Additional information

Summary description

The Ramsar site thus consists of disjunct units, of which a general overview is given below.

Hortobágy-Halastó: An artificial, 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 migratory 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.

Kunkápolnás: The largest natural alkaline marsh of Hortobágy, representing outstanding natural values. One-third of its extension is dominated by relatively deep reedbed, with some open water surfaces. Two-thirds of its area is covered by shallow alkaline marsh habitats, marshy meadows and tussocks in a mosaic structure. Wide range of wetland habitats from ephemeral waters until permanent, relatively deep open waters. Surrounded by extended natural grasslands.

Physical features of the site:

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, Hortobágy received spring floods of River Tisza, but never directly flooding the area. The flood reached 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.

Larger loess ridges can be found in the eastern part 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 Hortobágy are the permanent and the temporarily inundated marshes, several fishpond systems created in the place of former marshland, and Kisköre (Lake Tisza) reservoir.

The best example for permanent marshes in Hortobágy Ramsar site is Kunkápolnás Marsh and Egyek-Pusztakócs Marshland. Kunkápolnás Marsh represents the largest natural wetland of Hortobágy. One third of its extension is dominated by relatively deep reedbed, with some open water surfaces. This is regarded as the third largest reedbed in Hungary (after Lake-fertő and Kis-Balaton). Two third of its area is covered by shallow alkaline marsh habitats, marshy meadows and tussocks in mosaic structure. Wide range of wetland habitats from ephemeral waters until permanent, relatively deep open waters, inhabited by all the characteristic flora and fauna of these habitat types. The marshland is surrounded by extended natural grasslands. Average water level is at 86,5 m above see level. Seasonal and interannual fluctuation of the water level is a natural phenomena of the natural water budget of these wetland type, part of their ecological character.

Egyek-Pusztakócs Marshland earlier 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. 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 Hortobágy: deeper marshes in ancient riverbeds, shallow astatic marhes, natural levees, some nice surface erosion forms of alkaline soils. Today the mashland is supplied with water from River Tisza through the Western Main Canal by gravitation.

Temporarily inundated wetlands exist in the Zám-puszta, Pentezug-puszta and Angyalháza-puszta units of 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 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 fishpond 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 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.

Physical features of the catchment area:

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, Hortobágy received spring floods of River Tisza, but never directly flooding the area. The flood reached 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.
The restoration of the local catchment area of 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 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 Zám-puszta, Pentezug-puszta and Angyalháza-puszta units.

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.

Hydrological values:

Hortobágy-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.

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

Kunkápolnás Marsh: 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 is to be started to avoid the deposition of sediments. 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.

General ecological features:

Marshlands can be further divided into permanent and temporary marshes. The former can be found mainly in Kunkápolnás Marsh area and 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*), Water Soldier (*Stratiotes aloides*) 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): 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.

Social and cultural 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 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 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 fish.

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, hay production, reed harvesting, grazing and mowing, arable lands.

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

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 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 bicycle 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.

Current recreation and tourism:

Ecotourism is co-ordinated and supported from the Hortobágyvisitor centre in Hortobágy village, opened to the public in 2007, as well as from the Western Gate of 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 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.

Conservation measures taken:

The total area of the Hortobágy Ramsar Site is protected on national level as national park, NATURA 2000 site (SPA and SAC) and UNESCO World Heritage Site.

UNESCO Man and Biosphere Reserve: Angyalháza, Pentezug, Zám, Kunkápolnás, Hortobágy-Halastó. MAB Core areas: Totalling 1600 ha in Angyalháza, Pentezug, Zám, Kunkápolnás.

Hortobágy-Halastó: In 1991 the most valuable two ponds were 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/.

Angyalháza, Zám, Pentezug: The area is part of Hortobágy National Park. It is registered as Man and Biosphere Reserve, with 800 ha core area altogether. Also registered as Ramsar site. NATURA 2000 site (SPA and SAC). A management plan prepared in 1998 exists and being implemented (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/. LIFE-nature restoration project of local catchments was carried out in 2002-2003.

Northern and Middle Part of Kisköre Reservoir

The Middle Part of Kisköre Reservoir (Poroszló-basin) is also protected site since 1996 (extension of the Tiszafüred Bird Reserve, protected since 1973) as part of Hortobágy National Park, also Ramsar Site.

Zám: Wetland restoration project in Zám-puszta has been carried out carried out in 1998-2000 with support from Dutch Ministry of Agriculture, Nature Conservation and Fisheries and Dutch Ministry of Foreign Affairs (Matra Fund/Programme International Nature Management). Project organizer 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 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 m³ to 1.5 million m³, 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 1950s 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.

Pentezug: Hortobágy National Park Directorate has 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.

Kunkápolás: Extension of the Hortobágy Ramsar site in 2008, total extension area covers 8118.5826 ha. The water supply system (feeding canal and water management installations) was created in 1975 and 1986-87 to inundate the marsh, and it was renewed with some maintenance work in 2004. The flooding water originates from River Tisza through Western Main Canal and some smaller water courses. The flooding water is of high quality (drinking water of Debrecen town is taken similarly from River Tisza). The area is flooded gravitationally in each year, according to a water movement system similar to that before the water regulation. It is usually flooded in March, with an average of 1.5-5 million m³ water. In dry years late summer flooding (from end of July until September) might be needed, with a smaller amount of water.

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