Lunéville, Floodplain restoration and reconnection of hydraulic annexes, France

Year of issue

2025

Summary

The 75 km-long Vezouze river regulary overflows, leading to increasingly violent floods especially in the urbanized sector of Lunéville, worsen by the degradation of the natural river bed upstream. After the violent 1983, 1998 and 2004 floods, the local municipalities launched restoration work to reduce the impacts of future floods. It involved widening parts of the riverbed by leveling a levee on the left bank. Two one-meter-wide flood channels were excavated over six hectares, creating 60,000 m³ of cleared material. Wetland habitats like ponds and side channels were established, with trees and helophytes planted.

Photo Gallery



Location

48.589, 6.502

Project

NWRM

National ID

France_04

Sector

Hydromorphology

Installation Date

2007

Implementation status

Completed

Contact

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Overview

Location of the project

The Vezouze is a French river that flows through the Meurthe-et-Moselle department in the Grand Est region. It is a right-bank tributary of the Meurthe, and therefore a sub-tributary of the Rhine via the Moselle.

Country

France

NUTS2 Code

Lorraine

Sponge measures implemented in the case study

Floodplain restoration and management

Meadows and pastures

Involved partners

Authority type	Authority name	Authority role
Other	Communauté de Communes du Territoire de Lunéville à Baccarat	Initiation of the measure

Authority type	Authority name	Authority role
Regional / sub-national water authority	DIREN	Financing
Local water authority	Agence de l'Eau Rhin Meuse	Financing

Documents

revezouze_luneville-version-finale.pdf (8.41 Mo)

Site Information

Climate Zone

Cool temperate moist

Precipitation

939.00 mm

Temperature (°C)

10.00 °C

Elevation range

227

Slope range

0-1%

Vegetation class

The functional riparian forest has been preserved. Plantings were made on the rest of the site after the work (willows, ash trees).
The risk of proliferation of invasive species is being monitored. Two Japanese knotweed (Reynoutria japonica) plants have been spotted on the left bank.

WFD Ecological status

Poor

WFD Chemical status

Failing to achieve good

Design and Implementation

Project scale

Micro

Project scale specifications

Single site of small area.

Favourable preconditions

The scheme was made possible by a desire for integrated water management.
There were no technical contraints like site access due to urban proximity.

Financing

Total cost

1930000.00 €

Total cost information

This total sum is from 2007. Additional costs are not taken into account, and conducting a similar project would be significantly more expensive today.

Costs investment

230000.00 €

Costs investment information

Studies and land acquisition

Costs operational

1700000.00 €

Financing authorities

Authority name	Type of funding	Comments	Financing share
Direction régionale de l’environnement (DIREN)	Sub-national funds	—	20.5 %
Water Agency Rhin Meuse	Sub-national funds	—	34 %
Communauté de Communes du Territoire de Lunéville à Baccarat (CCTLB)	Local funds	Intermunicipality	—

Compensations

Oui

Compensations annual information

The acquisition of land on the left bank was legally forced for public interest in exchange for fair compensation.

Policy and Governance

Policy description

Facing recurring importoant and damaging flood events, this project aims to improve safety for the population.

Land ownership

Public land owned by the project owner.

Policy targets

Increase Water Storage

Improved Biodiversity

Oher Societal Benefits

Target remarks

Reduce the waterflow in urban areas during floods as the main goal of this project.
Create biodiversity hotspots with the restored floodplain and hydraulic annexes as a secondary objective.

Part of a wider plan

Non

Public consultation

Non

Consultation activities

Activity stage	Activity type	Key issues	Comments
Other	Information panels and a water-themed walking route in the city	The sensiblization to biodiversity presevation did not reduce significantly the degradations on the site.	The toursitic success was limited. The panels were removed.

Activity stage	Activity type	Key issues	Comments
Other	Animations for school classes	—	Nature and environment associations carry out over 200 animations per year in Lunéville and its surroundings. This site is often used as it allows to show natural spaces to children next to the city center (at wlaking distance from many schools).

Has contractual arrangements

Oui

Contractual arrangements

Arrangement type	Responsibility	Name	Role	Comments
Institutional arrangement	Partnership between the local authority (Communauté de Communes du Territoire de Lunéville à Baccarat) and the water agency (Agence de l'Eau Rhin Meuse).	Contrat de partenariat Agence de l'Eau	—	This partnership ended in 2018.
Contractual agreement	Agreement between the local water authority (Communauté de Communes du Territoire de Lunéville à Baccarat) and a farmer responsible for yearly meadow grass cut.	—	Maintenance of meadow vegetation	The farmer has to carry out the cut every year before 15th of june. The biomas produced is used for his own agricultural livestock activity.

Impacts and Monitoring

Monitoring System

Monitoring requirements

There is very limted monitoring. An ecological study was conducted in 2015, and a flood monitoring station was installed on the Vezouze river next to the floodplain.

Monitoring parameters

Hydromorphology, Biological communities (ecology), fauna, flora.

Upstream station

Flood Monitoring station in the Vezouze right next to the floodplain :
Vigicrue Station Lunéville (Vezouze)
https://www.vigicrues.gouv.fr/station/A657111001

Maintenance

Maintenance requirements

Selective vegetation management operations (in left bank wetlands and hydraulic side channels) were carried out between 2022 and 2024, otherwise few maintenance in this area. The wet meadow is managed with a yearly early cut and biomass removal.

Impact Assessment Methodology

Performance impact assessment method

Catchment outlet

Performance impact estimation information

Species present before and after implementation, decrease of flood impacts.

Socio-economic Impacts

Benefits and co-benefits

The main economic benefits are the prevention of damage repair costs due to flood events.
Other social benefits include the creation of an urban anemity space, which allows recreation activities such as fishing, walking, camping, etc. in a natural environment next to the city center.

Biophysical impacts: Hydrology

Information on reducing flood risks quantity

A 30 cm drop in water level in the town during the floods.

Biophysical impacts: Biodiversity

Improved biodiversity

Oui

Information on improved biodiversity

The habitats have evolved naturally. The shallow hydraulic side channels on the left bank have filled in and become vegetated, and the riparian forest has developed. The plant species introduced during the works have declined, giving way to native species of the valley. Currently, only 2 small patches of the invasive Japanese knotweed has been identified.
The site hosts many bird species, serving as a refuge area in an urban environment. Since 2022, the European beaver has also been observed on the site, showing the site's recolonization by a patrimonial species.
Some invasive fauna (nutria, crayfish, muskrat) are present, but not specifically to this site in the whole river basin.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Neutral impact-no change in WQ status

Information on water quality overall

No real monitoring of water quality was carried out. But as a small portion of a large river, the effecti of this measure alone is hard to quantify. There are still wuality issues due to storm overflowing of upstream combined sanitation networks.

Information on water quality improvements (W T°)

The shading provided allows local cool areas connected to the river, which supports the aquatic fauna during the warm summer temperatures observed by the local fishing associations.

Soil quality overall improvements

N/A info

Biophysical impacts: Others

Ecosystem impact climate regulation

No specific impact

Information on ecosystem impact climate regulation

Not measured precisely, but it is suspected.

Lessons Learned

Key lessons

The monitoring of the project shows that the improvement of biodiversity, as well as flood impacts decrease, are very satisfactory.

However, the design was flawed : the too limited depth of the hydraulic annexes (0.8 m max) lead to their natural closing over the years.

The site maintains its hydraulic efficiency. No flood exceeding the Q20 level (the 2006 event) has affected the town since the completion of the project. The site functions effectively during each seasonal flood. The combination of various measures allowed to prevent any damage from the 2024 flood event.

The site is heavily frequented by walkers and local residents, which has led to issues with illegal dumping and a fire incident in the meadow.

Barriers

Barrier type	Barrier role	Comments
Attitude of the public	Main barrier	Difficult acceptability of the project, due to numerous misunderstandings about the hydraulic functioning of the project and the river.
Attitude of relevant stakeholders	Main barrier	Land management difficulties. The local authorities had to force the acquisition of land.
Lacking financing sources	Secondary barrier	The studies and the work on this project were expensive.

Drivers

Driver type	Driver role	Comments
Past flooding events	Main driver	Past events heavily motivated the local politic officials to carry out this project.
—	—	—

Success factors

Success factor type	Success factor role
Attitude of relevant stakeholders	Main factor
Existing technical standards	Secondary factor

Success factor type	Success factor role
Existing institutional framework	Secondary factor

Cost effectiveness

No cost-effectiveness assessment was realized.

Transferability

A similar project can technically be carried out in plenty of other cities. However, land control and high financing possiblities are critical for the success.

Sources

Sources

Création de chenaux de crues et restauration des échanges entre lit majeur et lit mineur sur la Vezouze

Aux portes de Lunéville, l'eau

Contrat de partenariat Agence de l'Eau