Water supply and rehabilitation in Nagyszeksos-to Southern Hungary

Year of issue

2025

Summary

The Nagyszéksós-tó project aimed to safeguard the natural and recreational functions of the protected lake area by improving retention of 1.2 million m³ of water from excess periods and supplying surplus water from the nearby village’s treatment plant, with extra polishing in a newly created wetland. Other objectives included enhancing groundwater recharge, restoring drainage capacity to avoid prolonged waterlogging of farmland, and providing Mórahalom with improved recreation, cultural and educational opportunities.

Since completion, the site has become a key habitat, supported by buffalo grazing for vegetation management and seasonal hydrological cycles typical of saline lakes. In recent years, summer drying has recurred, seen by conservationists as a natural phenomenon, though it poses challenges for tourism. A major eco-tourism development started in 2024–2025, led by the Kiskunság National Park Directorate and Mórahalom municipality, will deliver a new visitor centre, thematic trails, birdwatching towers and educational facilities, scheduled to open in 2026, aiming to balance habitat protection with sustainable public access.

Photo Gallery







Location

46.22, 19.95

Project

NWRM

National ID

Hungary_02

Sector

Agriculture

Implementation status

Completed

Contact

Gábor Ungvári

Overview

Location of the project

The Nagyszéksós Lake protected area is located on the southern edge of Mórahalom, Csongrád-Csanád County, Hungary, close to the Röszke–Mórahalom road (route 5511) and the Serbian border, within the Kiskunság National Park’s administrative area.

Country

Hungary

NUTS2 Code

Dél-Alföld

Sponge measures implemented in the case study

Reduced stocking density

Lake restoration

Wetland restoration and management

Objectives

Improve water retention – Store 1.2 million m³ of water from excess periods in the Nagyszéksós Lake basin.
Supplement water supply – Deliver surplus treated water from Mórahalom’s wastewater treatment plant to the lake
Enhance groundwater recharge – Increase infiltration to support shallow aquifers.
Restore drainage capacity – Prevent prolonged waterlogging of adjacent agricultural land.
Safeguard and enhance natural values – Maintain biodiversity of the saline lake and surrounding habitats.
Strengthen recreational, cultural, and educational functions – Improve facilities and opportunities for the local community of Mórahalom.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
Local water authority	ATIVIZIG (Lower Tisza District Water Directorate)	Determination of design details of the measure	Provides technical support for hydrological works and structures.	Supporting
Nature park	Kiskunsági Nemzeti Park Igazgatóság	Implementation	Landowner and manager; responsible for implementation; oversees maintenance, monitoring, and long-term management.	Responsible
Local water authority	Municipality of Mórahalom	Implementation	Partner in implementation; co-manages tourism infrastructure and promotion.	Responsible
NGO	MME (Hungarian Ornithological and Nature Conservation Society)	Monitoring	Supports ornithological monitoring and ecological assessments.	Supporting
National water authority	Hungarian Government	Financing	Finance current eco-tourism development.	Supporting

Site Information

Climate Zone

Warm temperate dry

Precipitation

525.00 mm

Temperature (°C)

11.00 °C

Runoff

2.35 mm

Runoff coefficient

1.14

Elevation range

86

Vegetation class

It is a wetland area surrounded by crop production agricultural lands. Predominantly saline meadow and wetland vegetation, managed partly through buffalo grazing to maintain open, herbaceous habitats and prevent reed overgrowth.

WFD Ecological status

Unknown

WFD Chemical status

Unknown

Design and Implementation

Project scale

Micro

Project scale specifications

Focused on a single protected site (Nagyszéksós Lake) and its immediate surroundings in Mórahalom, with local hydrological works, habitat management, and eco-tourism infrastructure.

Project area

75 ha

Area subject to Land use change or Management/Practice change (ha)

9.00 ha

Constraints

The size of the area is constrained, bigger volume retention would threaten agricultural lands

Favourable preconditions

The main drainage channel of the district's drainage network passes by the lake. (The lake itself the area that reamined an drained)

Financing

Total cost information

Initial rehabilitation project (DAOP 5.2.1/D, mid-2000s) – exact total cost is not published
Eco-tourism development project (KEHOP Plusz, 2024-2026) : 1.4 billion HUF (~ €3.6 million) total budget

Costs investment

747095.25 €

Costs investment information

New water supply chanel, creation of wetland, reconstruction work inside the lake, reconstruction of drainage channels.
Inflation adjusted price from HUF 2009

Costs operation maintenance

1666.67 €

Costs operation maintenance information

This is the maintenance cost of the channels. Additonal cost will emerge in case of severe water shortage (reference to the water depth), the pumping of treated water to the constructed wetland to start supply the lake will start. It will have a cc 15€/day cost.

Financing authorities

Authority name	Type of funding	Comments
European Union	EU-funds: Cohesion and regional development funds	DAOP 5.2.1/D - Komplex vízvisszatartási akcióprogram a Nagyszéksós-tó vízrendszerében
Government of Hungary	National funds	—
Mórahalom municipality	Local funds	—

Compensations

No

Policy and Governance

Policy description

It is a lake-wetland with big shallow areas, the water level drops left these areas dry out frequently. The NWRM will mitigate the changes of water level. WFD pressure 4.1.2; 4.3.1 2.2??

Land ownership

The Nagyszéksós Lake protected area is publicly owned and managed by the Kiskunság National Park Directorate.

Policy targets

Increase Water Storage

Improved Biodiversity

Peak-flow reduction

Groundwater Recharge

Pollutants Removal

Oher Societal Benefits

Part of a wider plan

No

Public consultation

No

Has contractual arrangements

No

Contractual arrangements

Comments
The parties will prepare a plan to specify the operation details after the experiences of the first years in operation.

Impacts and Monitoring

Monitoring System

Monitoring requirements

Monitoring is carried out by the Kiskunság National Park Directorate and environmental authorities, focusing on the ecological status of the lake, bird populations, and vegetation changes, in line with national conservation and Natura 2000 obligations.

Monitoring parameters

Ornithological monitoring (breeding and migratory bird counts, species presence, nesting success), vegetation surveys (extent and composition of saline meadow and reed habitats), and hydrological observations (visual assessment of water level, presence/absence of surface water, seasonal drying). Scientific studies have also assessed water chemistry (salinity, conductivity, pH, major ions, phosphate) to understand hydrological and nutrient dynamics. These data support both habitat management (e.g. timing and intensity of grazing) and hydrological regulation (e.g. operation of channels) to balance conservation goals with recreational use.

Maintenance

Maintenance requirements

Maintenance is led by the Kiskunság National Park Directorate, mainly through buffalo grazing to limit reed growth, plus occasional invasive removal and upkeep of inlet/outlet structures.

Impact Assessment Methodology

Performance impact assessment method

Catchment outlet

Socio-economic Impacts

Direct benefits

1666,66662597656

Direct benefits information

There are avoided costs. According to the predictions the upgraded situation will decrease the total maintenace costs that emerged previously at the two organisations (water directorate, national park)
Improved recreational, cultural, and educational opportunities for Mórahalom residents and visitors. Ongoing eco-tourism development (2024–2026) will add a visitor centre, themed trails, and birdwatching towers, aiming to increase sustainable tourism revenue. Expected boost to hospitality, services, and local employment through tourism infrastructure.
Buffalo grazing is integrated into local agricultural activity, with potential income from livestock products.

Ancillary benefits information

There is no economic assessment of the miscallenous benefits. These could come from recreational activities, nutrient load mitigation and habitat services.

Biophysical impacts: Hydrology

Information on retained water

The rehabilitation works increased the lake’s capacity to store 1.2 million m^3 of excess water

Information on Restoring hydraulic connection

New inlet from Mórahalom’s wastewater treatment plant and a polishing wetland created; artificial channels (Széksóstói main canal) also influence hydrology

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

The eutrophication process that threatened the lake was changed, the water lily (Nympheaetum albae) appeared again in the lake. The site functions as a key breeding, migratory, and feeding area for birds; increase in habitat heterogeneity noted.
In recent years, complete summer drying has occurred, potentially reducing aquatic habitat availability, though conservationists note it is a natural seasonal cycle for saline lakes.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Positive impact-WQ improvement

Information on water quality overall

There is no quantitative inforamtion to measure the changes. Water chemistry studies recorded high salinity and alkalinity (Na, K, Mg, Cl, HCO_3^-, CO_3^{2-}), typical of saline lakes; phosphate presence linked to external inputs (including a point source found in reeds)

Soil quality overall improvements

N/A info

Biophysical impacts: Others

Ecosystem impact climate regulation

No information available

Lessons Learned

Key lessons

The project required the compromise of the water directorate and the national park how they manage their disparate interests of water levels in the lake facing the unpredictability of precipitation events. The further expansion of such a scheme in the area would have public, environmental and private gains as well, but the parties at the moment see no means how to harmonize conflicting interests if not only public, but privately owned lands would be involved as well.

One key lesson from the Nagyszéksós Lake project is that combining hydrological restoration with active habitat management can deliver both ecological and socio-economic benefits. The integration of buffalo grazing into the management plan proved effective in maintaining open saline meadows, controlling reed encroachment, and supporting biodiversity.

Another important point is the need to align ecological processes with human expectations. The natural seasonal drying of a saline lake is ecologically beneficial, but it can clash with tourism objectives that expect a permanent water body. This highlights the value of clear communication with stakeholders and adaptive management that respects natural cycles while providing visitor experiences.

The project also shows the benefits of long-term partnerships between local authorities, water management agencies, and conservation bodies. Coordinated actions between the Kiskunság National Park Directorate, the municipality, and technical agencies enabled both infrastructure development and habitat conservation.

Finally, the recent eco-tourism investment demonstrates that restoration projects can evolve over time, adding new functions while maintaining ecological goals. However, these expansions should be carefully planned to avoid compromising the natural dynamics that underpin the site’s conservation value.

Barriers

Barrier type	Barrier role	Comments
Other	Main barrier	In this case there was no real barrier because the area is state property, the funds enabled the purchase of the wetland location. But a similar measure - according to the official at the directorate - cannot be accomplished if arrangements with private owners should be included. The duration of such reconciliation has a huge uncertainty and big probability of failure that it cannot be financed on a closed time frame project bases.

Drivers

Driver type	Driver role	Comments

Balancing different objectives	Main driver	The obligation of the water authority (to provide safety against flood or water logging threats are in contradiction with the environmental management objectives of the national park. Because the lake serve as a buffer for storage of the surplus water. The applied solution is a way forward from this situation, but without the financial sources of the operative program no sources would be attained.
Availability of subsidies	Secondary driver	—

Success factors

Success factor type	Success factor role	Comments
Existing institutional framework	Main factor	The area is state property
Successful coordination between authorities	Main factor	—
Financing possibilities	Main factor	—
Attitude of relevant stakeholders	Secondary factor	The local government of the nearby village was supportive. The village has direct benefit from the project. There is an improvement in recreational facilities

Transferability

The measure is transferable to other small saline or seasonal wetlands where hydrological restoration and grazing can sustain biodiversity. Success depends on respecting natural water level fluctuations, securing long-term stakeholder cooperation, and balancing tourism with conservation. Care is needed to avoid altering salinity or drying cycles, and to ensure infrastructure does not harm habitat integrity.

Sources

Sources

Komplex vízvisszatartási akcioprogram a NagyszéksosTo vízrendszerében

A bivaly-rehabilitációs területek elemzése a Nagyszéksos-To és a Tanaszi-semlyék eltérÅ‘ biotopjain

A mórahalmi Nagyszéksós-tó vízkémiai vizsgálatainak elemzése

Nagyszéksós-tó: hiába a vízszint-csökkenés, rekord-fészek

A mórahalmi Nagyszéksós-tó ökoturisztikai fejlesztése

Vizes élőhelyek problémái és természetvédelmi kezelési megoldások a déli határ mentén

Drónfelvétel a kiszáradt mórahalmi Nagyszéksós-tóról, ahol korábban vízimadarak és bivalyok éltek – ma már csak a por maradt