

Removal of the Cussy weir on the Maria Stream

The operation

Category	Restoration
Type of operation	Partial or total weir/dam removal
Type of environment	Headwater stream
Issues at stake (water, biodiversity, climate)	River continuity

Start of operation	October 2004
End of operation	October 2004
Length of river affected by the works	-

River in the restored sector

Name	Maria Stream
Distance to source	9 km
Mean width	3 m
Mean gradient	-
Mean discharge	-

Aims of the project owner

- Restore river continuity by, on the one hand, making migration possible for trout, bullheads and white-clawed crayfish, and on the other, ensuring sediment transport.

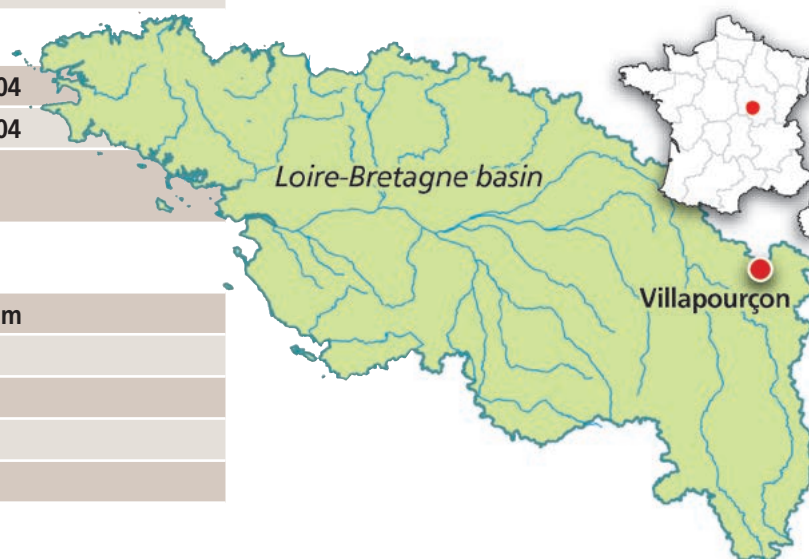
Environment and pressures

The Maria, ranked category-1 for fish, is ten kilometres long and flows into Dragne River from the north. The catchment area is 15 square kilometres and 90% covered with forest. The fish population consists essentially of two species, brown trout and bullheads. White-clawed crayfish inhabit one sector of the stream.

The catchment area has been subjected to very few anthropogenic disturbances. The only exception was the Cussy weir located one kilometre before the confluence with the Dragne. The weir, two metres high and eight wide, was built in 1932 to supply the town of Moulins-Engilbert with drinking water. Since the creation of the Rangère weir in 1951, the Cussy weir had served no purpose.

La localisation

Country	France
River basin	Loire - Bretagne
Region(s)	Bourgogne
Département(s)	Nièvre
Commune(s)	Villapourçon, Onlay



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The Cussy weir.

Regulatory context	Morvan regional nature park
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European directive references

Water-body ref.:	FRGR218
Natura 2000 site ref.:	FR2600986



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The impounded reach upstream of the weir.



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The stream in October 2004, toward the end of the project.

The weir had a major impact on the environment in that it completely blocked the upstream migration of trout and made difficult the downstream migration of juveniles. In addition, it blocked the transfer downstream of sand, gravel and stones.

■ Opportunities to act

Following an agreement with the water board of the town of Moulins-Engilbert, the Morvan regional nature park launched a partnership with the Departmental fishing federation to remove the structure.

■ Works and developments

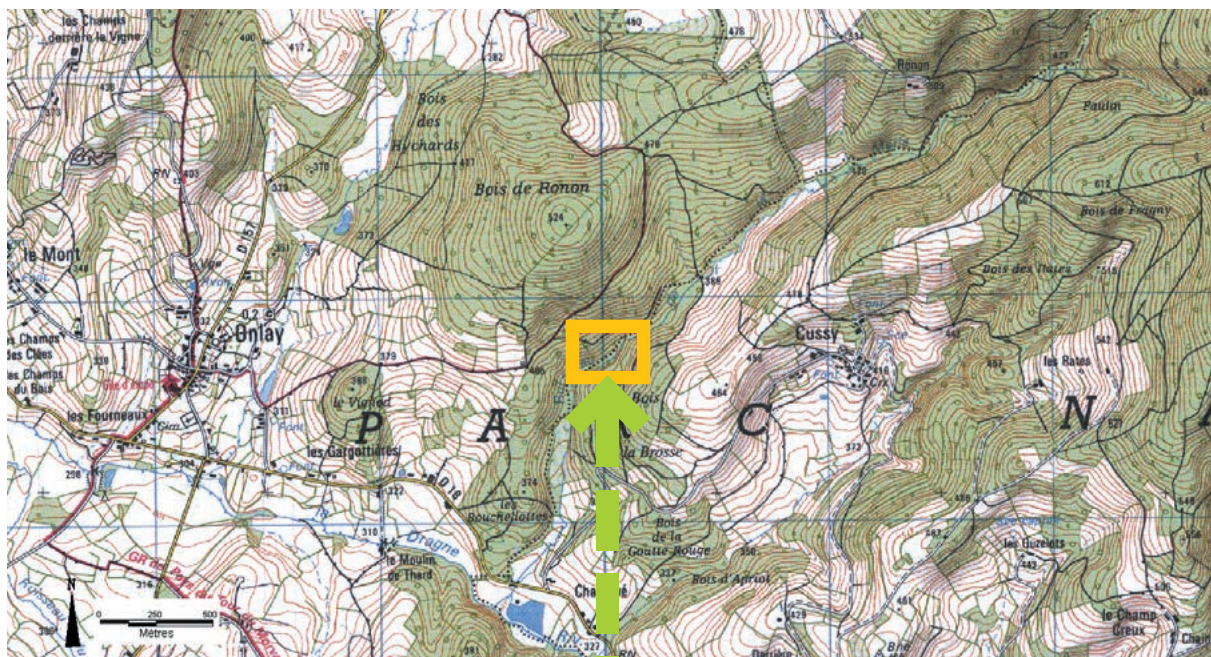
During the project, the water was diverted through a pipe. A straw filter was positioned downstream of the weir to trap any fine sediment. To start, the sediment deposited upstream of the weir was removed. It was spread over the banks, however the larger elements were left along the stream in order to be picked up later by it. The weir was then destroyed and the banks were stabilised using large rocks from the levee for the weir and from the surrounding area.

■ Regulatory approach

The work was authorised in accordance with the Fishing law.

■ Post-restoration management

No particular management measures were taken.



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■ Monitoring

Pre-works monitoring on the fish populations was carried out in 2002 by the High council on fisheries (CSP, which later became Onema then AFB). Fish were caught on three spots. Subsequently, two monitoring campaigns were run, one in 2004 just after the project and one in 2009. The latter campaign was the last to be run on the site.

■ Outcome of the project and outlook

Following the removal of the weir, nine kilometres of stream were once again accessible. The fish community has not changed, i.e. the two species observed remain brown trout and bullheads. This community is consistent with the type and location of the stream, which corresponds to a trout zone.

The monitoring campaign in 2004 revealed that the upstream section had been recolonised by trout alevins. By 2009, the trout population had increased and reached an equilibrium.

In 2004, the lotic section created where the weir had once existed was rapidly colonised by bullheads. By 2009, the population of bullheads had diminished. It would be worthwhile to continue monitoring the fish populations, notably by establishing comparisons with nearby streams.

The removal of the weir has restored sediment transport. Significant inputs of gravel have been observed downstream, thus recreating a favourable habitat for trout reproduction. The vegetation has natural-



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The stream in October 2004, a short distance upstream of the former weir. The banks are stabilised by large rocks drawn from the weir embankment.

ly recolonised the area and stabilised the banks. The large rocks positioned along the foot of the banks have prevented lateral erosion. Further upstream, regressive erosion has created a series of small steps that do not constitute obstacles for fish and contribute to habitat diversity.

Prior to 2004, the spawning grounds downstream of the weir were overused and those upstream underused. The removal of the weir restored the balance between the reproduction habitats.

In the framework of the 2011-2015 "Ecological continuity" LIFE programme, run by the Morvan and Ballons des Vosges regional nature parks, a number of

The stream in 2009, five years after being restored.



Jean-Christophe Baudin - Onema

Costs

In euros ex VAT

Studies	Not known
Purchase of land	Not applicable
Works and developments	10 000 €
Promotion	Not applicable
Total cost of project	10 000 €

Financial partners and funding:

Water agency, Regional environmental directorate (DIREN).

Technical partners:

Departmental fishing federation, French national agency for water and aquatic environments (Onema), Bourgogne-Franche Comté regional office and local office.

projects to improve aquatic environments have been undertaken.

For example, the park has worked to remove culverts to facilitate the passage of fish, to restore river continuity on several sites (partial or total removal of structures), to restore riparian vegetation, etc.

Promotion of the project

Not applicable.

Project owner	Morvan regional nature park
	
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