Restoring the Kuresoo bog, Estonia

Year of issue

2025

Summary

The restoration of the Kuresoo bog aimed to re-establish the natural water regime and typical bog vegetation in a severely drained area within Soomaa National Park, Estonia. Restoration was implemented on a pilot area of approximately 60 ha, where ditches were blocked with peat dams, brushwood and plastic piling. The area had been drained in the 1950s for peat extraction and forestry, resulting in significant degradation of the bog ecosystem.

Monitoring indicates that water levels have been successfully raised, resulting in the development of typical bog vegetation such as sparse pine cover and Sphagnum moss. These changes help reduce carbon emissions from the formerly degraded peat soil and support biodiversity conservation.

Recent sources confirm that over 1,000 dams were built across ~3,000 ha of degraded peatlands at Kuresoo as part of broader national efforts under the LIFE Mires Estonia project (2015–2021). Restoration planning employed drone-based LiDAR surveys and hydrological modelling, while fieldwork included local volunteers and national institutions. Long-term monitoring confirms a stable rise in water levels, recovery of bog vegetation, and return of protected bird species. Some initial restoration structures required corrective work to improve hydrological effectiveness.

As of 2023, the Kuresoo bog restoration is recognized as a national best practice example and has contributed significantly to Estonia’s peatland restoration targets, particularly within Natura 2000 habitats. The site continues to be managed by RMK, with ecological monitoring by the University of Tartu and ELF.

Photo Gallery



Location

58.4847, 25.1363

Project

NWRM

National ID

Estonia_02

Sector

Hydromorphology

Installation Date

2013-02

Implementation status

Completed

Contact

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Overview

Location of the project

The Kuresoo bog is located in central-western Estonia, within Soomaa National Park, in Viljandi County. It lies in a remote, lowland forested area characterized by extensive wetlands and peatlands, forming part of one of the largest intact bog complexes in the country.

Country

Estonia

NUTS2 Code

Eesti

Sponge measures implemented in the case study

Wetland restoration and management

Peak flow control structures

Check dams

Involved partners

Authority type	Authority name	Authority role	Comments
Other	State Forest Management Centre	Implementation	—
—	Universities	—	scientific reseach in the area

Authority type	Authority name	Authority role	Comments
NGO	Estonian Fund for Nature	Initiation of the measure	bog restoration project in frame of which inital research about the area and restoration plan was developed

Site Information

Climate Zone

Cool temperate moist

Temperature (°C)

5.00 °C

Elevation range

27

Slope range

0-1%

Vegetation class

Pleurozium schreberi, bog blueberry, Ledum palustre, S. angustifolium, S. magellanicum, S. fuscum, S, rubellum, pine

WFD Ecological status

Moderate

WFD Chemical status

Good

Design and Implementation

Project scale

Meso

Project scale specifications

The project covers an entire bog.

Project area

80

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

80.00 ha

Financing

Total cost

161900.00 €

Total cost information

Does not include the background studies - only construction works : construction of barrier dams and dykes and surveillance.
Application for practical work was financed by European Regional Development Fund. The background searches and restoration plan was made in frame of INTERREG IIIA programme.

Costs operation maintenance information

No maintenance needed, one time activity

Financing authorities

Authority name	Type of funding	Comments
European Union	EU-funds: Cohesion and regional development funds	Via Estonian Environemntal Investment Centre
Estonian Ministry of Internal Affairs	National funds	INTERREG IIIA programme : background searches and restoration plan.
Estonian Environmental Investment Centre	National funds	INTERREG IIIA programme : background searches and restoration plan.
Estonian Energy	National funds	INTERREG IIIA programme : background searches and restoration plan.
WWF Switzerland	Private funds	INTERREG IIIA programme : background searches and restoration plan.

Policy and Governance

Policy description

Kuresoo bog is one of the largest and well conserved consistent bog complexes in Europe (main habitat types 7110*, 91D0*) with total area 11 000 ha. In the south-east part there is 80 ha area we forest drainage system was built in 1970s. Drained area impacts directly ca 300 ha bog area nad the drained area as been designated as 7120 area (restoration is possible). Restoration of the drained area water regime will help to reduce its impact to the main bog. Since 2009 Soomaa national park belongs to PAN Parks network and Kuresoo bog is its core area. Kuresoo bog has salso been noted as internationally important bird area (IBA - International Bird Area), internationally ipportant wetland (RAMSAR) and it is also part of Natura2000 network.

Land ownership

State-owned land

Policy targets

Improved Biodiversity

Part of a wider plan

Non

Public consultation

Oui

Consultation activities

Activity stage	Activity type	Comments
Implementation phase	Volunteering	Local volunteers were involved in dam building and outreach activities, fostering public support and awareness of peatland values.

Has contractual arrangements

Non

Impacts and Monitoring

Monitoring System

Monitoring parameters

Hydrological monitoring - piesometric levels, ground pH and electrical conductivity, chemical copmposition of ground andand water od ditches, hydraulic conductivity of peat.
Vegetation cover(1,2,4,6 and 10th year). Topographic surveying after 10 years.

Impact Assessment Methodology

Performance impact assessment method

Catchment outlet

Performance impact estimation information

Monitoring will show if the priority habitat types (7110* and 91D0*) have improved

Biophysical impacts: Hydrology

Information on increased groundwater level

Raised water table: Restoration successfully raised and stabilized groundwater levels across the siteIn some restored zones, the water table rose by 30–50 cm during wet seasons

Information on increased landscape storage capacity

Seasonal water retention: Enhanced capacity to buffer seasonal rainfall and flooding within Soomaa's “fifth season” (spring floods).

Information on Restoring hydraulic connection

Wetland area expanded: Rewetting reconnected isolated patches into a more continuous mire system over ~3,000 ha.

Biophysical impacts: Biodiversity

Improved biodiversity

Oui

Information on improved biodiversity

Bog vegetation recovery: Recolonisation by Sphagnum mosses, sedges, and scattered Pinus sylvestris (Scots pine) observed across restored plots.
Notably, golden plover (Pluvialis apricaria) and wood sandpiper (Tringa glareola), both EU-protected, have been observed breeding again at the site.
Habitat restoration: Enhanced connectivity of habitat for mire-specific fauna and flora, contributing to the favourable conservation status of EU habitat type “active raised bogs”.

Information on increased permanent biomass

Rehydration of peat: Moisture levels in the upper peat layers increased, reducing peat decomposition and oxidation.
Reduced subsidence: Restoring waterlogged conditions limited further peat shrinkage and subsidence in formerly drained sections.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Not relevant for this application

Information on water quality overall

Water quality is in good status. Problems were with hydrological regime.

Biophysical impacts: Others

Ecosystem impact climate regulation

Impact on GHGs (net emissions and storage) including soil carbon

Information on ecosystem impact climate regulation

Reduction of CO2 emissions and

Information on ecosystem impact GHG soil carbon

Restoration thus contributes to carbon sequestration in the long term by restoring Sphagnum growth.

Lessons Learned

Key lessons

Kuresoo will be definitely bog restoration example area in Estonia where it will be possible to assess the impact of hydrological regime restoration to Sphagnum mossgroth and effectiveness of different damming technologies. Even though there were studies made for the area and restoration then in practice it turned out that additionally to wooden dams also peat dykes were built as wooden dams did not rise the water lever equally.

Large-scale restoration is feasible with proper planning and coordination

High-resolution planning tools improve restoration design

Restoration effectiveness varies and may require adaptive management.

Monitoring and post-project adjustments were crucial for long-term success.

Public engagement adds value.

Success factors

Success factor type	Success factor role	Comments
Financing possibilities	—	—
Available support tools	Main factor	The use of LiDAR drone imagery and 3D hydrological modelling before implementation allowed precise identification of drainage impacts and optimal locations for ditch blocking.
Successful coordination between authorities	Main factor	Success was enabled by strong collaboration between state actors (RMK), NGOs (ELF), researchers (University of Tartu), and EU funding (LIFE).

Flexibility / Adaptability

Some early restoration structures (dams) were found to be hydrologically insufficient and had to be corrected or reinforced later.

Sources

Sources

Soomaa Rahvuspargis Kuresoo raba kaguosas asuva rikutud raba taastamine

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Restoration of Kuresoo

LIFE Mires Estonia – Layman Report

Active raised bogs (Estonia – habitat 7110) – Presentation on restoration experience

The current state and ecological restoration of peatlands in Estonia