Mire restoration within the Sumava National Park, Czech Republic

Year of issue

2025

Summary

The Ministry-coordinated programme in Šumava National Park restores natural (pre-drainage) water regimes to mires, stabilising water tables, reducing fluctuations, and re-starting peat-forming vegetation and processes while engaging the public. Design has been refined around the Target Water Table (TWT) and a micro-catchment approach to size/space peat and wooden dams, infill drains, and return small streams to near-natural courses; public outreach and monitoring are integral.

Since 1999 the programme has expanded far beyond early pilots: by 2024, 65 locations in the Šumava region had been hydrologically restored, totaling 2,718 ha, with ~296 km of drainage channels blocked, 36 km of streams and 28 spring areas restored.

Within LIFE for MIRES (2018–2024), the project delivered ~2,181 ha of restored wetlands, 212 km of ditches blocked, 35 km of restored streams, and 28 springs, supported by 1,840 volunteers, strengthening habitat for flagship species such as black grouse and improving landscape water retention.

Overall, Šumava’s mire restoration now couples targeted hydrological design with long-term monitoring and public involvement to secure biodiversity gains and climate-relevant water storage at landscape scale.

Photo Gallery



Location

49.0183, 13.5186

Project

NWRM

National ID

Czech_03

Sector

Hydromorphology

Installation Date

2008

Implementation status

Completed

Contact

REC

Overview

Location of the project

Across multiple mire localities inside Šumava National Park (South Bohemian & Plzeň Regions) along upper Vltava/Otava headwaters. Examples: Gerlova Huť lies south of the junction of roads 27 and 190; Jezerní slať sits between Kvilda and Horská Kvilda; Mrtvý luh above the confluence of Studená and Teplá Vltava.

Country

Czechia

NUTS2 Code

Jihozápad

Sponge measures implemented in the case study

Wetland restoration and management

Removal of dams and other longitudinal barriers

Objectives

Early programme (1999–2014): restore drained mires by blocking ~62 km of ditches over ~590 ha, and pilot stream re-naturalisation (~2.3 km)—establishing methods and monitoring tied to TWT.
LIFE for MIRES phase (2018–2024): restore near-natural hydrology on ~2,059 ha across ~47 sites (43 on the Czech side), targeting the removal/closure of ~80 km of drainage channels and ~13 km of streams, with additional goals for springs and black grouse habitat. Delivery ultimately exceeded several targets: by late-2024 the programme reports ~196 km of ditches blocked, ~30–36 km of streams restored, 28 spring areas restored, and a cumulative ~2,718 ha of hydrological restoration across 65 locations (1999–2024).

Involved partners

Authority type	Authority name	Authority role
National water authority	Czech Ministry of Environment	Financing
—	Administation of Sumava National Park	—
—	PLA Authority	—

Site Information

Climate Zone

Cool temperate moist

Precipitation

1275.00 mm

Temperature (°C)

3.20 °C

Runoff coefficient

0.10

Elevation range

1085 m

Slope range

<2

Vegetation class

By habitat area inside Šumava NP, wetlands are dominated by bog woodland (91D0)* and waterlogged spruce forest; open active raised bogs (7110)* and transition mires (7140) are extensive but smaller by area (e.g., 3001 ha bog woodland vs 373 ha active raised bogs in park totals).

WFD Ecological status

Moderate

WFD Chemical status

Good

Water quality status

Principal pressures were historic drainage, stream straightening and peat/forestry operations

Design and Implementation

Project scale

Meso

Project scale specifications

A regional, multi-site programme across the national park (dozens of localities). Since 1999, restorations reached ≈2,718 ha, with ≈296 km of drainage channels blocked and ≈36 km of streams plus 28 spring areas restored; LIFE for MIRES (2018–2024) contributed heavily (e.g., ~2,183 ha, 212 km ditches, 35 km streams).

Project area

500

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

500.00 ha

Size

60.00

Size unit

km

Favourable preconditions

Former mire

Financing

Total cost

510000.00 €

Total cost information

€510,000 before LIFE

LIFE for MIRES (2018–2024) : total eligible budget of €5,845,002

Financing authorities

Authority name	Type of funding	Comments	Financing share
Sumava NP and PLA Authority	Sub-national funds	Co-financer pre LIFE also, management programmes.	—
European Union	EU-funds: Cohesion and regional development funds	State Environmental Fund : main financer for the initial restoration (pre-LIFE)	—
European Union	EU-funds: LIFE+	€3,507,002	60 % of LIFE for MIRES
Czech Ministry of the Environment	National funds	Co-financer of the LIFE for MIRES project	—
Bayerischer Naturschutzfonds	Other	Co-financer of the LIFE for MIRES project	—

Compensations

No

Policy and Governance

Policy description

Since the late 1990s the Czech Ministry of the Environment and the Šumava NP Administration have run a long-term Programme for the restoration of mires and wetlands. It addresses pervasive drainage and channelisation from forestry, agriculture, roads and historical peat extraction that lowered groundwater, dried habitats and degraded headwater hydrology. The programme works inside a Natura 2000 context (Habitats Directive habitats such as 7110*, 7140, 91D0*) and, through LIFE for MIRES (2018–2024), restores mires, springs and small streams using a micro-catchment design guided by the Target Water Table (TWT) concept, fully in line with WFD aims to remove hydromorphological pressures (drainage ditches, straightened/eroded channels) and recover near-natural flow and level regimes.

Land ownership

Land administered by Šumava NP Administration. Czech state owns ~86%, municipalities ~10%, and other private/legal persons ~4%.

Policy targets

Increase Water Storage

Improved Biodiversity

Pressure remarks

Almost 70% mires have been modified by various human activities like forestry, agriculture and peat extraction in the past.

Part of a wider plan

Yes

Wider plan

Name
Landscape management programmes

Public consultation

Yes

Consultation activities

Activity type	Comments

Environmental Education	Both visitors and local people regularly attend †œMire Days†□ , which have been organised in the Å umava NP since 2008. In the ,rst half of such a mire day, people help with mire restoration a-er which they can visit undisturbed mires during the a-ernoon excursion. Similar †œMire Weeks†□ have also been organised in collaboration with NGOs for already 8 years. *ese †œMire Weeks†□ are attended mainly by young people and students. In this way several hundred people from the whole Czech Republic have taken part in mire restoration

Has contractual arrangements

No

Impacts and Monitoring

Monitoring System

Monitoring requirements

Long-term hydrological and ecological monitoring is integral—groundwater levels and hydrochemistry are tracked against TWT targets to guide adaptive management.

Monitoring parameters

The programme monitors water table (piezometers/loggers), hydrochemistry (e.g., pH, conductivity, DOC and major ions like SO4, NO3, NH4, PO4, Ca, Mg, Al, Fe), and biota/vegetation response; datasets are used to verify that ditch blocking/stream re-naturalisation meet TWT and to detect lingering drainage effects (esp. at springs).

Maintenance

Maintenance requirements

Šumava NP teams (with LIFE partners and volunteers) inspect and repair peat/wood dams, re-infilling drains, reopen clogged channels to natural flow, and maintain visitor infrastructure as hydrologic conditions evolve.

Impact Assessment Methodology

Performance impact assessment method

Catchment outlet

Performance impact estimation information

Water table measured manually in all boreholes at nearly fortnight intervals. Automatic gauging(at 1h intervals) by piezometers was used in a selected 49 boreholes. Water samples from boreholes, ditches, runoff profiles from drained sites and samples from streams were taken monthly for a detailed hydrochemical analysis, including content of main cations and anions, pH, conductivity and DOC. Runoff from drained sites as well as amount of precipitation were measuered continualy.

Socio-economic Impacts

Direct benefits

Visitor infrastructure has been upgraded at multiple bogs (e.g., renewed boardwalks), both to protect sensitive peat surfaces and to channel tourism.

Information on ecosystem impact, reduced energy use

Restored streams were rapidly colonised by aquatic macroinvertebrates; the Hučina/Žlebský/Jedlový Potok programme tracks community development toward undisturbed references. On mires, restoration triggered vegetation and species recovery; one reported case is the increase of Listera (Neottia) cordata from ~50 plants (2008) to ~400 (2012) at a restored site.

Biophysical impacts: Hydrology

Information on retained water

1999–2024 results: At landscape scale the programme blocked ~265–296 km of drainage channels, restored 36 km of streams and 28 spring areas, re-establishing retention and connectivity in many micro-catchments (65 localities; 2,718 ha).
Example of hydraulic reconnection: the Hučina stream section was re-meandered, lengthened from 1.2 km to 1.7 km, old drains were infilled and several pools created.
Restoration raised the water table toward near-natural levels and reduced its fluctuations across restored mires; ditch blocking on slopes “did not result in flooding” but returned WT to the Target Water Table (TWT) for each habitat.

Information on runoff reduction

The fluctuations in the water table were reduced, especially in the dwarf-shrub bog sites and wet forests. The water table beneath Trichophorum lawns remained at almost the same level, but also here fluctuations were reduced.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Positive impact-WQ improvement

Information on water quality overall

Increased concentrations of PO4, Al, Fe. Hydrochemical changes were found to be much more expressed in wet forest than peatbog. Long-term monitoring is necessary for understanding ecological processes and complete cosystem response.
Monitoring shows hydrochemistry responds to rewetting, with changes most pronounced in minerotrophic mires; water quality outcomes depend on the share of mire types within a catchment.

Soil quality overall improvements

N/A info

Information on soil quality overall improvements

N/A info

Biophysical impacts: Others

Information on ecosystem impact GHG soil carbon

The programme’s aim is to restart peat-forming processes and restore near-natural hydrology (a prerequisite for long-term carbon storage and landscape cooling), but no park-wide GHG flux figures were reported.

Lessons Learned

Key lessons

The Target Water Table (TWT) is a practical design tool, especially for bogs and sloping mires. Setting site-specific WT targets and spacing dams to meet them helps raise levels while avoiding unwanted flooding.
Long-term monitoring, including several years pre-restoration, is essential to judge success in mires and adjacent habitats, understand processes, and see whole-ecosystem responses. Šumava’s network of permanent plots and wells underpins this approach.
When assessing hydrochemistry at catchment scale, responses differ between minerotrophic mires and bogs; interpretation must account for mire type and local conditions.
A micro-catchment strategy suits mountainous terrain: combine ditch infilling with wood/peat dams on slopes, and re-naturalise headwater streams. Results show raised WT and reduced fluctuation, without broad overflooding.
Public engagement (volunteers, outreach) strengthens delivery and stewardship at scale across many localities.

Barriers

Barrier type	Barrier role	Comments
Other	Main barrier	All restoration measures were limited in time
Attitude of relevant stakeholders	Secondary barrier	Land ownership limits where measures can be applied.
Other	Secondary barrier	Hydrochemical responses vary by mire type, complicating evaluation.
Other	Secondary barrier	—
Expected maintenance needs	Secondary barrier	Sloping terrain/erosion risk requires combined methods, raising effort.
Other	Secondary barrier	Hidden drains & springs need dedicated restoration attention.

Drivers

Driver type	Driver role	Comments
Organisation committed to it	Main driver	Authority of the Natural Park
Availability of subsidies	Secondary driver	—
Legal obligations	Secondary driver	Strategy programes

Success factors

Success factor type	Success factor role	Comments
Financing possibilities	Main factor	Strong, multi-year funding & partnerships (incl. LIFE).
Available support tools	Main factor	Proven techniques: ditch infilling + woody/peat dams; stream re-naturalisation. Clear hydrological design using TWT and micro-catchments.
Conducted assessments (incl. economic)	Secondary factor	Long-term monitoring network guiding adaptive management.
Public participation	Secondary factor	Volunteer involvement building capacity and social licence.

Transferability

Highly transferable to drained mountain mires: set a TWT, block and infill drains, restore headwater streams, and monitor long-term. Take care with mire type (bog vs minerotrophic), slope/erosion, land tenure, and hidden spring drainage; these govern design, sequencing, and outcomes.

Sources

Sources

Ecological restoration in Czech Republic

Restoration of Drained Mires (Å umava National Park, Czech Republic)

Ecology and restoration of drained mires in the Šumava National Park (Czech Republic)

Život pro mokřady

Přeshraniční revitalizace rašelinišť na podporu biodiverzity a vodního režimu na Šumavě a v Bavorském lese (LIFE for MIRES project page)

Restoration of drained and mined mires in the Šumava National Park

Mire conservation and restoration in the Šumava National Park (TransParcNet 2015)

Monitoring of the restored streams in the Vltavský Luh (Šumava National Park)

Report on the restoration of wetlands, springs and streams in a mountain landscape