisza and drained in late autumn.

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18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Halastó These fishponds can be regarded as water storage basins also. So in this respect they can have some significance in flood control.

Zám-puszta A good example of rare shallow ephemer water bodies and semistatic marsh type.

Pentezug-puszta Significant area for research in alkaline micro-formations and soil development processes of surface erosion forms.

Angyalháza-puszta

One of most valuable shallow water covered (ephemeral) area. During extermely high floods in River Hortobágy the area can act as emergency reservoir through flooding the marshes.

The **Egyek-Pusztakócs Marshes** can have some role in flood control as an emergency reservoir.

Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve)

The water-level of the reservoir is controlled throughout the year by the water management authority. There is an intensive process of siltation. A new management regime to avoid the deposition of sediments is to be started. The area has significance in flood control, watertable stabilisation and in sustaining of aquatic food-chain.

Middle Part of Kisköre Reservoir (Poroszló-basin)

Water storage. Also has significant effect regarding the watertable. Has some role in flood-control. Power production at the southern end of the reservoir.

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19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va • Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

Ss, 6, Sp, 1

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20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The most important wetlands of the Hortobágy are the permanent and the temporarily inundated, alkaline marshes, several fishpond systems created in the place of former marshland, and the Kisköre (Lake Tisza) reservoir. Their habitats, plant and animal communities can thus be grouped into alkaline marshlands/steppes and artificial water bodies (fishponds and reservoirs).

Marshlands can be further divided into permanent and temporary marshes. The former can be found mainly in the Egyek-Pusztakócs Marshes and some in Angyalháza-puszta, where open water surfaces exist with White Water Lily *(Nymphaea alba)*, Yellow Water Lily *(Nuphar lutea)*, Floating heart *(Nymphoides peltata)*, Water-Chestnut *(Trapa natans)*, surrounded by large reedbeds, narrow- and broadleaved bulrush, *Schoenoplectus sp.* and *Bolboschoenus maritimus* stands. The marshes are sourrounded by a belt of alkaline meadows and alkaline short grasslands forming a transition between the aquatic and terrestrial habitats. The boundaries show seasonal and interannual fluctuation in accordance with waterlevel changings. Marshy meadows have *Glyceria sp*, in Hagymás nice tussocks, wet meadows with *Alopecurus* and *Beckmannia sp.* and also alkaline short grasslands *(Achilleo-Festucetum pseudovinae, Artemisio-Festucetum pseudovinae)*. Higher ground with loess is covered by loess grasslands *(Salvio-Festucetum)*. Characteristic habitats in Angyalháza-puszta include bare or nearly bare soil surfaces with some succulent and prostrate plants. The largest and deepest marsh of Zám-puszta (Halas) is a chloridic-salinized area which is nearly unique in the Carpatian Basin and is characteristic for East European and Central Asian steppe climate. It holds valuable and rare halophytic plant communities.

Hortobágy Halastó has open water surfaces covered with vast stands of Floating-heart *(Nymphoides peltata)*, White Water Lily *(Nymphaea alba)*, along the dikes there are dense reedbeds. In some ponds there are a few smaller islands covered by reeds and bulrush. Mainly during autumn some ponds are dried up. These mudflats are very good feeding areas for waders.

Kisköre (Lake Tisza) Reservoir (Tiszafüred Bird Reserve and Poroszló-basin)

Deleted: ¶

The major part of the reservoir is open water. Large areas are covered by White Water Lily *(Nymphaea alba)*, Floating- heart *(Nymphoides peltata)*, Water Chestnut *(Trapa natans)*, Water Soldier (*Stratiotes aloides*) and Hairweeds *(Potametalia)*. Huge bulrush and homogenous reedbeds *(Typhetum angustifoliae, Scirpo-Phragmitetum)* can be found. Good quality meadows, partly mowed (mainly *Alopecuretum*). Oak-ash-elm gallery forests *(Fraxino pannonicae-Ulmetum)* on islands, peninsulas and on the shores of oxbow-lakes poplar and willow forests *Salicetum albae-fragilis)*, willow shrubs.

Deleted: ¶

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Halastó White Water Lily *(Nymphaea alba)*; Floating-heart *(Nymphoides peltata)* covers 40-50 ha on unit VI.; Arrowhead *(Sagittaria sagittifolia)*, Water Chestnut *(Trapa natans)*, *Salvinia natans*, *Wolffia arrhiza*. In the edge of the feeding canal *Chrysanthemum serotinum*, *Armoracia macrocarpa* (protected species). The Carpatic endemic, protected *Plantago schwarzenbergiana* grows on the dikes.

Zám-puszta

Endemics: *Suaeda pannonica, Limonium gmelini ssp. hungarica, Plantago schwarzenbergiana*.

Some halophytic species are also present as: *Salicornia herbacea, Suaeda maritima, Salsola soda, Atriplex littoralis, Bupleurum tenuissimum*. Relic loess grasslands *(Salvio-Festucetum rupicolae)*: *Salvia nemorosa, Salvia austriaca, Nonea pulla, Filipendula hexapetala, Dianthus pontederae, Agropyron pectinatum*. Significant population of *Phlomis tuberosa*.

Alkaline grasslands: *Artemisio-Festucetum*, on more wet parts *Puccinellietum limosae*. Marshy meadows with *Alopecurus pratensis, Beckmannia eruciformis, Agrostis alba, Eleocharis palustris, Schoenoplectus sp., Typha sp., Glyceria* sp., the protected *Cirsium brachycephalum*.

Pentezug-puszta
Typical *Artemisio-Festucetum* grassland with astatic marshes and meadows with *Alopecuretum* tall grass associations. Noteworthy is the largest *Orchis morio* population of the Hortobágy with around 1500 stems. In the loess grassland remarkable large population of *Dianthus pontederae.*In the marshes and marshy meadows *Glyceria fluitans et maxima, Batrachium aquatile, Lythrum virgatum, Utricularia vulgaris* and *Elatine alsinastrum* (this is an IUCN Red Data Book species) are notheworthy. Theres is a small island along River Hortobágy with some 100 years old oak *(Quercus robur)* tree. *Cirsium brachycephalum*.

Angyalháza-puszta
In River Hortobágy, bordering the site: *Nymphea alba*. In the marshy parts the *Utricularia vulgaris* can be found. In 1990 was found the *Orchis morio*, in 1991 *Orchis palustris*. Marshy meadows: *Cirsium brachycephalum*. Alkaline grasslands: *Spergularia marginata*. Hungarian Red Data Book species are: *Heliotropium supinum, Plantago major* and *Salsola soda*. Loess grasslands: *Phlomis tuberosa, Salvia austriaca, Salvia nemorosa*.

Egyek-Pusztakócs Marshes
Protected species of the marshes: White Water Lily *(Nymphea alba)*, Yellow Water Lily *(Nuphar luteum)*, Floating-heart *(Nymphoides peltata), Cirsium brachycephalum*, also IUCN Red Data Species are Water Chestnut *(Trapa natans), Ranunculus polyphyllus, Elatine alsinastrum*. Large population in the marshes of *Utricularia vulgaris, Salvinia natans, Hydrocharis morsus-ranae*. Protected species of the loess patches: *Phlomis tuberosa, Dianthus pontederae*. Largest population of *Taeniatherum caput-medusae* in Hungary. *Carex disticha* is recorded only in Hagymás marsh in the Hortobágy, also the largest population of Yellow Flag *(Iris pseudacorus)* of the Hortobágy region can be found here.

Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve)
Huge masses of White Water Lily *(Nymphaea alba)*, Floating-heart *(Nymphoides peltata)* can be found. IUCN Red Data Book species Water-chesnut *(Trapa natans)* covers vast areas in homogenous stands. In some parts Arrowhead *(Sagittaria sagittifolia)*. Large population of Yellow Flag *(Iris pseudacorus)*. Other protected plants: *Chrysanthemum serotinum, Armoracia macrocarpa*.

Middle Part of Kisköre Reservoir (Poroszló-basin)
Dense Water-Chestnut *(Trapa natans)* communities, White Water Lily *(Nymphaea alba)*, Floating Heart *(Nymphoides peltata)*. Reed *(Phragmites communis)* - Broadleaved Bulrush *(Typha angustifolia) -Schoenoplectus lacustris* mosaic stands. *Butomus umbellatus, Saggitaria saggitifolia, Iris pseudacorus*.

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22. Noteworthy fauna:
Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Insects:

Endemic subspecies of moths:

Saragossa porosa kenderesiensis and *Hadula dianthi hungarica* are food plant specialists living on halophytic plant species, *Artemisia santonicum* and *Gypsophila muralis*, respectively. The former plant is also a food plant of another endemic moth subspecies, *Narraga tessularia kasyi*. Fairly recently, a beetle species new to science was discovered on the alkaline grasslands of the Hortobágy: *Poecilus kekesiensis.*

302 bird species have been recorded in the Hortobágy Ramsar site, which is remarkably high compared to the 394 bird species registered in Hungary.
Most important nesting species (additional to the internationally protected species listed under point 14): Little Grebe *(Tachybaptus ruficollis)* 150-200 pairs, Black-necked Grebe *(Podiceps nigricollis)* 0-20 pairs, Red-necked Grebe *(Podiceps grisegena)* 0-5 pairs, Great Crested Grebe *(Podiceps cristatus)* 15 pairs, mixed heron colony with all the Hungarian breeding species (with Grey Heron *(Ardea cinerea)* and others listed under point 14), In the reedbeds, 250-300 pairs of Greylag Goose *(Anser anser)*, 200 pairs of Bearded Tit *(Panurus biarmicus)* and 100-150 pairs of Penduline Tit *(Remiz pendulinus)* breed, while Grasshopper Warbler *(Locustella naevia)* expands (10-50 pairs in the Ramsar site) in wet meadows. In some years 1-2 pairs of Pintail *(Anas acuta)* breed on wet meadows, but numbers are small even on passage. Montagu's Harrier *(Circus pygargus)* breeds in the area since the 80ies, recently 6-7 pairs. Red-footed Falcon *(Falco vespertinus)*, Kestrel *(Falco tinnunculus)*, occasionally 1 pair of Hobby *(Falco subbuteo)* also breed. Water Rail *(Rallus aquaticus)* is a fairly common breeder in reedbeds and marshes, possibly Baillon's Crake (*Porsana pusilla)* also breeds in tussocky wet meadows, but both are difficult to survey due to their secretive habits. In the puszta (steppe) areas, usually 25-30 Great Bustard *(Otis tarda)* are present and nest. White-winged Black Tern *(Chlidonias leucopterus)* breeds in fluctuating numbers, in wet years, the population of the Ramsar site can reach 100 pairs, while in dry years none nests. Common Snipe *(Gallinago gallinago)*, and Common Redshank *(Tringa totanus)* are valued members of marshland bird communities. Other nesting species: Quail *(Coturnix coturnix)*, Sand Martin *(Riparia riparia)*, Common Tern *(Sterna hyrundo)*, Black Kite *(Milvus migrans).*

The Hortobágy Ramsar site is also an important stopover for migrant birds, especially waterbirds (additional to the species listed under point 14, Criterion 5 and 6): after the breeding period, several thousand Greylag Geese *(Anser anser)* roam the wetlands in the migration period, Ducks occur in huge masses in spring: around 40-50 000 Mallards *(Anas platyrhynchos)*, 3000-4000 Garganey *(Anas querquedula)*, 900-1000 Wigeon *(Anas penelope)*, 7-800 Shoveler *(Anas clypeata)*. Raptors include in the marshy steppe areas in summer Long-legged Buzzard *(Buteo rufinus)*, Short-toed Eagle *(Circaetus gallicus)*, Saker (*Falso cherrug)*. Remarkable numbers of Spotted Redshank *(Tringa erythropus)* (5000-7000 in autumn), Curlews *(Numenius arquata)* (4000-5000 in autumn), Common Redshank (*Tringa totanus*) (1500-2000 in spring) are present in the whole of the Hortobágy, but their proportion staying within the Ramsar site is not predictable, depending on water conditions in the surrounding fishponds, etc., so they are not listed under Criterion 6 in point 14. Curlews also oversummer by the hundred, but do not breed in the Hortobágy.

Important mammals include 4-5 families of Beaver *(Castor fiber)* at Lake Tisza (Kisköre Reservoir).

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

The most important cultural value of the whole Hortobágy (including the steppe/marshy units of the Ramsar site) is the survival of ancient, traditional pastoral life. Extensive animal husbandry has been practiced here for thousands of years, and the preserved pastoral traditions, tools and lifestyle date back to the times of the Hungarian conquest of the Carpathian Basin (late 9th century). The co-existence of this traditional lifestyle and the natural heritage, which mutually formed each other during centuries, was recognized by the international community when, in the year 2000, UNESCO declared the Hortobágy National Park as part of the World Cultural Heritage in the cultural landscape category.

Main benefit from the fishponds is fish production (done on an extensive way). The reed harvesting is a significant activity too.

There is a church ruin originating from 11th century in the area of Zám-puszta.

The main benefit in the Egyek-Pusztakócs Marshes area is reed-harvesting. The old road-side inn built in the 18th century, which is museum today, represents outstanding cultural value.

In Angyalháza-puszta old traditional farm buildings have to be preserved. There are two traditional draw-wells for watering animals which was renovated.

A few members of a cooperative for fishing are working on the Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve). More significance has the area as breeding place for fishes.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box ☑ and describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

The extensive fish farming at Hortobágy Halastó is a good example for harmonizing farming practices with the conservation of the natural heritage. Traditional animal husbandry in the puszta (steppe/marsh) areas has also contributed to preserving and enriching the natural values of the site.

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

Traditional tools, methods and lifestyle of pastoral communities (herdsmen) have been maintained here in superb quality and provide a good example for the harmonious co-existence of man and nature.

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

Much of the grassland would probably be overgrown without grazing. The ecological character of the Hortobágy-Halastó and the Kisköre Reservoir depend on human activities as they are man-made, but extensively managed wetlands.

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

a) within the Ramsar site:

(a) owned by the Hungarian State and managed by HNPD.

b) in the surrounding area:

state owned, managed by Hortobágy National Park Directorate, Cooperative and private farms, Fishery, municipalities.

25. Current land (including water) use:

a) within the Ramsar site:

extensive fish farming, reed harvesting, Water reservoir, grazing of cattle, to lesser extent grassland-mowing, ploughlands, hay production, nature conservation, ,fishing /traditional, small-scale forestry

b) in the surroundings/catchment:

grazing, hayproduction, reed harvesting, grazing and mowing, arable lands.

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

Halastó: inadequate intensive fishfarming in the past, but since 1997 the whole system is used with priority of nature conservation purposes

Zám-puszta: after flood control (19th century) marshes partly lost their natural water supply, the long lasting dry period caused a decrease of wet parts and open water surfaces, creation of grassland irrigation system in the 1950-60ies on 150 ha of the north-eastern part of the Halas-marsh fragmenting the marsh bed and its catchment.

At **Pentezug-puszta** the long lasting dry period and the inadequate grazing affected the area in the last 12-14 years. On the northern part rice-fields were created in the 50s and were used partly as ploughland. The grassland vegetation of these arable lands has partly recovered and is used today for hay-making. To avoid the negative impact of the agricultural projects implemented in the 50s a grassland and wetland restoration feasibility study was prepared.

The Creation of rice and grassland irrigation systems at **Angyalháza-puszta**
in the 1950-60ies was fragmenting the natural beds of watercourses and marshes and the local catchment. The long lasting draught decreased the extention of wet parts, also some bare biotopes have disappeared.

Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve): The stabilization of its wildife is hindered by the significant fluctuation in water level deriving from the functioning of the reservoir: the winter drainage and the summer takeout for irrigation, illegal anglers also can cause some disturbance

In the **Middle Part of Kisköre Reservoir (Poroszló-basin)** the stabilization of its wildife is hindered by the significant fluctuation in water level deriving from the functioning of the reservoir: the winter drainage and the summer takeout for irrigation.

b) in the surrounding area:

Egyek-Pusztakócs Marshes: use of fertilizers, chemicals can be a source of danger by infiltration, ploughlands year by year expands a few metres to the marsh areas.
Overall the inadequate agricultural activities.

Water pollution coming from the Tisza River can be a source of danger for the **Middle Part of Kisköre Reservoir (Poroszló-basin)**.Refuse water of Eger town running into the upper reach of the reservoir results in deterioration of the water quality.

27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

The site is part of Hortobágy National Park. UNESCO World Heritage Site. NATURA 2000 site (SPA). In 1991 the most valuable two ponds was designated protected, since 1997 the whole system is protected. Registered as Ramsar site. Land cadastre list was attached to the Act on the Wetlands of International Importance in 2003 /8004/2003. K.Ért.11.)KvVM/.

The area is part of Hortobágy N.P. It is registered as Man and Biosphere Reserve. 14 ha of it is MAB Core area. Also registered as Ramsar site. Proposed NATURA 2000 site (SPA and pSCI). A management plan prepared in 1998 exists and being implemeted (validity: 1998-2007). Also a grassland-wetland restoration feasibility study prepared in summer of 1991. Land cadaster list was attached to the Act on the Wetlands of International Importance in 2003 /8004/2003. K.Ért.11.)KvVM/.
The Middle Part of Kisköre Reservoir (Poroszló-basin) is also protected site since 1996 (extension of the Tiszafüred Bird Reserve) as part of the Hortobágy National Park, also Ramsar Site.

Wetland restoration project in Zám-puszta has been carried out carried out in 1998-2000 with support from the Dutch Ministry of Agriculture, Nature Conservation and Fisheries and Dutch Ministry of Foreign Affairs (Matra Fund/Programme International Nature Management). Project organiser and administrator: Wetlands International - Africa, Europe, Middle East, P.O. Box 7002, 6700 CA Wageningen, The Netherlands. The restoration and the nature conservation management of the Halas-marsh is based on the simulation of the original pattern of water movements before the river regulations. The water supply system connects the marshes through the Western Main Canal with River Tisza, which gives the possibility to inundate the area imitating the natural floods. Water demand varies from 450,000 m^3 to 1.5 million m^3, depending on precipitation. It is part of the nature conservation management of the area to let the marsh dry out occasionally, according to the natural water regime.
Elimination of old rice-fields structures on the north-eastern part of the area was implemented in 2003. Former grassland irrigation system was built in the 1950ies in the littoral zone and local catchment, moreover partly inside this marsh, which is one of the most valuable alkaline permanent marsh of the national park. This ditch and dike system has completely altered the natural hydrological regime of the marsh and formed an obstacle to local run-off. In the frame of a LIFE-Nature project this system was eliminated in 2003. The marsh edge is grazed by cattle to repress reeds. As there are no more obstacle to local run-off, natural movement of surface waters has started to work on the local catchment.

The Hortobágy National Park Directorate have been awarded a grant from the European Union for a LIFE-Nature project in 2002 and a landscape rehabilitation project was launched aiming at the restoration of a complete habitat system of wetlands and grasslands on landscape scale, affecting the northern part of Pentezug-puszta: "*Restoration of pannonic steppes, marshes of*

Hortobágy National Park. Restoration of pannonic salt steppes and salt marshes to a favourable conservation state and ensuring long term conservation of this priority habitat type."
The project implementation includes the elimination (backfilling) of dike and canal systems of the former grassland irrigation and rice systems. It is possible to maintain suitable over-night places for migrating Common Cranes. As the fragmentation of the steppe is stopped, the local watershed started naturally functioning and a natural pattern of surface water movements is re-established, thereby local run-off waters from precipitation fill the natural depressions of marshy meadows and marshes. Recovery of favourable conservation status of flora and fauna of alkaline grasslands, meadows and marshes and the natural habitat structure of pannonic salt steppes is expected.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ❑;Ib ❑; II ☑; III ❑; IV ❑; V ❑; VI ❑

c) Does an officially approved management plan exist; and is it being implemented?:
There is a management and development plan for the national park prepared in 1998 (validity: 1998-2007).

d) Describe any other current management practices:
Barren islands were created in 2002 for breeding grounds for waders.

28. Conservation measures proposed but not yet implemented:
e.g. management plan in preparation; official proposal as a legally protected area, etc.
Some wetland restorations on the unused small ponds are planned. Restoration of the adjacent grasslands on the east (important feeding and resting grounds) was done in 2004-2005 in the frame of a LIFE-Nature project..
Elimination of structures of abandoned rice-fields and grassland irrigation systems on the northern parts of Pentezug-puszta was implemented in 2003-2004.
Proposed nature conservation management measures in the Egyek-Pusztakócs Marshes are: to stop with cultivation on approximately 50 % of the today cultivated arable lands, to continue with the restoration of loess grasslands, to increase the number of grazing animals (mostly cattle, extensive grazing). With the financial contribution of the EU LIFE-Nature fund restoration project of the surrounding grasslands is carried out in 2004-2008. These actions serve from one hand the restoration of the natural water movements (the restored grasslands will act as local catchment again) and from the other hand water quality control (buffer zones).
At **Middle Part of Kisköre Reservoir (Poroszló-basin)** Hydrological, hydrobiological researches (Middle-Tisza Water Management Authority, Szolnok). Fish-faunistical researches (Research Institute for Pisciculture, Szarvas). Botanical researches, the twenty years long lasting monitoring of the Tisza Research Committee (JATE University, Ecological Dep., Juhász Gy. Teachers' College, Szeged). Survey of basic ecological status (University of Debrecen and HNPD) is continuosly going on.

Deleted: r

29. Current scientific research and facilities:
e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.
The natural status survey of the area is going on.

Paleoecological research was carried out in 1998-99 at **Zám-puszta**, also a research on zooplankton of ephemer waters. The uniqueness of the area in sense of halophytic vegetation associations means a scientific research value. Also some research were started on vegetation.

In the Pentezug-puszta area 2800 ha of the natural grassland area is fenced and there is not human impact on it. Here in 1997 Przewalsky Horses were introduced for research purposes also serving the preservation of this wild horse.

In the **Egyek-Pusztakócs Marshes** hydrobiological and ornithological status survey is going on, occasional investigations on dragoonflies and fishes. The area has potential for further research activities.

Angyalháza-puszta is target area of the National Biomonitoring Programme. Research on the effect of grazing is continuously going on (botanical, zoological). Botanical research is carried out as part of the rehabilitation project.

Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve)

At governmental level a new strategy of using the whole reservoir in a way where the nature conservation prescriptions are taken in consideration is being prepared. There is a field station at the site. Hydrological, hydrobiological researches (Middle-Tisza Water Management Authority, Szolnok). Fish-faunistical researches (Research Institute for Pisciculture, Szarvas). Botanical researches, the twenty years long lasting monitoring of the Tisza Research Committee (JATE University, Ecological Dep., Juhász Gy. Teachers' College, Szeged). Survey of basic ecological status (University of Debrecen and HNPD) is continuously going on since 2000.

Middle Part of Kisköre Reservoir (Poroszló-basin)

Regular training courses are organised for locals, who rent canoes and guide tourists on the reservoir by canoeing. Some ecotourism development activities are planned on the short term.

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30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Halastó**:** One of the nature trails of the national park is here. Entrance is allowed with entrance card. There is a bird-hide system (ten hides), which is continuously completed with new ones, the old ones are repaired. These activities are implemented together with a local NGO. Also some signboards were prepared and installed at the site. Development of ecotourism facilities is planned. One of the most popular birdwatching site of the Hortobágy, where birds can be observed without disturbance.

Pentezug-puszta: As the area is strictly protected,visitors are not allowed to enter. At the northern part of the area, close to the main road since 1998 an Animal Park interprets the ancient domestic animal races for visitors, also explaining the significance of traditional grazing for nature conservation management. At north close to Hortobágy Village there is an observation tower to observe the wildlife of Pentezug-puszta.

One of the nature trails of the national park, entrance with visitor card is situated in the Egyek-Pusztakócs Marshes. Ecotourism developments were implemented in 1996-97: new observation tower and 1.2 km long wooden path connected with it were built in the Fekete-rét marsh, 30 km long bycicle path was built in the area, five new sign-boards were installed along it. New leaflet will be published about the area. Also new voliers were built to interprete for visitors the work of the bird repatriation center operating at the Fekete-rét marsh.

Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve)

Regular training courses are organised for locals, who rent canoes and guide tourists on the reservoir by canoeing. Some ecotourism development activities are planned on the short term. A new nature trail was opened on an island of Kisköre Reservoir in 2006 which can be approached by organised boats.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Ecotourism is co-ordinated and supported from the Hortobágy visitor centre in Hortobágy village, opened to the public in 2007, as well as from the Western Gate of the Hortobágy (Nyugati Fogadó) at the junction to Egyek on road 33.

Birdwatching tourism is mainly concentrated on Hortobágy-Halastó, where the industrial train of the Fishery had been renewed by 2006 and opened for ecotourism.

Entrance to the southern part of the Pentezug-puszta area is prohibited, in the northern part tourism is concentrated in the Animal Park.

Northern Part of Kisköre Reservoir (Tiszafüred Bird Reserve)

On the protected area some ecotourism development is possible, except for the most valuable and sensitive parts. On the sensitive parts temporary restriction of admission is applied. Other parts: limitation on power boats. Angling is allowed only from the dikes. Ecotourism development is planned in the region.

The Middle Part of Kisköre Reservoir (Poroszló-basin) reservoir is a significant recreational zone in summer, some tens of thousands of people visit the southern part of the reservoir. Main activities: angling, canoeing tours, jetskiing. The surrounding unprotected parts suffer pressure from tourism. On the protected area some ecotourism development is possible, except for the most valuable and sensitive parts. On the sensitive parts temporary restriction of admission is applied.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

The Tiszántúli and the Közép-Tisza-vidéki Authorities for Environmental Protection, Nature Conservation and Water Management are the first instant authorities of the Ministry for Environment and Water (the eastern parts of the Ramsar site belong to the Tiszántúli, while Kisköre Reervoir and most of the Egye-Pusztakócs Marsh belong to the Közép-Tisza-vidéki Authority).

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33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Hortobágy National Park Directorate
H-4024 Debrecen, Sumen u. 2.
szilvi@www.hnp.hu
Ms. Szilvia Gőri desk officer for Ramsari issues

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

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