Floodplain restoration of the river Slampe, Latvia

Year of issue

2025

Summary

The floodplain restoration of the River Slampe was carried out in 2005 within the Kemeri National Park, Latvia. The aim of the measure was to re-establish the natural floodplain regime of the Dunduri meadows by reconnecting them to the hydrological cycle of the river Slampe, which had been previously channelised. The restoration involved closing the outlet of the straightened riverbed, reconstructing approximately 2.1 km of the riverbed in a new meandering course of 4.65 km, and constructing a small dam at the downstream end near the Slampe-Kauguri canal. This raised the water level by about one metre, allowing for natural flooding of about 105 ha of floodplain meadows during seasonal high flows.

The project significantly improved floodplain hydrology and restored natural habitats. In the short term, early ecological results included sedimentation, island formation, and recolonisation by aquatic species. The reconnection of the river and floodplain also contributed to rewetting of previously drained meadows. However, monitoring two to three years after implementation indicated that ecological water quality had not improved significantly. The absence of riparian vegetation and high nutrient inflow from surrounding agricultural lands limited progress towards good ecological status. Dominance of filamentous green algae (Cladophora glomerata) was noted.

As of recent assessments (2021–2023), the Slampe River is still classified as a heavily modified water body, with potential to reach good ecological status depending on further catchment-wide measures. Long-term maintenance and monitoring have continued under post-LIFE frameworks, although no major restoration works have been added since. The site remains under active conservation within the Kemeri National Park.

Overall, the restoration successfully achieved hydrological and habitat objectives, but further actions may be required to improve water quality and riparian structure.

Photo Gallery



Location

56.8299499, 23.4008938

Project

NWRM

National ID

Latvia_01

Sector

Hydromorphology

Installation Date

2005

Contact

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Overview

Location of the project

Along the river Slampe

Country

Latvia

NUTS2 Code

Latvija

Sponge measures implemented in the case study

Re-meandering

Floodplain restoration and management

Stream bed re-naturalisation

Objectives

Reconnect floodplain meadows: Restore natural flooding to approx. 105 ha of Dunduri meadows in Kemeri National Park.
Reconstruct river course: Replace a straightened 2.08 km section with a new 4.65 km meandering channel.
Raise water levels: Build a small dam to raise water level by ~1 meter, enabling seasonal overflows.
Enhance habitats: Create diverse in-stream structures (islands, riffles, pools) to support biodiversity recovery.
Support birdlife: Improve conditions for migratory waterbirds (e.g., swans, herons, ospreys) through wetland expansion.
Excavation volume: Approx. 23,880 m³ of soil removed to shape the new riverbed.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
Other	Ķemeri National Park	Initiation of the measure	Project manager and land manager after the implementation	Responsible
Private property owners	Meliorprojekts Ltd	Implementation	Elaboration of technical project, supervision of the practical implementation	Supporting
Private property owners	Visko Ltd	Implementation	Practical implementation of the meandering technical project	Supporting
Private property owners	Carl Bro Ltd	Monitoring	Assessment of ecological status according to benthic macroinvertebrates after the project implementation	Supporting

Documents

cs-lv-01-final_version.pdf (1.17 MB)

Site Information

Climate Zone

Cool temperate moist

Precipitation

650.00 mm

Temperature (°C)

6.00 °C

Elevation range

8

Vegetation class

The area is predominantly covered by grass- and tall-herb turf, dominated by nitrophilous species such as Dactylis glomerata, Calamagrostis epigejos, and Artemisia vulgaris. Wet depressions host reed and reed canary grass. Vegetation reflects early successional, nutrient-rich floodplain meadows.

WFD Ecological status

Moderate

WFD Chemical status

Failing to achieve good

Water quality status

Water quality status according to benthic macroinvertebrates was assed as moderate in 1998. Concentrations of nutrients (N and P) were significantly increased in some measurements. Assessed aquatic vegetation showed richness of the nutrients in the water.

Design and Implementation

Project scale

Micro

Project scale specifications

2.1 km long stretch of the channeled river was turned in to 4.6 km long meandered stream. Natural floodplain grasslands resorted in 105 ha

Project area

105 ha

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

105.00 ha

Size

4.60

Size unit

km

Principles

- to restore hydrological regime characteristic to floodplain in surrounding meadows;
- costs;
- existing relief.

Constraints

Lack of experience and knowledge of all stakeholders, acceptance of the neighbouring landowners.

Favourable preconditions

Measures implemented in protected area and the landowner is the state

Financing

Total cost

144547.81 €

Total cost information

144 547.81 € Without administrative and personnel costs

32 597,15 € Technical project and implementation

111 950,66 € In total 163,2 ha purchased land

Costs operation maintenance information

It is not calculated, but there is only visual monitoring carried out by inspectors of Ķemeri national park.

Information on Economic costs additional

Economic loss not calculated, but before restoration of meanders and floodplains, surrounding lands were used very extensively by agricultural purposes.

Financing authorities

Authority name	Type of funding	Comments
European Union	EU-funds: LIFE+	EC LIFE Nature programme
Latvia	National funds	Latvian Environmental Protection Fund

Compensations

No

Policy and Governance

Policy description

In order to make Dunduru meadows more suitable for agriculture, the course of River Slampe was straighten in 1970. Since 1997 Dunduru meadows are included in newly established Ķemeri National park. Maintenance and restoration of the natural assets are the main goals for the park and restoration of the Dunduru meadows helped to restore natural floodplain grasslands ensuring suitable habitat for several species of EU and Latvian importance.

Land ownership

State of Latvia

Policy targets

Improved Biodiversity

Groundwater Recharge

Target remarks

Restoration of floodplain hydrological regime in Dunduru meadows

Policy impact

Directive	Relevant impact
WFD identified pressure	Altered habitats due to hydrological changes
Other EU	HBD – Habitat and Bird directive

Part of a wider plan

No

Public consultation

No

Has contractual arrangements

No

Impacts and Monitoring

Monitoring System

Monitoring requirements

Monitoring of the groundwater level was planned to be carried out in 13 boreholes at the river Slampe once in a month, but due to financial constraints the water level records are taken very seldom.

Monitoring parameters

Level of the groundwater

Maintenance

Maintenance requirements

Controlling the condition of the dam before estuary of the River Slampe. Responsible authority is the Ķemeri National Park.

Impact Assessment Methodology

Performance impact assessment method

Edge of Field/Plot

Performance impact estimation information

Monitoring of the groundwater level was planned to be carried out in 13 boreholes at the river Slampe once in a month, but due to financial constraints the water level records are taken very seldom.

Biophysical impact assessment method

The assessment of the ecological status is defined in the national legislation based on the WFD requirements.

Socio-economic Impacts

Ancillary benefits information

Fish and plants, tourism, recreation, and others

Biophysical impacts: Hydrology

Information on retained water

Water retention is increased. The measure ensured that territories are flooded during the spring : 150 ha of restored floodplain meadows. 30 % of restored meadows were flooded by first spring floods, but flooded area depends from the floods volume. The restoration raised mean water levels in the downstream Skudrupīte floodplain by approximately 0.45-0.9 m, enhancing seasonal inundation dynamics.
Remeandering work created diversified structure : introduction of meanders, islets, various channels.

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

Restored floodplain meadows in 105 ha, which is important resting and feeding place for migratory water birds and re-meandered river is suitable feeding place for Ciconia nigra (bird species of EU importance). At the same time observed 4 individuals.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Neutral impact-no change in WQ status

Information on water quality overall

Water quality according to water biological quality elements (macroinvertebrates and aquatic macrophytes) are not increased. Early monitoring (2–3 years post-restoration) noted persistent high nutrient input, dominance of Cladophora glomerata, and limited improvement of ecological water quality.

Soil quality overall improvements

N/A info

Biophysical impacts: Others

Ecosystem impact climate regulation

No information available

Lessons Learned

Key lessons

Expert on hydrology has to be involved in the development of the technical project.
Hydrological and water quality assessments have to be carried out prior to the re-meandring.

Restoring physical processes does not guarantee ecological quality. Despite restored flows, ecological water quality remained poor due to external nutrient inputs and absence of riparian vegetation. Catchment-wide nutrient management is essential to support in-stream ecological recovery.

Vegetation structure takes time to develop. Recolonisation occurred quickly, but vegetation remained dominated by early-successional, nitrophilous species, limiting biodiversity and filtration functions. Long-term management (e.g. grazing, mowing) is key to guiding vegetation succession toward target meadow communities.

Post-restoration monitoring is critical. The project included early monitoring, but lacked long-term, quantitative follow-up on biodiversity, water quality, or infiltration rates. Future projects should plan monitoring over at least 10–15 years, especially in slow-recovering ecosystems.

Restoration must be embedded in landscape-scale planning. Continued degradation from surrounding agricultural runoff limited water quality improvements. Successful restoration requires coordination with upstream land use practices (buffer zones, farming regulations, etc.).

Multipurpose land use (e.g. grazing) supports maintenance. The use of Konik horses and cattle helped manage vegetation cost-effectively, showing that agro-ecological approaches can maintain restored functions without intensive human input.

Barriers

Barrier type	Barrier role	Comments
Existing institutional framework	Main barrier	Long procedures to obtain the permit for implementation of water retention measures.
Attitude of decision makers	Secondary barrier	Negative attitude of the Ministry of Agriculture, since river stretch is the important subject to ensure drainage in the catchment.
Attitude of relevant stakeholders	Secondary barrier	Attitude of neighboring landowners who are not in favor of over flooded lands

Barrier type	Barrier role	Comments
Limited staff and consultant knowledge	Secondary barrier	Lack of experience of all involved stakeholders

Drivers

Driver type	Driver role	Comments
Other	Main driver	Availability of financial resources and financing potential to implement such measures.

Success factors

Success factor type	Success factor role	Comments
Financing possibilities	Main factor	Availability of financial resources and financing potential to implement such measures.

Flexibility / Adaptability

Implemented project had numerous mistakes in technical project that have to be improved.

Transferability

Taking into account EU Policy goals on biodiversity to restore 15 % of depredated land up to 2020, goal of the WFD to reach good water quality, goals of the FD and local conditions, remeandering and floodplain restoration (for water retention and nutrients capture) is recommendable to implement in a slowly flowing streams within the agricultural lands.

Sources

Sources

FINAL TECHNICAL REPORT of the project "Conservation of wetlands in Kemeri National Park, Latvia (project number: LIFE2002/NAT/LV/8496)

Palienes režima atjaunošana Slampes upes lejtece

MEADOWS OF DUNDURI AND RIVER SLAMPE

After-LIFE plans and their efficiency in Latvia

Restoration in a Changing Landscape – Latvia’s Experience

The Dunduri Meadows and Floodplain of the River Slampe

LIFE02 NAT/LV/008496 – Conservation of Wetlands in Kemeri National Park

Lielupes upju baseinu apgabala apsaimniekošanas plāns un plūdu riska pārvaldības plāns 2022.–2027.