ENABLING RIVER RESTORATION: THE FRENCH EXPERIENCE

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Abstract

In 1964 France defined a water management framework that led to the creation of 6 water agencies and 7 river basin committees (including Corsica). The water agencies are responsible for improving the quality of aquatic environments so that the objectives of the EU water framework directives (WFD) are met. They collect environmental taxes and give subsidies to municipalities, industrial or agricultural units to reduce pollution or carry out river restoration.

In 1992, France adopted a "water law" which resulted in river basin management plans that were approved in 1996. These plans set up fundamental principles for real integrated water management (water is the 'common heritage of the Nation'), such as the necessity to implement river management at the catchment scale and to improve water quality as well as aquatic habitats. They set up objectives in terms of ecological river restoration. In France, the first truly ambitious river restoration projects took place at the end of the 90s. In the Rhone Mediterranean and Corsican river basin, a policy to make space for water was also implemented. At the time, the main aim was to preserve and restore the space a river needs to meet its ecological processes (sediment equilibrium, connection to wetlands etc.). Later the benefits of a "space for river policy" in terms of flood protection also became more acknowledged.

Following the adoption of the water framework directive, the protection and restoration of aquatic environments was made one of the main priorities to achieve good ecological status. A focus on the Rhône-Mediterranean river basin reveals that 35% of water bodies are not in good ecological status because they have an altered hydrological regime. 45% have their ecological continuity disrupted by dams and weirs and 49% have a degraded morphology.
In 2013, France published a list of river reaches on which it was made compulsory to restore ecological continuity within 5 years. On the Rhone Mediterranean basin, a little less than 1400 weirs and dams were identified on this list as a priority. Between 2013 and 2018, ecological continuity was restored on approximately 1000 weirs. The 5 year deadline to complete the restoration of ecological continuity on those priority reaches had to be extended, as the work took more time than originally planned. Nonetheless, projects to remove weirs, build a fish pass or a by-pass river, to open flood gates to restore sediment continuity during morphogenic floods have become more common and more integrated, taking into account the various uses of the weirs into the project designs.

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In addition, every year, substantial morphological restoration is carried out on between 100km and 120km of degraded river reaches on the Rhone Mediterranean river basin. Such work includes the remeandering of straightened river reaches, the removal or setting back of embankment to make space for river, the restoration of riparian vegetation, input of coarse sediment in incised river reaches etc.

Such projects are vital at a time when climate change leads to more extreme events, including droughts leading to more prolonged dry riverbed reaches. These projects enable fish communities to reach more preserved areas during extreme conditions so they can become more resilient.

Linking river restoration with flood protection has proved to be complex for a various reasons. Traditional engineering solutions to implement flood protection have often relied on hard engineering, artificially straightening and widening river channels, removing riparian vegetation and building unsustainable embankments very close to the river. Such channelization has usually been made at the expense of biodiversity.

In addition, the stakeholders dealing with ecology and river restoration and those dealing with flood risk would be different, and might bring forward divergent river management solutions. There has been a cultural gap between those stakeholders

Several measures were taken to address this issue. The 27 January 2014 law on the modernization of public action established a targeted, mandatory competence linked to the management of aquatic environments and flood prevention, entrusting it to communes and groups of communes. In 2018, the responsibility for the maintenance and restoration of rivers and flood-protection structures now belongs exclusively to communes and their public intercommunal cooperation structures with taxation powers (EPCI FP).

On the Rhone Mediterranean basin, WFD river basin management plan and flood risk management plan are coherent as they contain similar chapters, carefully elaborated with state services responsible for flood risk and ecological river restoration. A map that shows priorities in terms of flood risk and river restoration has been inserted in both documents and nature based solutions are promoted.

Nature based solutions can both restore nature and tackle flood risk. They are also very advantageous for water depollution or replenishing groundwater. In France, these solutions have been operative in many territories. They typically involve 3 key ideas:

- Leaving more space for the river: opening up the river and increasing flood expansion areas. This is also a solution applied in several other countries: e.g. the "room for the river" program in the Netherlands or "making space for water", its English equivalent.
- Slowing down river flows: re-meandering, restoring sediment transport continuity, restoring riparian and floodplain vegetation where suitable.
- Managing water at a catchment scale: governance at the catchment scale is essential to make the right decisions and promote upstream - downstream solidarity to prevent floods.

Nature based solutions also bring multiple co-benefits as they contribute to climate change adaptation, improve water quality, and bring multiple socio-economic benefits. In 1997, 4km of embankments were setback from 100m to 200m on the river Durance, in South-East France. This avoided 10M€ as compared to the reconstruction of the embankments too close to the river that would be more costly to rebuilt and would cost much more in terms of maintenance. With more room, the river has now widened and some protected species have come back. On the same river, in the area of Saint Maurice de Manosque, it was estimated that the cost of setting back 400m of embankments would save 400k€ (2016). Protecting and restoring the space for river has become a top priority.

There is still some way to go reach the objectives set by the WFD in terms of river restoration. The cultural gap between hydraulic engineers and environmental engineers will need to be bridged and a stronger political will to implement nature based solutions would help. It is still a work in progress, but progress is being made, with climate change becoming a key driver of change as our territories need to adapt.