Restoring Europe's Rivers

RESTORE Events: Reporting

Field visit in France

Removal of water level management structures and river restoration

DATES

11th and 12th October

LOCATION

Sèvre Nantaise basin, Loire Valley

LIFE 09INF/UK/000032

The RESTORE project is made possible with the contribution of the LIFE+ financial instrument of the European Community

and works in partnership with

1. Key issues identified

Water level management structures were installed historically to control water levels across Europe. However scientific research has since shown that they have a detrimental impact on rivers, altering the natural flow regime and preventing natural processes from occurring.

Feedback from previous RESTORE workshops suggested that there was a need for examples where this issue had been approached. This event aimed to answer calls for:

- Fresh approaches to planning and implementing river restoration to meet WFD objectives.
- Practical examples of weir removal and structure lowering/ modification.

2. Event details

Over the two days, different approaches to overcoming barriers were visited. On-site discussions focused on the challenges facing organisations aiming to deliver multi-objective projects, and on technicalities relating to the delivery of the schemes visited. The Loire valley draining an area of 2350km² comprises main rivers and secondary networks of channels more than 2000km in length. Sites were visited on three rivers in the Sèvre Nantaise basin on the Rivers Ouine, Sèvre and Moine.

- On the River Ouine, structures have been removed as they significantly impacted morphology and fisheries. A variety of restoration measures (bank re-profiling and diversification of bed substrate) were trialled to assess their benefit.
- On the River Sèvre, water level management structures built to control water level, had led to fish passage issues and bed scour and associated erosion. An ox-bow lake was reconnected to bypass the structure and a shallow lake has been constructed to enhance fish spawning.
- On the River Moine, a valve was opened on a permanent basis to trial the impact this would have on morphology and fish. The pilot was so successful that six structures have been subsequently removed through Cholet. This has improved connectivity with the floodplain.

A natural bypass channel was also visited near the end of the first day, close to the River Sèvre site.

3. Introduction

“Le SAGE”, refers to the programme of activities implemented in France in relation to the river basin management planning cycle. While the consultation and delivery cycle took ten years from start to finish, work on the ground has generally been well received and good relations have been developed between the partners involved. On the whole, riparian owners were involved in schemes; however it was in rural areas that there was the strongest opposition with urban dwellers more accepting.

The process in the Loire catchment was undertaken in three stages:

1. Hydraulic and technical criteria were used to assess structures in order to select appropriate sites where restoration could take place.
2. Engagement with groups representing the local area known as mixed syndicates (statutory agency staff, water company representatives and local interest and recreational groups).
3. Social, economic and environmental criteria were used to prioritise sites where work was feasible.

4. Project sites visited

Figure 1 shows the locations of the sites visited. Sites A (River Ouine) and B (River Sèvre) were visited on day one, and restoration sites in and around Cholet (marked C) were seen on day two.

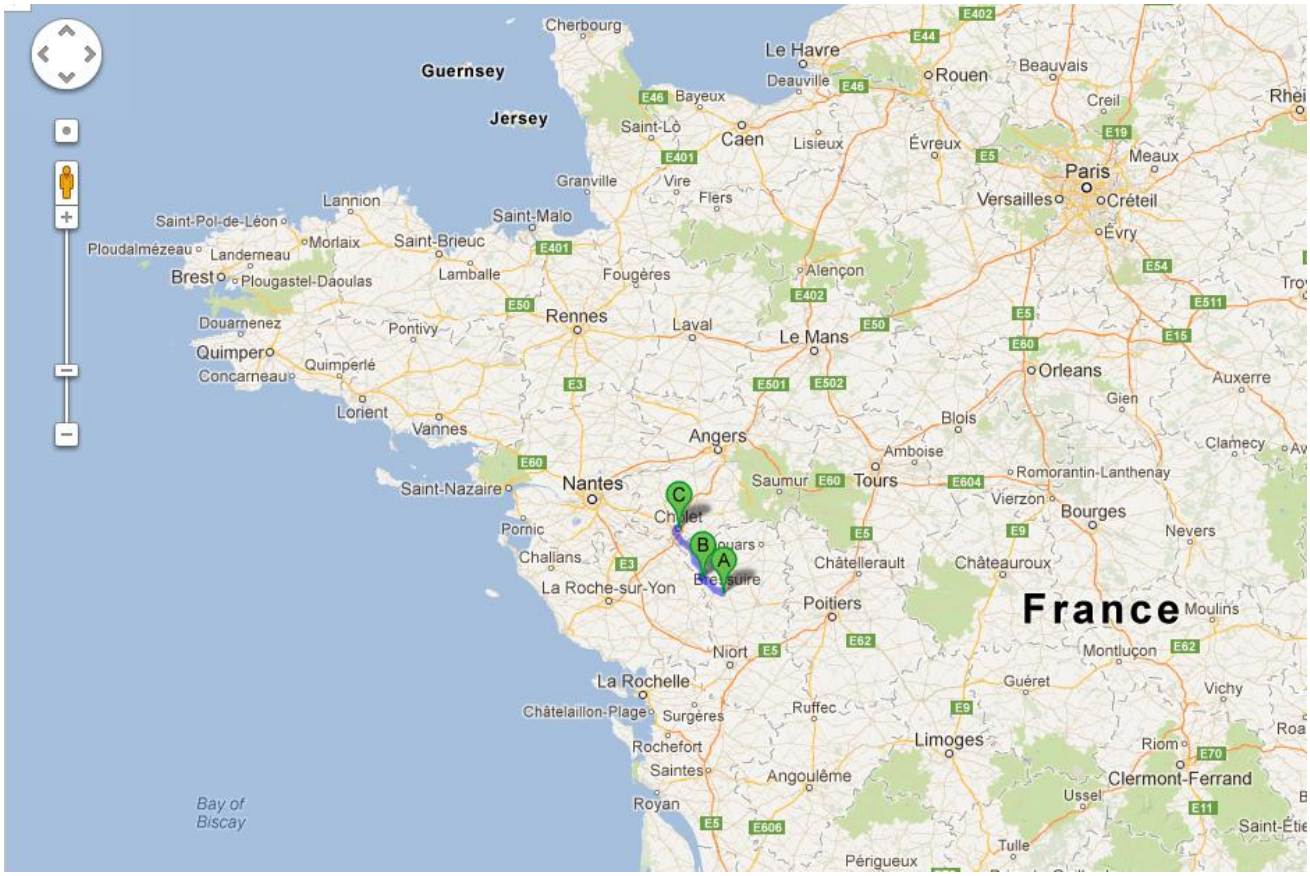

Figure 1 Overview map of restoration sites visited

4.1 Weir removal and restoration to diversify the river bed, River Ouine

Firstly delegates visited a site on the river Ouine (Figure 2) where a structure built between 1988 and 1990 had been recently removed to improve river morphology. The valve detrimentally impacted on river ecology, with water levels upstream much higher than you would have expected naturally.

Following a feasibility study that demonstrated that removal of the structure would improve the ecological quality of the river, managed by the Syndicat des Sources de la Sèvre (River Sèvre Trust), the Pont de l'Ecluse structure was removed leading to a drop in the water level. Prior to works, there had been limited in-stream or marginal vegetation and the channel was over wide.

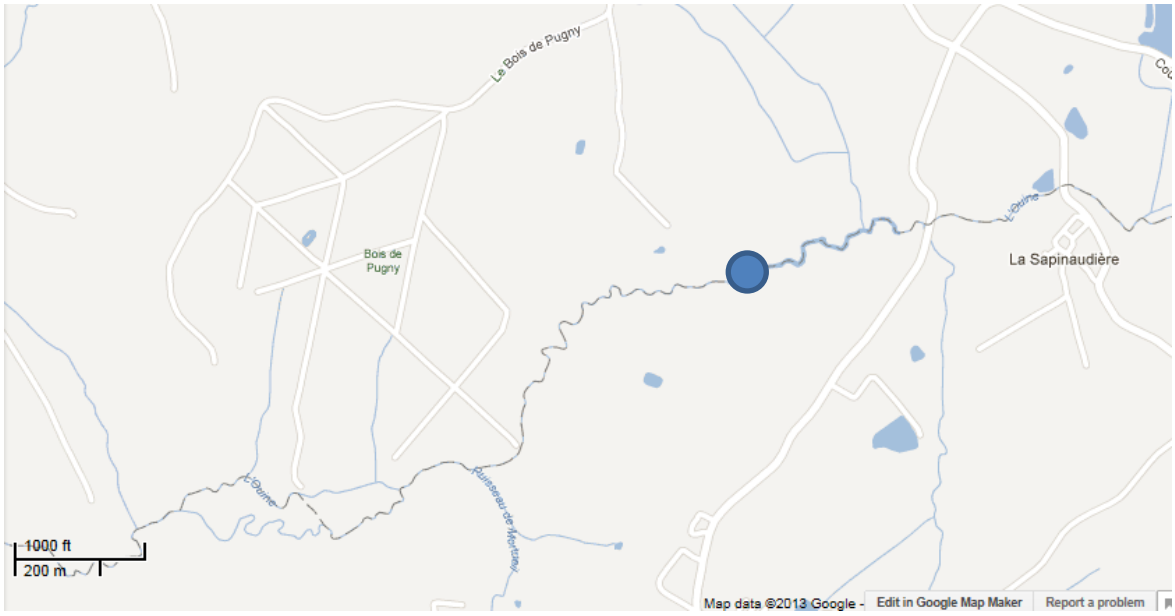

Figure 2 Map of the River Ouine restoration site (Pont de l'Ecluse) near Bois de Pugny

The River Trust trialled several river restoration techniques to support the recovery of the watercourse. In 2011, more naturally graded bank sides were created to encourage the establishment of bankside vegetation. In 2012, boulders were added to the river bed to narrow and diversify flows. Structures were built for cattle to drink from the river without damaging banks and to help riparian vegetation grow back. Before the removal, fishery studies had shown fish stocks at their lowest. Post works monitoring will aim to show an increase in the number and diversity of fish.

Photographs demonstrate the lower river water level post works, the recovery of bank vegetation (Figure 3), and the restoration of a more natural flow regime and narrower channel width (Figure 4). Project costs were estimated to be approximately 72 000€ (£ 57,600).

Figure 3 Lower water levels after removal of the structure unearthed a rich diversity of flora previously underwater

Figure 4 Restoration of a more natural flow regime

4.2 Weir removal, re-opening of an oxbow lake and creation of a shallow lake for coarse fish spawning, River Sèvre

In the 1970s, the natural course and diversity of the River Sèvre was straightened and modified. To remediate the watercourse, the Syndicat des Sources de la Sèvre (River Sèvre Trust), worked with local parties to remove some of the structures in order to reconnect oxbow lakes which had been disconnected from the main river. The Naulière weir (Figure 5), built between 1992 and 1994, significantly impacted flows 2km upstream of the structure and erosion and fish passage were two key issues.

To prevent sediment mobilisation, the weir was removed progressively between 2008 and 2010. A sill plate was built upstream to diversify flows and help feed the oxbow lake. A shallow lake was also excavated as a spawning ground for coarse fish (Figure 6). Removing the weir has naturalised the river and a diverse range of vegetation has begun to establish. The oxbow lakes reconnect to the main river at high flow (Figure 7). The cost of the works was 45 000€ (£36,170). This strategy will provide long-term sustainability for the wetlands near the Pré des Cosses.

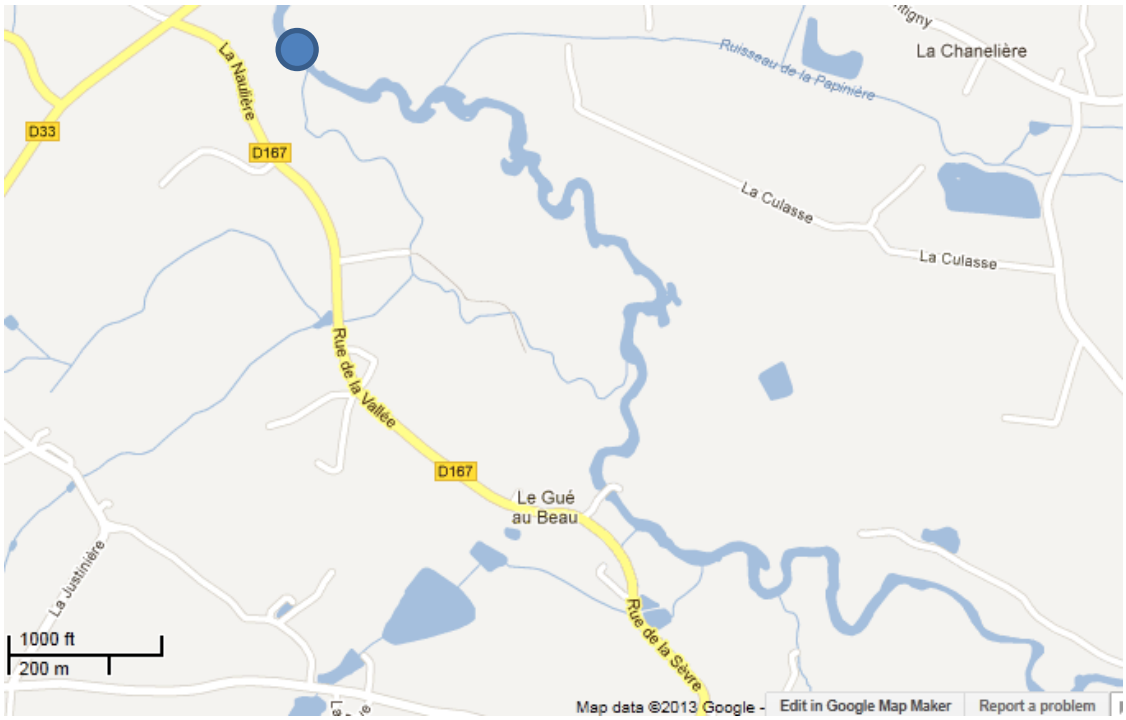

Figure 5 Map of the Naulière weir restoration site

Figure 6 Reconnecting the river with a natural ox bow will increase the ecological value of the river corridor

Figure 7 Shallow lake excavated as a spawning ground for coarse fish

4.3 Natural by-pass channel

The location of this site was close to the Naulière weir.

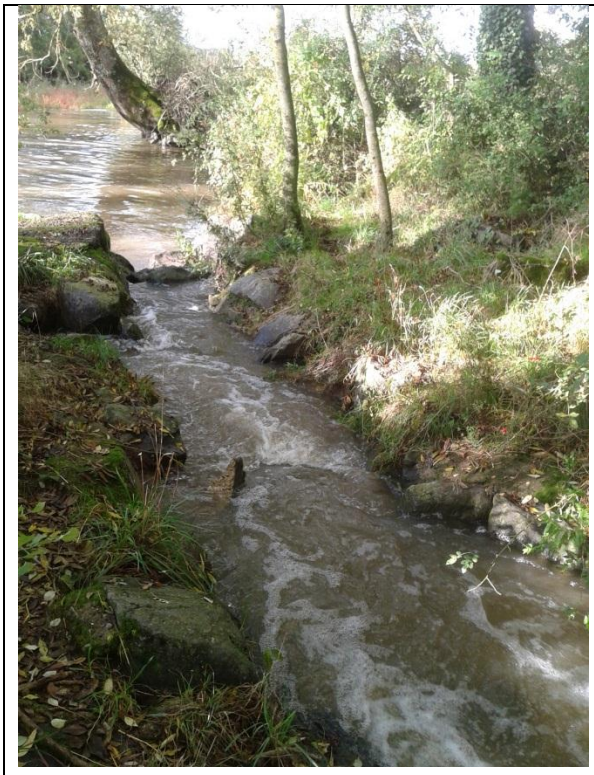

Figure 8 Restored channel to bypass structure on the main channel

Figure 9 Discussions on site

Within five miles of the Naulière weir, a barrier on the River Sèvre, impassable to fish, had to be retained. Instead of removal or lowering, it was bypassed with a small meandering channel (Figure 8). Anecdotal evidence suggests that fish have found the new channel without problems. It was discussed that the design of the bypass (appropriate channel length and adequate flow in the channel) was critical to its successful uptake by a range of fish species (Figure 9).

4.4 Deconstruction of structures, river narrowing, wetland creation and floodplain reconnection at multiple sites on the River Moine in Cholet

Cholet is located in western France, in the Pays de la Loire close to Brittany (population of 83,000). The River Moine flows through the centre of the town (Figure 10). Upstream of the town, two dams

provide the city with drinking water however downstream the watercourse has been degraded. In 2006, the Moine river trust (*Syndicat Mixte pour l'Aménagement de la Moine*) decided to assess the impact that opening several hydraulic structures would have on the water level.

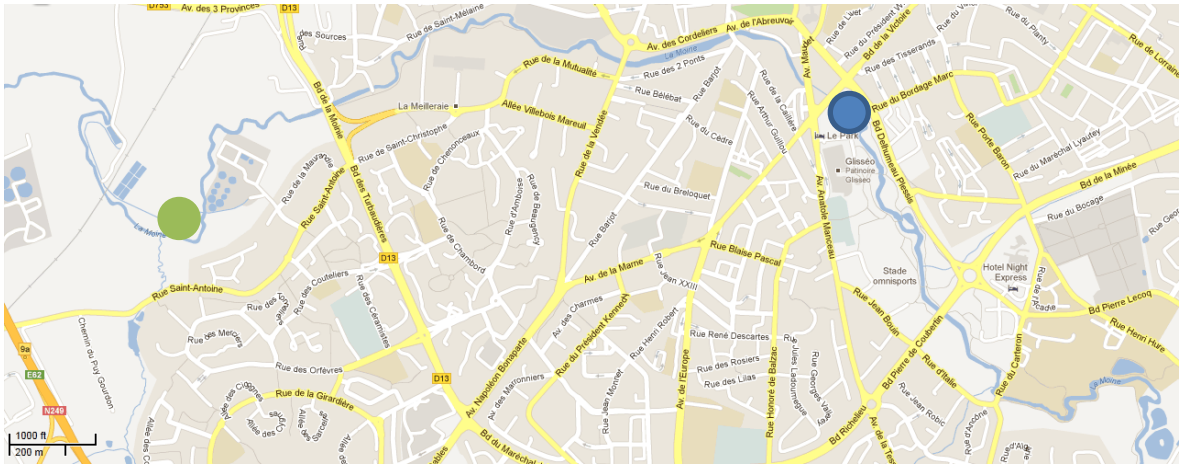

Figure 10 The location of two of the restoration sites visited on the River Moine in Cholet.

Note: the site shown in Figure 13 is off the map.

Results showed a significant improvement of biodiversity. The lowering of the water level allowed the re-establishment of riverside flora. Following this pilot, six hydraulic structures were either completely or partially removed. The works were undertaken between March 2012 and September 2012. Precautions were taken to monitor water levels and to inform the public about the project in person (Figure 11) and through signage (Figure 12) given it was an urban setting.

The first site visited was upstream of Cholet. The red arrow in Figure 13 shows the extent of the drop in water level following the removal of the structure. Following the removal of the structure, a large amount of the material behind the structure deposited 100m downstream of the structure (blue arrow). The sediment was checked prior works to ensure that release would not harm river ecology; however the natural meander that has formed as a result of channel adjustment was an unforeseen benefit of the works.

In Parc de Moine (blue dot, figure 10) the river was narrowed and wetlands were created (Figure 14). This is a popular area for people who work and live in the centre of Cholet and the restoration project had been well received by people that we had passed on the visit.

At the Grangeard site (green dot, figure 10), land was excavated to create a floodplain (Figure 15). This is estimated to have lowered water levels by 25 cm in a 100 year flood event, reducing flood risk to adjacent properties. In 2013, follow up restoration work and studies will be carried out (river morphology, macro-invertebrates and fish).

Figure 11 Talking through the project with local public

Figure 12 Project signage on site

Figure 13 Restoration of the Moine upstream of Cholet

Figure 14 Restoration through Parc de Moine where river habitat has been unearthed by lowering water levels

Figure 15 Creation of a floodplain on the site of a car park at the Grangeard site, which has lowered flood risk to properties and amenities

5. Attendance

Approximately fifteen to twenty people attended the site visit with representatives from atleast three European countries. Local representatives from the mixed syndicates and members of the French press joined the visit to learn more about the RESTORE project and the restoration work. Participants had varying backgrounds and experience in river restoration.

First Name	Surname	Organisation	Country
Abelard	Bernard	Federation des Deux Sevres pour la peche et la protection du milieu aquatique	France
Killian	Stephanie	BURGEAP Agence Loire Bretagne	France
Peress	Josée	ONEMA	France
Charrier	Antoine	IIBSN	France
Watkins	Jeremy	ENGEES (Strasbourg University)	Switzerland
Cailleaud	François	IIBSN	France
Renou	Eddie	IIBSN	France
Ribeyrolles	Muriel	IIBSN	France
Lustgarten	Boris	IIBSN	France
Mant	Jenny	River Restoration Centre	England
Elbourne	Nicholas	River Restoration Centre	England
Gambier	Thierry	SIAH de L'Autize et de l'Egray	France

6. Further information

Further information and photographs are available on request from the River Restoration Centre (rrc@therrc.co.uk). A workshop entitled "Breaking barriers – remove, replace or retain?", which will take place at the RRC annual network conference on 30th April 2013, will feature presentations that will be relevant to discussions that took place on the site visit.

The L'Institution Interdépartementale du Bassin de la Sèvre Nantaise (IIBSN) website for further information is http://www.sevre-nantaise.com/ and in particular, a report (in French) provides more detail about the specific process undertaken.

The RESTORE project will be able to consolidate this information and where applicable, information will be updated on the project's website, wiki-database and within the case study handbook for all to access. All of these projects will be added to the WIKI to support the other weir removal/lowering schemes that are already documented.

A document entitled "The French Water and River Management System", which outlines the French approach to delivering water management activities, has also been made available on the RESTORE website. A diagram from this document is included as an Appendix to support information provided in this RESTORE report.

7. Press coverage

An article on the RESTORE site visit featured in the local “Courrier de l’Ouest” news column and in “La Nouvelle Republique” (The New Republic).

CHOLET

La Moine intéresse les Anglais

Des scientifiques anglais de l’université de Cranfield ont découvert hier le nouveau cours de la Moine.

Bruno MOLLARD
redac.cholet@courrier-ouest.com

La restauration du cours de la Moine intéresse les scientifiques anglais. Depuis jeudi, l’Institution interdépartementale du bassin de la Sèvre nantaise pilote une délégation venue de Grande-Bretagne pour découvrir le travail de restauration des cours d’eau. Vendredi matin, la délégation conduite par Jenny Mant et Nicholas Elbourne, enseignants à l’université de Cranfield spécialisés dans l’étude des milieux aquatiques, s’est rendue sur les bords de la Moine à Cholet. Au Plessis d’abord, puis à Interlude, le groupe a profité des explications de Boris Lustgarten et d’Antoine Charrier, de l’Institution interdépartementale accompagnés d’Eddie Renou, technicien de rivière et de Bernard Abélard, administrateur de la fédération de pêche des Deux-Sèvres.

Un travail mené en amont depuis dix ans

Selon Josée Peress, membre de la direction de l’Office national de l’eau et des milieux aquatiques, présente hier à Cholet, « *la délégation britannique souhaite connaître l’expérience de renaturation menée sur le bassin de la Sèvre nantaise pour en faire profiter d’autres sites en Europe* ». Les scientifiques anglais travaillent pour le projet européen « Restoring Europe’s Rivers » qui encourage la restauration des cours d’eau dans plusieurs pays européens (1). « *Les problèmes liés à l’eau existent partout en Europe mais les procédures pour les résoudre ne sont pas les mêmes d’un pays à un autre. La restauration de la Sèvre nantaise nous semble intéressante par tout le travail mené en amont depuis dix ans* », explique Jenny Mant.

Cholet, bords de Moine, hier. *Les scientifiques anglais (à gauche sur la photo) entourés des représentants de l’institution interdépartementale du bassin de la Sèvre nantaise. Photo CO - Etienne LIZAMBARD.*

La Grande-Bretagne connaît les mêmes difficultés que la France pour maintenir ses eaux de surface à l’abri des pesticides. Sur la Moine, les travaux de renaturation - avec notamment la suppression des barrages - ont permis de rendre à la rivière son cours naturel : « *La Moine chante à nouveau, nous observons dès cette année une amélioration au niveau des inondations près du théâtre Interlude et la faune revient fréquenter la rivière. C’est un travail de longue haleine qui porte ses fruits* », soulignent Boris Lustgarten et Eddie Renou.

(1) Pour en savoir plus : www.restorerivers.eu

La Nouvelle République du vendredi 19 octobre 2012

la forêt-sur-sèvre

Le River Restauration Center découvre la Sèvre “ renaturée ”

Dans le cadre d’un projet européen, quatre experts et scientifiques anglais du *River Restauration Center* ont visité deux sites du bassin-versant de la Sèvre Nantaise. Objectif : bénéficier d’un retour d’expérience sur la renaturation des cours d’eau et les actions en faveur de la continuité écologique. « *Les travaux réalisés sur la Sèvre pour la continuité écologique sont relativement pilotes en France*, explique Annabel Dreillard, chargé de communication pour l’Institution interdépartementale du bassin de la Sèvre Nantaise. *Les scientifiques du River Restauration Center ont décidé de se rendre chez nous pour apprécier les effets positifs des aménagements en cours.* » Concrètement, les spécialistes se sont rendus jeudi matin aux sources de la Sèvre sur les secteurs de Pugny et du Breuil-Bernard avant de rejoindre l’après-midi le site de la Minoterie puis, vendredi matin, le secteur de la Moine à Cholet. « *Depuis plusieurs années, nous souhaitons redonner ses droits aux cours d’eau*, ajoute Annabel Dreillard. *Si, par le passé, on a changé les axes des rivières en les rendant plus droits, aujourd’hui nous avons redonné au cours d’eau ses virages d’origine.* »

Après les aménagements, l’heure du bilan pour les scientifiques européens en visite sur la Sèvre.

Appendix A: River and Water Management Structure of Organisations in France (Watkins, 2012).

Or Download the full report "*The French Water and River Management System, an Overview*" written by Jeremy Watkins, ENGEES, for the River Restoration Centre.

River & Water Management Organizational Chart in France