



LIFE Turnhouts vennengebied

Blue Pearls in the Purple Heath



Agentschap voor
Natuur en Bos



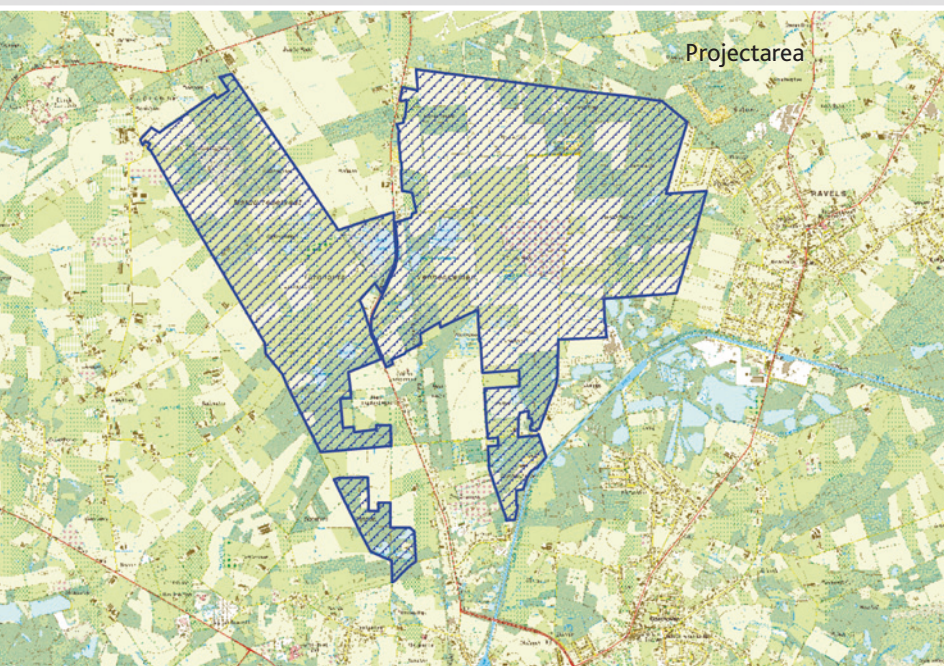
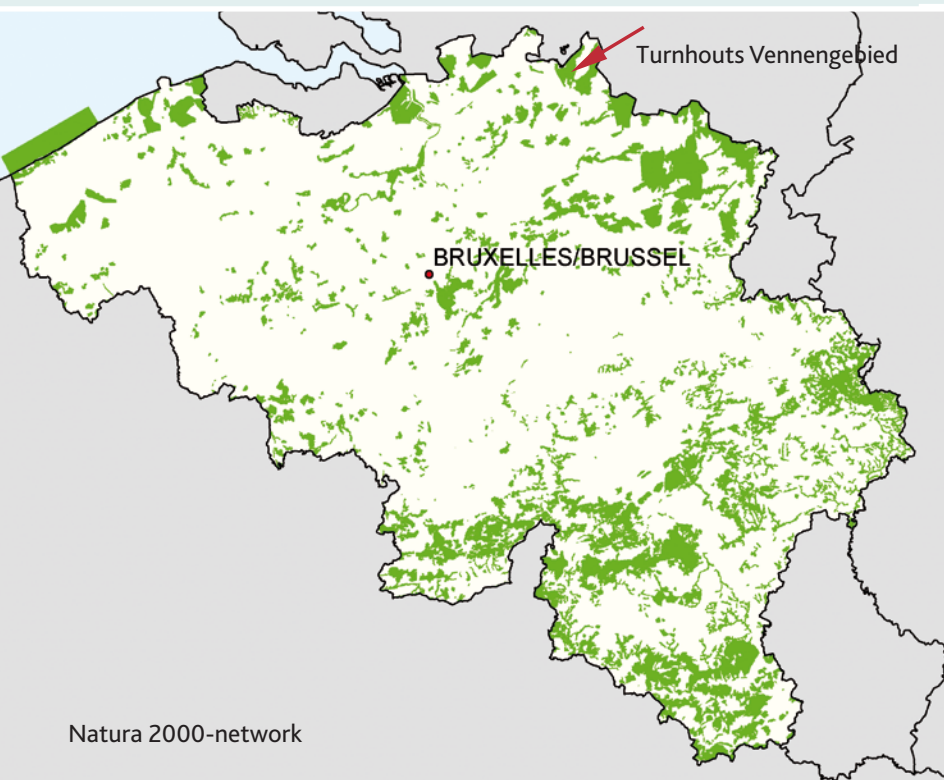
Turnhouts vennengebied

A few kilometers north of Turnhout, between the communities of Merksplas and Ravels, you will find the nature area 'Turnhouts Vennengebied'. Together with the Kalmthoutse heide, Landschap de Liereman, different military zones, Loonse and Drunense dunes and the Stabrechtse heide in the Netherlands, it are the remnants of a, once vast, heathland landscape

A wide and open landscape with heath, oligotrophic ponds and species-rich nardus grasslands harbor some very specific and rare species. The Turnhouts vennengebied is one of the most valuable heathlands in the Flemish region as well as on a European scale.

Several endangered species still resist: common snipe, Green-eyed Hawker, Queen of Spain fritillary and plants such as Common cudweed, Allseed, Bog Hair-grass and water lobelia are just a few.

It is not a coincidence that all of these species are most abundant within these heathland habitats. Therefore, it should not be a surprise that they were the main target in this unique LIFE nature project.



Under the guise of “Strong together”, the NGO Natuurpunt joined forces with the Flemish government. Together with the Agency for Nature and Forest (ANB) and the Flemish Land Agency (VLM), the LIFE project Turnhouts Vennengebied was carried out in close cooperation with the nature development project ‘Turnhouts vennengebied West’. Nature development is one of the instruments of the Flemish government to implement the decree on Nature conservation. Within the framework of these two projects, more than 120 ha of nature was restored in between 2006 and 2011.

This report gives you a glimpse of what has been achieved in the Turnhouts vennengebied within the LIFE and Nature development projects. We look forward to your visit to admire the results for yourself. More information on contact addresses or accessibility can be found on www.life-turnhoutsvennengebied.be



Heathland and Oligotrophic Ponds

The Turnhouts vennengebied lies on a sandy plateau, underlain by a thick clay layer, barely a few meters deeper. It is situated on the watershed between the Meuse and Scheldt. Due to the shallow clay layer the area is naturally very wet, which resulted in a high number of fens and moorlands. In contrast with the often wet character, you will also find dry, nutrient-poor sandy soils, relicts of the inland dunes formed by the wind long ago.

Nutrient-poor ponds

The shallow clay layer forms the basis of these nutrient-poor ponds. Without doubt, the well-developed pond vegetation has a very high nature conservation value, both in Flanders and northwestern Europe. They even harbor some one of the last populations of water lobelia and Floating Bur-reed, two typical species. Furthermore, Floating water plantain, a European habitat Annex II species, reaches its highest densities for Flanders in the Turnhouts vennengebied.



Wet heath and peat

In the immediate vicinity of the ponds you will find wet heath vegetation. When the soil remains very wet all-year round, a nice bog vegetation develops in close relationship with the wet heath and ponds. This mixture of heather and peat habitats contains unique ecological communities that have become rare in Flanders. Due to the specific conditions (wet and acid), many specialized species can be found in this particular environment.

Dry heath and inland dunes

These habitats occur on the dry, sandy soils. Inland dunes are a unique habitat with heather and different broom (*Genista*) species. Within the Turnhouts vennengebied, there are still plenty areas with a high potential for further restoration of inland dunes and dry heath.



Nardus grasslands

Species-rich grassland with many typical heathland species, called Nardus grasslands, are scattered throughout the site. It is one of the priority habitat in the European Union. They can be found on both dry and wet loamy sand soil. The best developed Nardus grasslands are known for their high biodiversity and are home to some very special orchids. Rightly, these grasslands should be treasured as hotspots for biodiversity.

Summary of European habitats, restored during the LIFE project

European Habitat	Code	Start project in 2006	End project in 2011
Dry sand heaths with <i>Calluna</i> and <i>Genista</i> / Inland dunes with open <i>Corynephorus</i> & <i>Agrostis</i> grasslands	2310 / 2330	23,6	36,2
Oligotrophic waters (<i>Littorelletalia uniflorae</i>)	3110	24,6	25,8
Oligo to mesotrophic waters (<i>Littorelletea</i> /Isoeto-Nano	3130	2,4	8,3
Northern Atlantic wet heaths with <i>Erica tetralix</i>	4010	40,0	40,0
European dry heaths	4030	36,0	36,3
Heischrale graslanden	6230	48,3	88,9
Depressions on peat substrates of the <i>Rhynchosporion</i>	7150	1,3	1,5
totaal		176,2	237,0

The Turnhout 'Tigers' of nature conservation

In the area you will find some typical and very special, often sensitive, species. Therefore, it is exceptionally important for nature and biodiversity and needs to be maintained in our region. Here, we illustrate some of these exceptional species are illustrated through figure and word.



The woodlark is a bird of moorlands, even in the presence of some trees. In this landscape, full of structure, this heathland dweller feels at home.



Thanks to this LIFE nature project, the nightjar has returned to the area. This bird, most active at dusk and night, flies with its beak wide open over the moorland to catch insects. You can find him mostly in a varied landscape of heathland, ponds, forest edges, and even on open, sandy areas. This bird nests on the ground what makes him vulnerable. In the autumn he migrates to Africa, only to return in late spring.



Floating water plantain, although not truly striking, is a very special plant indeed. This species is restricted to a very specific combination of environmental conditions in nutrient-poor ponds, making it quite rare in Europe. Therefore, this species has been included on Annex 2 of the European Habitats Directive. By dredging the oligotrophic ponds and removing other possible threats, a sustainable future and long-term conservation could be achieved for this peculiar plant. When Floating water plantain does well, the pond does well.



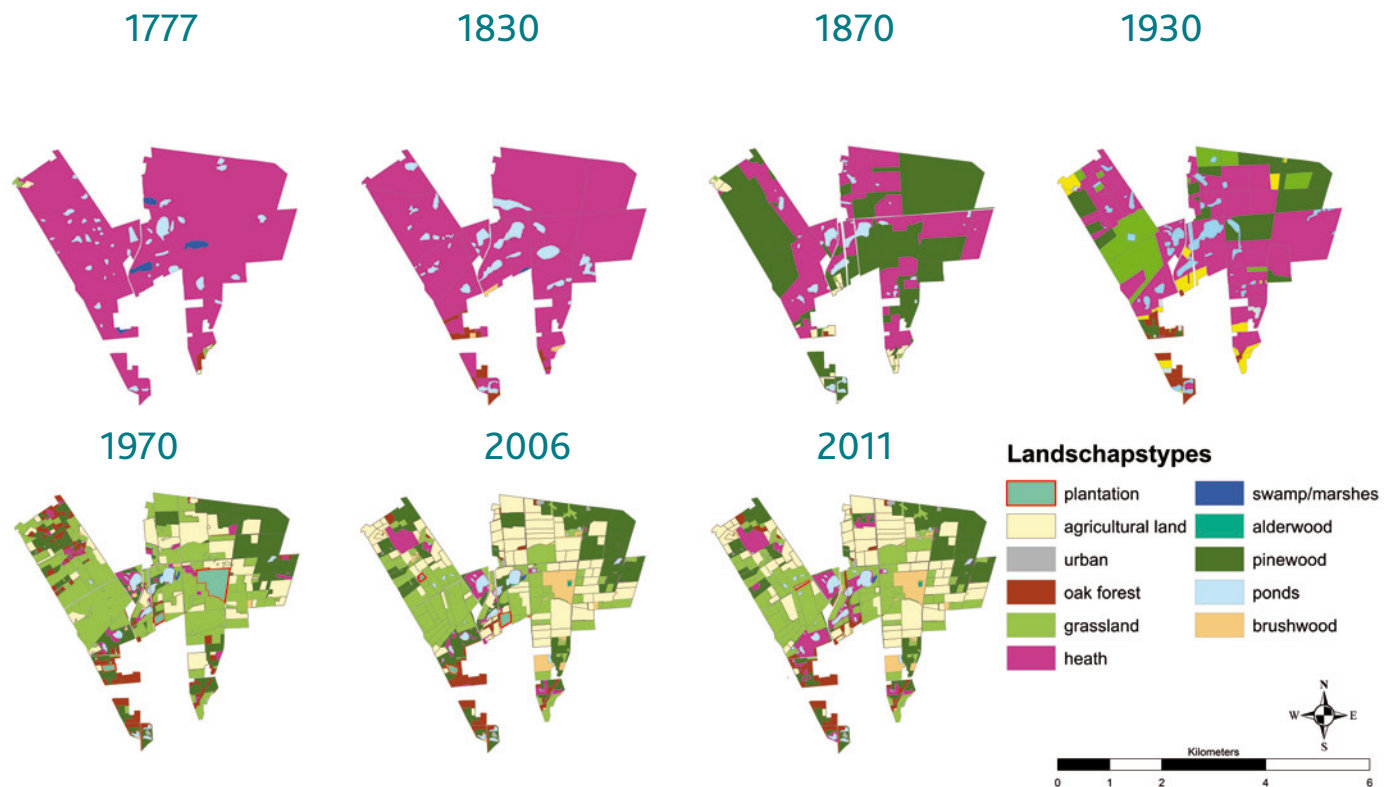
Water Lobelia is threatened with extinction in Flanders and is one of the typical species of the exceptional oligotrophic ponds you can find here. Only two summers after the restoration, the original population of 10 plants on one site has grown to more than 300 individuals, divided over three pools. These achievements are all a direct consequence of the extensive rehabilitation of the ponds.



Very striking is that no less than 7 annex I species of the European Birds Directive by the extensive reclamation of the former heathland habitats are classified as breeding birds. Besides the red-backed shrike, all these species now disappeared as a breeding bird from Flanders. This immediately shows the ecological importance of the Turnhouts vennengebied. Despite the disappearance of breeding birds an important nesting area remains for typical heathland species such as woodlark, nightjar and Bluethroat. Outside the breeding season the area is especially important for the migratory behavior of waders such as Whimbrel.



Together with Water Lobelia, Shoreweed is a true ecosystem engineer. These species are capable to grow in extreme nutrient poor conditions and even in very low carbondioxide conditions. Through their physiology they can bring oxygen in the anoxide soil. This reacts with the organic matter in the soil and carbondioxide is produced. Lobelia and Shoreweed can capture this carbondioxed with their roots and incorporated. By this system, the pond keeps very nutrient poor by the breakdown of organic litter in the soil, ideal for these species.



Nature restoration required?

After the invention of artificial fertilizer in 1914, the world changed. Global food production increased due to fertilizer application. It was the answer on how to feed the global human population which had grown exponentially after the industrial revolution. Unfortunately, this golden coin had a less shiny side. The era with the semi-natural environment had come to an end due to the frequent use of nitrogen and phosphate. The negative impact was especially large in species-rich, unfertile soils such as heaths and fens. High fertilization application quickly resulted in a sharp change of the heaths and grasslands. Common species outcompeted the species adapted to nutrient-poor soils. Furthermore, watercourses, ponds and lakes showed a sharp biodiversity decline as the high amounts of fertilizer turned, once bright oligotrophic ponds, into black lifeless waters. To reach a sustainable state for the habitats (restored and relicts), it is necessary that this fertilizer threat is neutralized within the area. This implicates restoration of whole landscapes.

Defragmentate nature!

Habitat fragmentation is one of the greatest threats to biodiversity. Species can no longer migrate from one suitable site to another. The impact of habitat fragmentation is most severely for smaller patches, while larger patches are less affected. Compared to large areas, small areas experience more negative influences from their neighbouring environment, the so-called edge effects.

This threat asks for an adequate solution. In 1987 Natuurpunt started with the acquisition of the first parcels of land. After two decades, a nature reserve of more than 430 ha had already established. During the LIFE-project, an extra 64 ha were acquired while another 26 ha were freed of any rights. This land acquisition had a positive effect on biodiversity as the heathland ecosystem got less fragmented. Different habitat-patches are now interconnected (metapopulation structure). Even more important, a large area is now free of direct negative influences and edge effects. In nature conservation the slogan "The larger, the better" holds true. A large area is very advantageous as it harbours many gradients in habitat conditions (dry – wet, oligotrophic – mesotrophic,...)

Habitat restoration in action

Obviously, land acquisition alone is not enough. The original habitats have often disappeared through severe land use changes. Levelling of the (micro)topography, drainage, plowing, afforestation or spontaneous scrub encroachment are the main drivers for species and habitat loss. To tackle these threats, drastic measures had to be carried out, e.g. felling pine plantations, sod cutting or even topsoil removal on former agricultural land.

Removal of pinewood and recent woodland

This conservation measure has a drastic impact on the landscape but is also necessary for the restoration of heathland, ponds and oligotrophic ponds. These habitats are of special interest for species as woodlark, nightjar and curlew. On a landscape scale the removal of pinewood is essential as pinewood evaporates more water than deciduous trees or other vegetation and hence causes desiccation. Although Flanders has one of the lowest degrees of forest cover in Europe, Natuurpunt choose to cut vast areas of pinewood. However, this deforestation was compensated for in several woodland projects in Flanders. This way, ecologically valuable forest areas are strengthened through afforestation, a double victory for nature!

Sod cutting

The recovery of heathland is often relatively simple. The soil contains a wealth of seeds of typical heathland species. These germinate again when we scrape off the nutrient-rich mulch. This material, called sods, has been transferred to nearby arable land. In fact, we gave this century-old land use a modern twist. In the past, the organic material from the barren heath was removed with spade and wagon to enrich agricultural land. Nowadays, it is done with excavators and tractors with a very low ground pressure. In less than one year after the restoration has been carried out, the first heather already germinates! In total 23 ha has been sod cut.

An excess of nutrients is a problem for species that naturally occur on very nutrient-poor soils. On nutrient-enriched soils only a limited number of species dominates. They replaced typical heath species as sundew, heather, but also indirectly affected species like the silver-studded blue and alcon blue. A nutrient-poor situation created by excavating the top layer of former intensively managed areas gives specific heath species a new chance to flourish. Prior soil study (analyzing phosphates) determines the depth to which the topsoil has to be removed to achieve nutrient-poor habitat conditions.





Working on European biodiversity

To achieve a successful recovery, research is indispensable. Thanks to Nature development, we were able to study and analyze the site in different perspectives. A range of studies was carried out: diatoms of the ponds, seed bank analysis, archaeological research, ecohydrological analysis and soil studies. These were the ingredients for an integrated management plan with concrete implementation measures in a broad vision within the Natura 2000 framework.

For the restoration of the oligotrophic ponds, an expert study was inserted in the LIFE project. It gave us detailed insights in the prerequisites of successful pond restoration. It showed how most of sludge could be removed by pumping out and dry dredging of the pond. Furthermore, it was obvious that the whole landscape influencing the pond had to be addressed. This involved the removal of woodland to reinforce

the wind dynamics on the pond and the restoration of local hydrology around the ponds. Wind dynamics are essential for the preservation of sandy shores as the create waves and water currents. Waterlobelias,, together with herb and floating water plantain, for instance are particularly fond of the sandy shores conserved by wind dynamics.

The fertilization had to be counteracted by the cessation of fertilization and topsoil excavation. Removing the nutrient-rich top layer puts an end to the leakage of nutrient-rich seepage in the pond. All this together results in optimal habitat conditions to enhance the redevelopment of oligotrophic and mesotrophic ponds. On the excavated areas, European Annex I habitats such as heather and Nardus grassland developed.



Action	Goal	Nature development project	Natuurpunt
Hydrological expert study restoration large oligotrophic ponds		Carried out	
Acquiring land	50 ha		64 ha
Acquiring land leases	20 ha		26 ha
Restoration of oligotrophic ponds	3 ponds	4 large ponds + 6 small ponds	
Restoring habitat from former agricultural land	20 + 12	20 ha	34 ha
Restoring heathland through sod cutting	12 + 5	13 ha	10 ha
Developing heathland habitat by removing plantations	20		37 ha
Placing a grid for grazing management	50 ha	122 ha (16 km raster)	
	50 ha	122 ha (16 km of fences)	
Constructing hiking paths		30 km of marked footpaths	

Some calculation and figures

Another approach to illustrate the extent of the project:

- Groundwork: approximately 97'000 m³ of soil was excavated and removed to farmland outside the Natura2000 site.
- Four large ponds contained 8'400 m³ of sludge, which was removed and processed according to Flemish and European environmental standards.
- To restore heathland habitat 23'000 m³ sods were removed and re-used in agriculture land to ameliorate soil structure and soil carbon content.
- 50'000 poles have been placed to fence 16 km to allow grazing management

This project resulted in a win - win situation for agriculture and nature. A waste product in nature conservation became a resource for agriculture.

In fact, the transfer of nutrients from the heath to richer farmland is a century-old habit. Precisely because of this land use, the heathland landscape appeared in our regions some millennia ago.



The key to success: working together for Natura 2000

Innovation and knowledge building

This LIFE project is particularly innovative in several aspects. Firstly, solutions with individual land users were sought through direct dialogue. A mutual respect between farmers and the NGO was a keystone to start negotiations. For local farmers, the long –term durability of their farm is most important. This point of view was interesting as the NGO Natuurpunt proposed some solutions for a win – win between nature and agriculture. One example are the user agreements to use cattle of local farmers for the grazing management in nature reserves of the NGO. Doing this, we were able to tackle some major threats to the ponds.

Moreover, by organising voluntary management agreements between the farmer and Natuurpunt, Natura 2000 objectives can indeed be realized. Of course, we further encourage more countermeasures pro nature, within for example the European common agricultural policy, to achieve a sustainable implementation of the European Habitats Directive.

Secondly, enhanced knowledge on ecological landscape restoration of ponds and moorlands is necessary. Only through proper scientific analysis of the area, correct measures could be defined and implemented. This lead to cost-efficient restoration with excellent results. The obtained knowledge is also valuable for other nature restoration projects in Flanders and Europe.

'Nutrient mining' of former agricultural land was one of the innovative management techniques. To mine nutrients (especially phosphate), former agricultural land is treated with clover, calcium and potassium in order to maximize yield. This way, phosphate extraction from the soil is enhanced. Once phosphate levels have lowered, nutrient-poor habitats can re-develop over time. One of the advantages of nutrient mining are the high yields during the first years, making grassland management still interesting for farmers. This is an incentive for them to cooperate with nature management. Later on, yields will be much lower. In short term, this creates more awareness within the farming community for nature conservation in Natura2000 sites.





Ecosystem services and climate buffer

The Turnhouts vennengebied improves environmental quality. Huge amounts of rainwater can be conserved in the sandy soils, that would otherwise run off and create severe floodings downstream. Transforming pine forests into deciduous woodland will also cause more rainwater to infiltrate.

The vegetation can now start to develop and will store some additional carbon CO₂ in the soil, an important CO₂ storage to combat climate change.

Additional water storage capacity will come in handy with the expected more extreme weather events such as prolonged droughts and intense precipitation especially for the habitats and species targeted. Moreover, forests and heaths filter the air. Scientific research showed that the proximity of nature reserves improves the health of residents.

Investments in sustainable management

An important prerequisite is that restored habitats need to be managed sustainably on the long term. Our investment in fences allows us to manage the habitats with our own cattle (Galloways) as well as with cattle of local farmers. At the end of the project for instance, we collaborated with 15 farmers, managing 140 ha in total. In 2006, at the onset of the project, this was only 82 ha (12 farmers). This way, target habitats will be managed sustainably and anchored locally.



Nature for everyone

Nature is a common good. The natural beauty in the Turnhouts vennengebied can be enjoyed along 30 km of marked hiking trails. An observation tower, -walls and lookout points allow the visitor to enjoy all aspects of the heathland landscape. Five different routes have been marked and incorporated in the walking network of the province of Antwerp.

The visitors centre 'Klein Engeland' is focused at receiving walkers. From here you can leave for a short 'culture - nature' walk (3.5 km) route where 'Litenatuurtjes', little nature oriented poems of Geert De Kockere are placed. For those who want to discover the great heather moors and ponds follow the 8 km long 'vennenwandeling'

Use of information from this publication to motivate people for the Turnhouts vennengebied is permitted, provided a correct reference to this publication and its initiator (Natuurpunt). We do encourage to disseminate this project to a broader audience. This Layman's report was realized within the framework of the European LIFE-project 'Large Scale Habitat Restoration in Turnhouts vennengebied' (LIFE 06 NAT/B/000084).

Pictures: Tom Andries, Tom Tijtgat, Luk Daniëls, Hugo Willocx, Geert Decockere, Marc Smets, François Van Bauwel, Joost Dewyspelaere, NP archief

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Published by: Chris Steenwegen • Coxiestraat 11 • 2800 Mechelen

European challenges: the Natura 2000 network

The Natura 2000 network is the network of protected areas in Europe. The heath, valuable ponds, exceptional soil conditions and biodiversity of the Turnhouts vennengebied are unique to Belgium and even Europe. Therefore, it is part of the Natura 2000 network under the framework of the Habitat Directive.

NATURA 2000 is LIFE!

The EU Life Nature Fund provides funding for projects within the Natura 2000 network. LIFE 'Turnhouts vennengebied' ran from 1 January 2006 to 31 October 2011 and was the second LIFE project in the area. The total project budget was € 4.1 million, of which the European Commission co-financed 40%. The policy instrument Nature development was incorporated in the framework of the LIFE Nature project. Thanks to LIFE nature we were able to successfully restore some exceptional European habitats in the Turnhouts vennengebied. Future generations will still benefit from the restoration of the area.

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