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Remeandering and restoring a natural water course for climate adaptation in France

In the Nouvelle-Aquitaine region, near-natural riverscapes help communities adapt to the impacts of climate change

River and wetland restoration significantly contributes to adapting to the effects of climate change and protecting valuable biodiversity. The Marais poitevin wetland is the largest wetland on the French Atlantic coast, making it one of the most important wetlands in France..

Key Learnings

- **Nature-based Solutions support resilient agricultural ecosystems:** Restoring naturally shaped watercourses helps rivers recover their natural functions and improves groundwater infiltration, helping agriculture adapt to the effects of climate change.
- **Stakeholder Engagement:** Bringing together local organisations, farmers, researchers, and local authorities is an important aspect in establishing a Nature-based Solution project. Drawing on local knowledge improves water management in Nouvelle-Aquitaine by aligning river and wetland restoration with regional conditions and capacities.

About the region

Nouvelle-Aquitaine is the largest region in France with highly diverse landscapes. It has a vast coastline, the largest stretch of forest in the country, and large rural areas including the mountainous territories of the Pyrenees and the Massif Central. The Marais Poitevin is a natural wetland area in France, spanning the Nouvelle-Aquitaine and Pays de la Loire regions. The entire area covers approximately 100,000 hectares, making it the second-largest wetland in France. Since the 11th Century, humans have developed the Marais Poitevin with thousands of kilometres of ditches, canals, and channels, and planted millions of trees to stabilise the riverbanks. This highlights the close relationship between humans and water. The historically established water network helps mitigate the effects of seasonal precipitation variations. Nevertheless, human activities and the impacts of climate change require a shift in mindset to preserve water resources and the surrounding natural landscape, especially as the region strongly depends on agricultural production.

Keywords

Climate Impacts

Flooding, Droughts

Adaptation Sector

Agriculture, Water Management

Key Community Systems

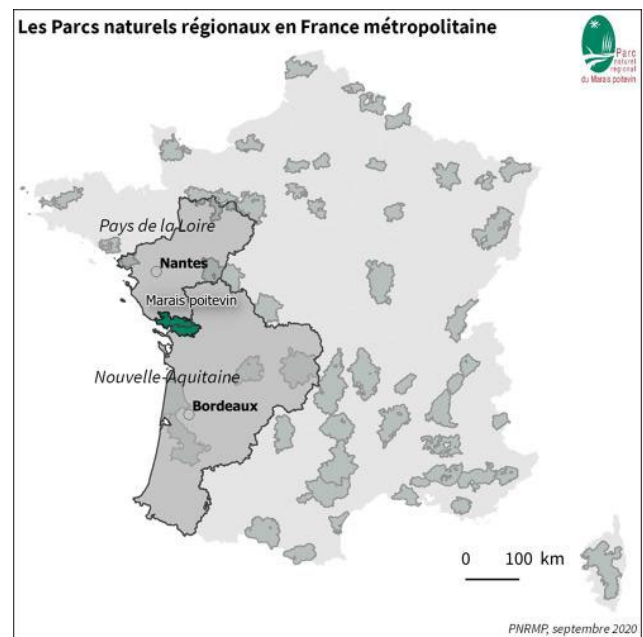
Water Management, Ecosystem and Nature-based Solutions

Countries

France

Funding Programme

Horizon Europe



Climate Threats

Due to its large and diversified landscape, Nouvelle-Aquitaine has several ecosystem types, making it sensitive to various climate hazards, such as droughts. Since 1950, rain has decreased as temperatures have risen by about 1.4 °C. Summers are therefore hotter with less rain than in previous years, leading to significant water shortages. Predictions estimate that those effects will be aggravated by more frequent, intense and prolonged droughts, causing more severe and longer low water periods and significant disruptions to natural water cycles. These climatic variations are already having a significant impact on the agricultural sector, making it particularly vulnerable to droughts. Other environmental change impacts, such as heavy rains, flooding, and fires, also lead to agricultural losses.

Shaping the Marais poitevin: A landscape through time

Since the 11th century, humans have transformed the Marais poitevin wetland to support agriculture. Coastal dykes were first built to prevent sea flooding, later followed by inland dikes and channels to manage excess water. In the 19th century, main channels were adapted for navigation, further altering the marshlands.



Figure 1: Aerial view of a canal in the Marais poitevin wetland. Image Credit: Romuald Goudeau.

By the 20th century, large-scale water management projects, including spillways, canal recalibrations, and buried drainage systems, expanded agricultural production, especially cereals. These interventions caused severe biodiversity declines, particularly among birds, sparking debates over the overexploitation of the wetland's water resources.

In response, the Environmental Ministry established the [Marais poitevin Regional Natural Park](#) in 1979. In the 1990s, major projects enabled enhancing and preserving the Marais poitevin with funding from the national government. The actions involved restoring small-scale heritage sites such as ports, wash houses, quays, canals and fountains, and building several footpaths and bridges in the wetlands to make them accessible for visitors..

At the same time, European, national, and local funds supported the first agri-environmental measures, encouraging farmers to protect the environment and promote sustainable farming practices. These measures involved contracts with local farmers to preserve natural meadows, promote biodiversity through extensive grassland management, and support climate change adaptation.

Today, climate change and historical land use are lowering groundwater tables in the Marais poitevin wetland. Droughts, combined with ongoing landscape and river modifications, increase water scarcity, disrupt habitats, reduce biodiversity, and weaken the ecosystem's resilience to extreme weather.

Wetland restoration actions in response to climate change

To adapt to climate change, the Marais poitevin Syndicate has implemented measures to restore the wetland's natural water cycle. Nature-based Solutions, in particular, offer a sustainable and cost-effective approach, increasing water retention and enhancing ecosystem resilience.

The [NBRACER](#) project involves promoting Nature-based Solutions across the territory, which is why the [Marais poitevin Regional Natural Park](#) collaborates with the joint Sèvre Niortaise watershed union, [SMBVSN](#) (Syndicat Mixte du Bassin Versant de la Sèvre Niortaise) to monitor the case study of the Vendié stream restoration project. The channelised Vendié River is at risk of drying out during the low-water period in summer. According to the Water Framework Directive, the Vendié River has poor ecological quality criteria, making it a good river restoration example.

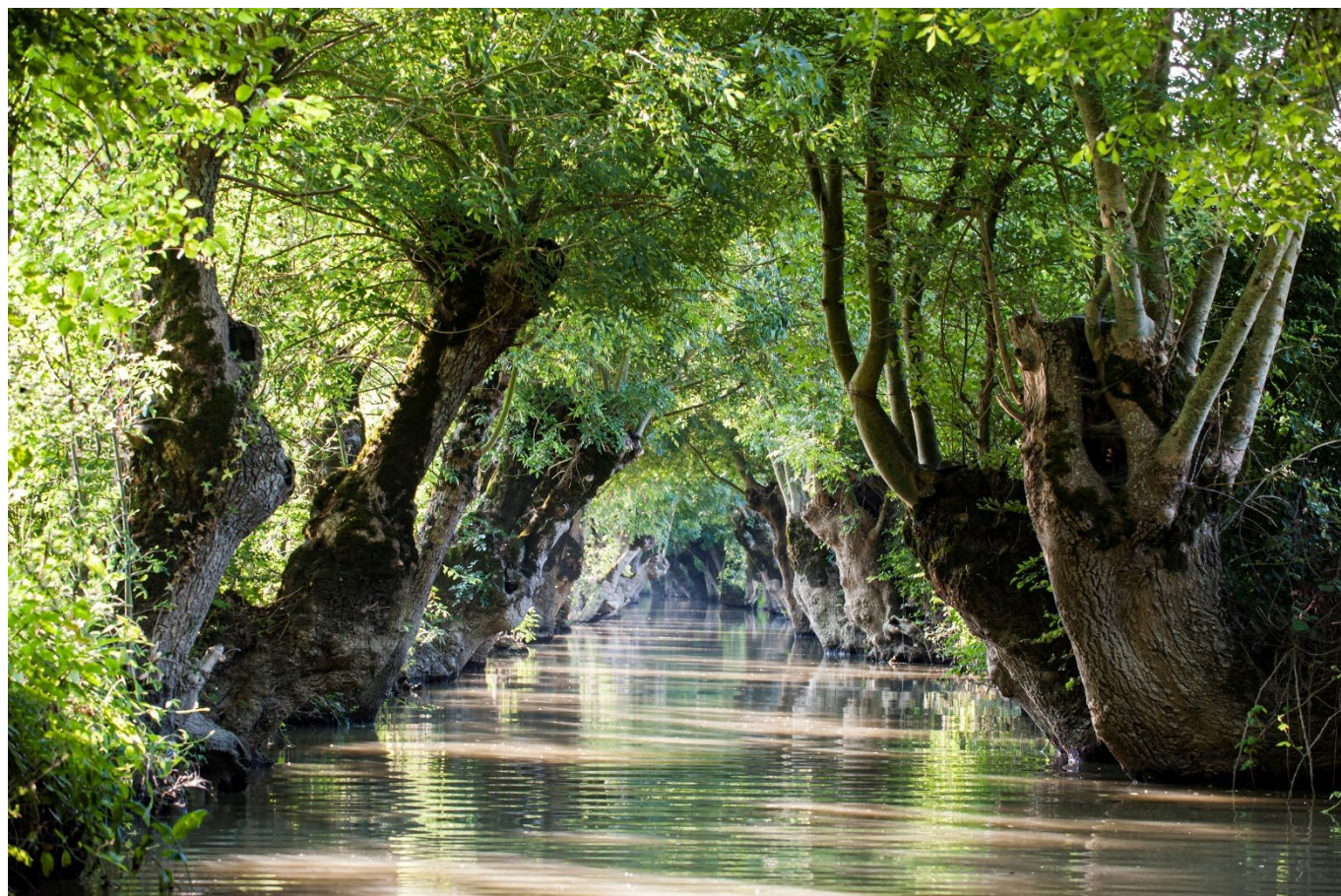


Figure 1: Canneld Vendié River at poitevin Marsh. Image Credit: Pascal Baudry.

During rainy periods, the Vendié frequently floods, limiting livestock and crop cultivation. To adapt, the SMBVSN develops restoration projects that improve water system resilience, considering ecological impact, technical feasibility, and long-term watershed management. The union also engages local citizens and landowners to secure necessary authorisations for actions on private land.

The measures are primarily funded by the Regional Water Agency, with the Parc Naturel Régional du Marais poitevin leading on-the-ground implementation. Thanks to NBRACER project funding, the PNR du

Marais poitevin monitors restoration efforts and identifies factors that enable or hinder replicating these interventions across the watershed.

Actions in the region include a co-design process focused on data collection and replication potential. Fieldwork near the Vendié includes the installation of piezometers and probes, which mix on-site data concerning the stream flow and atmospheric data, alongside numerous site visits, primarily coordinated by the PNR. The project team analyses this data with support from research teams at the [Bordeaux INP](#), research institute and university, and [Sorbonne Université](#), modelling the stream's functioning and climate behaviour within the Bordeaux part of the watershed. The private companies [MEOSS](#) and [Atos](#) provide remote sensing tools and satellite imagery to complement on-ground observations to better understand water dynamics and climate change impacts on the wetland ecosystem.

Local municipalities help bridge communication between citizens and the technical partners, while the Nouvelle-Aquitaine Region supports the project by coordinating stakeholders, facilitating knowledge exchange with other European initiatives, and ensuring visibility at a national level. To strengthen social acceptance and public engagement, PNR and [AcclimaTerra](#) are working together to inform and involve local communities, and to connect the project with ongoing climate research.



Figure 3: Geophysical monitoring at the Vendié demonstrator site. Right: Paco LeFrancois (Parc Naturel Régional du Marais Poitevin, NBRACER Project Officer). Left: Myriam Schmutz (Bordeaux IMP). Image Credit: Elise Perrocheau, January 2025.

“Restoring watercourses by using Nature-based Solutions have a positive impact on the environment and the associated activities. The aim is to multiply these actions in the future for a better adaptation to climate change in the region”, Bordeaux INP, Sorbonne Université

Summary

Historic landscape modifications for human development, combined with the threat climate change poses nowadays, are threatening the Marais poitevin wetland. Flooding, droughts and changing precipitation patterns make it difficult to cultivate one of Europe and France's most important agricultural landscapes. In response, an array of Nature-based Solutions, such as remeandering and restoring the natural water cycle, contribute to the adaptation efforts in the Nouvelle-Aquitaine region. Involving multiple stakeholders enables the development of tailored solutions adapted to certain circumstances. The actions foster climate change adaptation and contribute to biodiversity protection, one of the area's most valuable assets besides agricultural production.

Sources

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Further information

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Contact

Yohana Cabaret: NBRACER regional coordinator: [Yohana Stupar-Cabaret | LinkedIn](#)

Paco Lefrançois: NBRACER projet manager for the Marais poitevin : [Paco Lefrançois | LinkedIn](#)



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