Floodplain restoration in the Lonjsko Polje Nature Park in Croatia

Year of issue

2025

Summary

The Lonjsko Polje Nature Park, located along the Sava River, is one of the largest floodplains in Europe and a key retention area in the Croatian section of the Sava basin. Between 2006 and 2008, the restoration project aimed to improve the natural flood retention capacity of the floodplain by enhancing its ability to store excess water and reduce downstream flood risks. The intervention contributed to increasing the water retention volume from 634 million to 733 million cubic meters, using non-structural measures and improved management of embankments and natural flood dynamics. The area also serves as a vital biodiversity hotspot, especially for migratory birds and wetland habitats.

Since the original project, further efforts have continued under the Sava Parks II programme and national conservation strategies. As of 2025, restoration activities include the re-connection of former meanders, targeted flooding of over 200 ha of wetland areas, and the rehabilitation of at least 500 ha of degraded pastures in zones like Krapje Đol and Rakita. Monitoring and long-term management have been reinforced through the implementation of the PEM 103 management plan (2024–2033), including biodiversity tracking, invasive species control, and education programs. Remote sensing and satellite tools are now used to support environmental monitoring in collaboration with OIKON and the European Space Agency.

These ongoing efforts confirm the strategic importance of Lonjsko Polje for nature-based flood management, ecological restoration, and landscape-scale wetland conservation in the Sava River basin.

Photo Gallery



Location

45.3616, 16.8333

Project

NWRM

National ID

Croatia_01

Sector

Hydromorphology

Installation Date

2006

Implementation status

Ongoing

Contact

Adriana Raveau, ACTeon

Overview

Location of the project

The Central Sava Basin (CSB), located in Croatia, is an area that combines natural values with the function of storage of floodwaters of the Sava River. One of the most important areas is the Lonjsko Polje area. About 23 706 ha of this Nature Park, which has an area of approximately 50 600 ha, is used as the largest detention area in the Central Sava Basin.

Country

Croatia

NUTS2 Code

Kontinentalna Hrvatska

Sponge measures implemented in the case study

Floodplain restoration and management

Reconnection of oxbow lakes and similar features

Re-meandering

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
Nature park	Lonjsko Polje Nature Park	Implementation	Nature Park	Responsible
Regional / sub-national water authority	Croatian Water Agency	Financing	—	Supporting

Documents

cs-hr-01-final_version.pdf (1.15 MB)

Site Information

Climate Zone

Cool temperate moist

Precipitation

872.00 mm

Temperature (°C)

9.50 °C

Runoff

680.00 mm

Elevation range

113

Slope range

gentle (2-5%)

Vegetation class

Natural landscape elements and European riverine lowlands (reed, poplar, willow, ash, willow reed, alder, beech, oak hornbeam...).

WFD Ecological status

Bad

WFD Chemical status

Failing to achieve good

Water quality status

Upstream pollution comes from cities like Zagreb, Kutina, Bjelovar, and Sisak, where sewage plants, a fertilizer dump, an oil refinery, and an herbicide plant contribute to water quality pressures in the Sava basin.

Design and Implementation

Project scale

Large

Project scale specifications

About 23 706 ha (237 km²) of this Nature Park is used as the largest detention area in the Central Sava Basin.

Project area

23706

Project area specifications

Lonjsko Polje represents approximately 184 km² of retention area out of a total basin of 246 km²; 60% in floodplain forests, 30% wet meadows and pastures, the rest agricultural or aquatic areas.

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

17100.00 ha

Principles

Integrative planning, integration of demands, acceptable costs, impact on public perception and acceptability, aesthetic benefic, functionality, adaptability.

Financing

Total cost information

The project saves considerable costs, by reducing the amount of water engineering construction: both the length of dikes and the number of distribution facilities are lessened. Accordingly, maintenance costs are also reduced. Additional costs are incurred for designing the new facilities, for modelling the flood waves and for carrying out the risk assessment on the new system.
Incremental costs are needed for important improvements to the system, which will secure the longterm sustainable use of the floodplains. Restoration and rehabilitation projects are needed to achieve an integrated water management.

Costs operation maintenance information

Information not found

Financing authorities

Authority name	Type of funding	Comments	Financing share
European Union	EU-funds: LIFE+	LIFE05-TCY-CRO-000111 496 845 €	unknown
Croatian Water Agency	National funds	—	unknown
World Bank	Other	Croatian Inland Waters Project	unknown

Compensations

No

Policy and Governance

Policy description

After severe flooding of the river Sava (Zagreb 1964, Sisak and Karlovac 1965 and 1966) a flood prevention scheme, "Sava 2000" was set up and approved in 1972, with the aim not only to prevent flooding, but also to develop the agriculture. The project was a combination of the construction of large storage areas to retain excess flood water which the Sava cannot discharge, and conventional works (construction of dikes and regulation of the river canal). About 40% of the plan was completed when the region was plunged into conflict in 1990 and Yugoslavia fell apart, leaving large alluvial wetlands unregulated. In the meantime, the vision on ecological values changed. In the year 2000, the World Bank recommended to adjust the 1972 plan to a flood protection scheme that takes into consideration the ecological and landscape diversity values of the floodplains. This 'World Bankplan' proposed measures to mitigate the detrimental impacts on the biodiversity caused by the implementation of the first phase of the 1972 plan. Additional objectives of this new approach were to stimulate the preservation and development of the natural and cultural heritage of the Sava area. The Life project "Central Posavina - Wading toward Integrated Basin Management"; fits in this context in particular by promoting an Integrated Sava Basin Management Plan that meets the requirements of the Water Framework Directive.

Policy targets

Improved Biodiversity

Peak-flow reduction

Policy pressure

Directive	Relevant pressure
WFD identified pressure	4.1.1 Physical alteration of channel/bed/riparian area/shore of water body for flood protection
WFD identified pressure	4.2.2 Dams, barriers and locks for flood protection
Other non-EU	Croatia’s Nature Protection Act
Other non-EU	Ramsar’s Frameworks for managing Wetlands of International Importance

Policy impact

Directive	Relevant impact
WFD identified pressure	Altered habitats due to morphological changes

Part of a wider plan

Yes

Wider plan

Wider plan type	Wider plan focus	Name	Comments
National	Water	Croatian Inland Waters Project	Funded by a World Bank loan.

Public consultation

No

Has contractual arrangements

No

Impacts and Monitoring

Impact Assessment Methodology

Performance impact assessment method

Laboratory

Socio-economic Impacts

Benefits and co-benefits

The project saves considerable costs, by reducing the amount of water engineering construction: both the length of dikes and the number of distribution facilities are lessened. Accordingly maintenance costs are also reduced. Additional costs are incurred for designing the new facilities, for modelling the flood waves and for carrying out the risk assessment on the new system.
Incremental costs are needed for important improvements to the system, which will secure the long term sustainable use of the floodplains. Restoration and rehabilitation projects are needed to achieve an integrated water management.
Value added by the preservation and restoration plan results from the improvement of the nutrient sink capacity, protection of the valuable cultural and natural heritage, and the long-term conservation of large inundation areas for transboundary flood protection. The impact on the alluvial forest cannot been foreseen.

Biophysical impacts: Hydrology

Increased water storage

16.00

Increased water storage unit

% Percent

Information on runoff reduction

Information not found

Information on soil moisture

The storage capacity would be increased from 634 billion m3 to 733 billion m3, a 16 % augmentation.

Information on Restoring hydraulic connection

A very important component of the programme is the improved connectivity of water bodies. 27 oxbow lakes and floodplain areas, which were cut off from the ‘live’ river channel, would be preserved in addition.

Information on reducing flood risks quantity

Long-term conservation of large inundation areas for transboundary flood protection.

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

Value added by the preservation and restoration plan results from the improvement of the nutrient sink capacity, protection of the valuable cultural and natural heritage, and the long-term conservation of large inundation areas for transboundary flood protection. The impact on the alluvial forest cannot been foreseen.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Neutral impact-no change in WQ status

Soil quality overall improvements

Positive impact-SQ improvement

Information on soil quality overall improvements

Improvement of the nutrient sink capacity.

Biophysical impacts: Others

Ecosystem impact climate regulation

No specific impact

Lessons Learned

Key lessons

The purpose of the Life project "Central Posavina - Wading towards Integrated Basin Management" (2006 -2008) was to develop and improve an integrated river basin management approach in Lonjsko Polje Nature Park and at least on a Central Posavina scale. This has been done by in particular developing consultative processes and appropriate structures which involve the various stakeholders for the conservation, utilisation and management of the water resources by ensuring non-structural flood control methods which take advantage of the natural functions of wetlands to supplement or replace existing flood control infrastructure.

Barriers

Comments
Information not found

Drivers

Driver type	Driver role	Comments
Balancing different objectives	Main driver	In the year 2000, the World Bank recommended to adjust the 1972 plan to a flood protection scheme that takes into consideration the ecological and landscape diversity values of the floodplains. This 'World Bankplan' would propose measures to mitigate the detrimental impacts on the biodiversity caused by the implementation of the first phase of the 1972 plan. Additional objectives of this new approach are to stimulate the preservation and development of the natural and cultural heritage of the Sava area

Success factors

Success factor type	Success factor role
Successful coordination between authorities	Main factor

Transferability

The project has had a high demonstration value for other nature parks in Croatia and can act as a good example for how to develop similar management plans in other regions.

Sources

Sources

Information Sheet on Ramsar Wetlands (RIS) – Lonjsko Polje Nature Park

Croatia – Inland Waters Project: Environmental Management Plan

Central Posavina - Wading toward Integrated Basin Management

Godišnji program 2025 – Park prirode Lonjsko Polje

ULOGA RETENCIJA U ZAŠTIĆENIM PODRUČJIMA TOKA RIJEKE SAVE