

# Restoring fen wetlands, heathland & deciduous forest for climate adaptation

## Results of changes implemented to the 'Griesbroek' site by Natuurpunt



### UNDERSTANDING THE CATCHMENT

Under conditions where rainwater and local groundwater meet in a depression we can expect fens. In the Griesbroek, three former recreational ponds were located on a potential site for such fens. They were dug in the second half of the 20th century. During construction, the excavated soil was placed in dykes around the ponds. The dug depth capturing groundwater from the surrounding soils and the dykes providing a barrier to natural flooding created a highly disturbed hydrology. Moreover, in one of the ponds, bank revetments in asbestos sheet were installed to prevent bank erosion and leakage. Caravans and coteries were placed on the embankments and a variety of park and garden plants were planted. Such recreational ponds were also created deeper in the valley and scattered throughout the basin.

Coniferous forest (mainly *Pinus sylvestris*) was planted on many other infiltration soils in the Griesbroek and by extension the Kempen. This was partly to provide the mining industry with standing timber. These forests were preserved even after the mines closed. In many places, they still hinder optimal infiltration of rainwater, which is necessary to maintain groundwater reserves. This is necessary not only to preserve and/or restore lower-lying groundwater-dependent habitats but also for nearby agriculture and drinking water supplies in the wider region.

### PRIORITISING LOCATIONS FOR CLIMATE ADAPTATION MEASURES

The transformation from weekend ponds and a willow thicket to valuable fens in the landscape by Natuurpunt is an Ecosystem-based Adaptation measure and part of the Interreg 2 Seas project PROWATER. Ecosystem-based Adaptation (EbA), a Nature-based approach to climate change adaptation, harnesses ecosystem services to increase resilience and reduce the vulnerability of human communities and natural systems to the effects of climate change. These EbA measures can be integrated into adapted agriculture, forestry and environmental management.

The restored heaths and deciduous forests allow more water to reach the ground and infiltrate towards the restored fen and other lower-lying land. As fens in an infiltration area capture rainwater during rain periods, the adjacent higher grounds can slowly recharge with water. As a result, more water is retained in the infiltration area. This water can then slowly infiltrate towards groundwater bodies or be released to the downstream environment during drought spells. Moreover, as the potential difference between these higher grounds and the lower grounds in the valley nearby is greater, this increases the seepage pressure in the valley.

Besides the optimized hydrology, valuable habitats were also created. The weekend ponds were contaminated with invasive alien species American bullfrog (*Lithobates catesbeianus*) and Water primrose (*Ludwigia grandiflora*) and filled with organic sludge from the trees surrounding them. As sunlight could hardly penetrate these pond, the biological quality was very poor. After removing trees, dikes and invasive species the fens became an open and sunlit habitat, ideal for typical plant species, amphibians and dragonflies.

The created heathland seamlessly joins the adjacent grassland and completes a rare open gradient which is important for a number of species. The thinnings in the pine forests allow more light in the understorey from which native deciduous species will profit to redevelop.

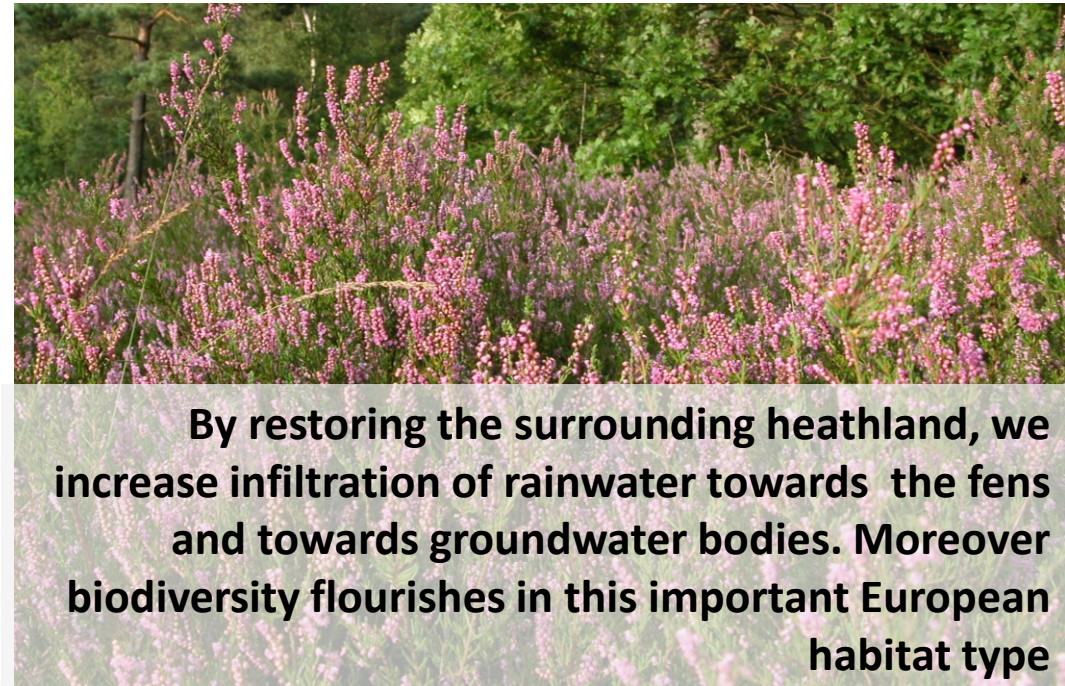
### MONITORING & EVALUATION

The works were carried out in the summer and autumn of 2021 and 2022 and at the start of 2023. Since then, the fens have stored a lot of rainwater. Now that works are completed, we are looking forward to nature's first reactions, which we will monitor through biodiversity surveys. We will also prevent recolonization of invasive exotic species.

Furthermore, we will continue highlighting opportunities for hydrological optimization :

- In between the fens runs a ditch that –under very wet conditions- drains water from higher grounds in the north where a plant breeder (manure, herbicides...) and four houses that are not connected yet to a sewage system are situated. Optimization of the sewage and ditch system, would allow the then clean water to infiltrate via the fens, rather than having polluted water drain towards the valley through the ditch.
- There are still a couple of recreational ponds adjacent to the fens. Restoration of these ponds to fens and surrounding heaths and deciduous forest would result in a complete gradient of infiltration grounds and associated rare habitats in the Grote Nete catchment. This would further stabilise groundwater levels, making it more feasible to keep enough water for nature and the ecosystem services it provides as well as allowing extraction for human usage.

**FOR MORE INFORMATION:** • [www.pro-water.eu/output-library](http://www.pro-water.eu/output-library)  
• <https://www.pro-water.eu/griesbroek-be>



By restoring the surrounding heathland, we increase infiltration of rainwater towards the fens and towards groundwater bodies. Moreover biodiversity flourishes in this important European habitat type

*Ludwigia grandiflora* and bamboo removal during the nature restoration works



The water system map, applied to the demonstration site. The restored fens are situated in the blue-green zone. The restored deciduous forest edge and heathland are situated in the adjacent brown and green-yellow zones.

### A cross-border cooperation

From November 2017 to March 2023, 10 partners from Flanders, the Netherlands and the United Kingdom work together on PROWATER. The project has a budget of more than 5.5 million euros. In each country, water production companies, governments and research institutes as well as land managers are involved in order to achieve a supported vision for Ecosystem-based Adaptation (EbA).

The project PROWATER receives 3.315.974 € through the Interreg 2 Seas fund, co-funded by the European Regional Development Fund (ERDF), to work on climate change adaptation and to increase resilience against droughts and extreme precipitation based on ecosystem services.

