

Bio-engineering and creation of side channels along the rectified section of the Scarpe River in Arras

The operation

Project owner	Arras urban area (CUA)
Category	Improvement of waterways
Type of operation	Bio-engineering techniques for river-bank protection
Type of environment	Intermediate river zone
Issues at stake (water, biodiversity, climate)	Good status of habitats, river continuity
Start of operation	2009
End of operation	2012
Length of river affected by the works	1 760 m

River in the restored sector

Name	Upper channelised Scarpe
Distance to source	35 km
Mean width	23 m
Mean discharge	3.2 m ³ /s (in Brebières)

Aims of the project owner

- Improve the biological and chemical quality of the Scarpe River.
- Recreate reproduction habitats for various species.

Environment and pressures

The Scarpe is a river in the Escaut basin and has its source in the town of Berles-Monchel in the Pas-de-Calais department. The river is 102 kilometres long and its basin spans 1 120 km². It flows under natural conditions (marshes, peat bogs), but also through agricultural areas and urban zones (in the cities of Arras and Douai).

The river was initially diverted to the north to supply the city of Douai and subsequently converted into a waterway shortly before the year 1000. Repeated dredging and widening followed. Its bed was rectified and diked, its discharge regulated. The development of river transportation continued in northern France in the 1800s with works on the banks and the creation of locks. In addition, human activities produced effluents that altered the physical-chemical quality of the water.

The location

Country	France
River basin	Artois-Picardie
Region	Nord – Pas-de-Calais
Departement(s)	Pas-de-Calais
Commune(s)	Arras, Saint-Nicolas-lez-Arras, Saint-Laurent-Blangy



Banks protected by sheet piles prior to the restoration works. Autumn 2010.

Regulatory context	Regulated river (List 1)
Water-body ref.:	AR48
Natura 2000 site ref.:	Not applicable

European directive references

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Creation of stagnant and semi-stagnant lagoons along the Scarpe. Summer 2010.

The Scarpe is currently channelised over two-thirds of its overall length, making it possible to travel from Arras to Mortagne-du-Nord, where it flows into the Escaut, via 19 locks dropping the level approximately 40 metres. This rectified section is made up of three reaches, the upper, mid and lower Scarpes.

The upper channelised Scarpe is 23 kilometres long and links Arras to Corbehem via nine locks. The valley, between Arras and Vitry-en-Artois, has been designated as a Type-2 ZNIEFF (high-value ecological zone) that includes the Fampoux marshes. The river is home notably to eels and pike, two fish species that are listed as vulnerable on the Red list of fresh-water fish in France.

To meet the needs of commercial shipping and recreational boating, the banks along the river were adapted to the "Freycinet gauge" (350-ton capacity) involving major civil works. Metal sheet piles line sections of the Scarpe from Arras to Douai. They limit diversification of habitats and exchanges between the aquatic and terrestrial environments, which in turn leads to a progressive disconnection of the side channels and a loss of transitional environments. Along the banks, great quantities

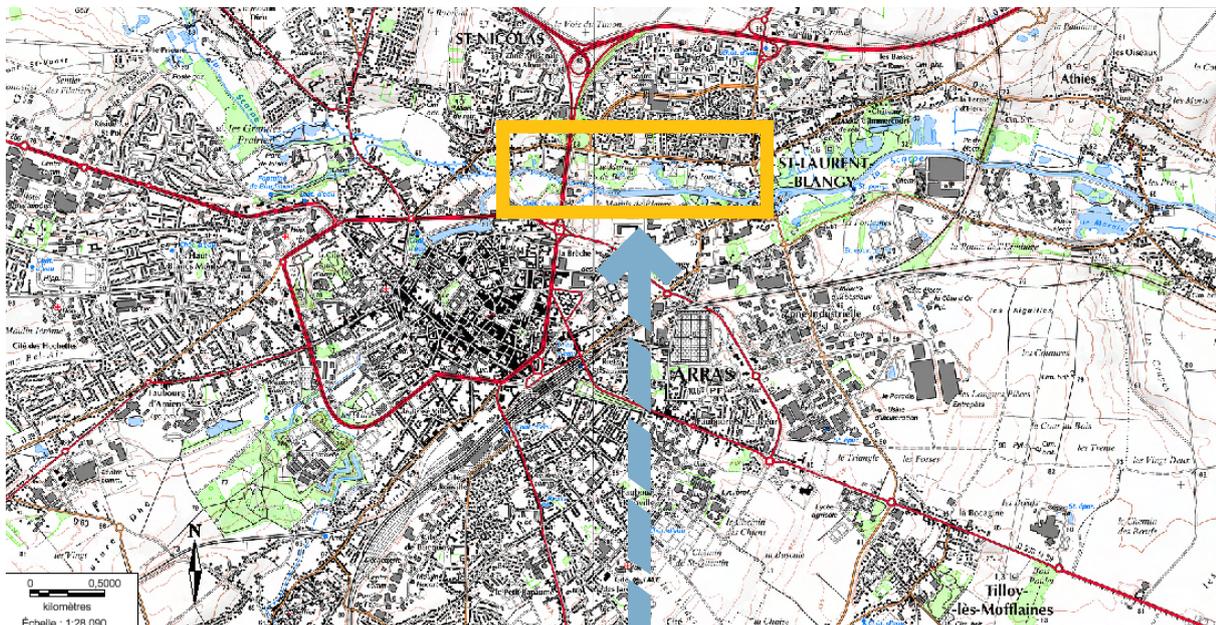
of rocks and landfill also limit the development of aquatic and helophyte vegetation. The fairly uniform plant cover is dominated by hydrophilic plants and is limited to the non-protected sections of the banks.

The environment is also exposed to other pressures, notably recreational activities (people walking along the tow-paths, hunting, fishing, boating) and a large geese population in Saint-Laurent-Blangy.

■ Opportunities to act

Since 2003, the Arras urban area (CUA) has pressed for effective projects to improve ecological continuity, efforts that were subsequently folded into implementation of the French ecological network "Trame Verte et Bleue". It also wished to take action on the Scarpe in order to meet the good ecological-potential objective set for 2021.

In a partnership with the Artois-Picardie water agency, CUA launched ecological-restoration works on a section of the Scarpe. The reaches most affected by anthropogenic pressures were seen as the priority, namely the entire section between Arras and Saint-Laurent-Blangy.



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Banks regraded and planted. Autumn 2012.

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Erosion and damage near the turn-around point on the Scarpe. Autumn 2010.

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Regrading and creation of a reed bed by closing the turn-around point. Autumn 2012.

In 2010, a preliminary study on the section was carried out by a specialised consulting firm. The study listed how the site is used, the constraints weighing on it and analysed its ecological value. The ecological assessment revealed the presence of emblematic plant and animal species such as woolly burdock and flowering rush. Three invasive species, including Japanese knotweed, were also observed and mapped on the banks.

The study recommended restoring natural banks with a slight slope and improving the riparian vegetation.

■ Works and developments

One land-based and two floating workshops were created to work simultaneously on different reaches and accelerate the works. The river was first dredged to enable the transport of the material required for the works.

The metal sheet piles, initially installed for bank protection, were deemed unsuitable and removed.

The banks were graded to a slight slope and stabilised using techniques suited to the hydraulic constraints weighing on each sector:

- helophyte rolls or calcareous landfill with geotextile fabric in areas where the constraints are not severe;
- mixed techniques (gabion bed and vegetated geomats) in areas subjected to greater constraints.

A total of 1 750 metres of bio-engineering bank-protection techniques were installed.

A number of measures were taken for the riparian vegetation, including planting of helophytes at the foot of banks, seeding of work areas with a mix of herbaceous plants, restoration of wooded areas by planting white willows and elimination of the invasive species found on site.

The top of the white willows was cut to encourage the growth of buds and of the tree trunks. This pruning technique will produce cavities that birds, small mammals and insects can use.

A lagoon was also created as an alluvial "annex" with two reed beds measuring 1 000 and 1 450 m² on the site of the former turn-around point for péniche barges in an effort to restore habitats for different species, notably pike.

■ Regulatory approach

The works were authorised in accordance with the Water law.

■ Post-restoration management

Over the three years following the works, maintenance and management adapted to the different areas was carried out by the contractor. After the three years, the management was taken over by the Arras urban area. In this sector, management of the waterway, normally assumed by Voies navigables de France (VNF), was delegated to the Arras urban area.

An agreement concerning the experimental management, development and operation of the upper channelised Scarpe from Arras to Fampoux has been in force since 1 January 2012 between VNF and the Arras urban area.

Management of the two restored redds is ensured by the Pas-de-Calais departmental federation of certified associations for fishing and protection of aquatic environments (FDAAPPMA 62).

■ Monitoring

An pre work survey was carried out in 2010, on the plant and animal compartments. Currently, no particular ecological monitoring has been set up. However, a check on the renewed growth of the vegetation was run in September 2012, during the works.

An assessment on the changes in the environment is also planned at some point at least five years after the works.

Cost

In euros ex. VAT

Preliminary studies	132 277 €
Purchase of land	-
Works and developments	1 189 032 €
Promotion	-
Total cost of project	1 321 310 €

Financial partners and funding:

Artois-Picardie water agency (51%), ERDF (48%) and the Arras urban area (1%)

Technical partners:

Artois-Picardie water agency; Pas-de-Calais departmental federation of certified associations for fishing and protection of aquatic environments (FDAAPPMA 62)

Outcome of the project and outlook

The works to renaturalise the banks of the upper channelised Scarpe will be pursued until reaching Fampoux and has already improved the quality of aquatic and terrestrial habitats as well as their diversity. The potential of the banks to serve as habitats for plant and animal species that depend on the nearby wetlands was optimised.

This project contributes to reaching the objectives for 2021, namely preserving fragile, natural areas and achieving good ecological status. It also fulfils a growing social demand and was very well received by visitors and local residents.

Unfortunately, the works had to be done from the water, which made it difficult. In addition, a large geese population, present on the river since before the works, has damaged and slowed the regrowth of the helophyte vegetation, particularly in the reed beds.

In 2010, the pre works assessment revealed a relictual population of woolly burdock that still existed on the site, but was threatened. The assessment was also an occasion to run surveys on two fish species, two emblematic bird species and one emblematic insect species. No amphibian species were noted.

An assessment of the impact of the works on the restored habitats and on biodiversity is planned at some point at least five years after the works in

order to give enough time to the environment to adapt and to the various species to go through their life cycle. The assessment, carried out by a specialised consulting firm, will be based on the changes in the population numbers of the species listed in the initially in order to determine the degree to which the objectives set by the project owner were met, namely:

- maintain the woolly burdock, pike and eel populations;
- install at least one amphibian species;
- double the number of bird and insect species (two and one respectively) observed prior to the works.

This project strove to achieve a balance between the ecological value of the site and its use as a waterway, i.e. a channel for commercial shipping, pleasure boating and the corresponding recreational activities. For example, the landscape of the site was improved with beneficial effects on tourism and pleasure boating, as well as on recreational activities (walking, etc.).

Promotion of the project

Several press conferences were organised during and at the end of the works to inform on the project for the ecological restoration of the upper channelised Scarpe. Informational signs will also be installed upstream and downstream of the project site.

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