

## Background and pre-operational context

The project deals with special, unique, rare and extreme habitats in the Austrian Natura 2000 area "Neusiedler See - Nordöstliches Leithagebirge", one of the largest contiguous inland salt areas in Central Europe. There, the priority habitat "Pannonian salt steppes and salt marshes" is present in all natural variants on an area of 3,676 ha, of which more than 80% is located in the Neusiedler See - Seewinkel National Park. The proposed project will directly affect 1,258 ha (34%). The number of sodapans has decreased from 139 to 48 (-66%) in the last 160 years, the water area from 3,614 to 656 ha (-82%). The current conservation status of the habitat type is "unfavorable - poor", both in terms of overall status and future prospects.

In the middle of the 19th century, the number of sodapans in Seewinkel amounted to at least 139 with a total area of 3,614 ha. This was before major interventions in the hydrology of the region took place. By 2014, both the number of sodapans and their total area had decreased by app. 75 %. This dramatic loss is entirely due to human activity. It was caused by large-scale drainage measures to reclaim land for agricultural purposes, by the direct destruction of sodapans through filling and - more recently - by massive groundwater extraction for agricultural irrigation purposes. Although the active destruction of sodapans and alkaline steppes and marshes came to a halt with the establishment of the National Park in 1993, the drainage system that caused the decline of salt habitats in the first place remains fully functional to this day!

The Pannonian sodapans, salt steppes and salt marshes of the "Neusiedler See - Seewinkel" National Park are currently under acute threat, as the long-standing and still ongoing decline in groundwater levels in the region has led to a complete interruption of the periodic, natural replenishment of the soil surfaces and sodapans with salts. This process normally takes place in the summer months when the region experiences semi-arid climatic conditions and the sodapans temporarily dry up. The sun and wind can then act on the exposed surfaces of pan beds and salt steppes, where they promote the evaporation of underground, saline groundwater. The replenishment process of surface and underground salt reservoirs depends entirely on very high groundwater levels, which must persist throughout the spring and much of the summer months.

In the past, such high summer levels could easily be reached, as there was no natural runoff in the Seewinkel and winter precipitation completely balanced out groundwater evaporation in the summer months. Today, since the groundwater level is artificially lowered by drainage and water extraction, the groundwater level only reaches the surface in wet winters and for short periods of time - the accumulation of salts has come to a dramatic standstill. Together with the constant leaching of salts through precipitation and drainage, this has led to an accelerated deterioration of the habitat type.

Improved water management is therefore urgently needed in the region. This includes improved water retention, sensible flood protection and a massive reduction in water extraction for irrigation purposes.

Over the course of almost 100 years, a sophisticated system of drainage ditches and canals has been created in the Seewinkel region. The primary aim of this drainage system was to reclaim land for agricultural purposes. However, once surface flooding and groundwater levels had receded, the existence of the drainage system also encouraged the expansion of settlements and infrastructure into formerly flooded areas. Thus, over time, the system has assumed a key role in flood protection not only for the reclaimed agricultural land but also for the expanding settlements. As the design of the system was never geared towards sustainable management of water resources, but towards coping with exceptional flood events in wet years, it has led to unnecessary water losses in normal or dry periods.

Flood protection faces two different challenges. On the one hand, the seasonal flooding of farmland must be prevented. This can be achieved by creating buffer zones near wetlands and along drainage ditches. On the other hand, flood protection must ensure a permanently low groundwater level within settlements in order to prevent potential damage to buildings and infrastructure.

Reducing water abstraction for irrigation purposes is one of the biggest challenges. In recent years, the expansion of arable land for water-intensive crops, combined with climate change, has led to an increasing demand for irrigation water. If the needs of wetlands are adequately addressed, it becomes clear that a fundamental change in agricultural practices is required - otherwise the limited regional groundwater resources will not be sufficient, especially under the conditions of climate change. Necessary adaptations in agriculture relate to the type of crops grown, cultivation techniques and irrigation practices. Viable solutions that are economically, ecologically and socially sustainable are therefore needed and will be addressed within the proposed LIFE project.

### **Overview of the threat to the sodapans in the Seewinkel region**

The Pannonian sodapans, salt marshes and salt steppes are severely threatened by:

- The reduction of natural water fluctuations and the lack of high groundwater levels, both of which lead to the degradation and loss of sodic grasslands and salt steppes, as the periodically recurring salt accumulation processes are disturbed.
- The lowered groundwater level, which leads to a general reduction in the extent of the habitats around the soda pans.
- The extraction of groundwater and surface water through drainage ditches, which leads to the leaching of the habitat-determining salt.
- Lowering of the groundwater table at local water abstraction points due to agriculture.
- The isolation of salt habitats within intensively used agricultural areas and the pressures on them.
- The lack of prolonged flooding of soils with naturally absent or sparse vegetation.
- The absence of flooding, which favors the spread of perennial plants through succession.

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- The spread of reeds, which destroys habitats by destroying sensitive soil structures.



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