Restoration of the Gentioux peat bog by clearing and aerial skidding

Year of issue

2025

Summary

More than half of the territory of the regional natural park of the Millevaches in Limousin (PNR) is covered with forest, some of which is the subject of intensive forestry exploitation. A peat bog restoration project in the headwater sector of the catchment area was initiated between the PNR (project manager) and the forestry cooperative Bourgogne Limousin (technical partner). The goal was to remove the softwood stand from the single-species plantation on the plot in order to restore the hydrological functioning of the peat bog. The work was carried out by aerial skidding using a cable mast. In addition to initiating collaboration between forestry and environmental management, the project has made it possible to restore the natural hydrological functioning of the bog and the associated specific habitats.

Photo Gallery



Location

45.783575, 1.999168

Project

NWRM

National ID

France_08

Sector

Hydromorphology

Installation Date

02.2015

Implementation status

Completed

Overview

Location of the project

The Millevaches plateau is a medium altitude area located in the center of France. At the beginning of the last century, this territory consisted of large areas of moors and peat bogs on which extensive grazing was practiced. The Millevaches plateau is home to the headwaters of the catchment areas of many tributaries of the Vienne and Dordogne rivers. The project is located near Gentioux vilage and consists of a topographic peat bog crossed by two small rivers. In the 60s it has been recalibrated and drained and embankments created by the drainage action have been planted with softwood species. It is located in a Special Protection Area for birds. The recalibration of the river has created a deepening of the water tablme and incision of the embankment leading to drying of the peat bog further enhanced by softwood water consumption.

Country

France

NUTS2 Code

Limousin

Sponge measures implemented in the case study

Wetland restoration and management

Water sensitive forest management

Objectives

• Increase water retention by the bog to improve low-flow support.
• Increase sediment retention by the bog to improve the hydromorphology of the watercourse (la Vergne).
Others objectives from the project manager:
• Work in collaboration with the silvicultural community.
• Restore the environmental functionalities of heritage wetland habitats.
• Promote the avifauna targeted by the Millevaches plateau Special Protection Zone (SPZ) (including Short toed Eagle).
• Improve the landscape in the municipality.
• Promote the exemplarity of the approach.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility

Nature park	Regional Nature Reserve of the Millevaches plateau	Initiation of the measure	Project owner.	Responsible
Architects / Engineers	Forestry cooperative Bourgogne Limousin (CFBL)	Implementation	—	Supporting

Site Information

Climate Zone

Cool temperate moist

Temperature (°C)

10.40 °C

Elevation range

792 m

Vegetation class

The problematic vegetation that was felled consisted of large conifers. The remaining vegetation in the area is characteristic of peatland environments. Peat-bog vegetation with Sphagnum mats and purple moor-grass (Molinia caerulea); surrounding plantations of Sitka spruce and Scots pine (partly removed). Early post-works encroachment by birch and willow noted.

WFD Ecological status

Moderate

WFD Chemical status

Good

Water quality status

Downstream longitudinal fragmentation on the Maulde water body; locally, past drainage/recalibration and conifer planting caused incision and hydromorphological alteration of headwaters.

Design and Implementation

Project scale

Micro

Project scale specifications

Single peat-bog site in a headwater micro-catchment, with localized logging and no heavy machinery in-situ.

Project area

1.5–1.8 ha

Project area specifications

Inside a 5 hecatre peat-bog area.

Size

1.80

Size unit

ha

Principles

Restoration via tree removal (Sitka rows, part of pine/birch) to re-raise the water table and recover bog function.

Aerial skidding (cable-mast) to avoid soil/peat disturbance; no heavy machinery in the wetland.

Keep a few tall “perch” trees for raptors (ZPS objective).

Hydro & habitat outcomes assessed by annual CEN monitoring; IAM checks downstream.

No design storm/capture volume or hydraulic capacity is specified in sources.

Factor constraints

The sensitivity of the environment made traditional logging unfeasible. The use of the emerging technique of aerial skidding allowed the operation to be carried out.

Favourable preconditions

This NWRM was not chosen and deployed with a strict objective of action on the water cycle. The hydrological effects were a co-benefit for the project manager. The primary motivation of this project was to initiate a dynamic of work in collaboration with the forestry world.

Financing

Total cost

26200.00 €

Costs operational

26400.00 €

Financing authorities

Authority name	Type of funding	Comments	Financing share
—	Other	€ 22,000 from the sale of the wood produced during the works.	83 %
Water Agency Loire-Bretagne	Sub-national funds	(50% of remainder after wood sale) € 2,100	8 %
Regional Natural Parc Millevaches en Limousin	Local funds	€ 1,260	5 %
Limousin region	—	€ 840	3 %

Policy and Governance

Policy description

After the war, at the same time as an agricultural decline, the territory was subjected to extensive afforestation accompanied by the drainage of planted peat bogs and the recalibration of certain streams. A limnogenic peat bog is located directly next to the village of Gentioux. It has been the subject of silvicultural activities since the 1960s and 1970s, when the two rivers in the area (the Vergne, a tributary of the Maulde, and its sub-tributary) were recalibrated and the plot was drained. Coniferous trees (Sitka spruces and Scots pines) were planted on the slopes resulting from the excavation of the drains. On the project site, the Vergne has been recalibrated and has an incision in its alluvial floor. The digging of drains has resulted in a lowering of the water table and dewatering of the peat bog and associated environments. Mono-specific softwood cultivation accentuates the hydromorphological alterations of the stream: up to 1.30 metres of incision in places. The root system of conifers promotes scouring of the banks and aggravates the lowering of the water table. Woody plants reduce efficient rainfall by increasing water pumping (strong evapotranspiration, the project manager referring to 50 m3 of water consumed per m3 of wood produced).

Land ownership

Privately owned by the Groupement forestier de la Brauze, managed by Philippe Jorrand.

Policy challenges requirements

Transferable to small, wet headwaters where conifers were planted/drained. Key cautions: fragile peat → avoid ground traffic; cost premium (≈20–30%) for cable-mast; align with Natura 2000 and forestry rules; anticipate low timber value; plan long-term monitoring.

Part of a wider plan

Yes

Wider plan

Wider plan type	Wider plan focus	Name	Comments
Regional	Water	Sources en Action	The “Sources en Action” Territorial Contract - a local environmental agreement aimed at protecting water sources and natural habitats.

Public consultation

No

Has contractual arrangements

No

Impacts and Monitoring

Monitoring System

Monitoring requirements

Ecological monitoring and Monitoring of hydromorphology

Monitoring parameters

Ecological monitoring consisting of vegetation surveys and faunistic observations was carried out by the Conservatory of natural spaces of Limousin in 2015, 2016 and 2017 at 12 stations. This monitoring was financed by the "Sources en Action" (Sources in Action) programme, within the framework of an agreement with the PNR. Monitoring of hydromorphology (IAM protocol: morphodynamic attractiveness index) was carried out by the PNR in 2016 and 2019 immediately downstream of the bog, in order to monitor the evolution of the substrates of the river Vergne and to evaluate the effect of the restoration of the bog on fine sediments.

Impact Assessment Methodology

Biophysical impact assessment method

• Ecological monitoring
• Monitoring of hydromorphology (IAM protocol: morphodynamic attractiveness index)
• Visual observations of the zone after the work

Biophysical impacts: Hydrology

Information on increased groundwater level

A rise in the water table has been observed by the project manager immediately after the works, leading to its outcrop over the entire wetland. The lateral drains which were not blocked were all recolonized by sphagnum moss already in the first year (summer 2015), with the consequence of greatly slowing down the flows. The colonization of drains by sphagnum moss therefore contributed to raising the water level in the external fringes of the peat bog plot, which was former in the process of drying out.

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

The annual monitoring of the 12 stations highlighted:
• A strong regeneration of peaty habitats, and an expansion of sphagnum development over a large part of the plot in 2017.
• The appearance of 4 species of odonata, 5 species of orthopterans and one species of lepidoptera specific to peatlands.
• On some parts of the plot, a dynamic of closure (implantation of birch trees and willows) and drying (appearance of molinia turds).
• Due to the incision of the bed of the Vergne, the lack of hydrological reconnection of the associated wetlands with the watercourse.

Biophysical impacts: Water & Soil Quality

Information on WFD ecological status obj quantity

Hydromorphologic monitoring shows a favorable evolution of granulometry: the initially silty-sandy substrate (2019) tends to be more heterogeneous and to evolve towards more gravel (trout spawning grounds).

Lessons Learned

Key lessons

The project was a success and allowed gathering forest managers and owners and the natural park. Despite the absence of piezometer to validate the water table rise, the fact the sphagnum recolonised the remaining drains, and a set of insects typical of wetlands have re appeared show the peat genesis restarted which is a positive conclusion. The low level of intervention on water flow and limitation of disturbance to the peat bog by using soft technique chosen by the natural park was validated by the success. The project allowed creating a specific programme on water and forests for the period 2017-2022, and inspired several other restoration projects using the same aerial skiddling method.

Barriers

Comments
In order to overcome the difficulty associated with the administrative management of the project - as a public institution, the PNR being unable to invest money in a private plot - it was necessary to obtain project management. An agreement to delegate project management from the Brauze forest group to the PNR was drafted, as well as an agreement dedicated to the fact that the PNR could use the plot to carry out monitoring and to bring the public to the site to show the results. One unforeseen constraint was the amendment of the forestry code that took place in 2015. At the time the site was designed, the PNR was not affected by the Forest Code. However, the 2015 code required any cut forest area to be replanted, which was contrary to the objectives of the PNR. It was therefore necessary to obtain additional authorization, justified by the multiple benefits of conserving and restoring the bog without replanting trees. Internally, it was also necessary to find solutions to convince the elected representatives, which required a lot of pedagogy to explain the purpose of this project and the purpose of launching this dynamic.

Success factors

Success factor type	Success factor role	Comments
Attitude of decision makers	Main factor	The low quality of the wood (due to the hydromorphic nature of the soil) and the environmental and regulatory constraints of the site made the forest manager consider the site of low interest both for timber harvesting and for planting new afforestation, and thus facilitated their involvement in the project. It also made it easier to obtain the derogation from the simple forest management plan. The financing of the work proved to be an obstacle, but the owner unblocked the situation by agreeing to transfer the wood to the PNR, which was able to generate revenue from the sale. In addition, the total cost of the project was relatively low, which helped convince the financial partners.

Sources

Sources

La restauration d’une tourbière plantée de résineux par débardage aérien

Utilisation de la technique du « câble-mât » pour restaurer une tourbière par coupe et export de bois planté sur la commune de Gentiouxs-Pigerolles (23340)

ZNIEFF Official Form

Restauration d‘une tourbière par coupe et export de bois planté par la technique du câble-mât