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Meetings

Restoration of river continuity: model initiatives across France and Europe

Summary of a day workshop organised by the French Agency for Biodiversity on 9 November 2017 in the Paris region (Ile-de-France), with the Yvette valley hydraulic-development syndicate (SIAHVY) and the regional nature park of the upper Chevreuse valley during the European Centre for River Restoration General Members' Meeting, held in France for the first time.

The French National River Restoration Centre, led by the French Agency for Biodiversity (AFB), organised a workshop and field visits on river continuity restoration initiatives. This was an opportunity for practitioners involved in the management of aquatic environments to discover reproducible actions targeting multiple issues, carried out in Italy, the United Kingdom, Finland and France, with the example of the River Mérantaise.

In order to meet the objectives for good status of water bodies set out by the Water Framework Directive, the restoration of hydromorphology and river continuity are a major lever, in addition to actions to fight diffuse pollution and manage water resources. Many dykes, weirs and dams have been built over the past decades, resulting in the fragmentation of natural environments and alteration of the morphology and hydrological regime of watercourses.

Many restoration actions have therefore been taken in recent years, driven by national regulations. To support and speed up the implementation of these projects, national river restoration centres have been created in many European countries, such as in France in 2016, which also belongs to the European Centre for River Restoration (ECRR).

These organisations, which are mainly resource centres, are essential for promoting the development of restoration by

View from the Gibeciaux watermill in Gif-sur-Yvette after work on the River Mérantaise.

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Martin Janes, President of *the European Centre for River Restoration (ECRR)* and Director of *the River Restoration Centre in the UK (RRC UK)*

The ECRR brings together 14 existing national centres and over 800 members with the aim of sharing know-how, promoting best practice and understanding national policies or organisational systems.
Events like the one organised by the French Agency for Biodiversity and the National River Restoration Centre are key for promoting river restoration.
It is also important to communicate on these actions and their results in fighting flooding and improving landscapes. This day of discussion and field visits was important for recognising the efforts of local stakeholders who carried out actions on the River Mérantaise.

helping aquatic environment practitioners develop contacts, providing access to expertise and sharing feedback.

In this context, the French National River Restoration Centre (CNRR) organised a meeting of the European network on 9 November 2017 for the first time in France, with the support of the Yvette valley hydraulic-development syndicate (SIAHVY) and the regional nature park of the upper Chevreuse valley (Haute Vallée de Chevreuse Regional Nature Park). This event was also the opportunity to present projects for the restoration of river continuity through European examples (UK, Finland and Italy) and actions carried out on the River Mérantaise for France. In addition to the main aim of improving the ecological status of watercourses, restoring river continuity can also meet other aims such as contributing to the development of recreational fishing, flood mitigation or slowing coastal erosion by promoting sediment transfer.

Restoration in response to diverse issues

The restoration of watercourse continuity largely depends on the local, national and even regional context. However, this approach is not always easy to implement, regardless of the country. The lack of sufficient financial resources, difficulty of some local stakeholders in taking ownership of issues and the lack of acceptability or leadership for these projects are just some of the barriers limiting the development of these actions. To promote the interest in restoration and facilitate its implementation, the bodies responsible for these actions can also draw on other issues not directly associated with gains in aquatic environments. Restoring the continuity of a watercourse will, in many cases, reduce the risks of flooding and make landscapes more attractive, while even preserving and promoting historical heritage.

Although the European directives (water framework, habitats and floods) provide the main frameworks for river restoration, the local approach used in the United Kingdom varies depending on the country: in Northern Ireland, actions are mainly aimed at reducing flood risks, whereas in England and Scotland, these approaches mainly seek to provide a solution that targets multiple issues.

In England, restoration actions mainly focus on a network of 44 rivers, which show signs of degradation despite their protected status as Sites of Special Scientific Interest (SSSI). The Environment Agency (EA) implements its policy by relying on the commitment of local organisations that draw up action plans for a basin or sub-basin in partnership with local stakeholders (trusts, private stakeholders, volunteers). "*108 local and non-governmental organisations are currently involved in restoration programmes,*" explains Martin Janes, Director of the River Restoration Centre in the United Kingdom (RRC UK). This type of initiative is paying off, much like the results of the £6 million River Improvement Fund programme, which sought to improve migratory fish habitats (North Atlantic salmon and European eel). In total, between 2010 and 2014, this programme, led by 26 river trusts, succeeded in fitting fish passes, easing or removing 233 barriers to migration and improving the ecological potential.

Mareta River, Bolzano Province, before restoration work in 2005, Stanghe, Italy.

Mareta River, Bolzano Province, after removal of check weirs in 2010, Stanghe, Italy.

Recurring problem of hydroelectric facilities

The issue of migratory fish movement and their habitats is also at the heart of the current river restoration initiative in Finland. There, facilities have been installed on most rivers capable of producing hydroelectric power, most without fish ladders, leading to a decline in salmon and trout populations.

A strategy was therefore defined in 2012 to promote the removal of river obstructions, especially hydroelectric plants no longer in operation, with priority given to rivers with endangered migratory fish, such as salmon and sea trout. Municipalities decided to remove hydroelectric structures in favour of restoring their rivers for leisure and fishing, such as projects in Vantaa and Jyväskyla. The structures that were left in place have been transformed into natural weirs or fitted with bypass channels, providing habitats, like the urban stream in Imatra in 2015.

Elizabeth Trimbach, owner of the Gibeciaux watermill

We were commited to working with SIAHVY from the start of this hydraulic and ecological restoration project. The project took over seven years to complete. We needed to bring our requirements into line with the priorities of the Seine-Normandie water agency, which provided most of the funding.
We wanted to keep the characteristics of the garden and a water network that respects the Gibeciaux watermill as a historical landmark. We therefore struck a compromise. For example, we agreed to modify the banks and re-establish a riparian vegetation, but we considered their maintenance too complex, which will therefore be carried out at least twice a year by the syndicate. We are generally satisfied with the restoration and any high waters since have not overflowed from the river bed, despite this being a common occurrence in the past!

The large number of barriers and small hydroelectric plants on watercourses is also an increasing problem in Italy. "*These barriers retain sediments upstream, leading to coastal erosion. The modification or removal of these barriers has become important because erosion is now responsible for financial losses. In the past forty years, Italy has lost 14.5 km² of beach,*" explained Giancarlo Gusmaroli from the Italian national centre (Cirf). On the Noce River, 18 of the 25 barriers were lowered between 2001 and 2006, enabling the watercourse to resume its ecological function and the beach to grow once again along the Tortora coastline (Calabria). Another example of restoration is the Mareta River in Northern Italy, which was home to numerous structures and major sediment extraction for the construction of a motorway in the 1970s. A major incision and narrowing of the river bed led to the disappearance of water retention zones, exposing the Vipiteno basin to more intense flooding. Thirty years later, restoration actions were carried out to extend and recreate the river bed. 16 weirs were also destroyed along a 2 km stretch in order to ensure longitudinal continuity on the Mareta.

Despite these encouraging and remarkable projects, restoration is likely to encounter new difficulties due to the growth of small hydroelectric plants in Italy. "*Between 2009 and 2013, the number of plants increased by 53%,*" despaired Giancarlo Gusmaroli, *"despite very low energy gains (0.8% of installed capacity).*" However, one piece of good news is that since 2016, a new legislative framework has required that each basin agency develop a sediment management plan for the 2021 update of their WFD management plan.

The Mérantaise – an ambitious restoration project

In France, many ambitious operations have been carried out over the past ten years to target multiple issues, including on the Mérantaise. This tributary of the Yvette River is classified on List 2 under Article L214-17 of the French Environmental Code and is a registered biological reservoir for brown trout. Many structures have been installed on the river in recent centuries. These structures altered the morphology and hydrological regime of the Mérantaise, preventing river continuity and causing major flooding in the municipality of Gif-sur-Yvette (in particular in 2007). Several projects and actions have been launched to preserve and restore this watercourse by HVC RNP upstream and SIAHVY downstream.

"After an initial essentially hydraulic project was refused in 2009, a second including both flood mitigation and restoration of river continuity was approved by the Seine-Normandie water agency, which provided 80% of funding," explained Jérôme Rozanski, Head of Natural Environments at SIAHVY. After many years of discussion and studies, the project ran from 2013 to 2015, with the aim of renaturing a 1,300 metre stretch of the Mérantaise around the municipality of Gif-sur-Yvette, in order to make high-quality habitats more accessible for brown trout upstream.

Michel Barret, President of the Yvette valley hydraulic-development syndicate (SIAHVY)

The SIAHVY has drawn on its expertise to contribute to the overall management of the water cycle and manage watercourse restoration projects with the secondary aim of flood mitigation. Significant background work and studies have been carried out to reconcile these two issues, which have now become a prerequisite for all new projects. It is a difficult balance to strike and still faces opposition from some residents scared of change. The example of the Mérantaise is a real success story and the many actions carried out show that it is possible, effective and reproducible. It simply requires working with local stakeholders and players to find the best solutions to reconcile restoration of river continuity with flood mitigation.

Alexis Pasquet, *European Rivers Network France*

This meeting is important for discovering real examples of river restoration and meeting the practitioners involved in these initiatives. The example of the Mérantaise also shows that an area lagging behind can be transformed into a positive example in just a few years. We also have lots to learn from feedback from European countries such as England, which places consultation and the involvement of local stakeholders and citizens at the heart of their actions.
We therefore need to increase the number of sources of information to promote these initiatives and make them accessible in order to make progress in this area. The principle of discussion and exchange used throughout the event is designed to develop new perspectives and innovative approaches.

A total of six structures were removed in various sectors (upstream, middle and downstream) and a cumulated 9 metres of headwater were eliminated.

These operations were carried out on private land and consultation with owners was required before project approval. Heritage aspects were also taken into account, such as the Le Lavoir and Gibeciaux watermill sites and CNRS park. "*The owners of the restored sites* ***demonstrated real solidarity*** *to protect downstream dwellings from the risk of flooding,*" explains Jérôme Rozanski, adding that "*flood mitigation remained the project's no. 1 objective.*" With the rehabilitation of the spillway, the watercourse can now absorb a fifty-year flood with a flowrate of 8 m^3 per second. These structures have already proven their effectiveness during the floods of June 2016. The work re-established river continuity over a nearly 4-kilometre stretch, but fully impassable barriers still exist upstream, at the Ors watermill.

However, this barrier is not likely to last forever. The watermill is one of the priority targets of the river continuity restoration programme carried out by the HCV RNP. Fish, spawning ground and barrier inventories established in partnership with Irstea since 2008 have shown that the Ors watermill and building are an upstream limit to trout colonisation, despite favourable rearing and spawning habitat being available upstream. However, it is not easy to remove this structure and restore the watercourse. "*This watermill still welcomes visitors and the issue of preservation of built heritage is also important. We need to reconcile these two approaches,*" explained Virginie Pastor, head of the rivers unit at HCV RNP. Especially as "*the 1.5 metre weir is essential to maintaining the road and bridge.*" The proposed restoration project has been submitted to the DDT (departmental directorate for territories) and consists in conserving the old millstream and creating a bypass channel to go round the weir. If the project is approved, work could start as early as 2020. ■

River barrier at the Ors watermill on the Mérantaise, 9 November 2017.

Find out more

About the discussion workshop and work on the Mérantaise: http://www.onema.fr/node/4286

About the National River Restoration Centre, by visiting the watercourse resource centre website:

In English: http://www.river-restoration.onema.fr and http://www.coursdeau.fr/

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Josée Peress and Marion Colin (AFB)

Meetings

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