

Removal of the Maisons-Rouges dam over the River Vienne

The operation

Category	Restoration
Type of operation	Total or partial dam or weir removal
Type of environment concerned	Lowland river
Issues at stake (water, biodiversity, climate)	River continuity

Start of operation	June 1998
End of operation	April 1999
Length of river affected by the works	15 km

Watercourse in the restored section

Name	The Vienne
Distance to source	314 km
Mean width	100 m
Mean gradient	-
Mean flow rate	198 m ³ /s

Aims of the project owner

- Restoration of river continuity for the return of large migratory fish.

Environment and pressures

The Vienne is a tributary of the Loire. 363 kilometres in length, its source is on the Millevaches plateau in the Corrèze. The Vienne drains a catchment area covering 21,105 km². The Creuse, a main tributary of the Vienne, flows into it around fifty kilometres upstream of the confluence of the Loire and Vienne. Situated approximately 250 km from the sea, both of these sub-basins historically attracted salmon, shad, sea lamprey and eels. At the start of the 1920s, Maisons-Montrouge dam was built to a height of 3.8 metres over the Vienne in order to meet the power requirements of the paper mills at La Haye Descartes.

This dam, built 250 metres downstream of the confluence with the Creuse, created a blockage in both of these basins. The virtually stagnant impoundment caused by the dam was estimated to cover 15 km in total: 8 km on the Creuse and 7 km on the Vienne.

Location

Country	France
River basin	Loire - Bretagne
Region(s)	Centre
Département(s)	Indre-et-Loire
Commune(s)	Ports et Nouâtre



Old postcards



Maisons Rouges dam before the removal

Regulatory context:	Classified watercourse under the French Water Act
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References in relation to European Directives

Water body ref.	FRGR0356
Natura 2000 site ref.	Not applicable

The consequences were immediate, because since the building of the structure, not a single salmon or shad had been caught in the waters of the Vienne or Creuse upstream of Maisons-Rouges. Remedial efforts had been made with the successive installation of three fish-passes, but the results showed them to have very little effect.

In 1948, EDF (French electricity supply company) took over the concession and automated the dam in 1980. In 1993, while the installation was starting to become obsolete or dilapidated and the concession was coming to an end, EDF applied for the renewal of the licence to exploit the hydro plant.

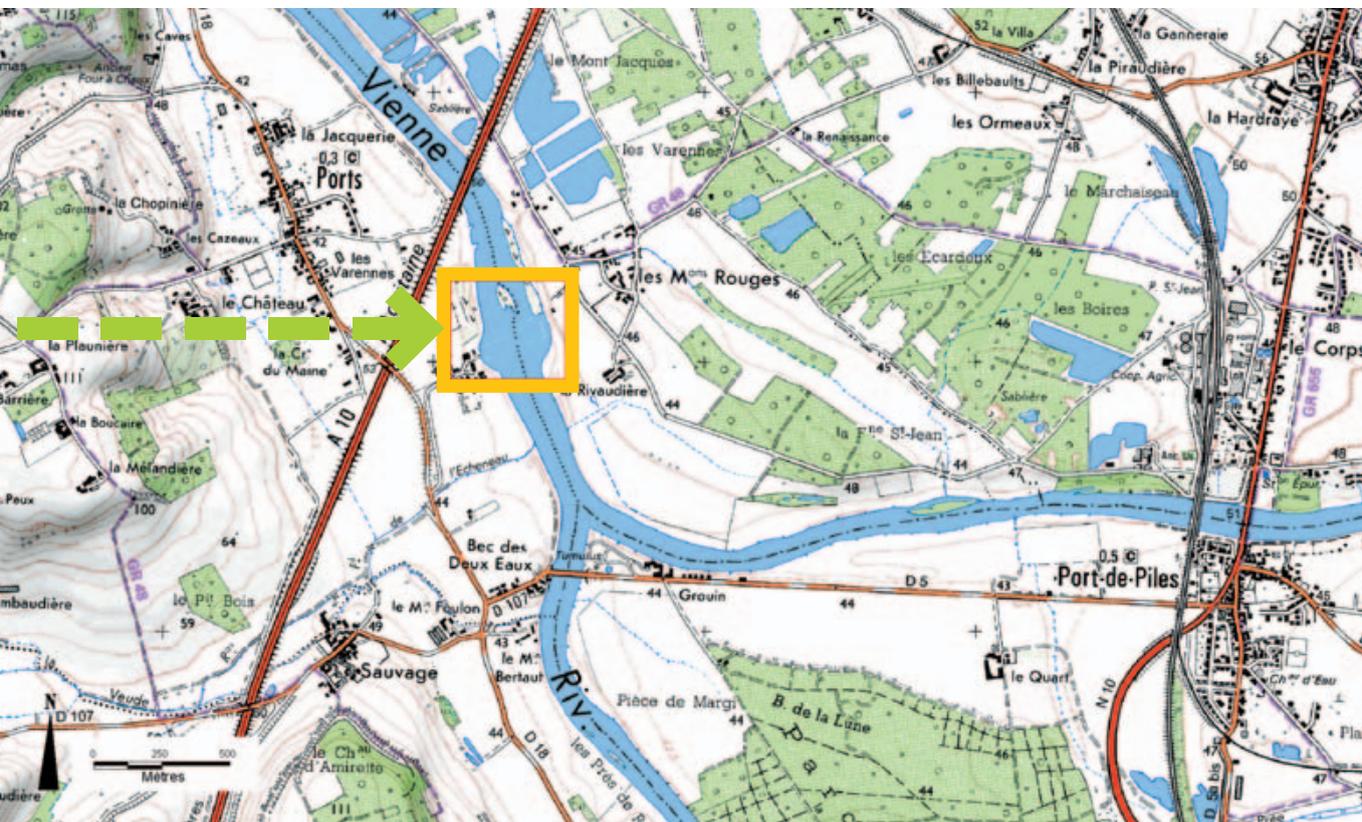
■ Opportunities to act

In January 1994, an inter-ministry committee announced the launch of a "Plan Loire Grandeur Nature" (long-term management plan for the River Loire), which included the removal of the Maisons-Rouges dam due to its numerous effects on river continuity and its low level of economic benefit. After the submission of an amendment to the licence renewal application, prefectural permission was not granted to EDF. The dismantling of the dam was then announced. The project did not meet with universal approval, especially from locally elected representatives and residents who feared that the dismantling would lead to a loss of business tax revenues and the loss of jobs, on the one hand, and the disappearance of the lake and the loss of the associated tourism benefits and scenic value, on the other. After four years of negotiations and enquiries, the removal of the Maisons-Rouges dam was scheduled.



Europa Technologies / Sanborn / Google 2008-2009

Satellite photo of the former site of the Maisons-Rouges dam. Alluvial banks have appeared and vegetation has grown on the banks.



■ Works and developments

The project consisted of partially removing the oblique dam and the mill building. The operation was carried out in three phases:

- Installation of protective dikes and removal of the transversal dam.
- Gradual lowering of the impoundment and removal of the protective dikes on the right bank.
- Installation of protective dikes on the left bank in order to maintain dry conditions on the worksite and for the demolition of the buildings.

The transversal dam, the three sluice gates and the flap were dismantled. A concrete slab was laid on the bottom of the river in order to limit the effects of bed scouring and slow down the downstream migration of sediments.

■ Regulatory approach

Information not provided.

■ Post-restoration management

No specific management measures were implemented.

■ Monitoring

An initial monitoring operation was carried out in 1995 for the preliminary studies and updated in 1998 prior to the removal operations. Major monitoring operations were then conducted each year from 1999 (end of works) to 2005, and again in 2009. This monitoring focused on the following components: hydromorphology and sedimentology, macro-invertebrates, large migratory fish and riparian vegetation.

■ Outcome of the project and outlook

The removal of the Maisons-Rouges dam was the first major dam removal operation in France (along with the Saint-Etienne-du-Vigan in Haute-Loire). The technical arguments concerning the impact of the structure on large migratory fish and river continuity were the keys to the success of this project. The results were very positive for all of the assessed components, and confirm the success of the operation.

The habitats of the low-water channel of the Creuse and Vienne, situated in the former impoundment area, have diversified. In 1988, the bottom of the impoundment bed was mainly covered with sands, whereas riffles have now appeared, incorporating coarser materials. Ten riffles have now re-emerged, six on the Creuse and four on the Vienne. Likewise, small islands, mainly consisting of gravel, have emerged. The substrate-velocity characteristics have become more heterogeneous, offering numerous biogenic environments for invertebrates and fish.



Michel Bramard – Onema

Persistent weir on the site of the Maisons-Rouge dam in July 2008.



Michel Bramard – Onema

The former impoundment of the Maisons-Rouges dam in July 2008 – nine years after its removal.



Laetitia Boulet-Berry – Onema

The Maisons-Rouges site in 2009 – ten years after its removal.

In 2000, the spreading of sediments retained in the dam led to siltation downstream, causing a significant loss of habitats for invertebrates. But in 2002 and 2005, following the occurrence of depletion phenomena in areas in which sediments had been deposited in 1999, habitats favourable to invertebrates reappeared and taxons which had been present before the arrival of the sediments have thus returned.

In 1996, the volume of sediments accumulated in the dam was estimated at 900,000 m³ (study by J-R. Malavoi, 1996-1997). Two years after the removal, the depletion involved 400,000 m³ of sediments which were than moving towards the Loire at an average speed of 2.8 km/year (Malavoi 2005). The investigations carried out in 2005 revealed that a

Costs

In euros excl. VAT

Cost of studies	1,130,00 francs i.e. €172,270
Cost of acquisitions	1,800,000 francs i.e. €274,400
Cost of operations and developments	14,170,000 francs i.e. €2,160,000
Cost of promotion	<i>Not applicable</i>
Total cost of the actions	17,100,000 francs excl. VAT i.e. €2,600,000

Financial partners and funding:

French State (65%), EDF (23%) and the Agence de l'Eau (Water Agency) (4%).

Technical partners of the project:

Elected representatives and users of the surrounding communes (towns and villages), Plan Loire Grandeur Nature, Logrami Association, CSP – Orléans delegation (which became the National Office for Water and Aquatic Environments in 2006) and the Departmental Fishing Federation.

large proportion of the materials in transit were currently blocked around the bridge at Pouzay, situated further downstream. The current advance of the sedimentation downstream of the former dam is very modest (amounting to an average thickness of a few tens of centimetres). Since the monitoring operations of 2005, several "natural" pools have been filled in and are thus reducing the speed and volumes of the migrating sediments.

With regard to flora, a significant development of the shrub layers and tree strata has been observed on the river banks of the Vienne and Creuse, and also on the alluvial banks within the area of the former dam. In 2009, an analysis of landscape changes revealed that a visitor discovering the landscape of the old dam would find it hard to imagine the previous layout of the site.

At the biological level, the monitoring of migratory fish instigated by the Conseil supérieur de la pêche (CSP-formerly ONEMA) and the Loire grands migrateurs (Logrami – Loire Large Migratory Fish) Association produced convincing results in terms of the recolonisation of the basin in 1999. These findings were confirmed in subsequent years. Thus, from 1999, in accordance with the forecasts, the shad started recolonising the 35 km of watercourses that had been made accessible (11 km on the Creuse and 24 km on the Vienne) and began rediscovering sites that were favourable to reproduction. Very

positive results were also obtained for the sea lamprey. Today, the Vienne basin is home to 80% of the sea lamprey contingent present in the Loire basin. As for the Atlantic salmon, improving results have been recorded at the Châteauponsac fish counter on the Gartempe in Haute-Vienne: nine adults were recorded there during the second half of 1999. Such observations had not been made since the building of the Maisons-Rouges dam. In 2004, 57 large Salmonidae spawners were recorded at the station, which is a record in recent times. The now systematic return of thick-lipped grey mullet to the Creuse and Vienne has also been observed beyond the two video-counter stations of Descartes (Creuse) and Châtellerault (Vienne).

Promotion of the operation

The removal of the Maisons-Rouges dam, which was one of the first examples of major dam removal in France, received extensive media coverage. This large-scale project was featured in local and national articles and in a video.



MALAVOI J-R., RICHARD N., JUGE P. (2005). *Suivi des impacts de l'arasement du barrage de maisons-rouges. Étude morpho-sédimentologique, études floristique et faunistique, suivi photographique et paysager*, AELB, DIREN Centre: 209.

ARTIGES C., HONG S., MOREL-FATIO A., VERGNON M. (2006). *Évaluation en appui des décisions publiques : retour d'expérience et perspectives dans le cas de quelques barrages en France*, MEDD, ENGREF : 98.

Project owner	French State
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