

Riparian vegetation management along the Secchia river (northern Italy)

Experimenting sustainable management practices

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Abstract

The “Interregional Agency for the Po River - AIPo” mission is to protect the Po river plain from flood inundation through maintenance of hydraulic structures – such as levees – and riverbeds where the riparian vegetation, especially in the last decades, has developed not always compatibly with flood safety standards.

Past management practices on riparian vegetation, based only on minimizing hydraulic roughness, are inadequate. The riparian zone has, in fact, a multifunctional purpose in stabilizing the banks, in reducing the risk of flooding slowing down the flood, and in being a landscape and recreational element for the environment.

Basing on these assumptions, AIPo is testing more adequate techniques to manage riparian vegetation which involve: (1) hydraulic modelling and knowledge of the riparian habitat, (2) sharing with stakeholders, (3) best practices for wood-energy operators and companies and (4) monitoring the results of the planned actions.

This model of intervention, based on the Rhone-Mediterranean and Corsica Water Agency SDAGE guidelines, and shared with a complex mosaic of stakeholders, is currently being tested, on the Secchia river, a right tributary to the Po River which flows northwards across the Apennine Mountains, mostly in Emilia-Romagna Region, and, in its final stretch, in Lombardia.

Keywords: riparian management, hazards, fluvial ecosystems, objective sharing, economic sustainability.

Introduction

The Interregional Agency for the Po River (AIPo, the Italian acronym), is a public body that provides engineering and environmental services across the full spectrum of operations in support of interests of the Italian regions crossed by the Po river: Piemonte, Lombardia, Emilia – Romagna and Veneto. Its mission is to provide flood protection and flood damage reduction. The Agency operates through its main Headquarter in Parma, 12 divisions throughout the River Po Basin and a Research and Development District. It was established in 2003 and took over the role of the previous organization called “Magistrato per il Po”, which was part of the Ministry of Public Works.

In the past “Magistrato per il Po” ensured the safety of rivers, providing for clear felling practices of riparian vegetation in the riverbed, with close interventions to ensure the minimum hydraulic roughness of the riverbed and a rapid transit of floods.

Over the past 20 years, the decrease of the economic resources for maintenance works of hydraulic structures and riverbeds, and the acquired awareness of the environmental value of riparian forests have triggered a conflict between vegetation, meanwhile grown out of control, and hydraulic safety. This conflict is greater on the stretches of man-made fluvial ecosystem, forced into high embankments, hanging on the ground level.

In order to overcome what represents not only an hydraulic safety problem but also an ideological conflict, AIPo recently promoted, on the river Secchia plain, two case studies of riparian vegetation management using the “participatory planning”.

Study Area

The pilot area of intervention is the river Secchia, extending for 90 km from the barrage of the “overflow basin to retain its flood waters” and the confluence with the Po river, crossing two Regions (Emilia-Romagna and Lombardia), two Provinces (Modena and Mantova) and a Park of local interest (PLIS) which comprises the floodplains adjacent the river Secchia up to the confluence of the river Po.

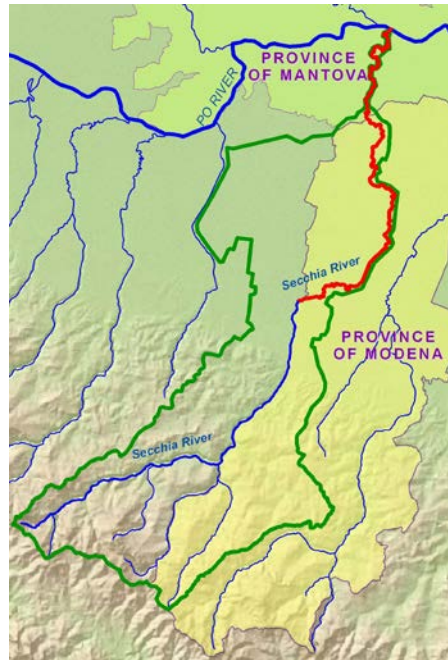


Figure 3: Secchia river basin (green) and area of intervention (red)

Methods of study and intervention

Riparian vegetation management programs in the Secchia river pilot area developed from two initiatives carried on by different requirements but with the same target by AIPo, that is the management of:

- stumps and logs of mature and heavy trees, with superficial roots, grown over steep bank slopes, which can start banks landslides and damages to the levees when very close to the channel (i.e. without overbanks);
- narrow cross sections, bridges with reduced span between piers and, in general, hydraulic works reducing channel width, may be severely damaged by floating logs. Temporary wood dams can easily grow and cause local inundations or hydraulic load at levees or other flood protection structures;
- river stretches with levees height not compliant with the design of river basin authorities for flood protection. Here, the presence of dense and non flexible vegetation increases channel roughness, leading to local flow velocity reduction and consequent higher water depths.

The first one, in the Modena Province territory, developed from the need to plan, under severe pressure of time, the cutting of riparian vegetation provided by the civil protection authority, after the inundation caused by the collapse of the embankment of the river Secchia that occurred on January 2014. The last extensive interventions of river vegetation cutting in the Province of Modena date back to the early 2000s (Anselmo & Terzuolo, 2001).

In only three months, AIPo has achieved, and shared with public stakeholders (National Po river Authority, Emilia-Romagna Region, Province of Modena, Municipalities and Park Authority), a "Program for the management of riparian vegetation", using the methodology proposed by the guidelines of the SDAGE Rhone-Mediterranean and Corsica Water Agency (Agence de l'eau RM & C, 1998). The program is based on:

1) detailed survey of riparian vegetation, 2) hydraulic modelling, 3) definition of management objectives, 4) definition of intensity levels of intervention and 5) definition of criteria for intervention.

The management objectives were based on the identification of different reaches of the river with homogeneous characteristics from the point of view of the hydraulic and morphological requirements, the bank protection from erosion, the reduction of the risk of flooding slowing or fastening the flood downstream. From the result of these studies, intersected with the ecological, functional, typological and structural characteristics of vegetation that descends from the detailed survey, it was possible to define the level of intensity of maintenance and the consequent intervention criteria.

AIPO is now implementing the Program: 26 km of interventions along the Secchia river bed have been designed and contracted for an amount of 1M euros. On the remaining 18 km, where the program provides an intensive level of maintenance, that means that the 70% of vegetation will be cutted, the interventions have been contracted at “zero-costs” to qualified companies operating in the wood energy supply chain.

The second initiative concerning riparian vegetation management, developed in the Province of Mantova starting from 2012, to ensure the hydraulic safety and flood protection of the Secchia river, in a stretch strongly conditioned by environmental protection laws, for the presence of the “Park of floodplains of the mouth Secchia (PLIS)”.

After two year of work with the stakeholders, AIPO subscribed, in April 2014, an agreement with the PLIS, the Lombardia Region, the Province of Mantova, four Municipalities, two Land reclamation and drainage authorities, in order to develop a "*Program for the management of riparian vegetation*", using the methodology of the SDAGE guidelines. The program co-financed by AIPO, the Province of Mantova, the PLIS Park and private companies.

Results

The riparian vegetation management experience carried out in the river Secchia, supported by the SDAGE French guidelines, can be considered a pilot study area, to be replicated in other river of the Po basin, both for technical/scientific methods of intervention and for the positive sharing with public and private stakeholders.

Discussions and Conclusions

The effort for the future is the implementation of a system for monitoring the effectiveness of interventions in order to achieve the objectives of hydraulic safety and sustainable maintenance of riparian vegetation in the Secchia river, including the use of hydraulic modeling and multi-temporal sampling of transects .

The monitoring will allow to establish the frequency and best practices for cutting vegetation in order ensure the compatibility of riparian vegetation with the objectives of the program, and to quantify the resources necessary for the proper management of the river.

On these issues it will be useful to develop discussion and cooperation between the world of research and public administrations.

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