

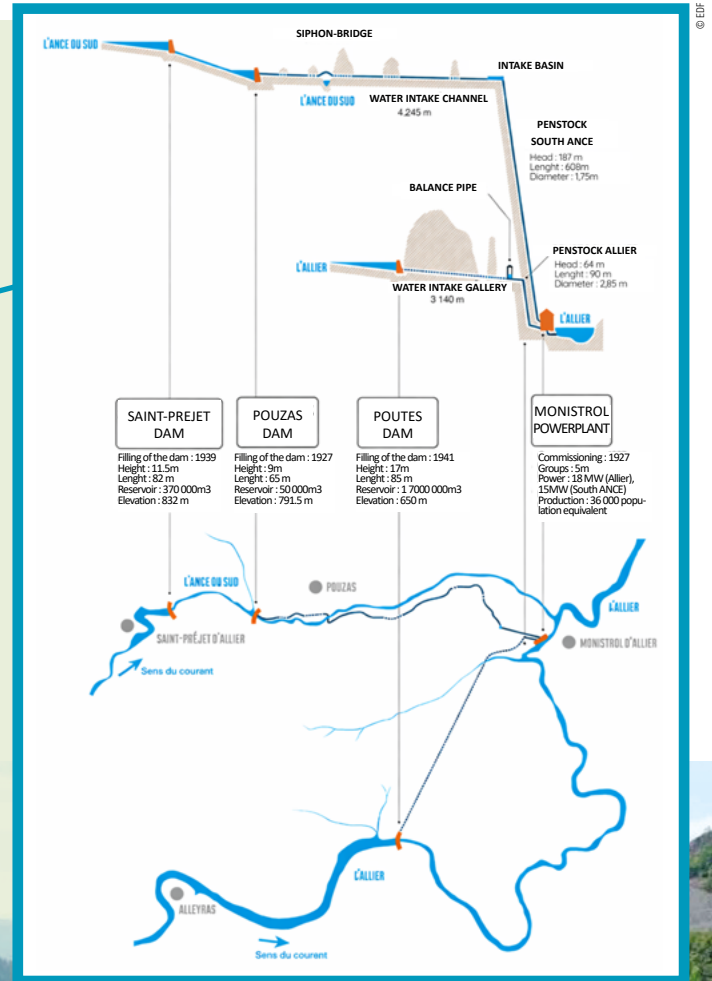
## CASE STUDY ON THE ALLIER BASIN



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# LOWERING AND RECONFIGURATING THE POUTÈS DAM

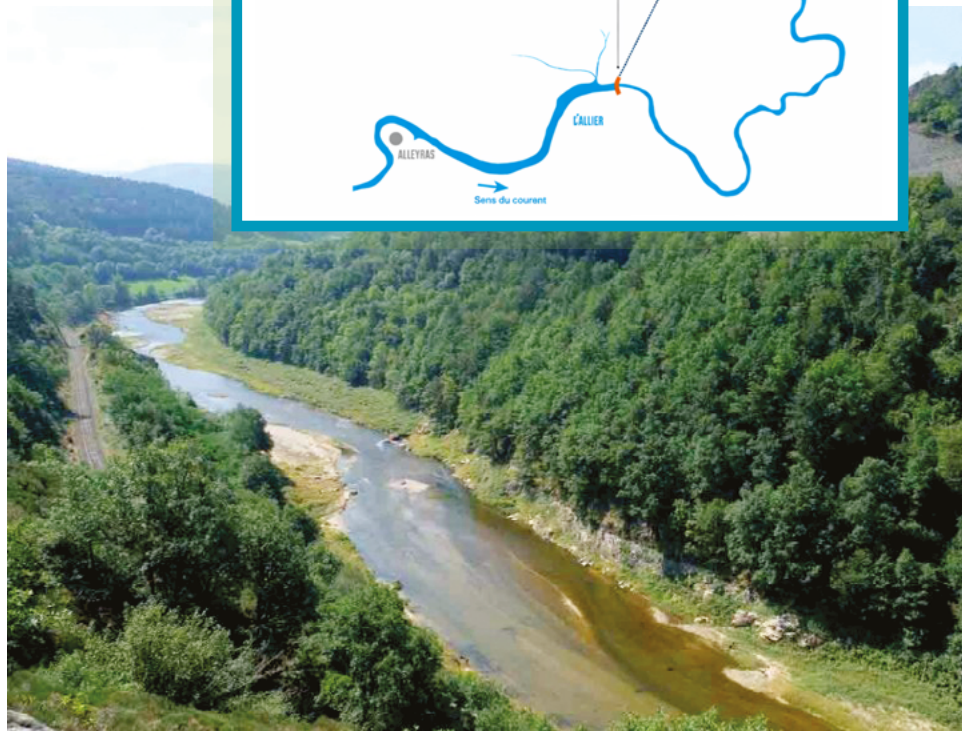


### LOCATION

On the Allier river  
Country : France (dept : Haute-Loire, 43)  
Watershed : Allier – Loire

### KEY NUMBERS

- **The Poutès-Monistrol d'Allier Hydroelectric Complex**  
**Installed capacity** : 27 MW (shared between 15 MW for the Ance du Sud section and 12 MW for Poutès).  
**Average annual production before/after reconfiguration** : 82 GWh/69.7 GWh or -15%
- **The Poutès Dam** :  
**Commissioned in** : 1941  
**Opening of the New Poutès** : October 24, 2022  
**Height before/after restructuring** : 17m/7m



↑ The Allier in its original bed upstream of Poutès, 2022

# The development of the Allier

The Poutès dam is part of the Poutès and Monistrol d'Allier hydroelectric system in the Haute Loire region. The project was an initiative of the Loire and Centre Electricity Company, aiming to harness the hydraulic power of two rivers - the Ance du Sud and the Allier - and direct it to a shared power plant in Monistrol d'Allier. Construction began in 1918. Originally, two dams were planned: one at Poutès on the Allier and another at Pouzas on the Ance du Sud. However, work at Poutès was halted in 1921 due to a labour shortage caused by the First World War.

As electricity demand continued to rise and the Pouzas reservoir proved too small, a second dam was built in 1939 on the Ance du Sud, about 1400 metres upstream in Saint Préjet d'Allier. Despite not having formal authorisation, in the context of the Second World War, construction of the Poutès dam resumed and was completed on 30th September 1941.

In 1956, EDF took concession of the development for a period of

fifty years. The electricity produced is equivalent to the household consumption of a town of around twenty thousand inhabitants.



↑ Construction of the Poutès dam

# A controversial hydroelectric complex

Located 879 kilometres from the estuary, the Poutès dam has long been held responsible for the dramatic decline of salmon in the Loire and Allier system, which is home to the last major population of wild migratory salmon in Europe.

The spawning grounds located upstream of Poutès produce more than two thirds of the juvenile salmon in the Allier basin. As early as 1897, the construction of the Saint Etienne du Vigan dam, which was completely impassable and located upstream of Poutès, had already eliminated 25 hectares of spawning habitat. The construction of the Poutès dam and the effects of its lock gates dealt an even more severe blow, sterilizing 120 hectares of spawning grounds and causing the disappearance of five sixths of the Allier salmon population.

In response, a fish lift was installed in 1986 and modifications were made to the Poutès dam. The Saint Etienne du Vigan dam was removed in 1998. An outlet for the downstream migration of young salmon was also created. Despite these efforts, the measures were considered insufficient, as they remained largely ineffective and significant problems persisted during downstream migration.

During the summer of 1991, members of the SOS Loire Vivante and Robin des Bois associations launched a campaign to save the salmon. As part of the operation known as the Salmon's Ascent, they denounced every obstacle in the Loire and Allier basin and peacefully occupied the EDF plant at Poutès Monistrol to protest against this barrier to migration.



↑ The Campaign "La remontée du saumon" ("The Salmon's Ascent") by SOS Loire Vivante and Robin des bois.

## Toward the New Poutès

For more than 20 years, nature protection groups, local elected officials and EDF were locked in a conflict over the future of the Poutès dam.

The real shift only began after the 2007 Grenelle Environment Round Table, which opened the door to constructive dialogue and gradually softened long-standing positions. These discussions led to several alternative scenarios for the dam. Between 2009 and 2011, EDF presented three proposals. The first two were rejected, one by local elected officials and the other by environmental organizations. The third proposal, however, was accepted by all parties. A compromise was finally reached: the dam would be lowered by 13 meters, extensively redesigned, and equipped with a fish pass. The Minister of Ecology then officially announced the reconfiguration of the Poutès dam.

In March 2015, EDF received a renewed concession for 50 years, with strict performance requirements for both upstream and downstream migration of migratory fish. The technical design of the project was then developed collaboratively with all stakeholders, including EDF, scientists, the state, environmental associations and local representatives. Initial tests were carried out in EDF's laboratories in Chatou. However, in May 2016, just two weeks before work was scheduled to begin, EDF suspended the project due to the company's financial difficulties. The following year, a new and more gradual timeline, which extended the work over 6 years instead of 5, was presented along with an adapted version of the project, now referred to as the New Optimised Poutès.



← New Poutès construction site

## Operation of the “Optimised New Poutès”

The overall operating principle remains unchanged. The system diverts water from the Allier to the Monistrol d'Allier power plant, located 10 kilometers downstream, in order to take advantage of the difference in elevation. The water reaches the plant through a gallery 3.3 kilometres long and 3.5 metres in diameter, excavated directly into the mountain.

The dam has been lowered by 10 meters, which makes it possible to supply the gallery directly without the lifting system, either by siphon or pumping, that had originally been planned.

Another major improvement is the installation of two large valves that are opened for 91 days each year. These openings are distributed throughout the year according to the periods when salmon migrate upstream and downstream and during major floods. During these 91 days, the structure becomes completely passable for both fish and sediment. The timing of these opening periods is determined by a committee that relies on monitoring cameras located downstream in Vichy and Langeac. Outside of these opening windows, fish passage is ensured not by a new fish pass but by the upgraded existing lift. The downstream migration outlet has also been optimised.



← Removal and destruction of valves on the Poutès



→ View of the New Poutès at the end of construction

# Comparison of the site before and after development

## BEFORE

**Height :** 17 m  
**Volume of retention :** 2,4 millions de m<sup>3</sup>  
**Length of retention :** 3,7 km

- Equipped with a lift connected by a succession of a slowdown pass and basin pass
- Equipped with a bypass outlet in 1986



## AFTER

**Height :** 7 m  
**Volume of retention :** 105 000 m<sup>3</sup>  
**Length of retention :** to 0 at 1.2 km according to the position of the valves

- Improvement of the fish lift through a secondary fish pass
- Improvement of the downstream outlet
- Total open period 91 days/year
- No more retention effect & dropping water temperature



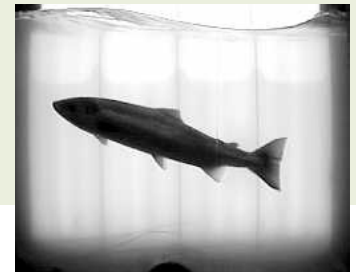
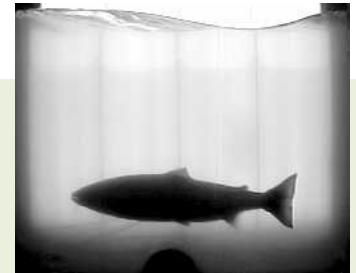
## The first results

For the downstream migration, several smolts are monitored using radio tracking as part of the AMBER European project. The first results show a remarkable improvement. When the dam is not in passable mode, the smolts now find the downstream outlet much more quickly than in previous years. The average time needed for smolts to find the outlet in 2015 was 10 days, which has been reduced to just 5.5 hours in 2023.

For upstream migration, the dam is equipped with an acoustic camera at

the level of the gates. In 2023, it is still not operational on the left gate. The fish lift, however, is equipped with an optical camera. During 2023, 2 salmon used the lift. An estimated 11 salmon passed through the opened dam. Since 2019, the start of the construction work and therefore the restoration of fish passage on the Allier, 127 salmon have passed Poutès either via the lift or the gate.

→ The first salmon of 2024 which were photographed at the Vichy counting station, 87 and 90 cm respectively.



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Find more information :

→ Website [www.ern.org](http://www.ern.org), in the "Solutions/Restoring" section

→ Book "New Poutès : The Story of a Reconciliation in Haute-Loire, Man and the Allier River, in french only", off-series of Eveil of the Haute-Loire, 2022, available from SOS Loire Vivante/ERN