

LIFE 13 NAT/ FR / 000506



**Restoration of freshwater pearl mussel (*Margaritifera margaritifera*) habitat in Dronne river, France**



*International seminar - Monitoring and restoration of freshwater (mussel) habitats  
Clervaux 28th Nov. 2018*



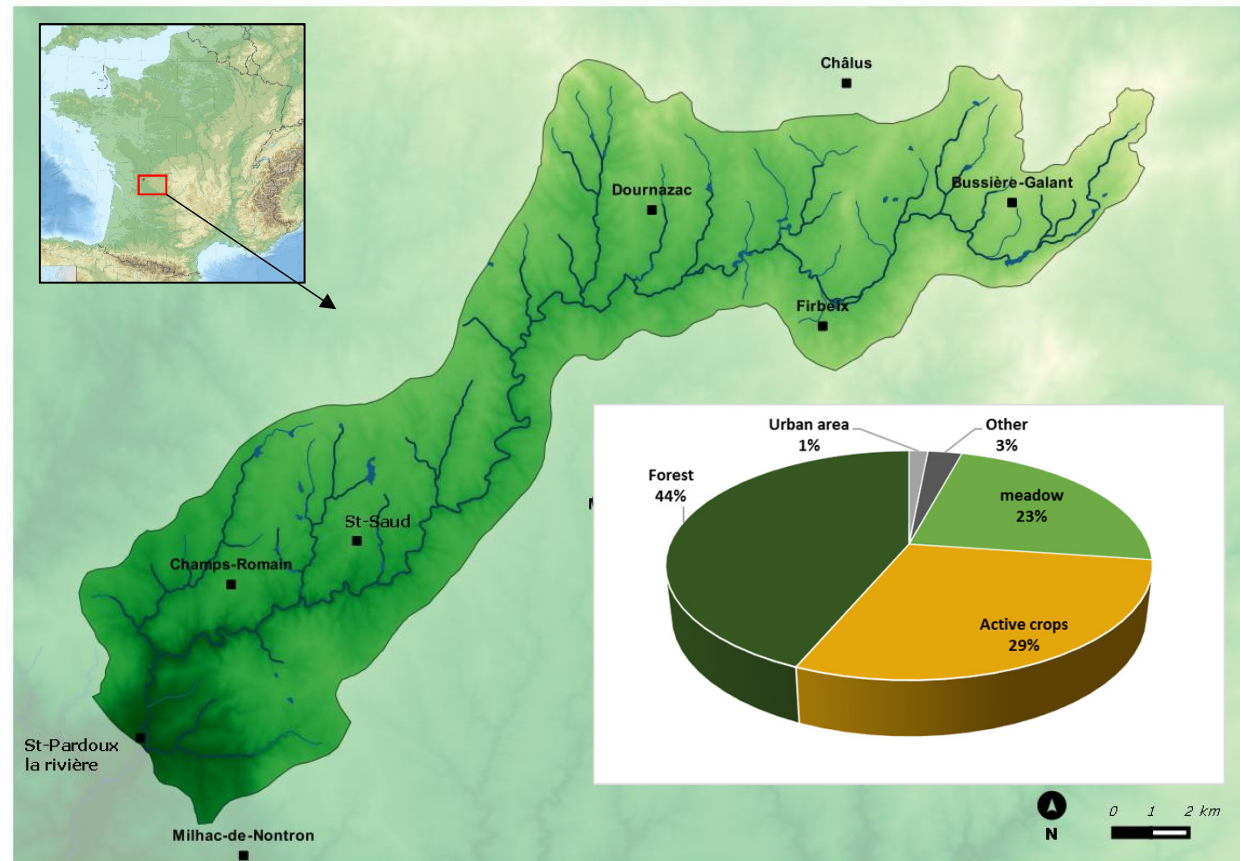
A vertical photograph of a forest stream with rocks and greenery, partially obscured by a white curved shape.

## Summary

1. Emergence of the LIFE Haute-Dronne program
2. Habitat restoration and monitoring
3. Other components of the program
  - *Ex-situ breeding*
  - *Biology and ecotoxicology of FPM*
  - *Communication and awareness*

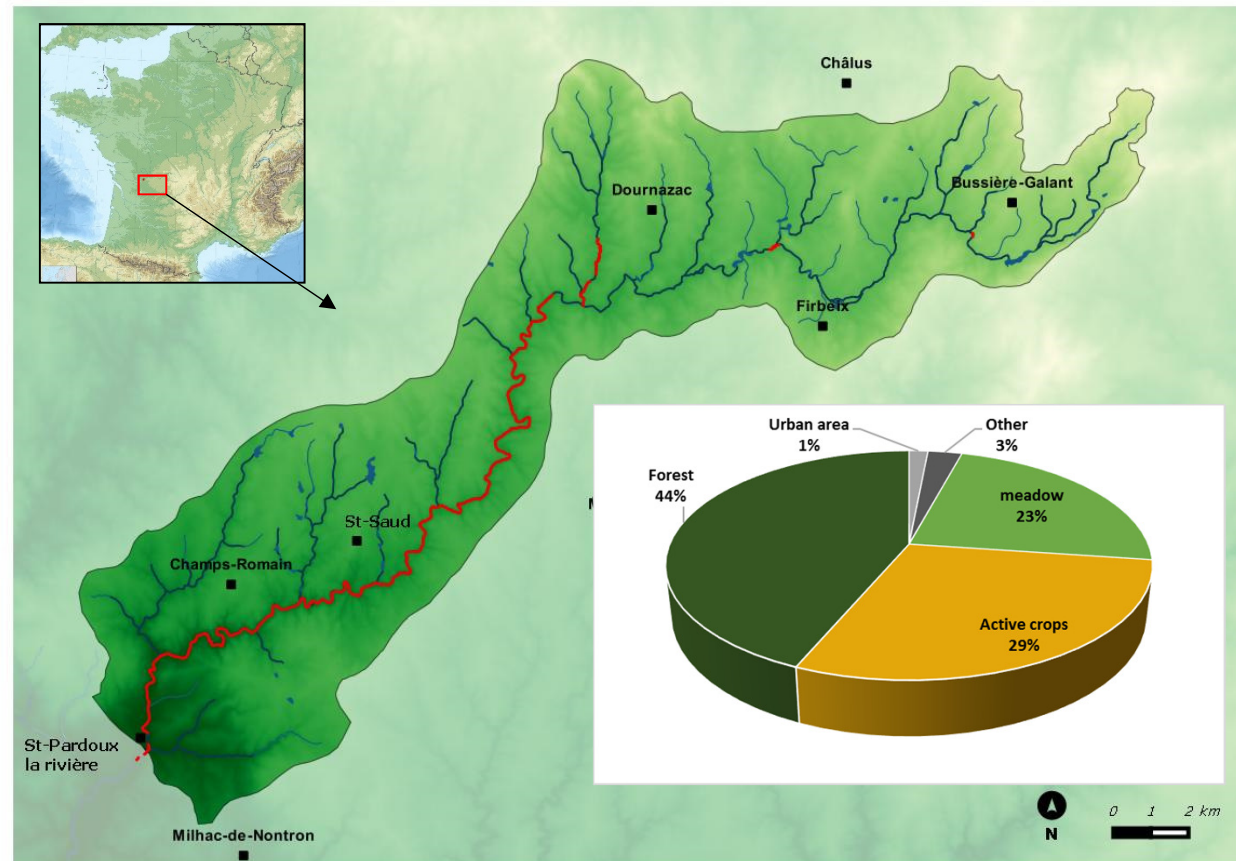
# 1- Emergence of the LIFE Haute-Dronne project

- Catchment area: 215 km<sup>2</sup>
- Rivers linear 160 km (Dronne 52 km)



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- Catchment area: 215 km<sup>2</sup>
- Rivers linear 160 km (Dronne 52 km)
- 20 000 FPM over 30 km



## 1- Emergence of the LIFE Haute-Dronne project

- Insufficient and highly localized recruitment
- Main sources of disturbances

Forestry

Sewage

Agricultural practices

Soil erosion, eutrophication

bovine trampling ...

Issues addressed  
through different tools :  
Natura 2000, Park forest charter, etc.



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Dams / artificial  
lakes

fragmentation of river  
ecosystems

Temperature

substrate clogging...

???

(ecotoxicology, sensibility of  
FPM juveniles...)





# 1- Emergence of the LIFE Haute-Dronne project



**Axe 1.** Habitat restoration

**Axe 2.** Ex-situ breeding and releasing FPM

**Axe 3.** Improved knowledge of the biology and ecotoxicology of FPM

**Axe 4.** Communication



*6 years (2014 – 2020)*



## 2- Habitat restoration and monitoring

Dams impacts on the Dronne river

Fragmentation of river ecosystems





## 2- Habitat restoration and monitoring

Dams impacts on the Dronne river

Fragmentation of river ecosystems



Reservoir sedimentation and loss of habitat : 6,3 km (> 10% of length river)



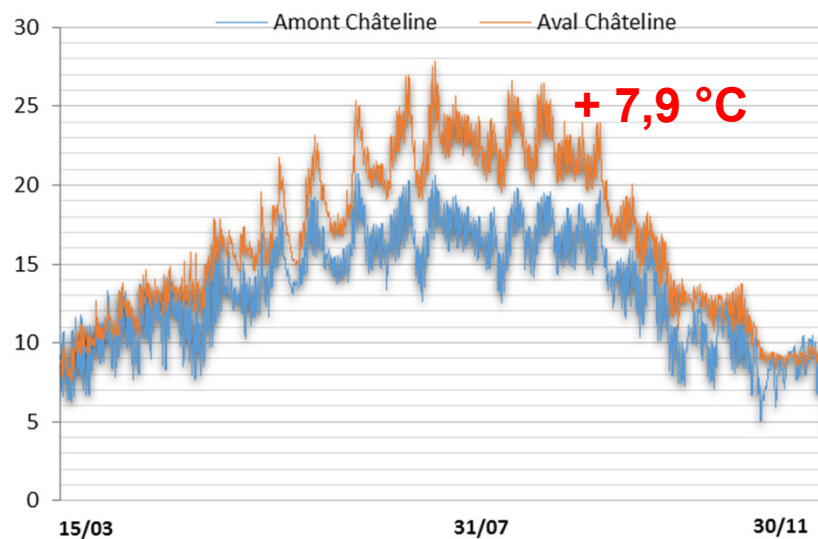
## 2- Habitat restoration and monitoring

### Dams impacts on the Dronne river

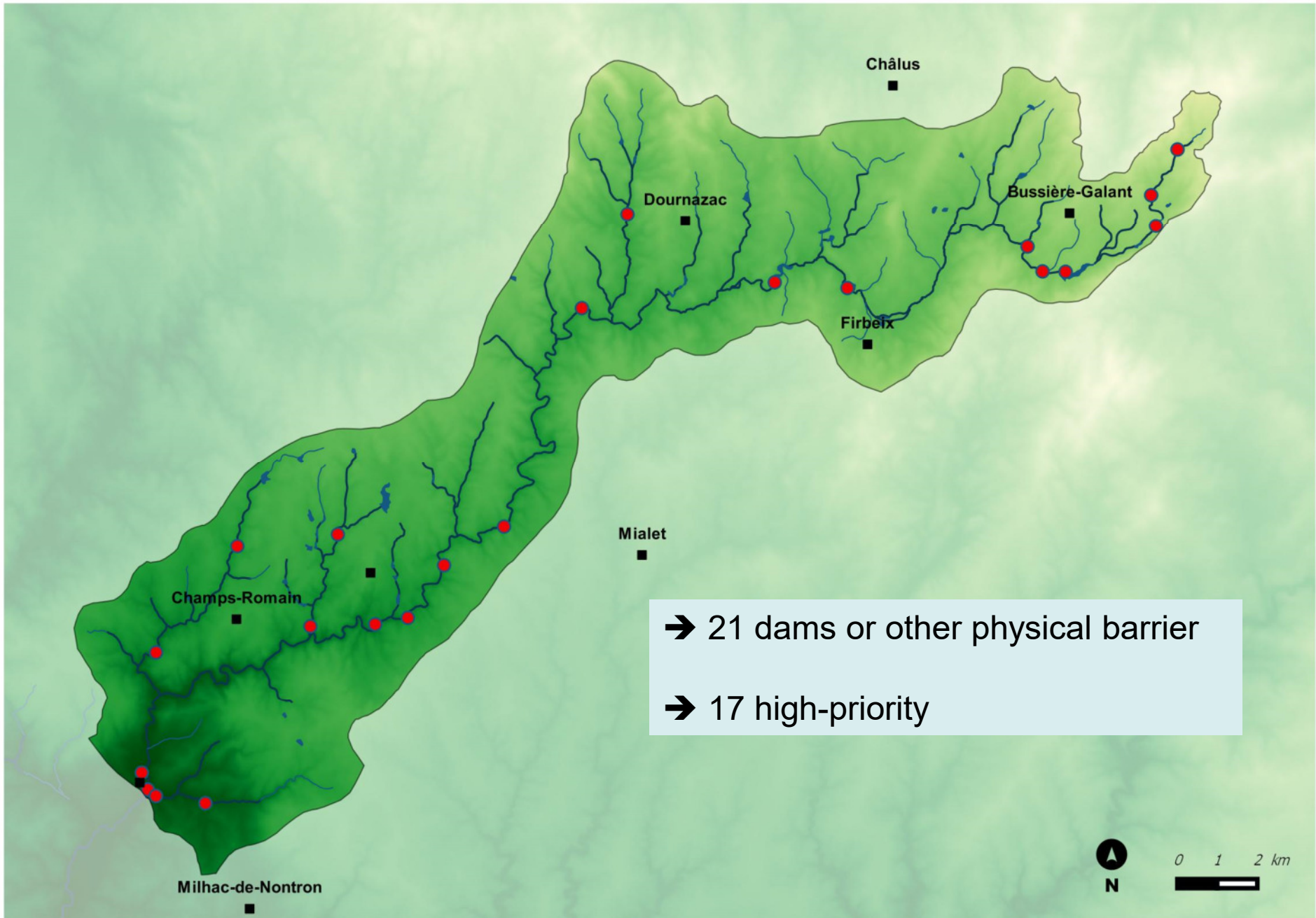
Fragmentation of river ecosystems



Reservoir sedimentation and loss of habitat : 6,3 km (> 10% of length river)



Water  
température



## 2- Habitat restoration and monitoring

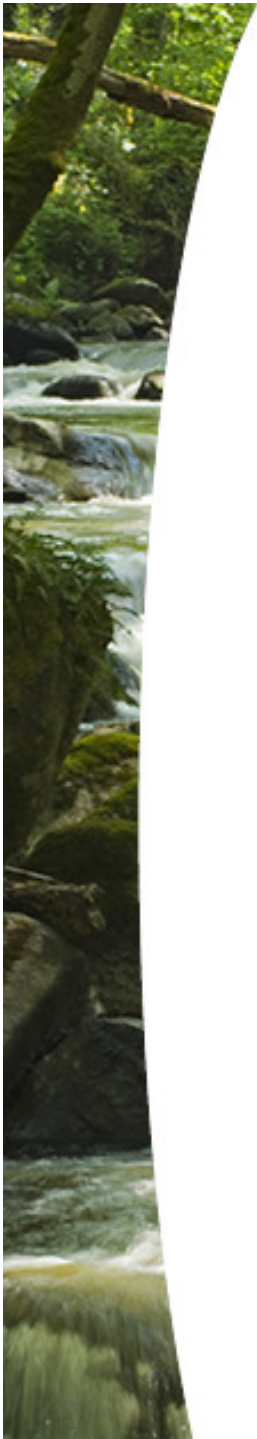


***Before***

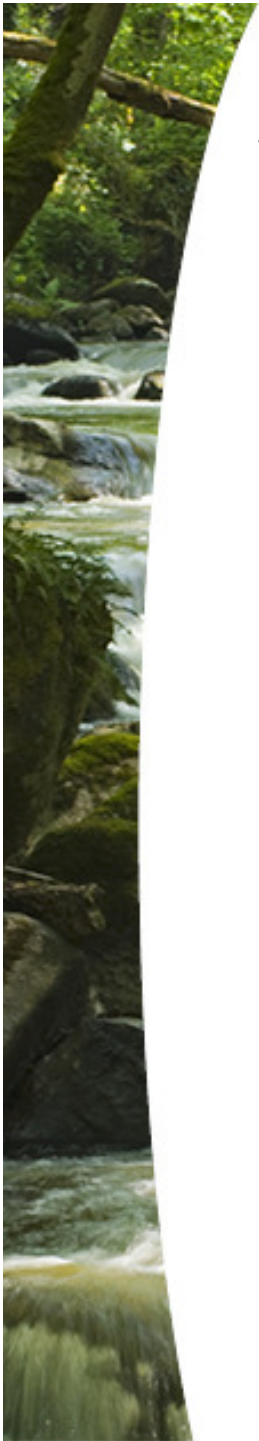
## 2- Habitat restoration and monitoring



**After**



## 2- Habitat restoration and monitoring



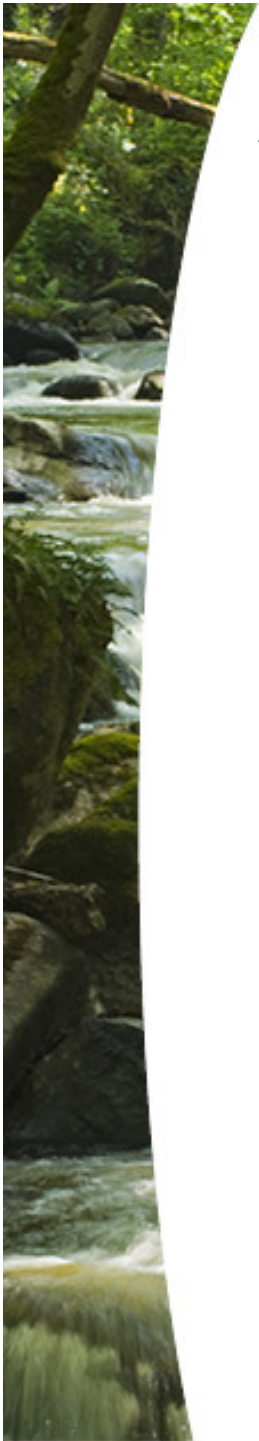
**Before**

## 2- Habitat restoration and monitoring



**After**

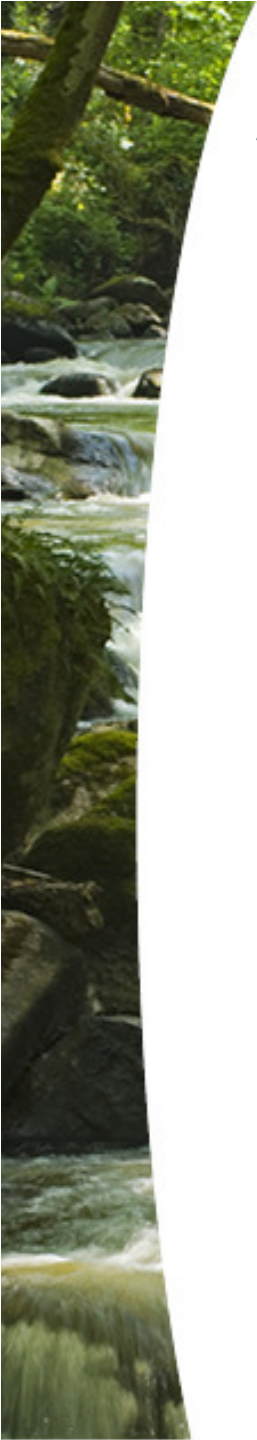
## 2- Habitat restoration and monitoring



***Before***



## 2- Habitat restoration and monitoring



*After*

## 2- Habitat restoration and monitoring



*Before*

## 2- Habitat restoration and monitoring



*After*

## 2- Habitat restoration and monitoring



***Before***

## 2- Habitat restoration and monitoring

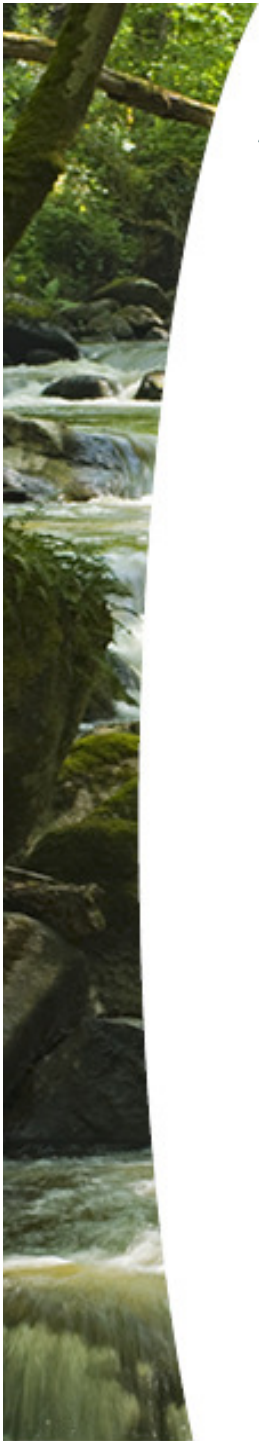


*After*

## 2- Habitat restoration and monitoring



**Before**



## 2- Habitat restoration and monitoring

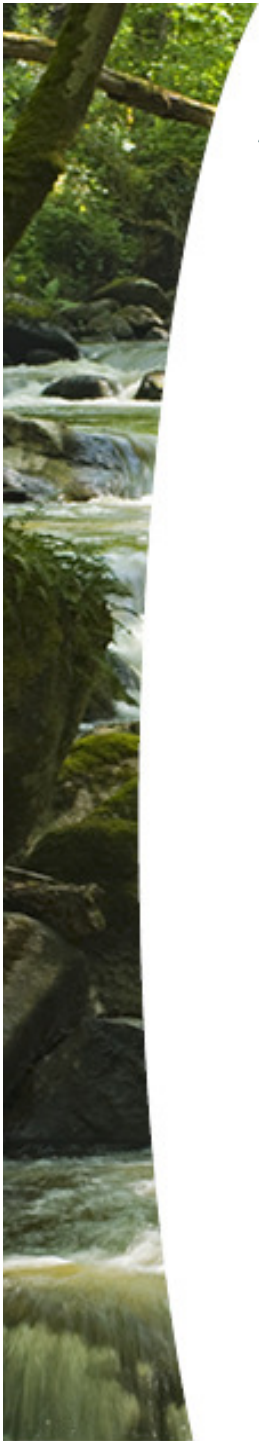


**After**

## 2- Habitat restoration and monitoring



*Before*





## 2- Habitat restoration and monitoring



*After*

## 2- Habitat restoration and monitoring

- *Monitoring attractiveness habitat*



**A**



**B**

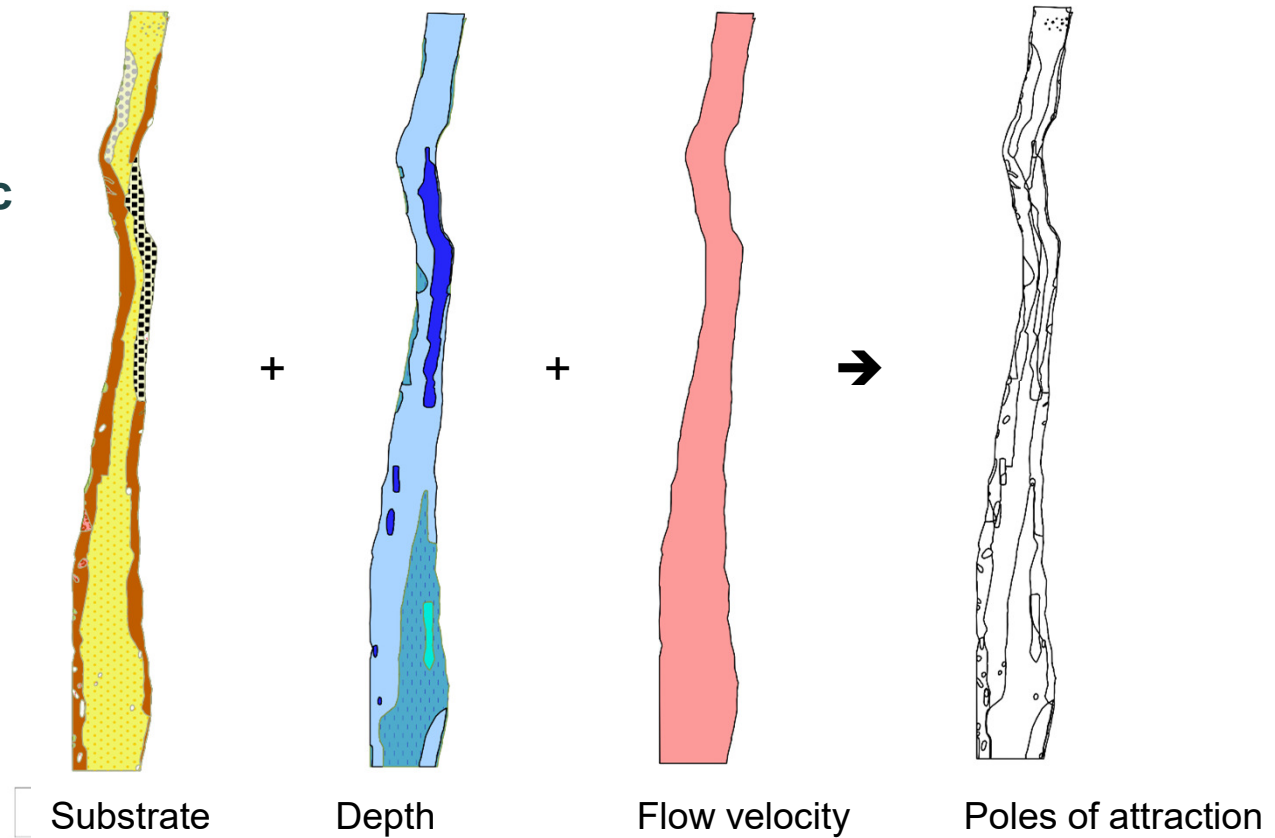
## 2- Habitat restoration and monitoring

- *Monitoring attractiveness habitat*

Just upstream  
Grade : 4/100

*I.A.M. Indice d'Attractivité Morphodynamique  
Station Dronne 2*

Index of  
Morphodynamic  
Attractiveness  
(IAM<sup>PP1</sup>)



**Slide 27**

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**PP1**

Crossing substrates / heights / speed allows to define poles of attraction and a note

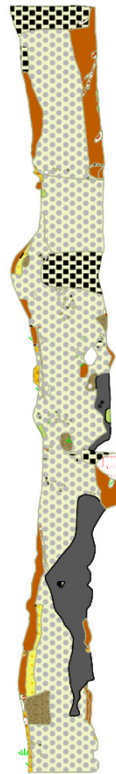
Pnr Périgord-Limousin; 14.11.2018

## 2- Habitat restoration and monitoring

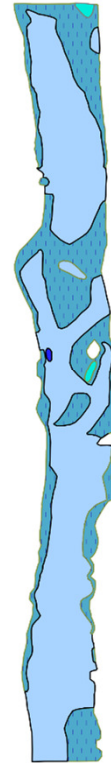
- *Monitoring attractiveness habitat*

**Dronne reference area**  
Grade : 61/100

*I.A.M Indice d'Attractivité Morphodynamique  
Station Dronne 1*



Substrate



Depth

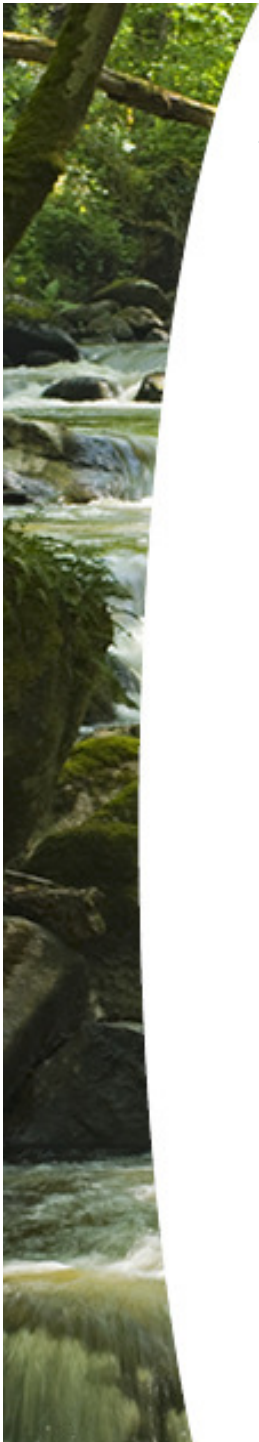


Flow velocity



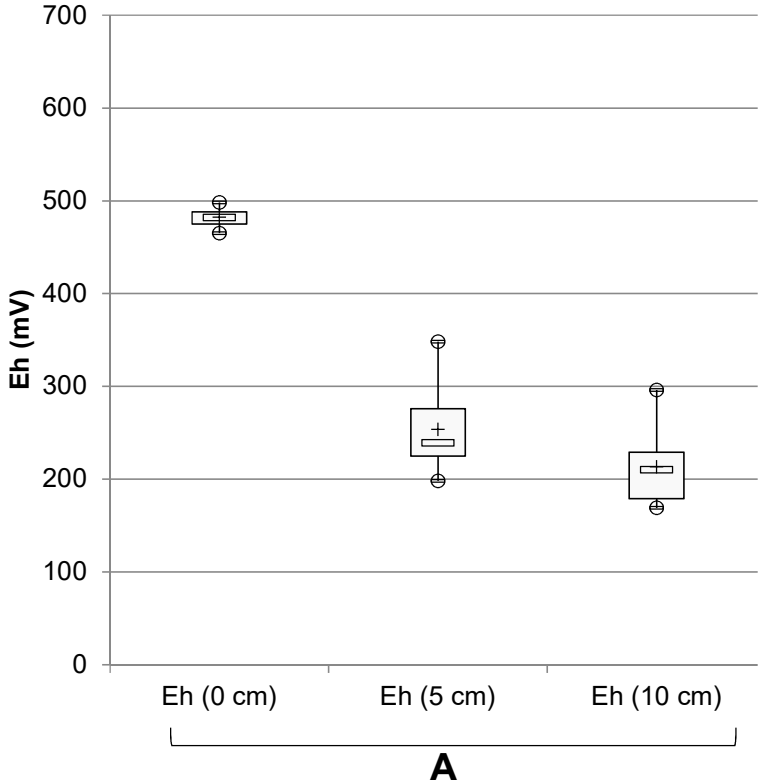
Pole of attraction

*Reference area  
without dam  
(objective)*



## 2- Habitat restoration and monitoring

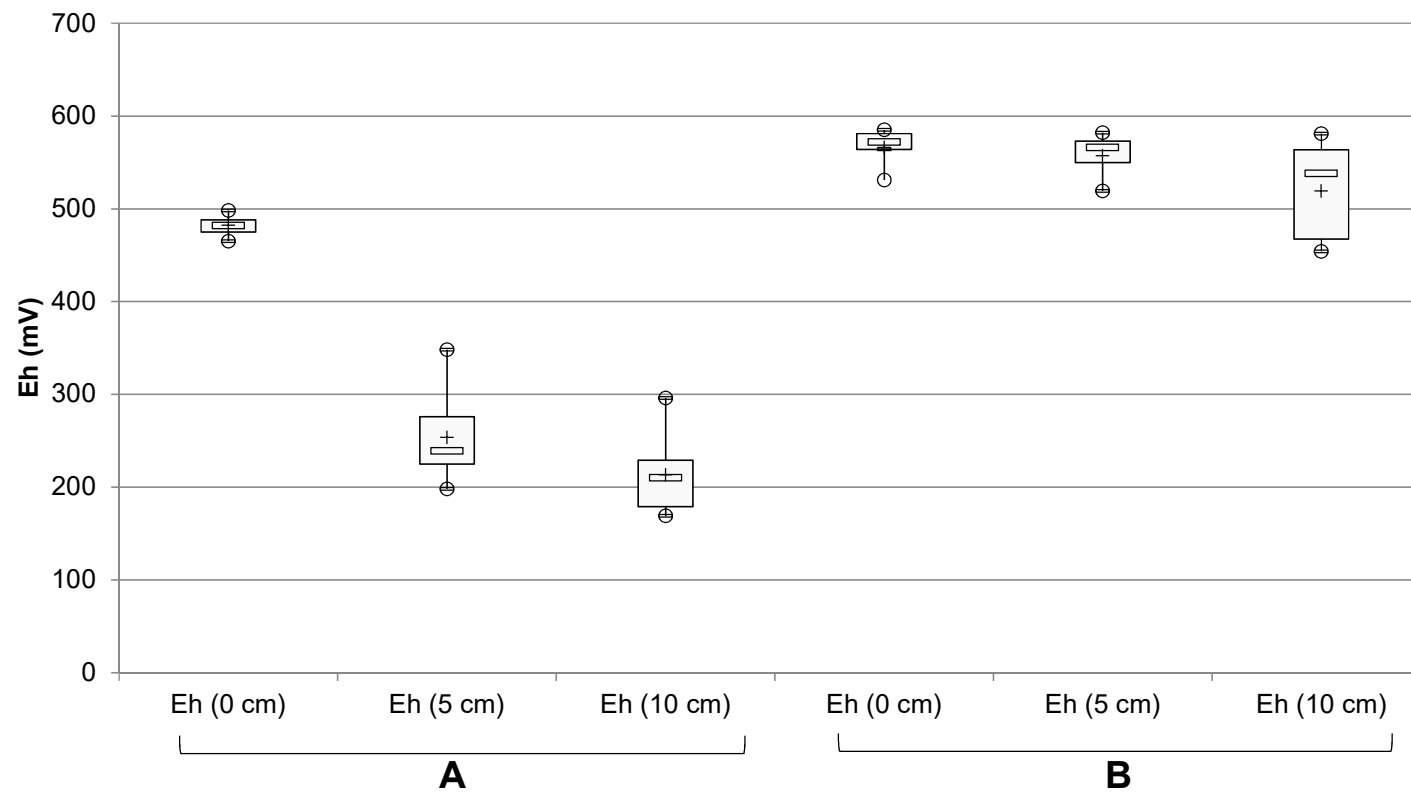
- *Monitoring substrate clogging*



Redox potential in freeflowing water at the surface and at 5 and 10 cm in the bed, before project (A) and 20 months after project (B) on restored section (n=45 for each measure)

## 2- Habitat restoration and monitoring

- *Monitoring substrate clogging*

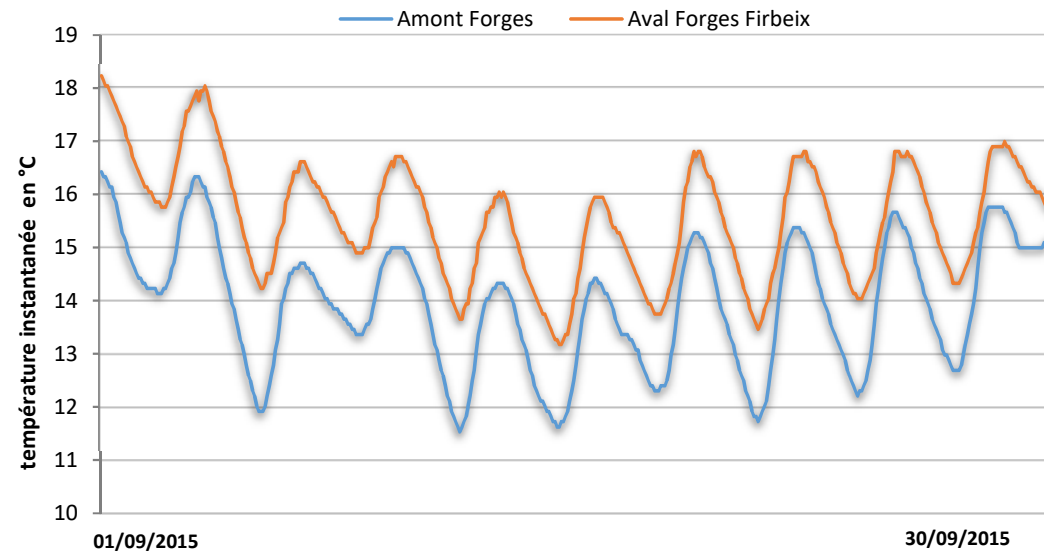


Redox potential in freeflowing water at the surface and at 5 and 10 cm in the bed, before project (A) and 20 months after project (B) on restored section (n=45 for each measure)

## 2- Habitat restoration and monitoring

- *Monitoring water temperature*

Before restoration

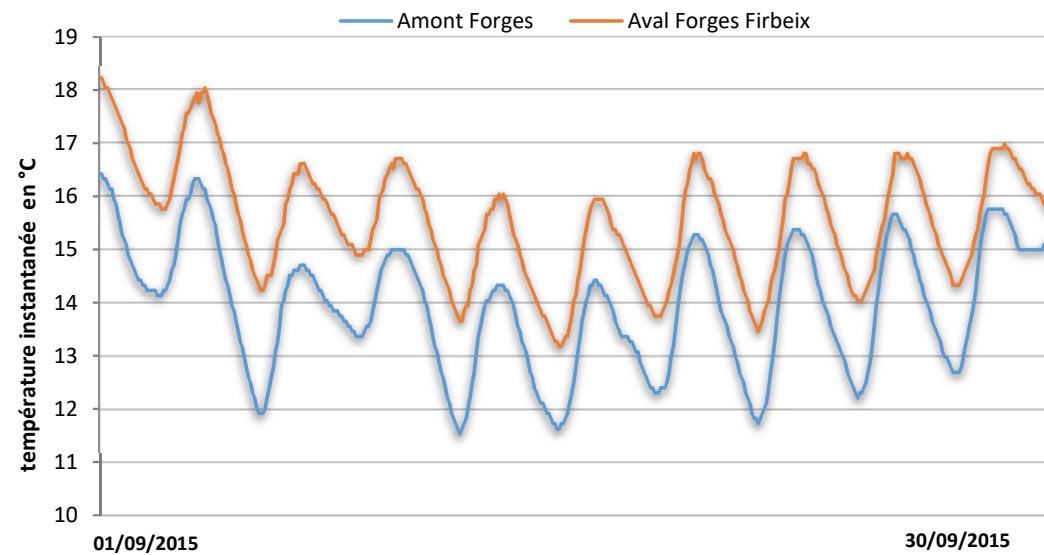




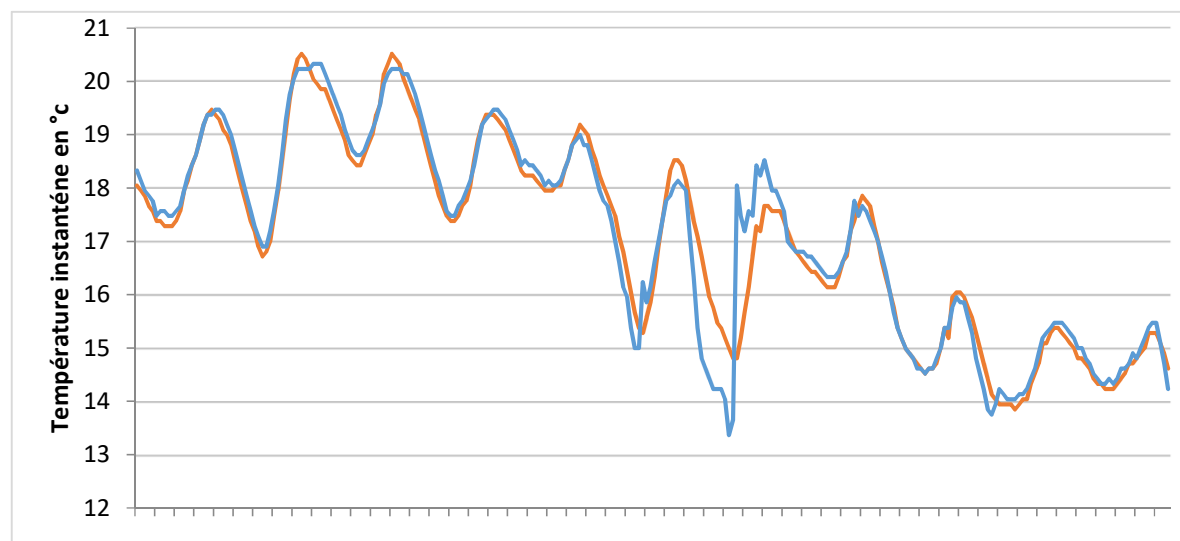
## 2- Habitat restoration and monitoring

- *Monitoring water temperature*

Before restoration



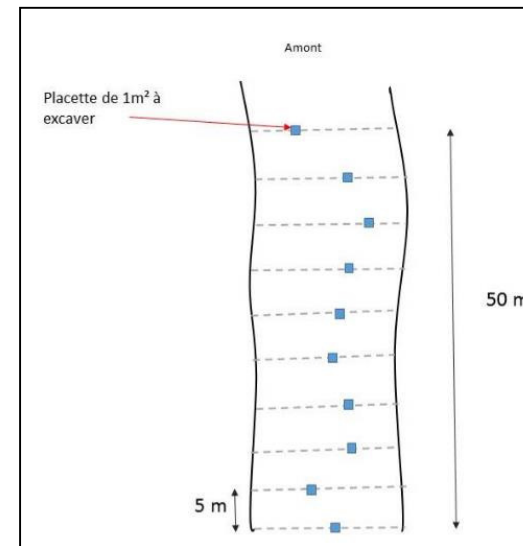
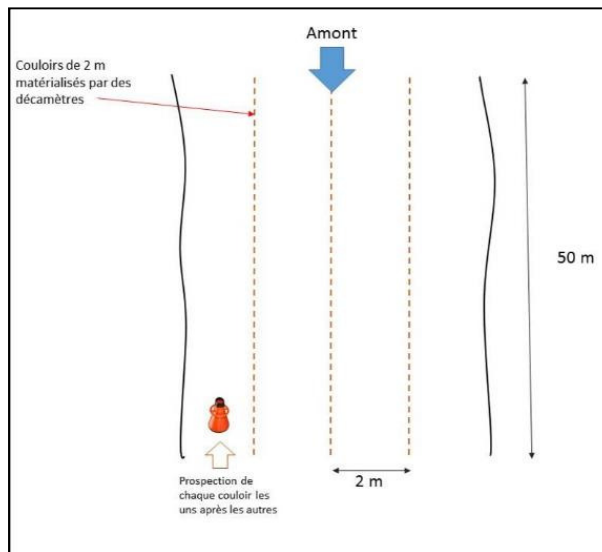
After restoration



## 2- Habitat restoration and monitoring

- *Monitoring FPM population*  
Initial status : double sampling

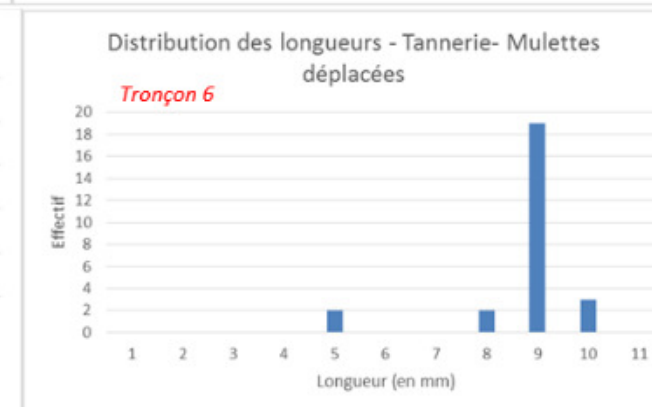
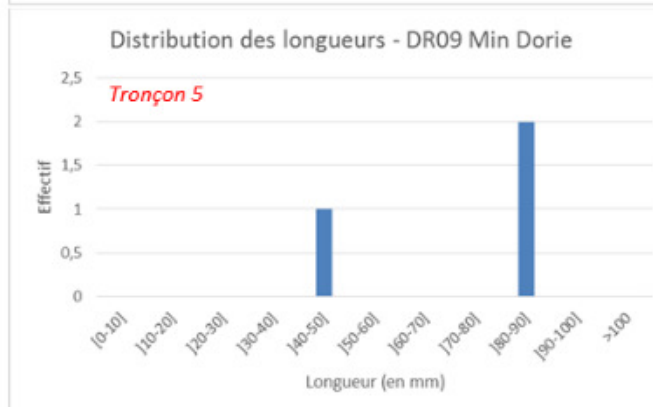
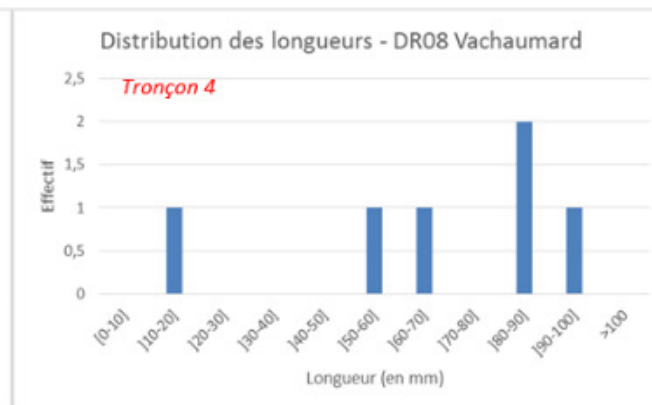
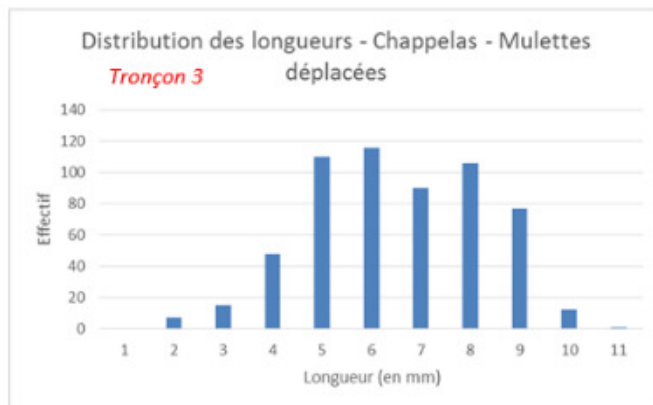
Experiment repeated  
at the end of the  
project



## 2- Habitat restoration and monitoring

- *Monitoring FPM population*

Initial status : double sampling



Age pyramid very heterogeneous



## 2- Habitat restoration and monitoring

### *Other parameters monitored*

- Water chemistry



- Benthic fauna index

- Host fish population

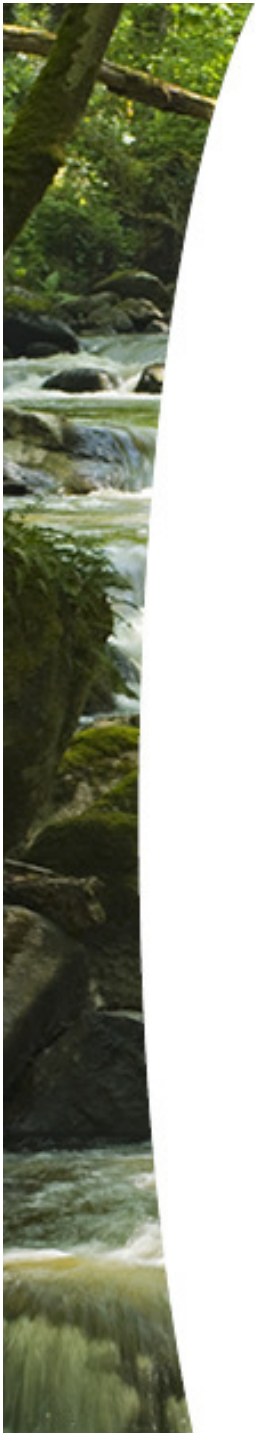


### 3- Other components of the program

#### *Captive breeding of FPM*

2 objectives :

- Strengthen natural population
- Understanding impact of trace metals on juveniles



### 3- Other components of the program

*Biology and ecotoxicology of FPM*

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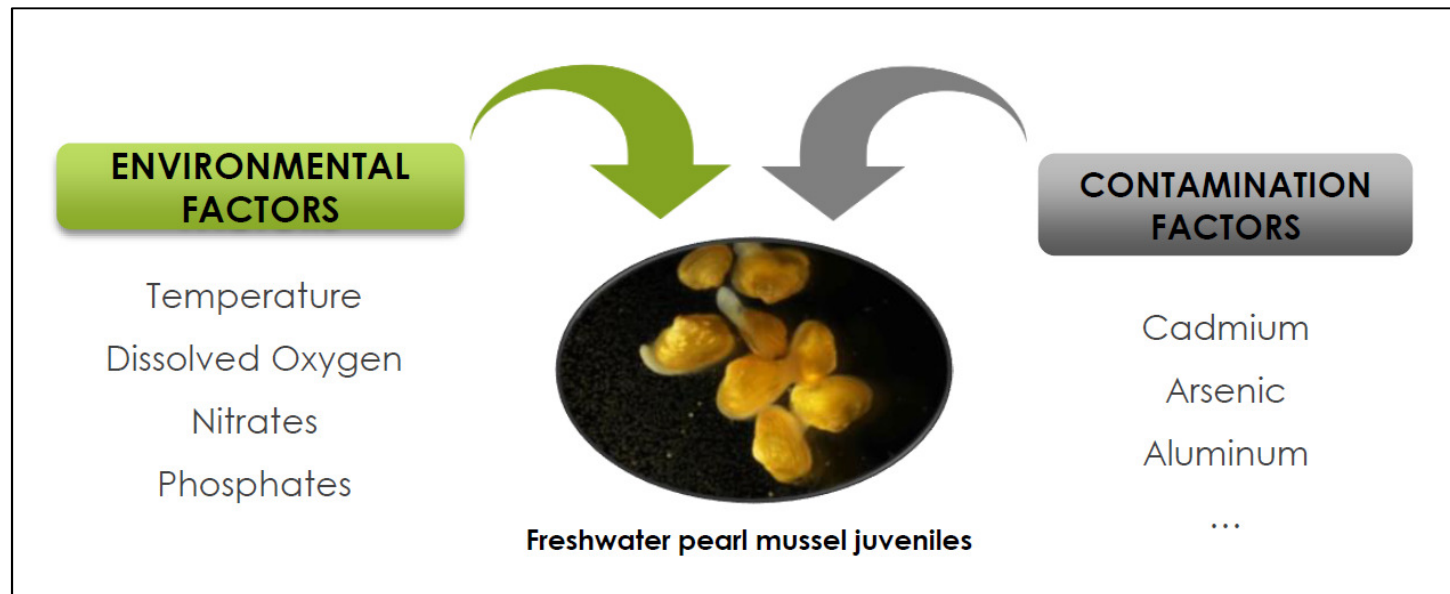
### 3- Other components of the program

*Biology and ecotoxicology of FPM*

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- Ph.D. Student 2017-2020 : Study of the sensibility of freshwater FPM juveniles to environmental and contamination factors



Contact : [tiare.belamy@u-bordeaux.fr](mailto:tiare.belamy@u-bordeaux.fr)

### 3- Other components of the program

*Biology and ecotoxicology of FPM*

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Environ Sci Pollut Res  
DOI 10.1007/s11356-017-0294-6



RESEARCH ARTICLE

## Transcriptomic responses of the endangered freshwater mussel *Margaritifera margaritifera* to trace metal contamination in the Dronne River, France

Anthony Bertucci<sup>1</sup>  • Fabien Pierron<sup>1</sup> • Julien Thébault<sup>2</sup> • Christophe Klopp<sup>3</sup> • Julie Bellec<sup>2</sup> • Patrice Gonzalez<sup>1</sup> • Magalie Baudrimont<sup>1</sup>



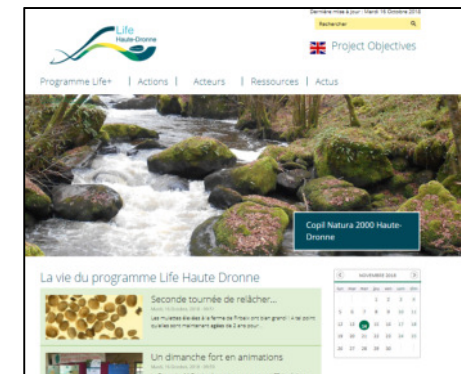
### 3- Other components of the program

#### Communication

- General public

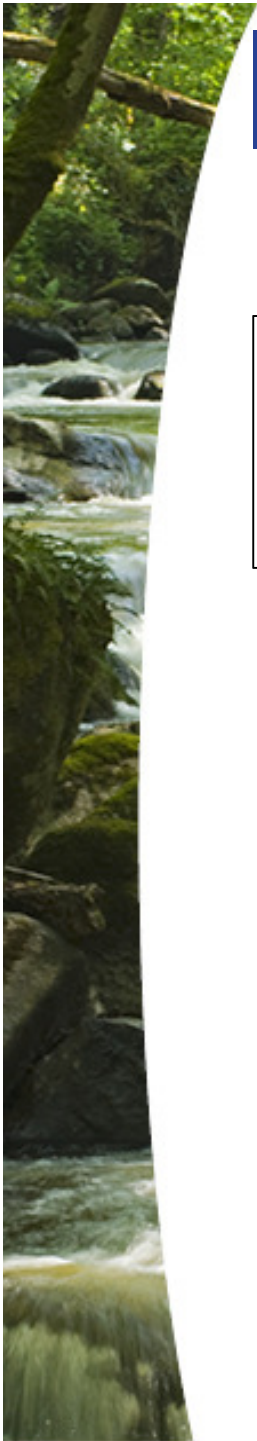


[www.life-haute-dronne.eu](http://www.life-haute-dronne.eu)



- Education programs in schools





**Save the date : 6-7-8<sup>th</sup> november 2019**  
**International seminar about conservation of freshwater**  
**bivalve and habitat restoration**  
Dordogne, France



***<https://life-haute-dronne.eu>***

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