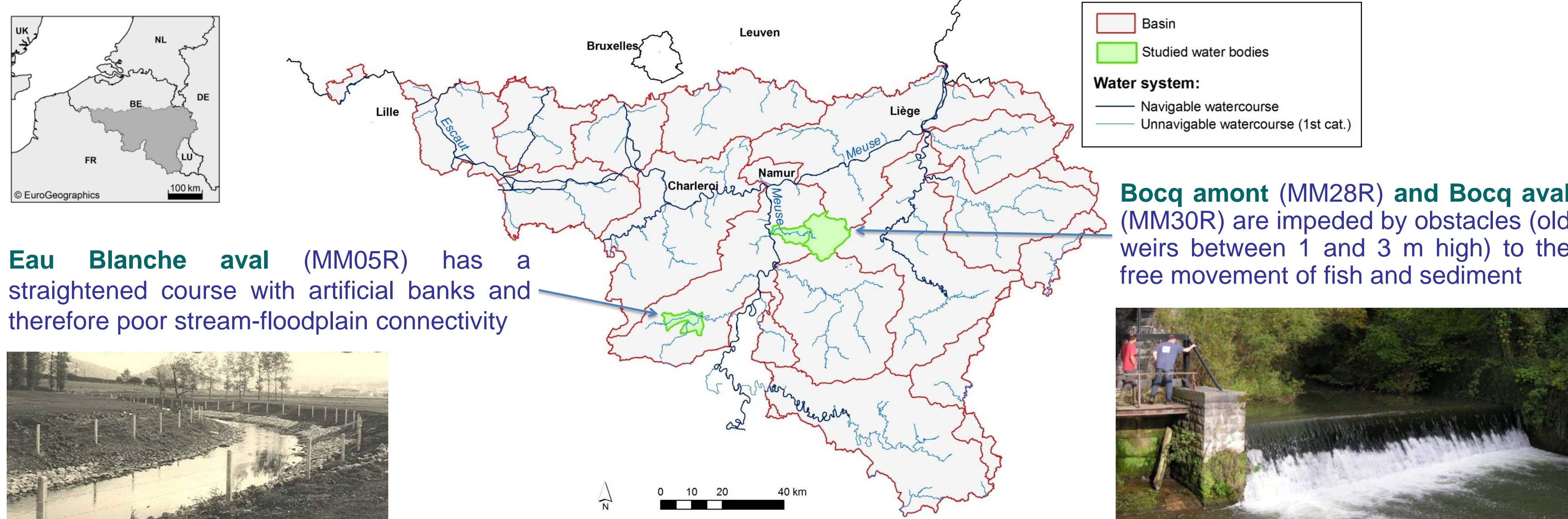


1. Introduction

In the context of the **Water Framework Directive**, a LIFE+ Environment project (called Walphy), co-funded by the European Union and the Service Public de Wallonie, was launched in 2009. It aims to improve hydromorphological quality of the **upstream Meuse basin** in order to achieve the “good ecological status” required by the WFD. It also aims to undertake experimental river restoration projects and to assess their success on the basis of ecological and geomorphological monitoring.

2. Studied water bodies



4. River restoration work : *improvement of transversal continuity*

In the **Eau Blanche** basin, these works consist of enhancing river channels and restoring meanders or banks. The length of the restoration work is more than 6 km



Eau Blanche - Mariembourg : river channel enhancement (length : 2340 m)



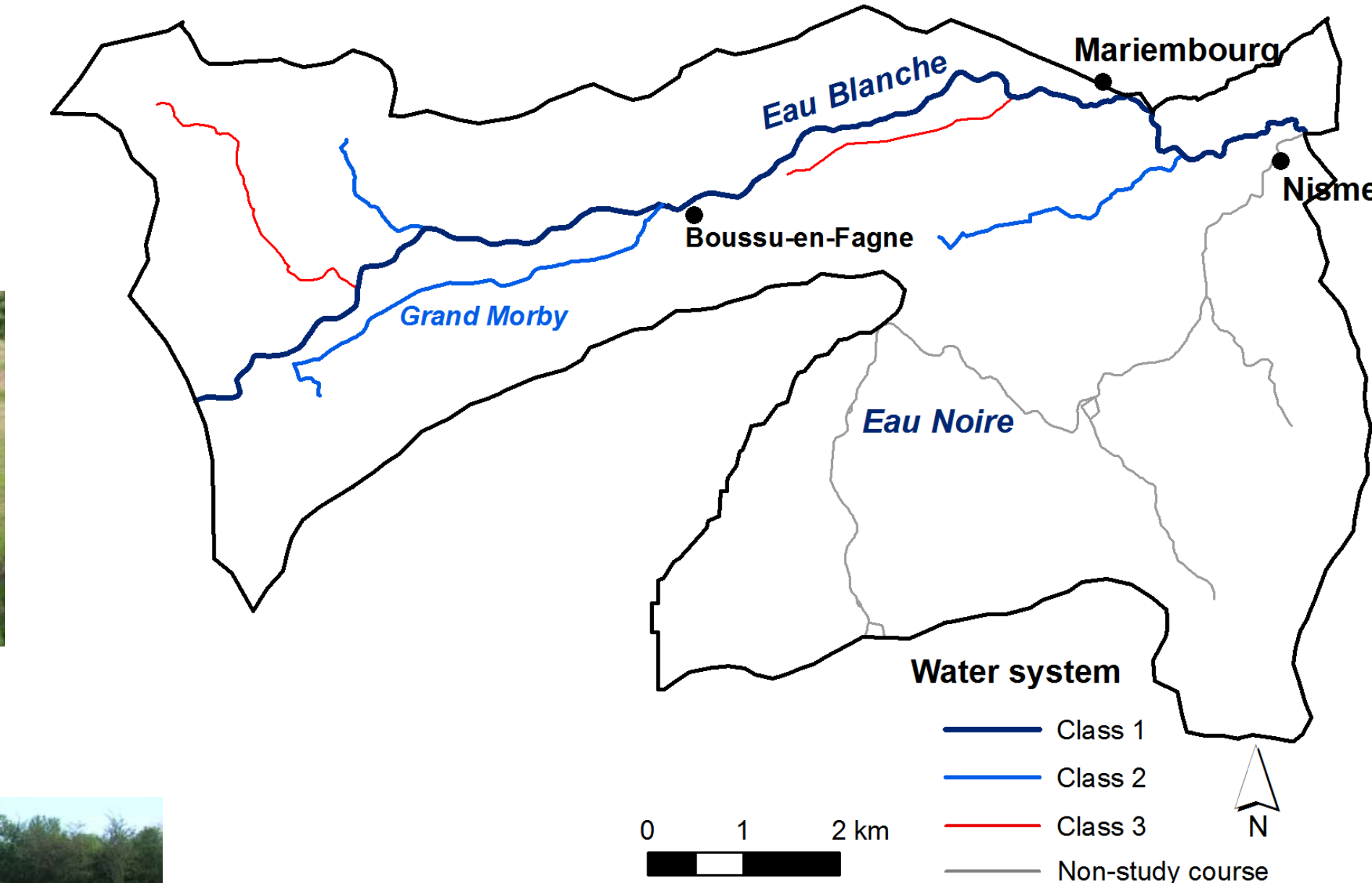
Eau Blanche - Nismes :
Meandering channel (length : 2450 m)



Grand Morby - Boussu-en-Fagne :
Reconnecting remnant stream
(length : 1000 m)

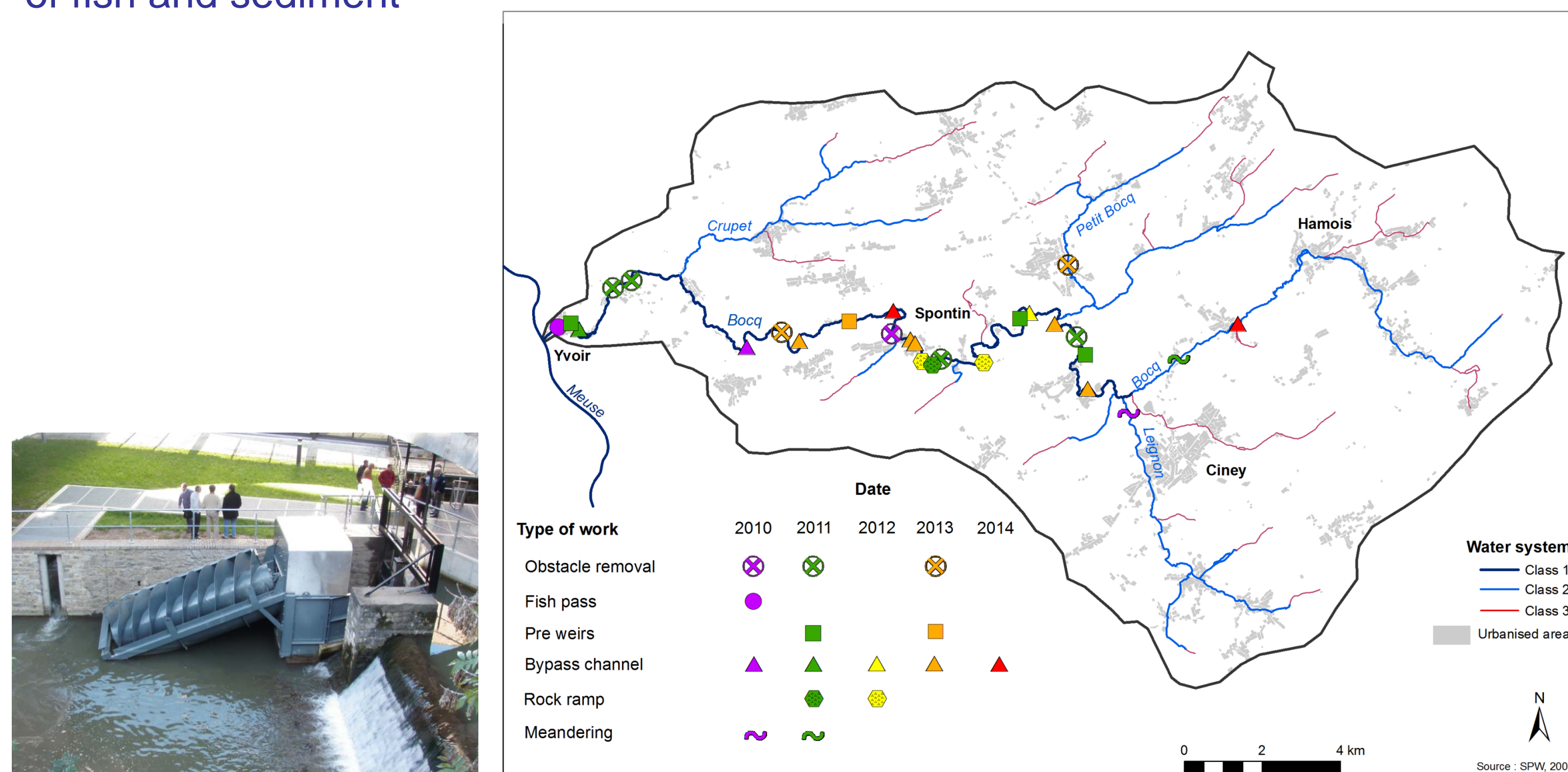


Eau Blanche - Boussu-en-Fagne :
Reconnecting remnant meander (length : 300 m)

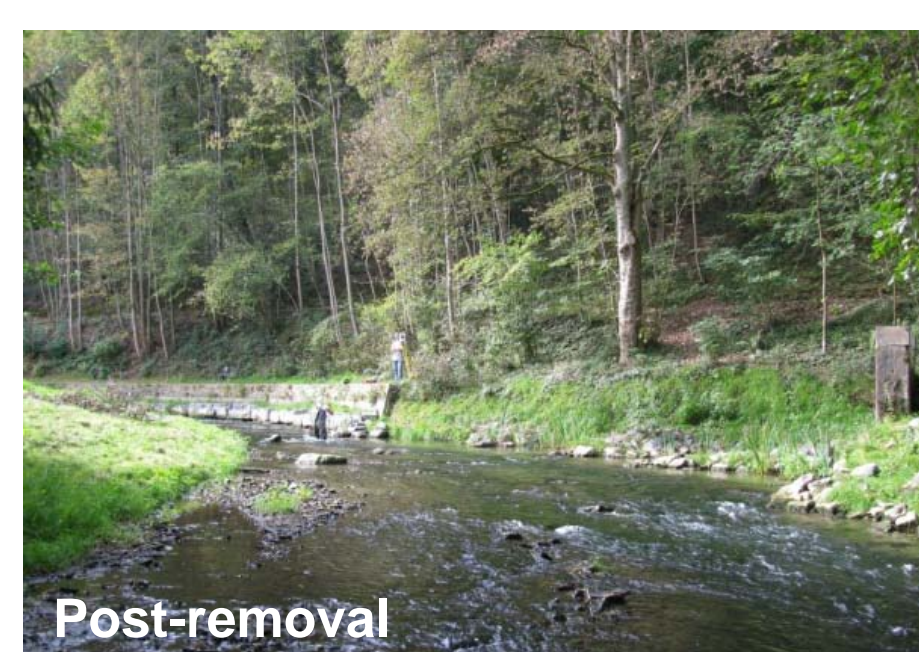
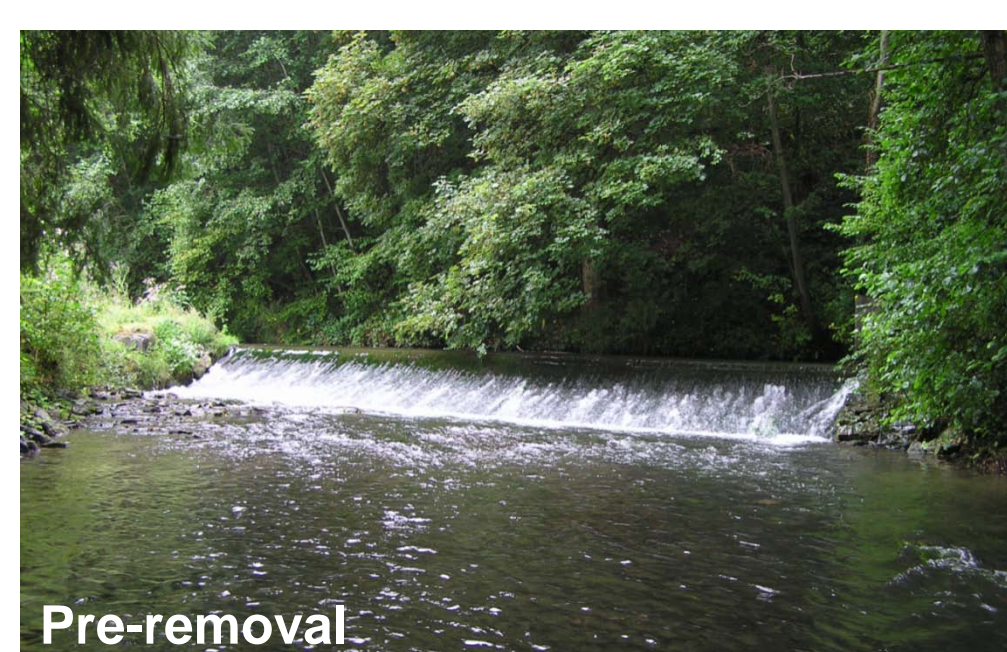


3. River restoration work : *improvement of longitudinal continuity*

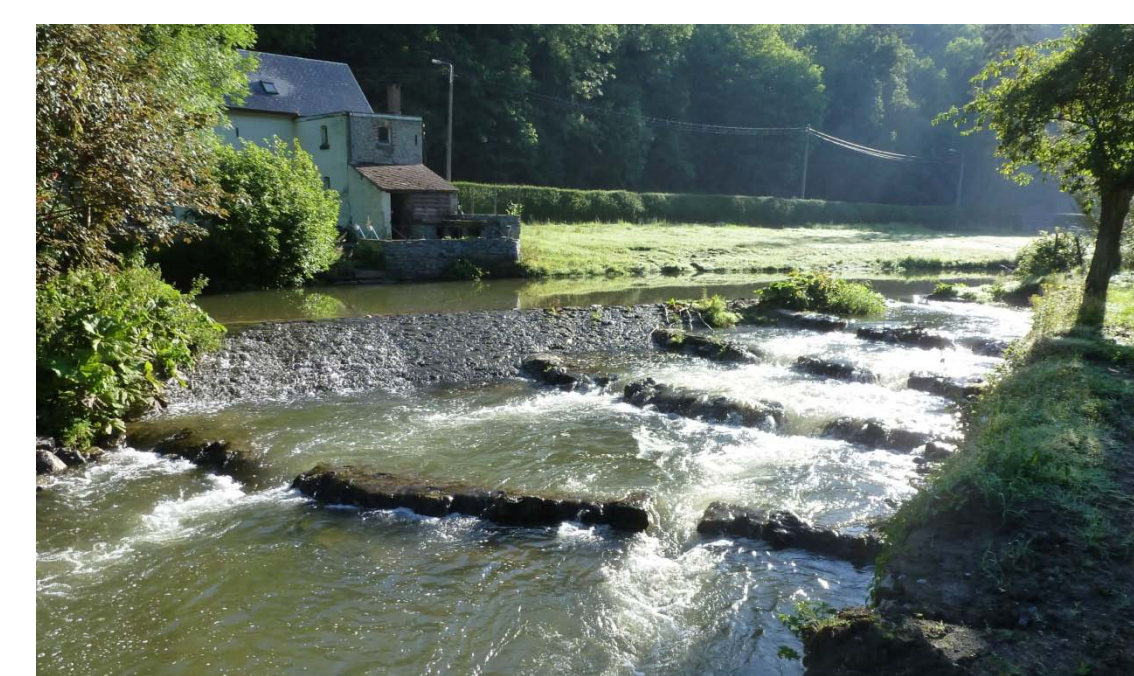
In the **Bocq** basin, these works consist of making 25 obstacles passable to improve the free movement of fish and sediment



Bocq - Yvoir : 1st obstacle
(1.85 m high). Fish pass and
micro-hydroelectric plant



Bocq - Spontin : removal of old weir (1.20 m high)



Bocq - Yvoir : old weir (1.50 m high)
Fish ramp and boulder bar construction



Bocq - Purnode : Weir (1.35 m high)
and bypass channel



Bocq - Spontin : Rock ramp

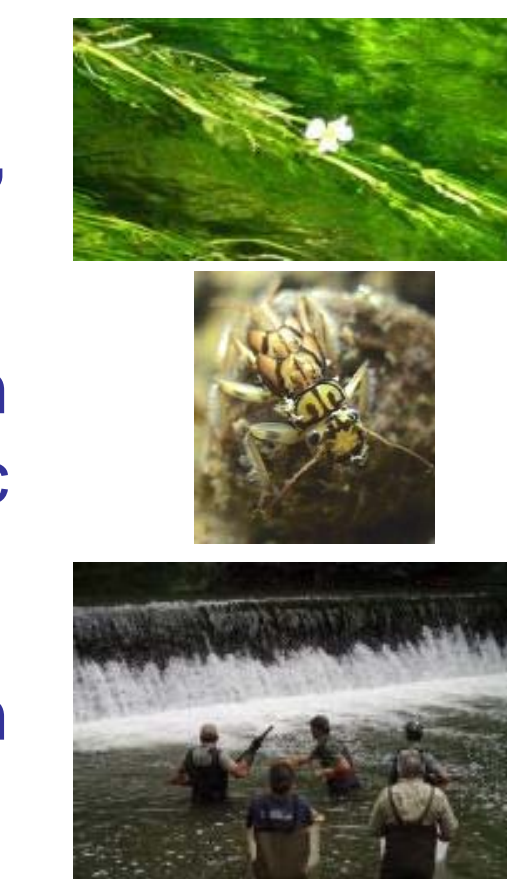
5. Scientific monitoring

Aim : assessing the success of restoration projects through the comparison of data collected pre- and post- restoration work

a) Biology

Survey of 3 types of data :

- Macrophyte : indexes (IBMR) based on cover, ecological amplitude and trophic level of taxa
- Macroinvertebrate : indexes based on abundance, diversity, species richness, specific pollution sensitivity index, habitat quality,...
- Electrofishing and fish indexes based on abundance, density, species richness,...



c) Geomorphology

- Comparison of topographic surveys pre- and post- restoration work
- Sediment transport : evaluating bedload mobility using traced pebbles at :
 - reaches impacted by obstacle to highlight a recovery of the natural transport of sediment
 - reaches with gravel reintroduction to characterize the mobility of new spawning gravel
- Clogging of the gravel bed and its impact on habitat quality
- Restoration works and their resistance to erosion are related to flood characteristics (discharge, recurrence, specific stream power,...)

b) Morphology

Survey of 3 types of data :

- Water depth model
 - Water velocity model
 - Dominant substrate class
- + physical quality indexes

