



Living with the River

**LIFE-Nature project in the
Tisza floodplain**

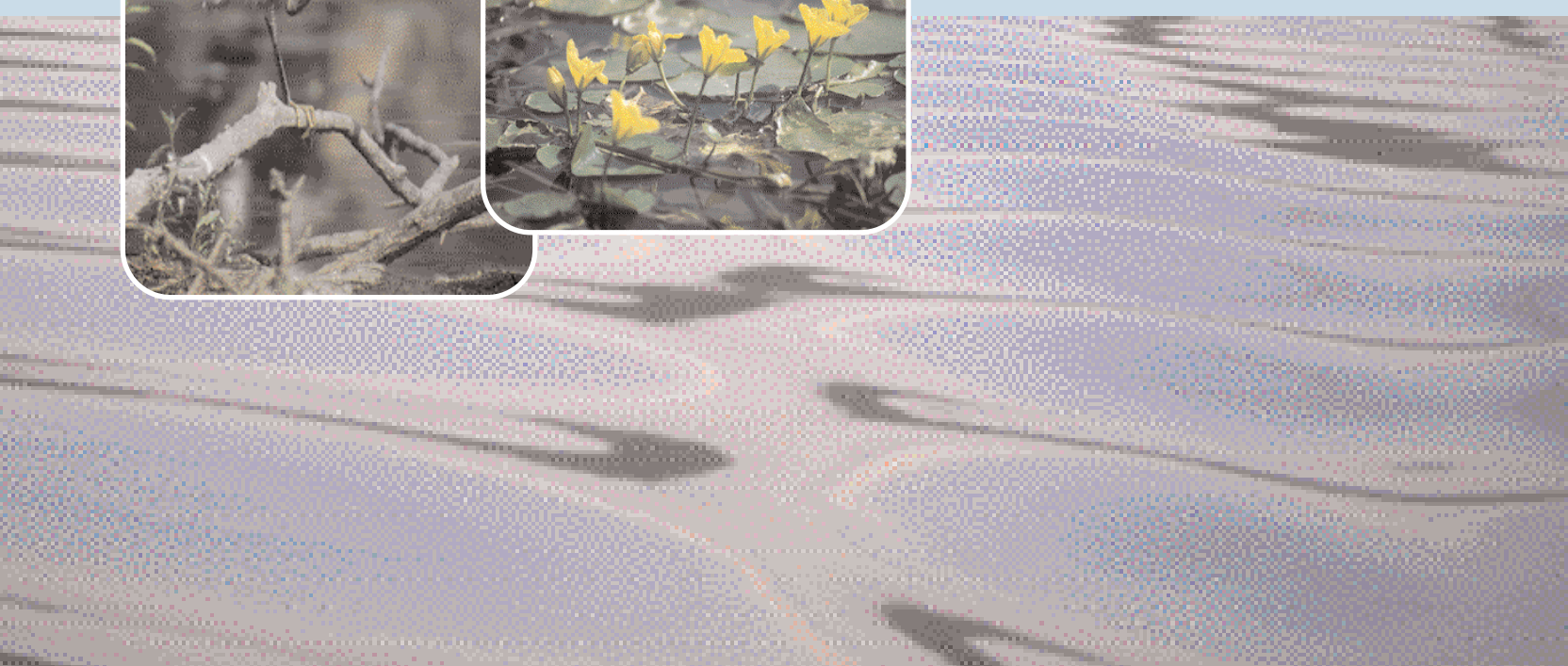




Photo: István Zsoldos

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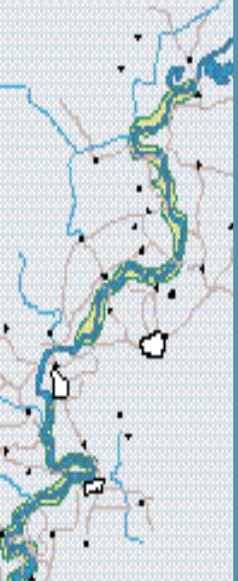


“In summer and in winter, in autumn and in spring, there was peace in this land, where the flowers poured towards the village like the smoke of the shepherds’ fire. The trees grew, the meadow was full of flowers, and the forest murmured with life.

Fish blinked in the river, frogs gave concerts in the spring, and in the summer the yellow sword-flag kept nodding while dreaming at the bank of the river.”

*István Fekete:
The wind and the forest*

*WWF Hungary
Budapest, 2002*



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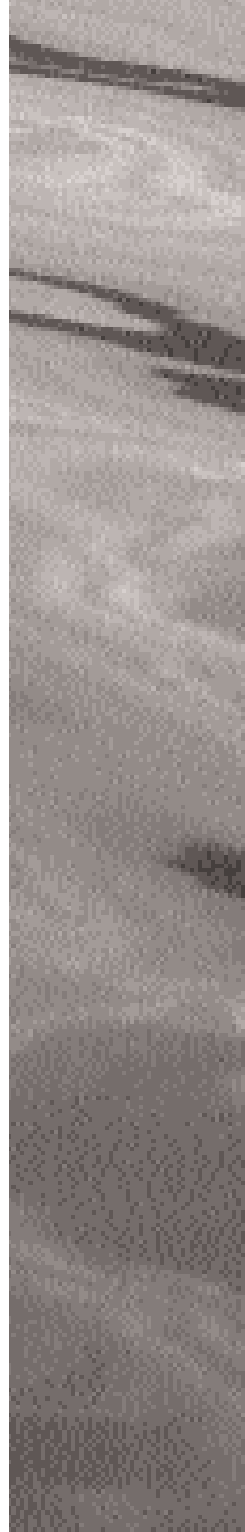
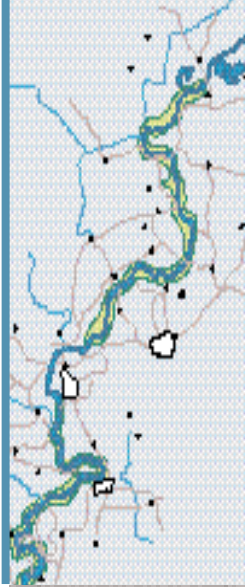
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Greetings

The Tisza River, an ancient force shaping and sustaining the land, has become a symbol of the characteristic plains region of Hungary. This publication presents the possibility for and necessity of a large-scale landscape rehabilitation programme, along with the diversity of tools it would involve. It presents well-reasoned proposals for activities which, when implemented, will serve as models for the people along the Tisza. It seeks solutions for the conservation of the river's biological diversity, as well as its role as an ecological corridor, making use of the opportunities offered by the preservation of traditional land-use methods and taking into account the well-being of the local population. People of the Great Plains Region of Hungary used to wish for "two Gods for this land: one to bring floods, and one to dry them up". This dichotomy has supported the mosaic-like landscape along the Tisza, defined spatial linkages and maintained the dynamics of its natural systems. The regu-

lation of the water table and the revival of the connections between the river and its former wetlands will unleash the power of the ecological processes that maintain the abundance of nature. This approach looks way beyond the narrow boundaries of the current floodplain defined by the dykes, it considers the natural systems of the original floodplain, projecting into the future the possibility for the continuation of the work. It already re-creates, at least in thought, the ancient inter-dependence and harmony of freshwater and terrestrial systems.

*Csaba Aradi, Director
Hortobágy National Park*



About LIFE

In the terminology of the European Union, LIFE is an acronym that stands for "L'Instrument Financier pour l'environnement" (Financial Instrument for the Environment). The LIFE instrument provides funding in three major areas of action: Environment, Nature and Third Countries. Although all three areas aim at the protection and improvement of the environment, they each have their specific priorities. LIFE Nature provides funding for the conservation of wild flora and fauna and the protection of habitats of EU interest.

LIFE dates back to 1992 and it has made possible the implementation of nearly 300 projects in 20 countries. Between 1996 and 1999, €450 million was spent on LIFE programmes. LIFE funding was opened to accession countries in 1999, with the first seven projects funded in Romania. In 2001, two projects were started in Hungary with the help of the LIFE instrument. One of them is the Tisza LIFE Project, which is presented in detail on the following pages.

Introduction

Our readers may wonder what on earth one of the largest conservation organisations of the world is doing along the Tisza River, in the fields of small villages like Nagykörű, Tiszajenő or Tizsakürt.

The question is not unreasonable, as WWF is best known for its efforts to protect popular and attractive species like apes, the African and Asian elephant, rhinos, tigers or marine turtles. However, a careful reading of WWF's mission statement takes one closer to the Tisza. The goals of the organisation are the promotion of the conservation of biological diversity, the reduction of pollution and the sustainable use of natural resources. As it can be expected of a purposeful organisation, WWF has identified issues, on which most of its conservation efforts would be focussed. These priority areas are forests, freshwater, oceans and coasts, species, climate change and toxics. Clearly, tackling all of the above tasks looks like a daunting challenge. WWF therefore decided to further concentrate its limited resources to those areas of the globe which represent the richest biodiversity and which are most threatened. Researchers have identified some 200 such ecoregions.

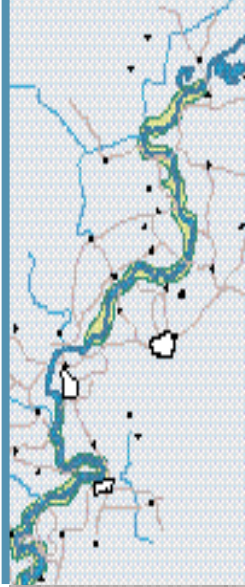
Hungarians do not have to travel far to encounter such valuable and threatened ecoregions. The top two hundred areas include the mountain range of the Carpathians, as well as the delta of the Danube River. It is easy to recognise that the conservation, and possibly restoration, of the once rich biodiversity of the Danube and its tributaries is of primary importance for the protection of the Danube-delta. By focussing our efforts and resources on the lower stretches of the Hungarian section of the Danube (the forests of Gemenc) and on the Tisza (one of the major tributaries of the Danube), we are also working on the realisation of our international targets.

The LIFE programme of WWF Hungary can go a long way towards the conservation of the biological diversity of the Carpathian-basin by preserving traditional forms of floodplain management, or even reviving some practices. Although some may consider the protection of Siberian tigers more important, there are elements of our natural heritage along the Tisza which no-one else is going to protect for us. When we contribute to the conservation of biological diversity in Nagykörű, Tiszajenő or Tizsakürt, we are also protecting the Danube-delta, and helping our organisation to achieve its global conservation goals.



Great egret
Photo: István Lőrincz

Life before the regulation of rivers



Ottó Hermann, the great Hungarian ethnographer, considered fishing and nomadic pastoralism as the most ancient of all trades. Already during the reign of the House of Árpád (the oldest Hungarian dynasty, which ruled at the beginning of the second millennium), there were highly specialised trades linked to *fok* management, like the *pákász* and *csikász* (marsh-dweller gatherers and fishermen). Herders had a challenging and highly responsible task, as the herds under their care represented a significant portion of the wealth of the community.

People of the region fished in the lakes, ponds and marshes, netting large quantities of fish, as well as the highly sought after item on the menu of the genteel class, pond turtle. In addition, they marketed rushes and wicker-work, water-chestnuts and countless other products.

People living along the Tisza were resourceful and had a profound knowledge of their environment. They managed to carve out a living even in the most difficult of times. For example, during a long drought in the early 1830s, desperate fisherman started to farm and turned their boats into pigsties. By the mid-1840s, however, there was such an abundance of fish that “if a merchant bought two quintals [200 kilograms] of fish for a florin or two, he was given a third one gratis”.

The apple, pear, plum and walnut trees growing in the floodplain could withstand long periods of inundation, tended to be more resistant to disease and pests and did not need pruning or other care. These fruit trees formed “jungle orchards”, where grapevines were often trained onto the trees.

These orchards formed part of the community property up until the end of the 18th century: when harvest time was declared, all households were entitled to take home one cartful of fruit. Remnants of these jungle orchards can still be found in small patches in the floodplains of the upper stretches of the Tisza.

People living along the river were familiar with the movements of the water, the way it constantly built up and destroyed the river banks. They took advantage of the pools of water retained in natural depressions, and they even did limited earthwork to divert and retain water according to their needs. They opened up sluices (called *fok*) in the high banks so that water could inundate large areas during floods.

The essence of *fok* management is that areas are recharged with water from below. The lowest point of the *fok* system is the *fok* itself, which is directly connected to the riverbed. When the water level reaches the *fok* during floods, it begins to fill up the floodplain from below, without destruction. As the flood recedes, the *fok* can be blocked up to retain water in the floodplain. The *foks* did not only serve as “flood control devices”, the shallow water they retained in the floodplain also served as a fish nursery.



Area flooded by Hungarian rivers before the regulations

Confined between dykes

The most significant medieval collection of customary law in Hungary, the Tripartitum by Werbőczy (1521), provides evidence that the diversion of waters, flood control measures and the construction of mill-ponds was common practice as early as the 13th century. Another purpose of these early hydrological measures was to make rivers navigable, making it possible to float timber from the mountains and to ship the products of the royal salt mines in the Carpathian Mountains.

An expansion of the population during the 18th century increased the demand for grain. To meet this need, extensive herding was gradually replaced by the production of field crops, and forests were converted to fields.

However, to further increase the area of arable land, it became necessary to reduce the areas affected by floods. A new chapter in the history of water and landscape management opened towards the end of the century with the implementation of the first large-scale hydrological interventions, such as the closing of the Mirhó-fok.

The training of engineers in Hungary began in the early 19th century. This, along with the systematic mapping of the country, provided the basis for future large-scale engineering projects. Count István Széchenyi, a wealthy and enlightened aristocrat, took the lead in the process. As the president of the Transport Committee, he identified the improvement of the transport network and the expansion of arable land as the way forward for the future development of the country. Due to his personal involvement and tireless campaigning, the Tiszavölgyi Társulat (Tisza Valley Association) was established in 1846. It was a self-governed organisation, which divided the costs of its activities in proportion to the benefits achieved. Beyond the general aim of flood control, it also considered among its targets the development of water transport and irrigation, as well as the enhancement of water retention and control of erosion.

During the grain boom, river transport offered the cheapest way for getting cereals to the markets. River barges were towed upstream by oxen. To make towing possible, much of the valuable forest along the river bed was cut, and the *foks* filled in.

The bulk of the original floodplain of the Tisza, i.e. the area which was regularly inundated during floods, is now on the protected side of the dykes. The dominant part of the former floodplain is utilised for intensive production of field crops and vegetables.

About one third of the active floodplain, the part of the former floodplain confined between the dykes, is also under intensive management. Approximately one third of the active floodplain is forest (about half of which is hybrid poplar plantation), another third is

*A nagy-magyarországi nagyúrak
és főbírák részéről 1845-
szeptember 23-án alatti költ. legye-
rendelete folytán az őri újabb fő-
szabályozás a Tisza folyó-
átlános szabályozás elvégzését
részletesen kidolgozott mélylist-
telével tárgyalt fel.*

Budapest, szeptember 22. 1845

*Vásárhelyi Pál
főbíró feljegyzése*

The regulation of the Tisza started near the village Tiszadob in 1846, based on the plans of Pál Vásárhelyi

arable land, and only the remaining one third contains meadows and other natural habitats, like swamps.

In pre-historic times, about 85% of Hungary was forested. The large-scale deforestation over the centuries significantly altered the ecological conditions of the Great Plains. Period maps indicate that at the beginning of the 19th century, the forest cover of present-day Hungary was around 28%. After the abolishment of serfdom, 1.3 million hectares were deforested and converted into pastures between 1848 and 1878.

After World War I, only 11.8% of the country was covered by forest. Since then, over 600 000 hectares of forest have been established, mostly after World War II, within the framework of various afforestation programmes. Unfortunately, much of these forests consist of plantations of non-native, fast growing species and clones, planted in the habitat of native species. Today about 19% of Hungary is covered by forests and plantations, while the forest cover of the Great Plains is significantly lower.

The most important field crop in the floodplains is maize. This is made possible by the varieties available, which are well-adapted to short growing seasons. These can mature even if they are sown only after the spring floods. The rapid growth of the late-sown maize can be attributed to the following two main factors: the nutrient-richness of the soil, which is due to the silt deposited during floods, and the moisture retained in the soil after flooding. The fertile soil is also conducive for the development of weeds, which used to be controlled mechanically (by hoeing), but today chemicals have taken over. To protect the quality of water of the Tisza, it is imperative to phase out the use of chemicals in the floodplain, as pesticides can be washed into the river.

It is true for Hungary in general, and the floodplains in particular, that the importance of grasslands has declined considerably since the middle of the 20th century. Pastures and meadows used to provide the basis for

animal
husbandry.

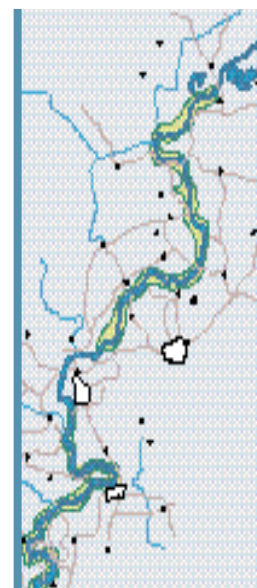
The number of live-stock has declined over the past twenty years, while the proportion raised in intensive, zero-grazing systems had started to increase long before. Instead of grazing and hay-making, cattle are now raised on dry feed which is mostly produced on arable fields. Due to under-utilisation and lack of management, grasslands deteriorate, eventually turning into shrubland and forest. As the area of grasslands of high conservation value has drastically declined, the protection of the remainder and the restoration of degraded grasslands is of high priority.

Apart from cutting-off bends of the Tisza, embankments along the river and circular levees around human settlements were steadily being constructed and enlarged. Along the Tisza and her tributaries alone, 4500 km of embankment was constructed (6400 km nationwide), reducing the area of the floodplain from 38 500 km² to 1800 km² (or from 25 000 km² to 1200 km², if only the present-day territory of the country is considered). The embankments protect more than 840 settlements from the floods, while the circular levees guard 48 cities and large villages.

Many people who had made their living from the river lost their livelihood and joined the ranks of the navvies. They built the earthworks, which protect nearly 40 000 km² of land from flooding (including areas in the Danube catchment). Of this area, approximately 23 000 km² falls within the present-day borders of Hungary.



Kingfisher
Photo:
László Haraszthy



Water management and flood prevention today

The current flood control system of the Tisza was developed in several steps, with numerous modifications along the way. The cut-offs were initiated by digging a trench that would channel the water in the right direction. The trench would then be broadened

and deepened by the river itself. A new plan entitled, the 'Revision of the Vásárhelyi Plan' ("A Vásárhelyi Terv Továbbfejlesztése") was developed in 2001 and 2002. It is centred around the concept of emergency storage of floodwaters, which facilitates rational landscape development.

In recent years, ecologists have increasingly turned their attention towards the problems related to the too narrow floodplains, as well as the huge areas of the former floodplains which have been drained and are subject to salinification. As the river can no longer spread its deposits over a large area, it deposits its load in the narrow

strip of active floodplain, gradually silting it up. Due to human activities (deforestation, increased drainage, the expansion of paved-over areas etc.), precipitation falling in the catchment area reaches the river much more quickly than before. The filling up of the floodplain and the altered flood regime has led to further problems. Whilst the floodplains are rising higher and higher, the river is cutting itself deeper and deeper in the riverbed, due to the increasing speed of the water. This has resulted in declining

water levels at average flow rates. As a result, dangerous floods that threaten towns and villages can be followed, within a few weeks, by serious droughts.

One of the more detrimental results of human activity is the introduction of exotic species. The bastard indigo (*Amorpha fruticosa*) was introduced in the early 20th century. It found a very favourable environment, and spread throughout the floodplain. This two to three-metre-tall shrub forms dense thickets, in which few other species can succeed in the competition for light. It is favoured by beekeepers, although it causes a lot of damage by its aggressive expansion, displacing the native vegetation from the floodplain.

and deepened by the river itself. Pál Vásárhelyi, a hydrologist and the mastermind behind the great efforts of the 19th century, envisioned a confined floodplain that would allow floods to recede faster and without spreading into the surrounding areas.

The disastrous floods that occurred after the regulation of the Tisza had started (in 1867-68, 1879, 1888, 1919, 1932 and 1940-41) contributed to the further development of the flood control system. However, between 1998 and 2001, within a period of only 28 months, four floods of unprecedented intensity occurred. These made it clear that the required flood safety could no longer be maintained solely by the elevation of the dykes: a para-



Fighting the flood in Nagykörű, April 2000
Photo: Viktória Siposs



The Tisza: the focus of activities of WWF Hungary

WWF became active in Hungary in 1986, by supporting the raptor conservation programme of the Hungarian Ornithological Society (known today as Magyar Madártani és Természetvédelmi Egyesület, MME or BirdLife Hungary). It opened its own office in 1991. At the beginning, it mostly focussed on assisting the legislative process of the transition period, with advice and recommendations aimed at the conservation of nature in Hungary. During this initial period, the floodplain forests along the Tisza received much attention. In 1993, WWF Hungary published a document about the conservation status of floodplain forests.

In its conservation strategy, developed in 1995, WWF Hungary identified the Tisza-valley as its priority region. One of its goals is to contribute to the conservation of the Tisza region's biological diversity and, where possible, to the restoration of a former, richer habitat through nature conservation and the promotion of extensive agricultural practices. Most of the natural treasures of the Tisza and its environs can only be protected together with the preservation of the traditional, extensive farming activities, typical of the region, which also contribute to the well-being of the local population.

WWF Hungary initiated its Tisza Programme in 1999. The rehabilitation of the first pilot areas took place in 2000, the year of the cyanide and heavy metal spill disasters. The Agyagosi-zsilip (sluice of Agyagos), near Tiszabábolna, was completed in April, while the first 400 metres of the restoration of the clay-pits in Nagykőrű was inaugurated in October. In May of the same year, the suppression of bastard indigo, the aggressively expanding, adventive shrub, began in the

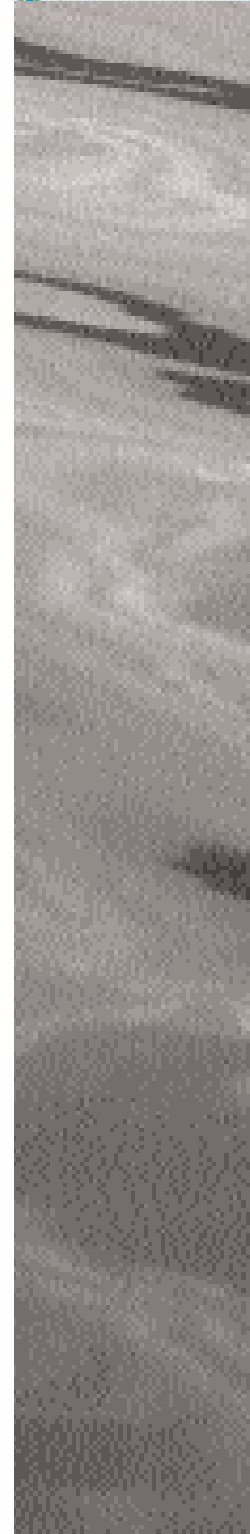
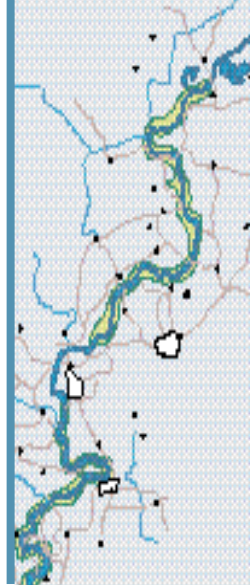


Press conference at the clay-pits
Photo: Péter Rákosi

floodplains of the Körös river, using traditional Hungarian grey cattle to graze the area.

Also in 2000, WWF Hungary produced a publication analysing the opportunities for nature conservation in the Tisza-valley, and presenting brief summaries of ongoing activities.

On the initiative of WWF Hungary, organisations dealing with the Tisza formed two alliances. The Tisza Platform was organised in the aftermath of the cyanide and heavy metal pollution episodes for the assessment of the damage and the planning of restoration measures. Members of the Tisza Műhely (Tisza Workshop) concentrate on the possibilities for the revival of traditional land management techniques in the floodplain.



The locations of the Tisza LIFE Project activities

As it has already been mentioned in connection with the regulation of the Tisza, most foks have been closed off or filled up. However, with the help of old maps and much geographical research, the remnants of the old fok system can still be found. This exploratory work can identify those systems that can still be practically restored and then the former system of management can be revived.

Having successfully carried out restoration activities in the three pilot areas, WWF Hungary decided to undertake a bigger task. Together with WWF Austria, they prepared a joint proposal, to be funded under LIFE Nature, for the restoration of the Austrian section of the upper Mura River and the mid-section of the Tisza (Közép-Tisza). The implementation of the Tisza LIFE Project began in January 2001, and will be completed in December 2005. Its goal is to restore, along the Tisza river, areas which used to sustain high biodiversity, but have been degraded. The restoration will follow the conservation principles discussed above, including the extensive utilisation of the areas concerned. Activities planned in the framework of the Tisza LIFE Project

include the rehabilitation and management of four pilot areas, the expansion of existing protected areas and education/information activities.

The Tisza LIFE Project is implemented within the area of the Middle-Tisza Landscape Protection Area (MTLPA), which stretches along a 134-km section of the river. The protected floodplain area is interrupted only for a 6-km segment at the city of Szolnok. The MTLPA was established in 1978 and its 7670 ha area includes 59% forest, 13% grassland and 3% arable land, orchards and reedbeds. The remaining 25% is mostly made up by the river and other permanent water bodies.

Habitat restoration of the pilot areas will be carried out with the help of local authorities and environmentally responsible local citizens. Technical design and required construction work have been contracted out to local companies. The management of the areas is also done with the involvement of local farmers. The project is being implemented in close co-operation with the Directorate of Hortobágy National Park (HNP, which is the supervisory authority of the MTLPA) and other relevant authorities.

Main data of the areas to be restored

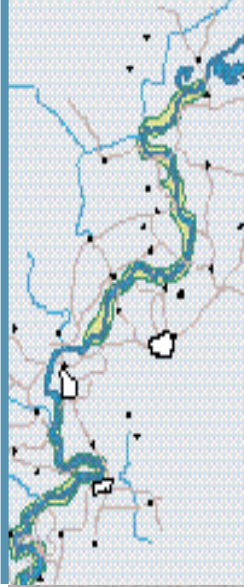
Name Area	Kőtelek kb. 500 ha	Nagykörű clay-pits 80 ha	Nagykörű Tóalj 100 ha	Tiszajenő 210 ha	Tiszakürt 44 ha
Ownership	private	state	local council + private	2/3 state 1/3 private	state
Management rights	private	water management authority	local council + private	Hortobágy National Park + private	Hortobágy National Park
Protection status	proposed for protection	protected	protected	proposed for protection	protected



Kötelek



Nagykörű



Tiszajenő



Tizsakürt

Photos: István Zsoldos

Clay-pit rehabilitation project in Nagykörű

The earth needed for the construction of the dykes was excavated from pits, called “kubikgödör” (clay-pits). These pits are usually situated in rows running parallel to the dykes, on the side towards the riverbed (i.e., in the floodplain area). This is also the case in Nagykörű. Often dubbed “fish-cradles” or “fish-cemeteries”, they serve as excellent spawning grounds after floods, but they act as traps for millions of spawn as the water recedes. They often dry up completely, and the trapped fish perish.

Records from the 19th century indicate that, even then, people made efforts to utilise the clay-pits as fish nurseries. However, the ditches excavated at that time have silted up. The remnants of these ditches could be located during the preparatory phase of the project, and they provided guidance for the rehabilitation of the area.

The “Nagykörű idea” calls for the connection of the clay-pits with the ditches, making it possible for the water, together with the fish, to drain into the river as the floods recede. The implementation is based on a careful survey. The network of ditches connecting the bottom of the pits drains towards the river. With the help of the sluice, built on the lowest point of the drainage channel of the system, water can be retained after the spring floods in sufficient quantity to last throughout the summer. The sluice also allows the regulation of the water level. The system is best drained at the end of summer or in the autumn, when the young fish have grown stronger. The draining of the pits is also the time of harvest: the larger fish can be netted from the drainage channel, while the spawn is released into the river. Not all pits are connected to the system: some are retained as feeding ground for birds.

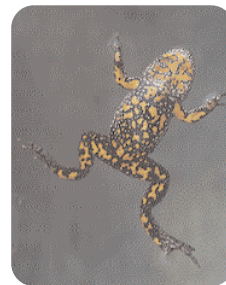
WWF Hungary participates in the Nagykörű Landscape Rehabilitation Programme, initiated by the local authority. In spring 2001, the restoration of clay-pits along the first 400 m stretch was completed, along with an interpretation trail for visitors.

Amongst the clay-pits, there are peculiarly shaped willow trees. Their branches are regularly trimmed near the trunk, forming a low, dense canopy, which very effectively breaks the surf during high water. These pollard forests thus protect the dykes from excessive erosion. The old, hollow pollard trees provide habitat for a very rich wildlife.

A number of bird species nest in the hollows, and

The late-flowering moon-daisy (*Chrysanthemum serotinum*) is a perennial plant of wet habitats
Photo: István Lőrincz

Fishing in the clay-pits is done by hand-made instruments
Photo: Ferenc Kis



While the fire-bellied toad (*Bombina bombina*) is a common species in Hungary, its population is in rapid decline in the European Union. The Habitats Directive lists it as a priority species for conservation.
Photo: László Haraszthy



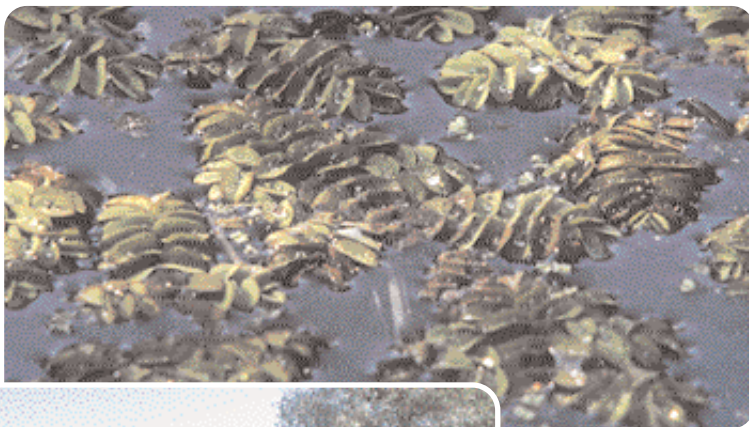
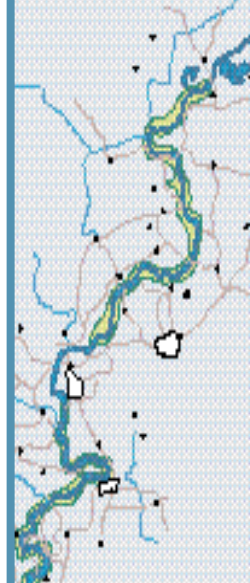
such forests provide a quiet lair for the wild cat (*Felis silvestris*). Clay-pits are lined up in the immediate vicinity of the dykes, and have not been utilised in recent decades. This is how they have remained well-preserved to date. The largely undisturbed strip of clay-pits is among the best habitats of the floodplains.

Characteristic botanical features of the area include the Hungarian horse-radish (*Armoracia macrocarpa*) and the summer snow-flake (*Leucojum aestivum*), both blooming in late spring and early summer, and the autumnal late-flowering moon-daisy (*Chrysanthemum serotinum*). The strips of land separating the clay-pits are a favoured habitat of the broad-leaved helleborine (*Epipactis helleborine*), an orchid species typical of willow-poplar gallery forests, while the narrow buckler

fern (*Dryopteris carthusiana*) is often found on decomposing logs.

The clay-pits were first drained in the autumn of 2001. The catch included native species like the swampfish (*Umbra krameri*), weatherfish (*Misgurnus fossilis*), fluvial goby (*Gobius fluivatilis*) and northern pike (*Esox lucius*).

The undesirable abundance and rapid expansion of bullhead brown catfish (*Ictalurus nebulosus*), an introduced species, gives reason for concern. However, the clay-pit rehabilitation model implemented in Nagykörfű allows for selection among species: the bullhead has the habit of staying in the pits until the water gets very shallow. Instead of allowing it to enter the river, it can be harvested or left in the pits as bird food.



Salvinia (*Salvinia natans*) often appears on the surface of standing water
Photo: Ferenc Kis



The weatherfish (*Misgurnus fossilis*) can tolerate extreme conditions and demands little oxygen. It spends the day hiding in the mud and forages mostly at night
Photo: István Lőrincz



The water-filled clay-pits can enrich the diversity of the Tisza
Photo: László Haraszthy



Pollard forests make home to the hoopoe (*Upupa epops*)
Photo: István Lőrincz

Securing permanent water cover for the Tóalja area

Before the regulation of the river, the Tisza made several sweeping curves in the vicinity of Nagykörű. There are archaeological records of a pre-historic human settlement established on the flood-proof high banks, near today's village. The first historical record of the monastery of the village is from 1212.

Three cut-offs were made during the regulation of the river, in 1847-48, in 1856 and in 1934. That a significant part of the village was destroyed to create one of these cut-offs, which later turned out to be slow to develop, is revealing of the over-zealousness of the efforts. The *fok* system of Nagy-fok was severed from the river by the new embankment. Although its former riverbeds and lake-basins can still be identified, its restoration would be a very difficult task. However, a smaller *fok* and a connected lake were included in the new floodplain, and can be more easily restored.

It is the Anyita-fok and the lake of the same name, which occupy the low-lying areas of a bay in the floodplain called Tóalja ("bottom of the lake"). After the river regulation, attempts were made to cultivate the area, but it was made impossible by the constant emergence of water during wet periods. Vegetable and fruit

production still flourishes on the sandy soils of higher grounds closer to the river (known as Homoksziget, meaning "sand island") where the ancient fruit varieties (mostly pears) tolerate the occasional flooding.

The fertility of Tóalja is legendary, as it is commemorated in local sayings. This productivity is due to the periodic inundation that has been going on since ancient times. However, a summer levee was constructed in the 1970s for the (rather short-term) security of agricultural production. [A summer levee is constructed between the riverbed and the main embankment, to protect the area between the latter and itself from the summer floods, which tend to be relatively minor, but can still destroy crops during the growing season.] In 1999, preparations were made to open up the summer levee to facilitate the passing of a major flood. Suddenly, the river got out of control and burst the levee. Since then, the one-time Anyita-lake has re-emerged and the continuation of the unnatural, intensive agricultural practices has become impossible. This has afforded the opportunity to begin utilisation of the area in a nature-friendly, sustainable manner.

In the framework of the Tóalja Restoration Project, which is supported by WWF, a semi-natural forest is going to replace the hybrid poplar plantation (that has been killed by the prolonged inundation) and degraded fields will be converted, with the help of Hungarian grey cattle, into valuable pastures. This will require some engineering intervention, making it possible to regulate water in a nature-friendly way. With the re-vitalisation of the Anyita-fok, a controllable connection will be established between the river bed and the lake.

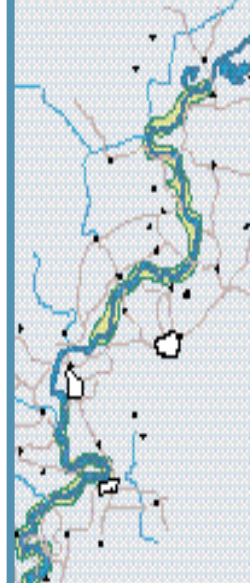
The water regime of natural habitats, altered by river regulations, can be improved. The extensive utilisation of these areas can help retain the local population while protect-



The pond turtle (*Emys orbicularis*), the only turtle species of Hungary, occasionally appears along the dykes
Photo: István Lőrincz



The freshwater sponge (*Spongilla lacustris*) is one of the representatives of the diverse life along the Tisza
Photo: Viktória Siposs



ing nature, thus creating the possibility for a long-term approach to management. The Project is going to create an assemblage of different habitats, and facilitate the natural development of such habitats.

The essence of the restoration effort is the establishment, by the cleaning and revival of old canals, of a connection between the area and the riverbed, making the in and out-flow of water possible. A sluice will have to be constructed on the lower section of the system, below the point where the three canals meet, so that the water table can be set to best serve conservation and management needs. Willows and traditional fruit varieties will be planted to increase the habitat diversity of the approximately 100-hectare area. The conservation of grasslands will be aided by the grazing of grey cattle.

The sign of the project's success will be the appearance of indicator species, organisms that have specific requirements towards their habitat. The pond bat (*Myotis dasycneme*), which is threatened throughout Europe, is such a species, requiring a complex habitat structure. It can only find sufficient food over unpolluted, open water bodies. A tree-dweller, it occurs almost exclusively in mixed, semi-natural floodplain forests. There are few or no hollows in hybrid poplar plantations, so those do not make a suitable roosting site. On the other hand, the uneven-aged mixed stands of natural and semi-natural floodplain forest provide a better food source and more hiding places to the lesser spotted wood-

pecker (*Dendrocopus minor*). These forests are also preferred by the black woodpecker (*Dryocopus martius*) and green woodpecker (*Picus viridis*), which feed on larvae found under the bark of dead trees. The mentioned woodpeckers make holes of different sizes at different heights, allowing the pond bats to find suitable roosting sites.

Thanks to its favourable hydrology, Tóalja makes an ideal habitat for amphibians and reptiles. The small ponds and puddles, where these species live, do not dry up completely even during the summer. With the exception of typical mountain species, all frog species of the country occur here.

Among the warblers, the lesser whitethroat (*Sylvia curruca*), the garden warbler (*Sylvia borin*) and the black-cap (*Sylvia atricapilla*) are common, and even the olivaceous warbler (*Hippolais pallida*) can be found.

Surveying provides the basis for the planning of the earth works
Photo: Ferenc Kis



Improving the hydrology of the Nagy-rét of Tiszajenő

The Nagy-rét (“Big Meadow”) is a 200-hectare grassland near Tiszajenő. The Kőrös-ér [a small stream], arriving from the direction of the town of Nagykőrös, makes a sharp turn at the north-west edge of the meadow, goes around the Vár-domb (“Castle Mound”) and cuts itself deeply into the ground before entering the Tisza. In the mid-20th century, its course was abbreviated by digging a canal that enters the Tisza on the other side of the Vár-domb. The purpose of this cut-off must

no greater than 20 to 40 cm, but it is enough for the wet grassland to develop a mosaic-like vegetation pattern. Lower lying areas, as they dry out later, are dominated by hydrophilic species. The pattern of vegetation gives a clear indication of the relief. The 3.5-metre-high Vár-domb clearly emerges from the otherwise flat terrain.

In the past, the area was a pasture for a long time. The most important task is the maintenance of the diverse community of the semi-natural grassland. Regular graz-

ing leads to the dominance of plants of low stature, resistant to browsing and trampling, which tend to be of high conservation value. The poor hydrological status poses another risk for conservation. Although the

lower-lying parts remain moist for a long time after floods, a significant portion of the area dries out by early summer. This is also detrimental to the economic productivity of the area, as good water supply could make it possible to harvest hay up to five times a season. The lack of appropriate management (grazing, hay-making) favours the spontaneous establishment of woody vegetation, including the spread of bastard indigo and other

adventive species. The degradation of the area can still be stopped and reversed: with proper management and by supplying sufficient water, it can be turned into an exquisite grassland.

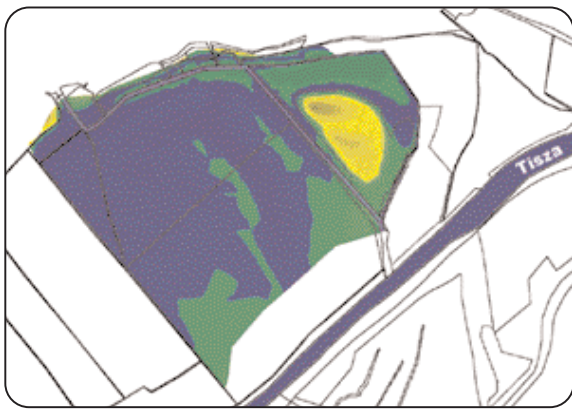
The pattern of vegetation clearly reflects the differences in relief and hydrological conditions
Photo: Viktória Siposs



The Nagy-rét is a typical feeding habitat of the black-tailed godwit (above, *Limosa limosa*) and the redshank (left, *Tringa totanus*)
Photo: Zoltán Vajda

have been to accelerate the drainage of unwanted water. There is a strip of hybrid poplar plantation between the meadow and the Tisza.

Across much of the area, the elevation difference is



The elevation model of the Nagy-rét of Tiszajenő. With the damming of the Kőrös-ér the hydrological status of the area can be improved. The extent of water cover can be regulated with a sluice. Lower lying areas are indicated in dark blue. The several meters high Vár-domb stands out in yellow.

Illustration: Tibor Nagy

One of the goals of rehabilitation is the creation of better hydrological conditions by water retention. This will provide suitable habitat for shorebirds, including waders.

Grazing on the Nagy-rét will be conducted according to a management plan adopted to the spatial and temporal pattern created by the relief and hydrology of the area.

Higher-lying, drier areas will be grazed by grey cattle and also mowed. Grazing will create a grassland structure that will mostly benefit those bird and insect species that favour short grass or bare soil. Cattle will be allowed to graze lower-lying, wet areas only after the breeding season, as those areas support plant communities which are favoured breeding grounds for the redshank (*Tringa totanus*), the black-tailed godwit (*Limosa limosa*) and the corncrake (*Crex crex*). It is expected that the meadow will provide food and an undisturbed habitat also for egrets and the black stork (*Ciconia nigra*). Management will be implemented with the involvement of local farmers.

Approximately two thirds of the Nagy-rét is owned by Hortobágy National Park (HNP), while the remaining one third by individuals. It is a priority for the HNP to acquire (buy out) the areas in private ownership. Due to the mixed ownership, restoration will begin on 90 hectares owned by HNP, and will be extended to the full area as it becomes possible. The area is not yet protected. The project will encourage the purchase of the private areas by HNP, and its objectives include the facilitation and acceleration of the process of bringing the whole area under formal protection.

There are records, from as far back as the time of King Matthias (1458-1490), indicating that the already famous grey cattle was driven from Hungary to the markets of western Europe, almost without losses. It is also a fact that the treasury covered the war cost of driving out the Turks from Hungary (1680s) from 1/30 of the export levy on grey cattle.

This large, peaceful, but very strong and sturdy animal was in demand not for its low price, but for its quality meat. This is true once again in our time when the spread of diseases like BSE, a result of intensive feeding, is threatening western Europe. Grey cattle populations are free of BSE, as they have never been given animal-based feed. This breed is more resistant against other diseases, too. The animals are raised under natural conditions and are not given any hormonal treatment. Their meat is rich in iron, low in cholesterol and has a special aroma due to the aromatic and medicinal plants in their diet.

Photo: László Haraszthy



Conversion of a hybrid poplar plantation in Tiszakürt

In the outskirts of the village of Tiszakürt, there is a 32-hectare, mildly saline, protected floodplain grassland. The future of this area is uncertain, as its management is not secured. Adjacent to this area, there is a 12-hectare hybrid poplar plantation, which is suffering from unsuitable site conditions.

The hydrological condition of the area is satisfactory and requires no intervention. The goal of the restoration project is the conversion of the poplar plantation, which is undesirable from a conservation perspective, into a semi-natural grassland, and the appropriate management of the resulting, contiguous 44-hectare area. This will be achieved mostly by grazing grey cattle, and to a lesser extent by mowing.

The Tisza mayfly (*Palingenia longicauda*) is very sensitive to environmental change, especially to water pollution
Photo: István Lőrincz



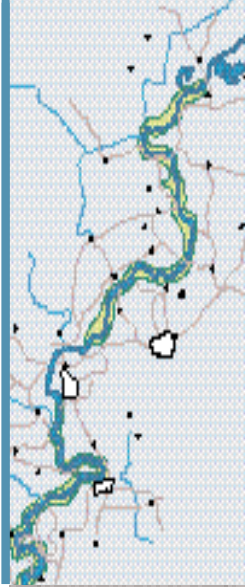
The summer snow-drop (*Leucojum aestivum*) blooms in groups from April to June
Photo: Dénes Dobrosi



A plant community typical of saline habitats is a special conservation value of the meadow near Tiszakürt
Photo: Viktória Siposs



Expansion of the protected area in Kőtelek



The Góitói Holt-Tisza (Góitó oxbow lake) is close to the village of Kőtelek. It is under protection and it is listed among the so-called “sanctuaries”. Researchers and conservationists categorised the most pristine oxbow lakes of the Tisza and tributaries as “sanctuaries”. Oxbows of this type are dedicated solely to conservation, no fishing or recreational activities can be permitted.

Góitó was formed in 1865 when a huge river bend was cut off. It sustains a rich and diverse flora and fauna. The area between the oxbow and the river has been used for forestry and field crops, but some of the arable land has been gradually abandoned. As a result, a significant portion of the area is now occupied by invasive weeds such as the bastard indigo, Canada

goldenrod (*Solidago canadensis*) and the spiny clotbur (*Xanthium spinosum*). It is a promising sign that the black and white poplars that reach above the dense thicket of the bastard indigo are developing well. Based on the experience from other areas it is expected that the indigo will recede under the permanent shade of the poplars, and the thicket will open up. In the long term it is expected to develop into a forest. The goal is the facilitation of conversion into forest as larger, contiguous areas of forest represent a higher conservation value than many small patches.

The area is privately owned, and is not under protection. The abandonment of the fields over the past ten years is an indication that the cultivation of the area is not profitable for the owners. Hortobágy National Park is planning to purchase the area and to bring it under protection. WWF Hungary will assist the National Park in these efforts.



Black poplars emerging from the dense thicket will suppress the indigo in 10-15 years
Photo: Viktória Siposs



The contiguous floodplain forest provides suitable habitat to species particularly sensitive to disturbance, like the black stork (*Ciconia nigra*)
Photo: Tibor Tömösváry

Beaver reintroduction to the Middle-Tisza

Due to the disappearance of wetland habitats and ruthless hunting, the European beaver (*Castor fiber*) was on the brink of extinction by the end of the 19th century. The last individual in Hungary was shot in 1854. Almost a century and a half later, beavers were detected in Szigetköz. These were migrants from a population that had been reintroduced into Austria. Natural colonisation over large distances is a slow process. As the beavers could not be expected to colonise the lower section of the Danube within the foreseeable future, WWF Hungary began their systematic reintroduction in 1996.

The one-time presence of beavers (in Hungarian: "hód") along the Tisza and tributaries is commemorated in the names of towns and villages such as Hódmezővásárhely, Kishódos and Nagyhódos. Beavers used to be hunted for their fur and musk throughout the country. If the gallery forests along the river provide a suitable habitat for the beaver, it will be an indication of the diversity of the floodplain and the richness of its wildlife. In the autumn of 2001, beaver families were



The presence of the beaver (*Castor fiber*) can be noticed mostly through the toothmarks they leave on trees
Photo: László Haraszthy

released by WWF Hungary along the Öreg-Túr, a tributary of the Upper-Tisza. The results of continuous monitoring indicate that they thrive in their new habitat.

The beavers that will find their new homes in the Tisza region will originate from already stable populations in Austria and Germany. In the summer months, beavers mostly feed on herbaceous vegetation, while in winter their diet is dominated by the bark and buds of woody species. Beavers are rather clumsy on land, and they leave the water only for brief periods to short distances. Contrary to popular belief, the European beaver seldom builds a castle, it tends to live in burrows.

As part of the Tisza LIFE Project, beavers will be reintroduced to the Middle-Tisza in the autumn of 2002, following a detailed survey of suitable habitats. The release will also be preceded by an educational and outreach campaign aimed at local land managers and hunters.



The beaver (*Castor fiber*) is seldom spotted during the day
Photo: Gerhard Schwab

Education and outreach activities

Education and awareness-raising are integral components of the habitat conservation and restoration activities of WWF Hungary. WWF's publications, events and homepage publicise news and information about the Tisza and the Project. The quarterly newsletter of WWF Hungary provides regular updates on the Tisza LIFE Project and other WWF activities.

This brochure, presenting an overview of the Project, is the first one in a series of publications planned in the framework of Tisza LIFE.

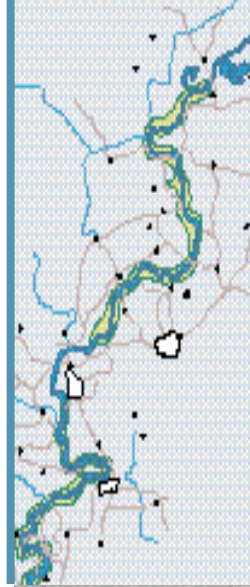
The publications will be distributed to the decision makers, extension specialists and general population of the region. There will be educational programmes in schools, and field trips will be organised for students.

A workshop series will be organised for the mayors and land-management professionals of the region to discuss the possibilities for the revival of traditional floodplain management. At the completion of the Project, in 2005, a conference will be held to summarise the accomplishments and to assess the fulfilment of the goals. Participants will include experts and representatives of government agencies, local authorities, organisations dealing with the Tisza and educational institutions. Achievements will be presented jointly by the representatives of WWF and project partners.

Visitor information boards will be installed near the project sites. The boards will present the condition of the area before the restoration activities, as well as the conservation tasks ahead. Visitors will learn about the goals and expected results of the activities, species living in the area and the ecological impact of the project.

The Tisza LIFE Project maintains a web site (www.tiszalife.hu), presenting a description of the programme and a listing of current events and news. The media will be regularly briefed about current events and the successes of the project.

A trade fair will be organised for the promotion of products of extensive, nature-friendly landscape management. A wide range of natural products will be presented in a festive atmosphere. Naturally, the emphasis will be on the "fruits", both literally and in the broader sense, of the floodplains. The baskets woven from the osier of willows, dough-baskets made from rushes of the marshes, furniture, bowls and plates carved from the wood of the native Black poplar are just some of the eye-pleasing products of the ancient water-world that can still be put to good use around the house and kitchen. Those who will buy not only handcraft, but also some of the extensively produced food will, beyond serving preservation and conservation goals, benefit their own health. The fruits of the "jungle orchards", the honey of the floodplain meadows, the fish from the clay-pits and from Tóalja are all produced without the use of chemicals, while the meat of the free-range grey cattle and mangalica, the traditional Hungarian hog breed, are free from the risks created by modern, intensive meat production methods.



The first Fair of Extensively Produced Goods was held in September, 2001 in Szarvas
Photo: Ferenc Kis



Glossary

Adventive species - plant and animal species which are not native in the given area, but were purposefully or inadvertently introduced by humans, and which are not fully naturalised.

Clay-pit - former pit-mines that supplied the material for the construction of the dykes. They tend to be located close to the dyke, in the active floodplain.

Extensive agriculture/farming - farming in which areas are utilised with minimum outlay and labour, with low impact on the environment (e.g., no or low use of artificial fertilisers and pesticides).

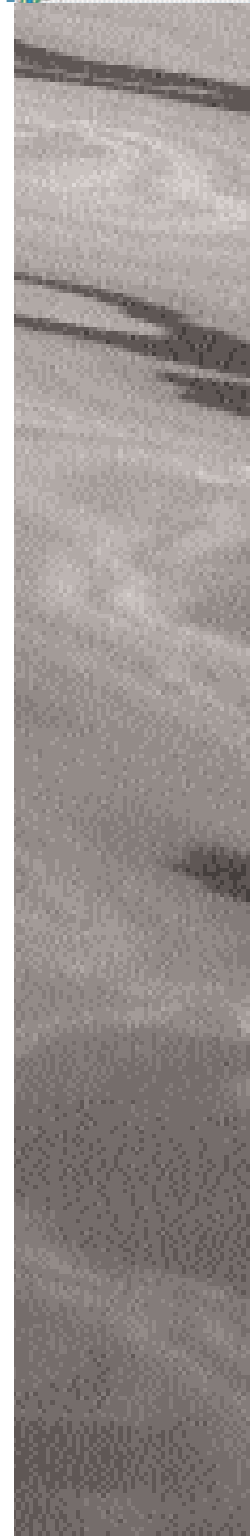
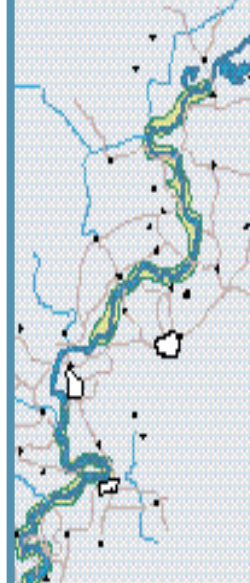
Floodplain - area that can be potentially inundated by the river. The dykes constructed for flood control divide the floodplain into a flood-protected part behind the dyke, and an active floodplain that is inundated during floods.

Fok - (Hungarian) a usually natural opening in the riverbank, which can be closed off or opened up to regulate water levels in the floodplain according to the needs of the utilisation of the area.

Native species - a species that was formed in the given bio-geographical area, and has co-evolved with its environment.

Oxbow lake - a lake formed in a former river bend that has been separated from the riverbed either through the natural shifting of the river or through human intervention.

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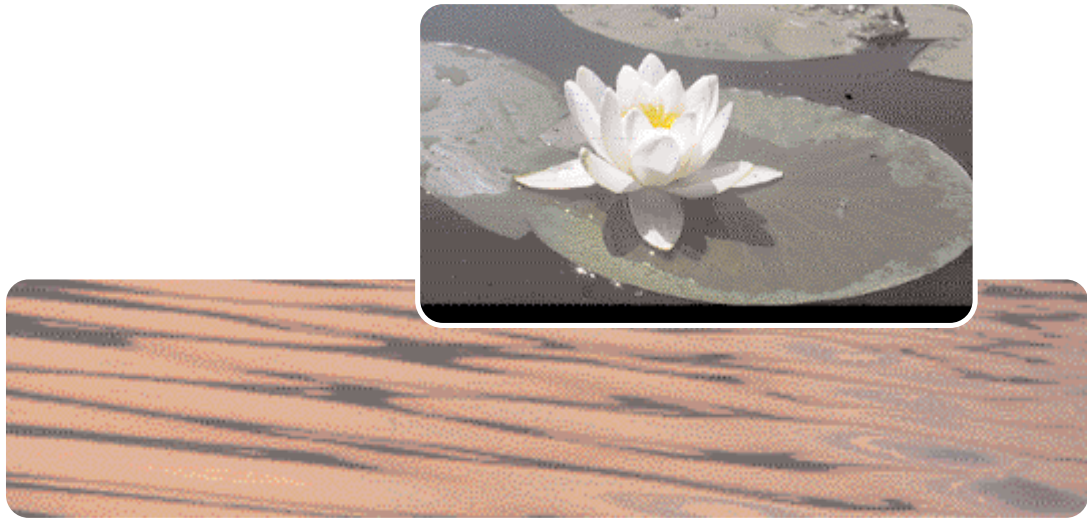
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WWF is one of the world's largest and most experienced independent conservation organisations with almost five million supporters and a global network active in more than 90 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- Promoting the reduction of pollution and wasteful consumption.