CASE STUDY ON THE SÉLUNE BASIN

TOWARDS A FREE SÉLUNE RIVER

THE LARGEST DAM REMOVAL IN EUROPE, 2023

SOS Loire Vivante
ERN EUROPEAN RIVERS NETWORK

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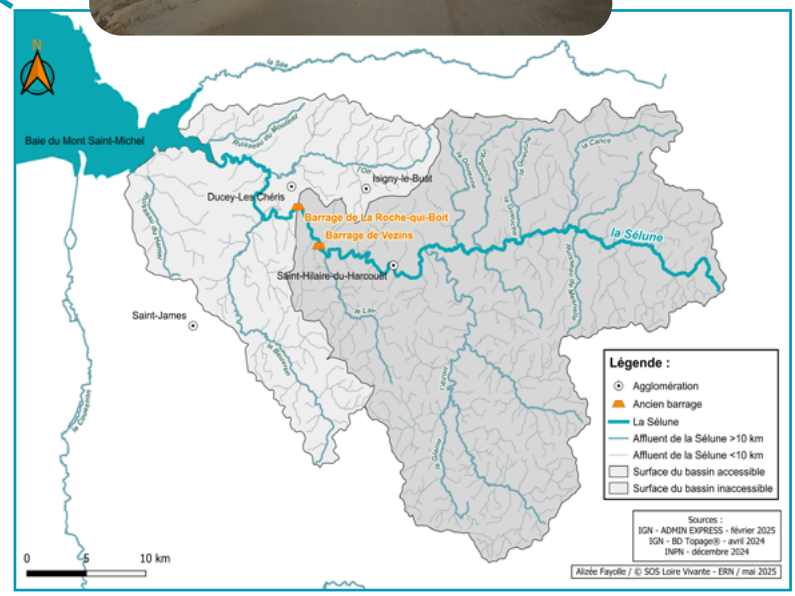
← Mont-Saint-Michel Bay



LOCATION

On the Sélune river
Country: France (dept Manche, 50)
Region : Normandie
Watershed : Sélune

KEY NUMBERS

- **Vezins dam**

Height : 36m
Length : 278m
Installed capacity : 12.6 MW
Annual production : 20 GWh
Reservoir length : 19 km
Reservoir volume : 19 million m³
Start of removal work : June 2019
End of removal : September 2020

- **La-Roche-qui-Boit dam**

Height : 16 m
Lenght : 129 m
Installed capacity : 1,6 MW
Annual production : 4,7 GWh
Reservoir length : 1,4 millions m³
Reservoir volume : 4 km
Start of removal work : June 2022
End of removal : April 2023

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↑ The waterway has been restored to its natural state following the dismantling of the Vezins dam

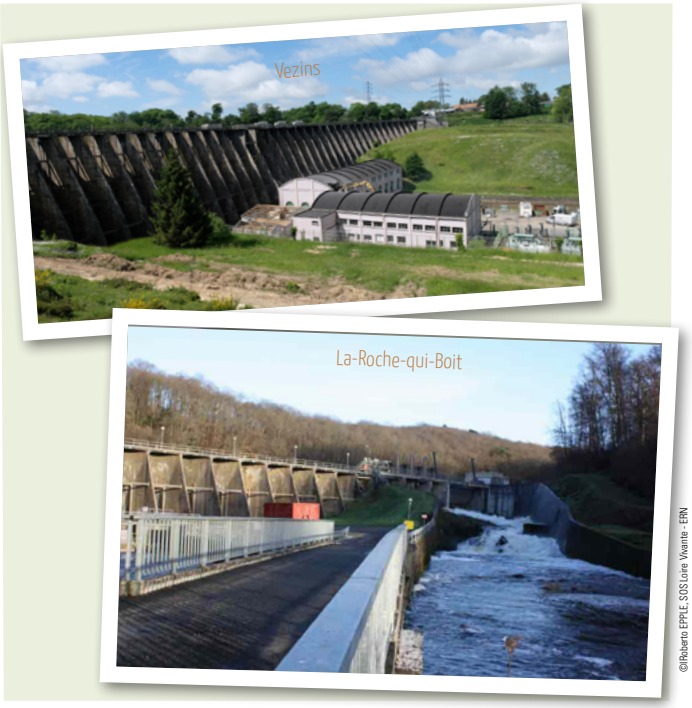
Removing the dams - a necessity for the life of the river

The Sélune is a coastal river in Normandy that has undergone major transformations over the past century, particularly following the construction of the large hydroelectric dams at Vezins (36 m) and La Roche-qui-Boit (16 m). Built between 1916 and 1932, these structures profoundly disrupted the river's natural dynamics by blocking the migration routes of fish and altering sediment transport.

By 2010, the amount of sediment trapped in the two reservoirs was estimated at 2.4 million m^3, 2 million in Vezins and 0.4 million in La Roche-qui-Boit. The loss of landscape connectivity and the deterioration of water quality, notably due to cyanobacteria blooms and the resulting ban on swimming, gradually weakened the entire watershed ecosystem. This led to the near disappearance of the Atlantic salmon, the European eel, and the sea lamprey in the area. All were restricted to the lower reaches of the river.

The fact that the dams could not be brought up to regulatory standards, combined with the poor water quality, low energy productivity, and the impossibility of modifying the structures, led environmental associations and elected officials from the Sélune River Basin Committee to call for their removal once the concession expired in 2007. On November 13, 2009, the Secretary of State for Ecology, Chantal Jouanno, officially announced that the concessions would not be renewed and that the dams would be dismantled.

This decision was confirmed in 2012 through decrees ordering the cessation of operations. Although local opposition emerged and the project was suspended by Minister Ségolène Royal in 2014, the process was relaunched in 2017 by Minister Nicolas Hulot. The dismantling of both dams was completed in the spring of 2023.



↑ The Sélune, blocked for over a century by the Vezins and La-Roche-qui-Boit dams

Local controversies versus national and international support

Although the project is grounded in solid scientific principles, it has nonetheless sparked significant concern and strong local opposition. Many residents who had developed a deep attachment to the artificial lakes, which were now used for recreation and tourist areas, feared the socio-economic repercussions of their removal. Their worries included a decline in tourist appeal, potential changes in land use, and the loss of a landscape that had become part of their identity. Others criticised the decision-making process itself, denouncing top-down choices, the lack of communication between 2009 and 2012, and a process they viewed as incomplete and overly technical. This opposition was notably expressed through the mobilisation of local associations such as *Les Amis du Barrage*.

Conversely, the project enjoys broad support from the local water management body and the collective *Les Amies de la Sélune*, which brings together 52 civil society organisations in France and abroad, including the European Rivers Network, the National Federation of Fishing in France, France Nature Environnement, and the Humus Foundation. These groups emphasise the importance of restoring European waterways, fulfilling the commitments of the Grenelle de l'Environnement, and adhering to the national framework for sustainable hydroelectricity.

The valley restoration initiative also contributes to the objectives of the Water Framework Directive, which requires member states to achieve a good ecological status for watercourses and remove barriers to the movement of migratory fish. Environmental studies further highlight the exceptional potential for biodiversity recovery, particularly through the return of migratory species once the river is restored.

↑ Reservoir lake of Vezins dam

A major scientific programme

Given the scale of the project, the state commissioned numerous studies to guide technical decisions. From 2012 to 2027, a multidisciplinary scientific programme led by INRAE was launched to monitor the effects of restoring the river. This programme brings together 16 research projects and around 60 scientists from various institutions spanning geology, hydrology, chemistry, biology, as well as the humanities and social sciences. It is structured into three phases: a pre-work assessment phase (2012–2019), the construction phase (2019–2023), and the restoration phase (2023–2027). The research focuses on three major themes: river dynamics, aquatic and terrestrial biodiversity, and territorial transformations. An observatory has been established, and environmental monitoring data are made publicly available on the Sélune program website.

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↑ Scientific monitoring through electrofishing in rivers

2019-2023 - The deconstuction phase

Three major stages were defined for the construction phase. The first concerned sediment management. This operation was carried out between 2017 and 2019 for the Vezins dam (under state supervision) and between 2020 and 2021 for the La Roche-qui-Boit dam (under EDF supervision). Its purpose was to clear the riverbed. The sediments were recovered and used to reshape the banks, preventing them from being transported downstream. In total, 500,000 m^3 of sediment from the Vezins reservoir and 160,000 m^3 from La Roche-qui-Boit were reused. Contaminated sediments from the Yvrande tributary, which had been polluted by former industrial activity, required specific treatment and secure storage.

The second stage involved the complex draining of both reservoirs. Draining began in 2019 for Vezins and in spring 2022 for La Roche-qui-Boit. The volumes of water released amounted to 19 million m^3 for Vezins and 1.5 million m^3 for La Roche-qui-Boit.

A salvage fishing operation accompanied this process, during which 17 tonnes of fish, mainly white fish and catfish, were captured.

The third stage consisted of dismantling the dams: Vezins between 2019 and 2020, and La Roche-qui-Boit between 2022 and spring 2023. Both structures were deconstructed using a “snacking” technique, removing the dam progressively from top to bottom. The recovered materials were crushed and stored on site to reduce transport and limit CO_2 emissions.

Following these three stages, compensatory measures were implemented under the exemption order for protected species. Several species were identified, and new habitats, such as ponds and bat roosts, were created near the former Vezins dam.

VEZINS DAM

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LA-ROCHE-QUI-BOIT DAM

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↑ A look back at the large-scale construction projects that transformed the river and its surroundings

Revival of the Sélune valley after the dismantling of the dams

Just one year after the dams were removed, observations confirmed the return of migratory fish such as Atlantic salmon, European eels, and sea lampreys upstream of the former structures. In July 2023, up to 110 lamprey spawning grounds were recorded, and scientific electrofishing revealed the first generation of salmon born upstream in more than a century. Environmental DNA (eDNA) analyses, along with scientific fishing surveys, further validated these findings.

Since the dismantling of the dams, the river ecosystem has regained its natural sediment dynamics, and the ecological condition of the former reservoirs has begun to improve. Fine sediments, once trapped behind the dams, now move freely and contribute nutrients that support downstream biodiversity, particularly in the Sélune estuary. Coarser sediments are gradually redistributed during floods, helping restore the river's natural balance. Oxygen levels in the water have risen, and species sensitive to pollution have reappeared. The riverbanks are slowly revegetating. In addition, summer water temperatures downstream have dropped by about 2°C, with daily variations now clearly visible. These are highly encouraging signs.

Following the removal of the dams, new natural areas have emerged, and an initial educational trail has been created. It offers residents and visitors an opportunity to explore the site's history and better understand this restored environment.

Impact on floods

The scientific program also sought to assess the impact of the dams on flooding. Since 2014, two monitoring stations have been installed upstream and downstream of the structures, at Viney Bridge and Signy, to track the river's hydrological dynamics and analyze variations in flow before and after the removal of the dams.

The results show that flow rates at both stations are similar, whether the dams are present or not. This indicates that the structures did not increase evaporation and had no influence on flood dynamics in the alluvial plains. The dams therefore played no role in managing floods on the Sélune, and their removal does not increase the risk of flooding downstream. Flood risk has always existed in the valley, but it has been amplified over time by urbanization, land-use changes, and climate change.

To reduce this risk, water circulation must be slowed by restoring vegetation on the river banks, improving rainwater infiltration, and limiting soil sealing and artificial surfaces.

A wealth of instructive feedback

The Sélune project is one of the most ambitious river restoration initiatives to date in Europe. Its scientific monitoring, which will continue through 2027, offers a valuable body of evidence and recommendations that can inform similar projects elsewhere.

The removal of the dams marks a turning point for the Sélune. Over time, the valley will gradually recover its natural dynamics, biodiversity, and landscape.

However, the shortcomings of the consultation process remain the project's main weakness and continue to complicate the alignment between the ecological objectives and the expectations of the local community. The ecological project underestimated, or even overlooked, residents' attachment to the lakes and the strong opposition expressed by several local associations. At the same time, territorial planning efforts did not sufficiently prepare inhabitants for the transformation of their living environment. Despite this, recent surveys show that the new landscape is generally well received. The development of wooded areas aligns with residents' desire for quiet, natural spaces. New associations are now becoming involved in the valley, exploring and rediscovering its ecological, archaeological, and landscape heritage.

↑ The river regains its natural course following restoration and the deconstruction of the La Roche-qui-Boit dam

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Find more information :

→ ERN, Removal of two large dams (Vezins et Roche qui boit) to free the Sélune River !
→ ERN, International symposium on the Sélune (2019) and webinaire (2024)
→ OFB, Summary of the Selune symposium
→ Programme Sélune, The Sélune scientific programme
→ Préfet de la Manche, Objective Sélune : restoring a vibrant valley