

Foreword to representatives and public people

The Saint-Pardoux, a river to protect

The river Saint-Pardoux, a small river starting at the watershed of the Dore, is an outstanding river because its good ecological condition classified under the class 1 of Article L. 214-17 of the Environment Code, which counts all rivers require protection policies for migratory fishes. The Saint-Pardoux is also part of the Natura2000 "Dore and affluents" perimeter, which includes all the rivers with a flora or faunistic interest to the heritage. In fact, a native and protected species has been observed in the river: the white-legged crayfish.



The white-legged crayfish, a native protected species in France

Today, the Saint-Pardoux is threatened by quality issues: from one side, the bovine stamping, which leads to the deterioration of the riverbed and brings organic substances in the water; from the other side, the conifer plantation on the river's edge which is modifying distinctly the morphology of the Saint-Pardoux and the quality of the water.

Thus, it is essential to take protection and restoration actions, which are one of the goals of the territorial contract (Contract territorial Dore Amont).



Consequences of resinous plantation on the Saint-Pardoux.



Consequences of the bovine stamping on the Saint-Pardoux.

What is the territorial contract Dore upstream (Contract territorial Dore amont) ?

The territorial contract was born from the awareness of the water issues by the local actors on the territory of the Dore upstream and on the will of the representatives of the watershed. This project has been created for a period of 5 years. It aims to preserve, restore and maintain all the rivers of the territory, which follows the European directives recommending reaching the good environmental status for all rivers by 2021.

Planned actions

To solve all these issues, the Territorial Contract has designed and planned some restoration work for the Saint-Pardoux and the other affluents of the Dore. Thus, in the years 2016 and 2017, actions should be taken to stop riverbanks damages by bovines and to promote the withdrawal of the conifers.

Aim of the study

This study was developed as a preventive analysis of the work by the Territorial Contract. Focusing on the issue of spruce plantation on the edge of the river, the target is to set up several indicators to follow and monitor the state of the river. These indicators will allow shedding light on the negative impacts of the conifers on the Saint-Pardoux, and could also be used in the future to show the positive effects of the restoration.

What are the impact of the conifers?

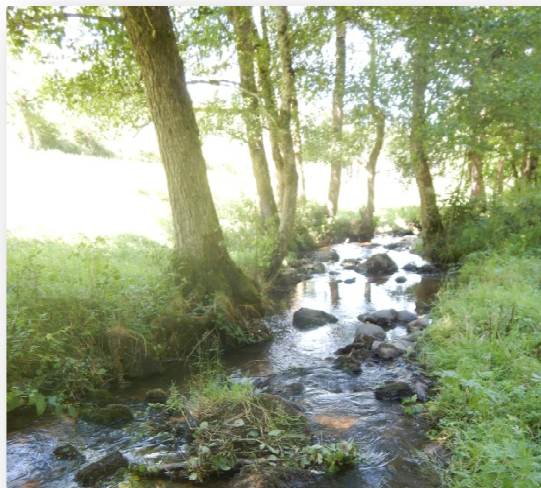
Some resinous species (like spruce, Douglas...), associated with inadequate management, prevent the riparian vegetation to ensure its functions for several reasons:

- its root systems cannot maintain the stability of the edges and encourage the erosion (trees falling in the minor riverbed, creation of logjam),
- planted in high quantity, these trees cause shadow on the river, limiting the development of the fauna and the flora,
- the plant litter doesn't decompose easily and accumulates in the riverbed,
- the use of mono-species and regular configuration in plantation, prevent the environment ability to resist perturbations (floods, tempests, fires, invasive species) and the limit the development other vegetation stratum (herbaceous, bushy species, tree-filled species).

Moreover, it is hard to manage the conifer trees for the owner as they are ill-suited for riverbanks and thus, have a slower growth and increased sensitivity to parasites. The collapsing of the river's edges lead to the falling down of trees while the side erosion causes earth losses. Hence, plantations of resinous trees cause troubles for both the environment and for the owners as well.

How to put in light the resinous plantations impact?

We have identified two sectors called "stations" located on the Saint-Pardoux. The first one has been defined in a non-conifers area possessing specific river vegetation (alder, ash, etc.). This station was declared "reference station", which means the environment in this location is identical to the environment we should find normally. The second station has been chosen downstream compared to the previous one, and was located inside an area impacted by the resinous plantations.



On the left, the reference station, on the right, the resinous station.

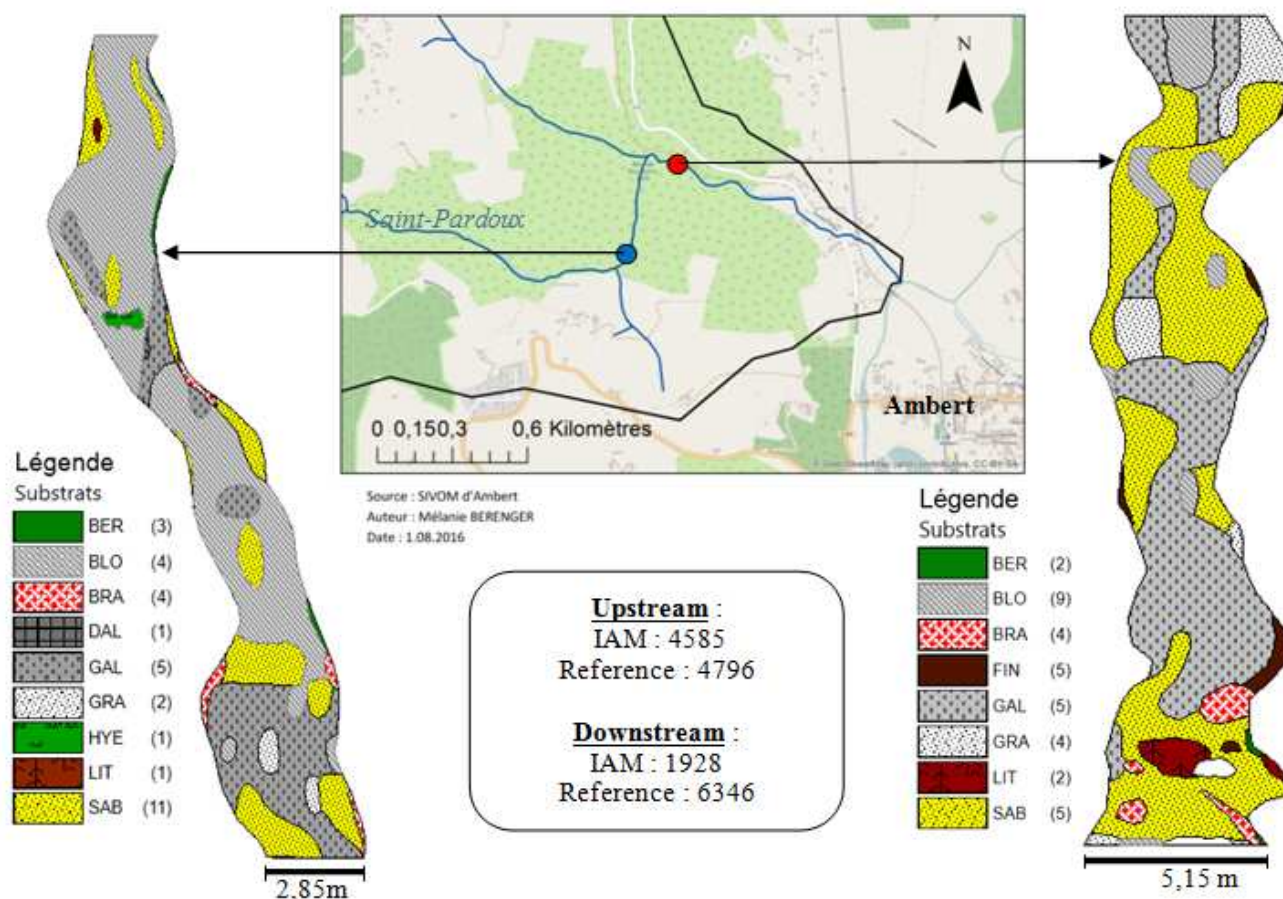
The follow-up protocol defines two measures: 1) a geomorphology monitoring, including the analysis of the geometry of the riverbed, flow facies, sediments transportation, riparian vegetation and the state of the river edges; 2) a biologic diagnostic studying the fauna found in the bottom of the river (benthic macro invertebrates). The following indicators have been used: SYRAH, CARHYCE, IAM, IBG-DCE and sediment traps.



Some examples of the river analysis performed on the Saint-Pardoux

What are the results?

First, the morphologic study showed that the riverbed in the resinous station is twice larger than in the reference station. It also has much fewer flow facies, less diversified substratum and a high quantity of sand. The river's edges are dug and high, threatening to fall down and bring trees with it. The erosion of the riverbed in this zone is clearly visible. The biologic analysis confirms these observations, by showing a degradation of macro-invertebrates' population between the two stations.



Example of results of the IAM indicator: the reference station on the left, the resinous station on the right.

What are the next steps?

There are simple solutions to manage the river issues linked to the conifer plantations. All the planned work consists of cutting trees on the river's sides to create space between the river and the plantation (5 to 6 meters). This will lead to the restoration of the riparian vegetation adapted to the river ecosystem and will also limit the shadows on the river.

In order to accelerate the restoration, it could also be possible to plant suitable trees directly. The area will be monitored and maintained in order to keep a good riparian vegetation.

During the 3 to 5 years after the restoration, the indicators used in this study will be updated for the two stations, so that the results could be compared to the present study as a follow-up to the restoration.