Removal of five lakes on the Val des Choues stream

The operation

Category	**Restoration**
Type of operation	**Pond removal or derivation of watercourse**
Type of environment	**Headwaters**
Issues at stake (water, biodiversity, climate)	**Good status of habitats, conservation of species of national or european importance and river continuity**
Start of operation	**June 2006**
End of operation	**2007**
Length of watercourse affected by the works	**700 m**

Watercourse in the restored section

Name	**The Val des Choues**
Distance to source	**1.5 km**
Mean width	**2 m**
Mean gradient	**10 ‰**
Mean flow rate	**-**

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The most upstream pond is retained. It is a site of heritage interest (historic and faunistic).

Location

Country	**France**
River basin	**Seine-Normandy (Normandie)**
Région(s)	**Burgundy (Bourgogne)**
Département(s)	**Côte-d'Or**
Commune(s)	**Villiers-le-Duc**

Aims of the project owner

- Increase the area that can be colonised by crayfish by removing ponds and re-establishing the stream in its original bed.
- Restore the habitats of the European brook lamprey, bullhead and brown trout.
- Restore the upstream-downstream continuity (flow, sedimentary and biological continuity).

Environment and pressures

The Val de Choues stream is a tributary of the Ource and is 5.5 kilometres in length. It flows through a limestone valley, 80% of which is forested and its catchment area covers an area of 18 km². The fish population apparently consists of brown trout, bullhead and European brook lamprey. The white-clawed crayfish is present upstream.

Regulatory context:	**State-owned biological reserve**

References in relation to European Directives

Water body ref.	**FRHR4**
Natura 2000 site ref.	**FR2600959**

In 1968, with a view to salmonid farming, the ancient Narlin pond, originally created by the monks of a local abbey, was transformed into a complex of five ponds. This fish farm proved to be unprofitable and was abandoned in 1973. This development was the cause of the impacts observed on the watercourse: the watercourse was cut off from its main tributaries, temperature changes occurred, there was influx of undesirable fish species and an obstacle was created to the free movement of fish and crayfish. The fragmentation of the stream by the ponds modified the environment and increased the fragility of the crayfish population.

Opportunities to act

The Val de Choues forms part of the Natura 2000 site *"Milieux forestiers du Châtillonnais avec marais tufeux et sites à sabot de Vénus"* (Forested environments of the Châtillon area with tufaceous marshland and sites with the Lady's slipper orchid). In the framework of the "LIFE" Nature Programme "*Ruisseaux de têtes de bassins et faune patrimoniale associée*" (Headwaters and associated heritage fauna), this site was chosen for a project concerning the restoration of white-clawed crayfish.

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The preserved heritage pond embankment.

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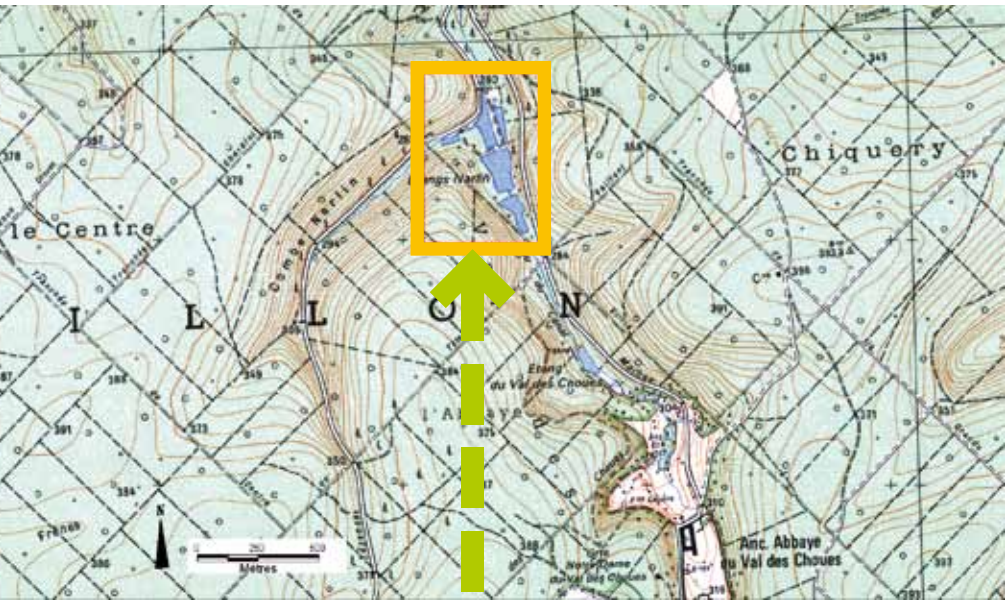
The Val des Choues stream reforming its bed in the sediment left by the ponds (March 2009).

Works and developments

The partners in this project wanted the works to be as simple and inexpensive as possible (drainage followed by the opening of the downstream dikes). The geomorphological adjustment and ecological recolonisation processes would then be scientifically monitored.

The water bodies were drained in two phases. In June 2006, the three upstream ponds were drained and the fish were rescued. The embankments were opened in August. In September 2006, the two remaining downstream ponds, which until then had been acting as sedimentation basins, were drained and the embankments were then opened in November.

The most upstream pond could not be removed due to its major heritage value (historic and faunistic). This pond was linked to the other ponds by the watercourse and a parallel canal (created for fish-farming purposes). In order to reduce the drying out of the watercourse, the entire flow emerging from the pond was redirected towards the stream by dismantling the dividing weir that was responsible for supplying water to the canal and by partially filling in the upstream section of this canal. Developments were made in order to diversify the habitats in the original watercourse (laying of limestone blocks) and a gate was installed in the upstream water body.



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The new sinuous course of the stream in June 2009.

Regulatory approach

"Dossier d'autorisation" consent according to the French Water Act for the drainage of ponds in the State-owned forest of Châtillon:

3.2.4.0 (A): Drainage of ponds or water bodies

"Dossier de déclaration" consent according to the French Water Act for the second phase of works:

3.1.1.0 (D): Installations, structures, fill materials and groynes in the low-water channel of a watercourse, constituting: 1. An obstacle to the outflow of flood-waters. 2. An obstacle to ecological continuity.

3.1.2.0 (D): Modification of the longitudinal and horizontal profile.

3.1.5.0 (D): Destruction of fish spawning areas.

Post-restoration management

No specific management measures have been implemented. The aim is to allow the surrounding forest to recolonise the environment in a spontaneous and natural manner.

Monitoring

This operation was preceded by the implementation of a scientific monitoring process whose purpose was to determine the evolution of the physical and biological characteristics of the site. An initial monitoring of the stream upstream and downstream of the ponds was carried out in 2005 prior to the drying out process. Following the works, inventories concerning the invertebrate, fish and amphibian populations were compiled, in addition to mapping and descriptions of the environment, in order to measure the speed and dynamics of the recolonisation of the environment and observe the morphological development of the watercourse. Finally, regular photographic monitoring constituted an additional visual approach.

Outcome of the project and outlook

The initial results of the scientific monitoring have been very promising: the winter flow rates have allowed the stream to re-establish its bed throughout almost the entire length of the restored linear watercourse, which is following a slightly sinuous course in a main shallow bank channel (banks only 10 to 20 cm deep). The response is better than expected, with the bed developing very quickly in favour of biogenic habitats related to the presence of woody debris. However, coarse alluvia (small pebbles, gravel and sand) remain scarce and the bottom of the bed remains muddy.

The draining of the first three ponds in June led to an explosion of vegetation growth. In less than three months, the dried out former ponds were recolonised by natural vegetation - mainly white willow and

Costs

		In euros excl. VAT
Cost of studies		**€13,070**
Cost of acquisitions		*not applicable*
Cost of operations and developments		**€50,000**
	including: for the first phase of works	€28,000
	for the elimination of dikes	€10,000
	for filling in the canal	€4,000
Cost of promotion	*for the information board*	**€5,000**
Total cost of the actions		**€68,070**

Financial partners and funding:
LIFE (European Community, French Ministry responsible for the environment, Regional Council, Rhône, Water Agencies of the Mediterranean & Corsica and Seine-Normandy regions), Natural Regional Park of the Morvan.

Technical partners of the project:
Natural Regional Park of the Morvan, ONEMA (French National Agency for Water and Aquatic Environments – Inter-regional delegation for Burgundy-Franche Comté.

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The Val des Choues stream within the impoundment area of the former ponds. Detail of particle size in the watercourse in June 2009

See the monitoring reports on the Life website:
http://www.liferuisseaux.org/chatillonais.htm

brown galingale - thus stabilising the sediment.

Certain biological aquatic communities also appear to be re-establishing themselves especially those from connected aquatic ecosystems (amphibians). In August, during the recording of inventories, white-clawed crayfish were rediscovered over a 3.5-kilometre stretch in the upstream part of the restored sector. These individuals currently constitute one of the largest populations of this species in Burgundy. Recolonisation by native fauna such as the river trout and the brook lamprey has been observed. Species adapted to head waters are present throughout all of the monitored stations, including those within the areas of the ponds.

The local fishing association, which used to fish in these ponds, can continue its activities in other nearby lakes.

Promotion of the project

An information board has been erected on the site and numerous meetings have been held there: signature of the *Sequana* River Contract, final handover colloquium for the *LIFE* programme, visits for river associations, etc.

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