

IMPROVEMENT OF THE ECOLOGICAL STATUS OF THE RIVER ÓRBIGO. LEÓN. DUERO BASIN. (SPAIN)

INTRODUCTION

The project consists of the recovery of the river longitudinal and lateral connectivity through the removal and the set-back of levees and the adaptation of the weirs and transversal barriers. This way allows the floodplain recovery and the flood damage mitigation, the recharge of the alluvial aquifer and also the habitat and biodiversity restoration.

The morphology of the Orbigo River has been modified by man. It was originally braided and wandering, with avulsion trend. It has historically been subject of embankment and channelization to protect crops, villages and infrastructures. Such solutions present a lot of malfunctioning problems and failures, expensive maintenance and a lot of impacts on the associated aquatic ecosystems, even though this area is located in Natura 2000 Network.

Recently changes in land use, now dedicated to poplar plantations, allow solutions more focused on green infrastructure. The idea behind the project is that by restoring river connectivity with the floodplains, the hydraulic capacity of the river in the event of flooding would be vastly increased, since it would be able to absorb more water in a controlled manner. In turn, through restoration of this connectivity, several natural processes would be re-established that would lead to ecological improvements. The project represents a good example of synergic implementation of different European Directives as Floods Directive, Water Framework Directive and Habitats Directive and their respective goals of reducing the negative effects of floods, improving the ecological status of water bodies and enhancing the diversity of habitats. It fits perfectly in the concept of Natural Water Retention Measures.

OBJECTIVES

The main objectives are floodplain recovery to reduce flood damages risk and the improvement of the ecological conditions of the water bodies by reducing hydromorphological pressures.

The objective of recovering the morphology and hydraulic capacity of the former stream bed of the river, and its partial connectivity with the flood plain is a double one that cannot be separated: increasing the concentration times and improving the ecological conditions of the riparian corridor and the diversity of habitats.

Therefore, the Órbigo River Restoration Project is an example of integration both water management and land use policies, so that it deals on recovering “room for the river”, improving lateral connectivity and the recovery of secondary channels and other para-river structures which lost its functioning because of channelization.

This project is pioneering and it is in accordance with the communication from the Commission to the European Parliament, the Council, the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions named: A blueprint to safeguard Europe's Water Resources. In the paragraph 2.1, Land use and the ecological status of EU waters: problems and solutions, it says: "Pressure from agriculture and flood protection can be mitigated or prevented. Methods include developing buffer strips, which provide biological continuity between rivers and their banks and using, whenever possible, green infrastructure such as the restoration of riparian areas, wetlands and floodplains to retain water, support biodiversity and soil fertility, and prevent floods".

MAIN ACTIONS

The project consists of different types of works:

- Levee removal
- Levee setback
- Rip-rap removal
- Recovery of secondary channels.
- Recovery of flood prone areas
- Restoration of flow continuity by transformation of a weir into a detachable one.
- Re-vegetation with native riparian species

Levee removal



The project involved the naturalization of the river channel along a stretch about 24 km in length located in the upper section of the river. The actions consist of eliminating 8,710 m of levees and 4,720 m of rip-rap, moving away from the channel earth embankments and rip-rap along another 5,220 m, and recovering 10,063 m of secondary channels and adjacent fluvial areas. These actions

imply the recovery of more than 400 ha of flood prone areas with a high capacity to attenuate floods naturally. The works are complemented with re-vegetation actions using riparian native plants to help the recovery of the gallery forest.

Other actions as a public participation process, education and training and a volunteering program completed the implementation of the project.

The public participation processes that took place to carry out the project had special relevance in social terms; they covered the whole process, from the initial design phases to the implementation phase, holding about 50 meetings. They represent a new way to address project development was tested, giving citizens the power to make decisions, and responsibility regarding project implementation and results. It is a methodological innovation as compared to the system used to date, where public participation, in many cases, was merely an administrative formality. Public participation provides communication and transparency, in order to get social consensus and shared decision-making, given that social acceptance is also essential for the success of a project that is using solutions of green infrastructure for the first time after so many years of grey one carried out in the latest 50 years.



At the same time, a volunteering program was carried out by a not-profit association under the management and monitoring of the DBA. This program intended to encourage public participation in river management process and to raise awareness in neighboring residents about the importance of achieving a good ecological status for the river. This program helped to promote positive attitudes towards the project.

The Orbigo River project has been selected to be showed as an example of good practice in courses and seminars by several universities, by the Iberian Centre for River Restoration and also in the training program of the Ministry.

It also became a finalist in the first European Riverprize awarded last year by the International River Foundation.

OUTCOMES

Flood control: Once the project had been carried out (the works were completed in September 2012), the first results could be observed during the high waters that occurred in February and April of 2013 and 2014, where water flows higher than those in the last 15 years (not taking into account the attenuation due to the newly available floodplain areas) have remarkably showed that there have not been economic damages and the local community (as opposed to what happens in other areas of the basin) not only has requested new actions, but also has assumed the consequences of high water flows as an expected event, with a perception of feeling safer.

Ecosystem improvement: By recovering the stream space and therefore the capacity to attenuate floods of the floodplain, we achieve, as a consequence, a greater infiltration rate and rate of recharge of the alluvial aquifer and achieve higher habitat diversity, by recovering areas adjacent such as secondary channels, side bars, outflow deltas, oxbow wetlands...which contribute to improving the biodiversity associated to stream ecosystems as well as to related ecosystems.



Cost-savings: In economic terms, the application of approaches within a framework of green infrastructure is particularly relevant; it means also a new direction since it gives the works the capacity to self-regulate, reducing drastically the need for maintenance, serving as well as a constant example of proper functioning facing highly stable inertias.

Social benefits: Finally we may note that the project has lead the towns located on the sides of the Órbigo River in the project area to regain their traditional relationship, through the integration of the river in the urban setting, as opposed to the previous situation where the river was isolated by longitudinal dikes. This has also an economic dimension, through the improvement of the landscape and the strengthening of tourism opportunities.

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