Removal of the dam on the Allier River at Saint-Étienne-du-Vigan

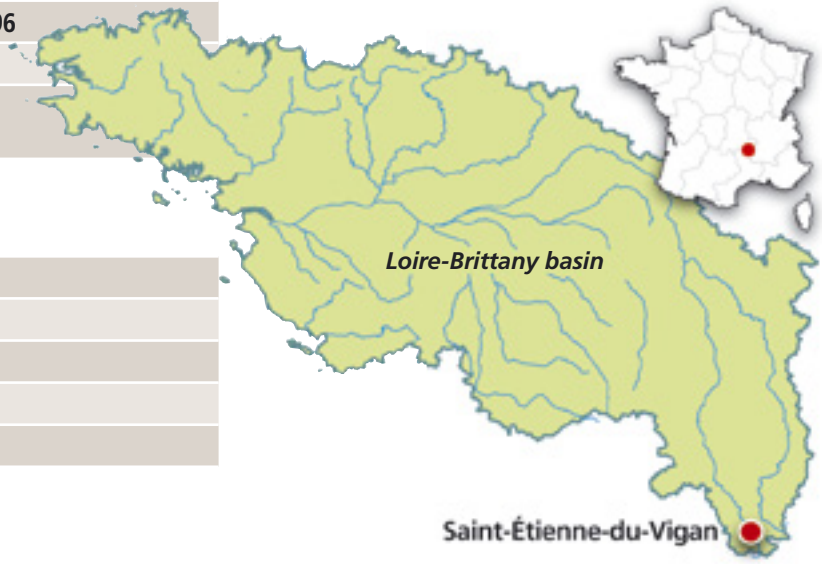
The operation

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

Start of operation	**November 1996**
End of operation	**July 1998**
Length of river affected by the works	**900 m**

The location

Country	**France**
River basin	**Loire-Bretagne**
Region(s)	**Auvergne, Languedoc-Roussillon**
Département(s)	**Haute-Loire, Lozère**
Commune(s)	**Saint-Étienne-du-Vigan, Naussac**



River in the restored sector

Name	**Allier**
Distance to source	**44 km**
Mean width	**20 m**
Mean gradient	**7.4‰**
Mean flow rate	**10.5 m³/s**

Aims of the project owner

• Restore river continuity to enable the return of migratory fish.

Environment and pressures

The Allier is a tributary to the Loire River and runs a total of 421 kilometres. Its basin covers a surface area of 14 310 square kilometres. The river constitutes an excellent habitat for migratory fish. Salmonids dominate in the fish community with brown trout, grayling and Atlantic salmon. A number of rheophilic cyprinid species are also present. Until the end of the 1800s, salmon represented a major source of revenue throughout the Loire-Allier basin. The gorges of the upper Allier River constitute some of the best spawning grounds in the entire basin.

In 1895, a power station was built on the banks of the Allier River to supply electricity to the towns of Langogne and Pradelles. The dam was 14 metres high and created a reservoir approximately 900 metres long. It was estimated that 30 000 cubic metres of sediment were blocked by the dam. No fish passes, for either upstream or downstream migration, were installed.

Old postcard

The dam in the early 1900s.

Regulatory context	**Regulated river**

European directive references

Water-body ref.:	**FRGR0141a**
Natura 2000 site ref.:	**FR8301075** (since 1999)

Henri Carmié – Onema

The town of Langogne and the *Force et Lumière du Velay* company were the owners from 1897 onwards, but sold the dam to *Électricité de France* (French national electricity company) in 1950. In 1993, ÉDF applied for a renewal of the license to operate the hydroelectric plant.

Opportunities to act

In January 1994, an interministerial decision announced the launch of the *Loire Grandeur Nature* plan which included the removal of the Saint-Étienne-du-Vigan dam due to its significant impact on river continuity. In October 1994, the licence was refused and the French State requested that EDF assume the cost of dismantling the dam.

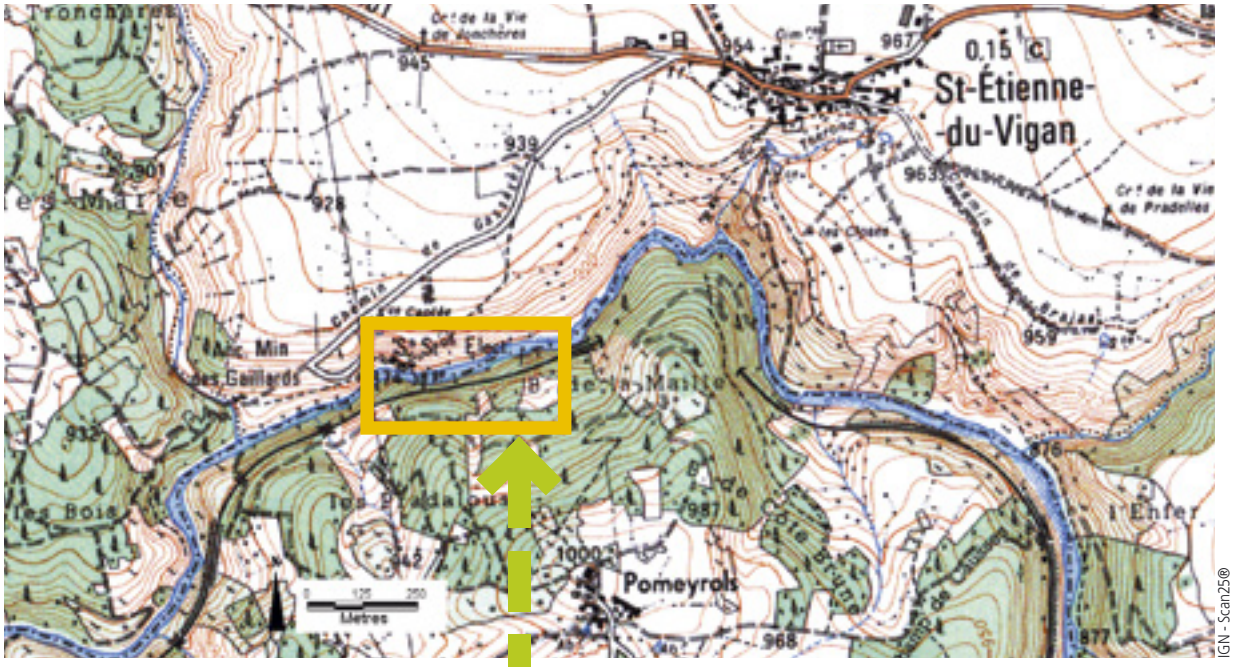
Works and developments

Works and developments

The work consisted of totally removing the dam and the power station. It took place in three phases:

- November 1996, demolition of the power station;
- January 1997, an additional gate was installed to empty the reservoir. Emptying of the reservoir took place in November 1997 during the high-water period in order to dilute the sediment at the bottom of the reservoir;
- spring 1998, the riverbed was bypassed to enable work under dry conditions, then on 24 June 1998, the dam was blown up because the layout of the site precluded the use of heavy machinery. The site was then restored to its original condition.

The Saint-Étienne-du-Vigan dam in 1996, following the demolition of the power station.



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European Rivers Network, SOS Loire Vivante, Roberto Epple

The demolition of the Saint-Étienne-du-Vigan dam in June 1998, using dynamite. The river water was rerouted along the right bank.

European Rivers Network, SOS Loire Vivante, Roberto Epple

The site following demolition of the dam in 1998.

Regulatory approach

The work was authorised in accordance with the Water law. The authorisation documents were drafted using the nomenclature in effect prior to 2006. Below are the corresponding articles in the new nomenclature:

3.2.4.0: Discharging of ponds or lakes

3.1.1.0: Installations, structures, embankments and groynes in the riverbed, constituting:

1. An obstacle to the flow of flood waters,

2. An obstacle to river continuity.

Post-restoration management

No particular management measures were taken.

Monitoring

In 1995, preliminary studies (sediment analysis) were carried out. During the work, water quality was monitored, notably to check the levels of suspended matter and ammonia. Following the work, EDF was obliged to monitor the banks of the reservoir for a period of three years. The objective was to verify the stability of the river banks because of a train line running in the immediate vicinity. Monitoring took the form of photographs taken a regular intervals. In addition, each year the *Loire grands migrateurs* (Logrami) association, in conjunction with Onema (national agency for water and aquatic environments), used a helicopter to count spawning grounds in the Allier basin.

Outcome of the project and outlook

The removal of the Saint-Étienne-du-Vigan dam restored both river continuity for fish and sediment transport. Salmon were observed just months later in spawning grounds upstream of the former dam, during the winter of 1998. The following year, approximately 40 spawning grounds were counted, representing 15% of all the spawning grounds in the Allier River.

These results are encouraging. Unfortunately, the existence of other dams downstream, e.g. Poutès-Monistrol, limits the recolonisation of the Upper Allier by salmon and explains the low upstream-migration rates observed in the last few years.

L. Fauron – Onema

The site of the Saint-Étienne-du-Vigan dam in October 1998, following the restoration work.

Costs

	In euros ex. VAT
Studies	**106,700 €**
Purchase of land	*Not applicable*
Works and developments	**1,158,600 €**
Promotion	*Not applicable*
Total cost of project	**1,265,300 €**

Financial partners and funding:
Preliminary studies: Ecology ministry, Water agency, EDF.
Demolition of the power station: EDF (70%), Water agency (30%).

Technical partner:
Water agency.

In terms of its morphology, the river is in the process of rapidly achieving a new balance. Sediment transport has restarted and now supplies the downstream spawning grounds with gravel.

A few years after the work, the transport of sediment downstream revealed the foundations of the former structure that was demolished to make way for the Saint-Étienne-du-Vigan dam. Additional work was therefore necessary to create a notch in the old weir.

The removal of the Saint-Étienne-du-Vigan dam was accompanied by an action plan to compensate the revenues lost by the town and to stimulate its economic development. The taxes drawn from the dam previously represented 7.5% of its tax revenue. The action plan included water sanitation, upgrading of farm buildings and enhancements for tourism. Unfortunately, the last point in the action plan was never executed.

Promotion of the project

Not applicable.

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, 77 + annexes.

Project owner	EDF
Contact	Pascal Bomassi National agency for water and aquatic environments. *pascal.bomassi@onema.fr*