Restoration of the Ernz Blanche river, Luxemburg

Year of issue

2025

Summary

The Ernz Blanche (Luxembourg) river restoration sought to undo channelisation that had uniformised the river and increased downstream flooding. It relocated the watercourse into the thalweg, widened and/or raised the bed, re-meandered the channel, backfilled the former bed, restored adjacent streams, redesigned pipeline connections, and redeveloped areas around hydraulic structures.

After the 2002 feasibility, major works were delivered in 2010–2011 on the Koedange–Supp reach (~5 km), reducing flood peaks at Larochette (–3.8 m³/s; –25 cm) and creating ~110,000 m³ of storage (project cost ≈ €1.52 m). In 2016, longitudinal continuity downstream at Ernzen was restored via a pool-type fish pass at Wehnschelt and a rough ramp at Milleboesch. The project area has also been tied into the PC5 cycle path and Natura 2000 management.

Under Luxembourg's 2021–2027 Flood Risk Management Plan, additional riverbed restoration and space-for-river measures are listed/advancing on several reaches, incl. 417 m at Larochette; 1,102 m along CR119 at Ernzen (in implementation); 2,739 m at Altlinster; and 629 m at Medernach. Recent 2025 decisions cover local flood-protection works and targeted sediment removal in Larochette, while continuous hydrometric monitoring at station "Larochette / Ernz Blanche" supports ongoing management.

Photo Gallery



Location

49.7837, 6.2194

Project

NWRM

National ID

Luxembourg_2

Sector

Hydromorphology

Installation Date

2002

Implementation status

Completed

Contact

Alexandra Rossi, ACTeon

Overview

Location of the project

On the White Ernz between Soup–Koedange–Larochette (Mëllerdall), near CR119/PC5 cycle path; approx.

Country

Luxembourg

NUTS2 Code

Luxembourg

Sponge measures implemented in the case study

Re-meandering

Stream bed re-naturalisation

Wetland restoration and management

Reconnection of oxbow lakes and similar features

Objectives

Erase channelisation effects; re-meander & widen/raise bed.

Create ~110,000 m^3 flood storage; reduce Q10 peak from 18.8 → 15 m^3/s.

Restore adjacent streams & hydraulic structures; improve continuity.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
Local water authority	Municipality of Fischbach	Initiation of the measure	Project owner	Responsible
Local water authority	Municipality of Heffingen	Implementation	Project owner	Responsible
Local water authority	Municipality of Larochette	Initiation of the measure	Project owner	Responsible
Other	Department of Roads and Bridges	Initiation of the measure	Project owner	Responsible
National water authority	Ministry of Sustainable Development and Infrastructure	Other	—	Supporting
National water authority	Water Management Administration	Other	—	Supporting
Other	Ministry of middle classes and tourism	Other	—	Supporting
Architects / Engineers	Micha Bunusevac design office	Determination of design details of the measure	—	Responsible
Architects / Engineers	Kisch S.A.	Implementation	Operator	Responsible

Site Information

Climate Zone

Cool temperate moist

Precipitation

853.00 mm

Temperature (°C)

9.20 °C

Elevation range

272 m

Slope range

2-5%

Vegetation class

The Natura 2000 site “Vallée de l’Ernz blanche” is dominated by beech forests (Asperulo-Fagetum 9130 ≈ 682 ha; Luzulo-Fagetum 9110 ≈ 139 ha), with alluvial alder-ash forests (91E0* ≈ 18 ha) and lowland hay meadows (6510).

WFD Ecological status

Poor

WFD Chemical status

Failing to achieve good

Water quality status

Historic channelisation/hydromorphological alteration; nutrient pressure evidenced by orthophosphate above “good” threshold at Koedange (2017); multiple fish barriers—several removed/mitigated since 2016–2022.

Design and Implementation

Project scale

Meso

Project scale specifications

The measures span ~10 km of a river reach across several communes (river/sub-basin scale) with basin-level flood retention objectives and multiple sub-projects.

Project area

6596000

Size

10.00

Size unit

km

Basis of design

The NWRM was designed to reduce the peak flow for a 10-years storm (from 18.8 m3/s to 15 m3/s).

Principles

Space-for-river restoration: relocate channel to thalweg, re-meander, widen/raise bed; reconnect floodplain and tributaries; redesign pipes/structures. Retention capacity ≈ 110,000 m³. Designed to lower 10-year peak from ~18.8 to 15 m³/s.
Connectivity: subsequent fish-pass works at barriers (e.g., Hessemillen, Bakesmillen, Neimillen, “am obersten Deich”).

Constraints

Steep Luxembourg Sandstone valleys with narrow floodplains over marl layers; permeable sandstone aquifer sustains baseflow. Valley geometry and prior straightening constrained options; state landownership was a favorable precondition.

Favourable preconditions

Land next to the river is owned by the Grand Duchy of Luxembourg.

Financing

Total cost

2940000.00 €

Costs investment

2940000.00 €

Costs investment information

The investment costs cover all the earthworks and structures.

Costs operation maintenance information

The maintenance costs were not assessed in the feasability document. However, we can assume that they are low and that there are no extra maintenance costs compared to a usual river management.

Financing authorities

Type of funding
National funds

Policy and Governance

Policy description

Larochette is a village located along the Ernz Blanche River. It is regularly flooded, leading to damages on houses and community facilities. Classical flood protection measures (dikes, river banks, etc.) exacerbate the flood risk down stream.
The overall flood risk is due to urbanisation and the river canalisation upstream from Larochette, as well as river realignments.

Land ownership

State-owned riparian land: parcels along the project reach were owned by the Grand Duchy of Luxembourg, so no land acquisition was needed.

Policy targets

Peak-flow reduction

Increase Water Storage

Improved Biodiversity

Part of a wider plan

No

Public consultation

No

Has contractual arrangements

No

Impacts and Monitoring

Impact Assessment Methodology

Performance impact assessment method

Edge of Field/Plot

Performance impact estimation information

A hydrological study was realised in order to measure the impact of the NWRM.

Socio-economic Impacts

Direct benefits information

The benefits could in theory be assessed based on the costs of avoided damages due to floods in Larochette. This assessment has not been done.

Ancillary benefits

Social benefits

Ancillary benefits information

Creation of an active tourism area, with a bike path.

Biophysical impacts: Hydrology

Information on retained water

Creation of ~110,000 m³ retention, floodplain reconnection and channel complexity; design aimed to lower 10-year flood peak and delay flood wave at Larochette.

Peak flow reduction

15.00

Peak flow reduction unit

m3/sec

Information on peak flow reduction

Reduction of the peak-flow rate in Larochette by 3.8 m³/s (from 18.8 m³/s to 15 m³/s).

Information on reducing flood risks quantity

Lowering of the high water level in Larochette by up to 25 cm

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

Wetland restoration is beneficial for the aquatic biotope.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Positive impact-WQ improvement

Information on water quality overall

The wetland restoration leads to the improvement of self-purifying properties. This leads to improved overall water quality. Though, no assessment has been realized.

Soil quality overall improvements

N/A info

Biophysical impacts: Others

Ecosystem impact climate regulation

No specific impact

Lessons Learned

Key lessons

The natural water retention measure was more cost effective than a classical measure. The possibility of building a rainwater retention reservoir was considered but costs amounted to about 10M€. The cost of the wetland restoration project was about 2,9M€.

Transferability

High where land control exists and basin-scale planning guides reach selection; needs hydrologic studies (e.g., flood-risk concepts), coordination with Natura 2000 objectives, and careful management of sediment/nutrient sources.

Sources

Sources

Restauration des prairies humides le long de l'Ernz Blanche entre Altinster et Larochette

Interview with Micha Bunusevac

Restauration des prairies humides le long de l'Ernz Blanche entre Koedange et Soup

Nouveau tronçon Soup – Koedange de la PC5: 4,7 kilomètres de pure nature !

Plan de Gestion Natura 2000 LU0001015 « Vallée de l’Ernz blanche »