Restoration and monitoring plan REWET Open Lab 5

This document provides a concept plan for restoration and monitoring on the 2 project sites of Open Lab 5 of the REWET project. The plan will be discussed with Natagora for a feasibility check and to bring it into line with Natagora's own restoration goals.

Introduction pilot sites

The REWET open lab site 5 is situated on two locations in the upstream areas of the Amblève river catchment. The Amblève river originates in the Ardennen Eifel Massif and blends together with the river Ourthe, a tributary of the river Meuse (figure 1).

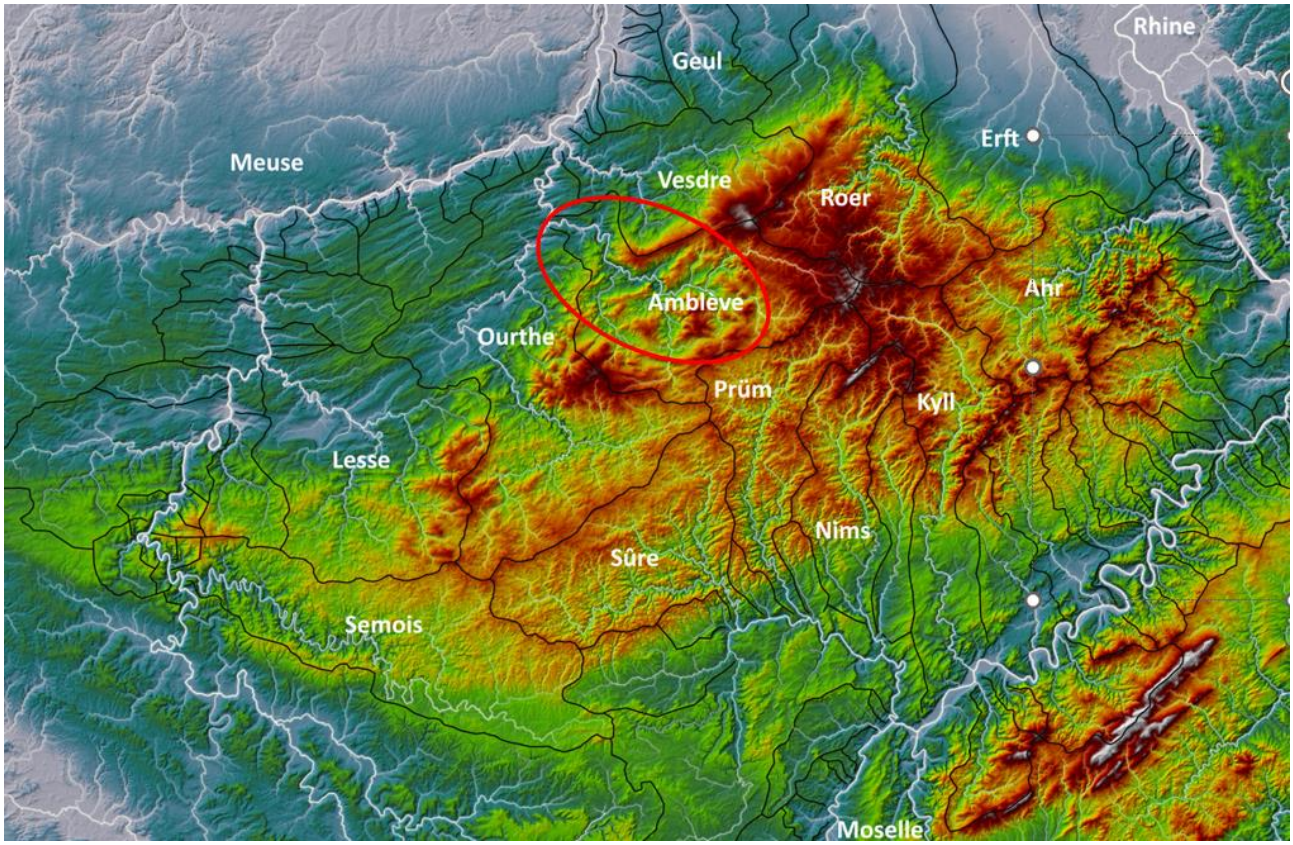
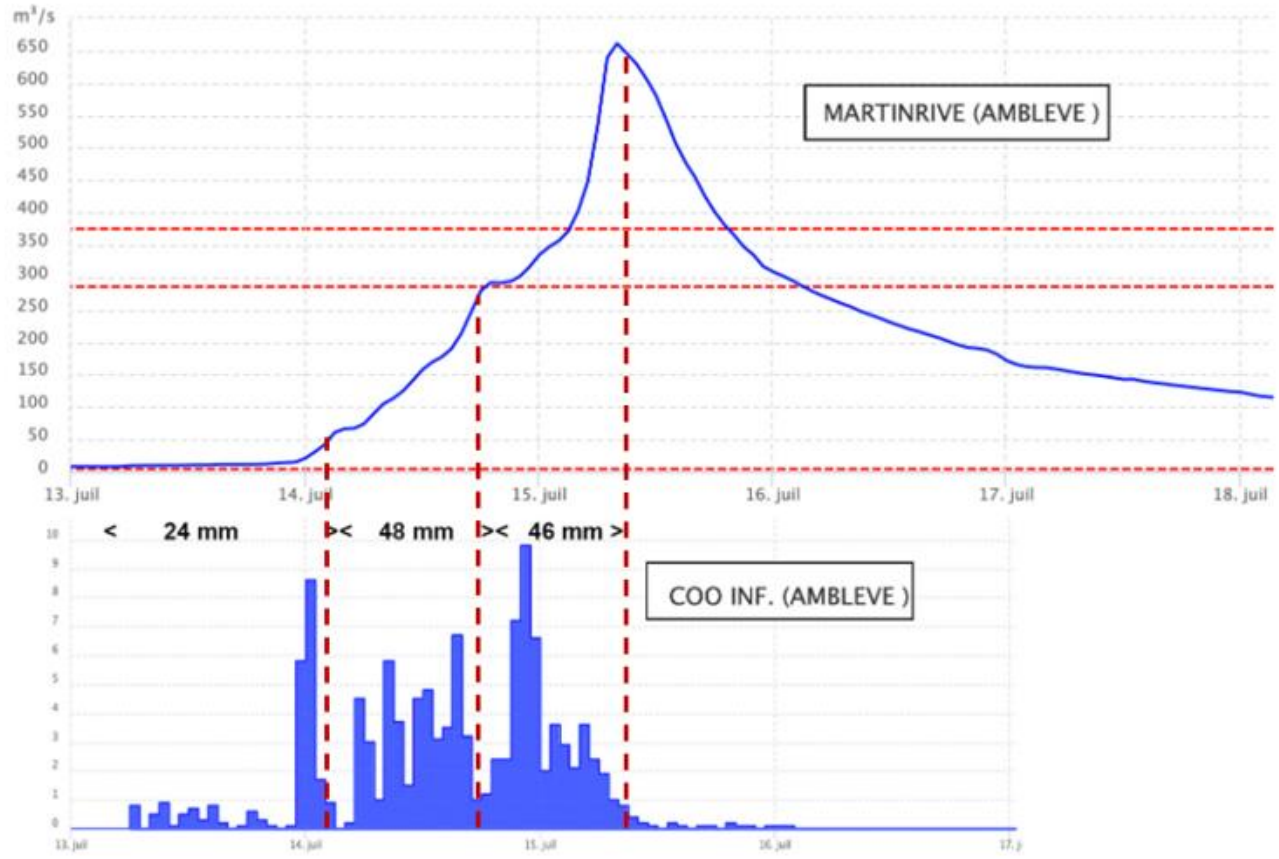


Figure 1: The Amblève river catchment is part of the Ardennes and Eifel Middle mountains.

Just as the other rivers in the Ardennes – Eifel massif , the Amblève river was severely hit by the 2021 flooding. Peak discharges witch are 15 m3/sec on average reached 650 m3 /sec at July 15th 2021, causing mayor damage.



Afvoerverloop Ambleve en neerslaggegevens van een meetstation in het stroomgebied.

Wetland International, WWF, Natagora and Stroming are working on Nature Based Solutions to delay water discharge by restoring natural wetlands in upstream catchment areas. Restoring wetlands in Middle Mountain areas reduces flood and drought risks, and capture carbon in soil and vegetation. It also increases biodiversity, improves water quality, and strengthens Europe's green infrastructure. The two locations in open lab 5 are the river Bêche and the river Emmels.

The river Bêche

In the south-eastern part of the Vielsalm municipality the small stream Bêche flows to the river Salm. The area is owned and managed by Natagora. In addition to the LIFE Nardus assignment for habitat restoration, REWET will focus on carbon sequestration and hydrological restoration to retain and slow down water discharge. This area is suitable for natural water retention measures as it is severly drained.

The watershed has an area of approximately 2 km^2 and an elevation ranging between 470 and 530 meter altitude.

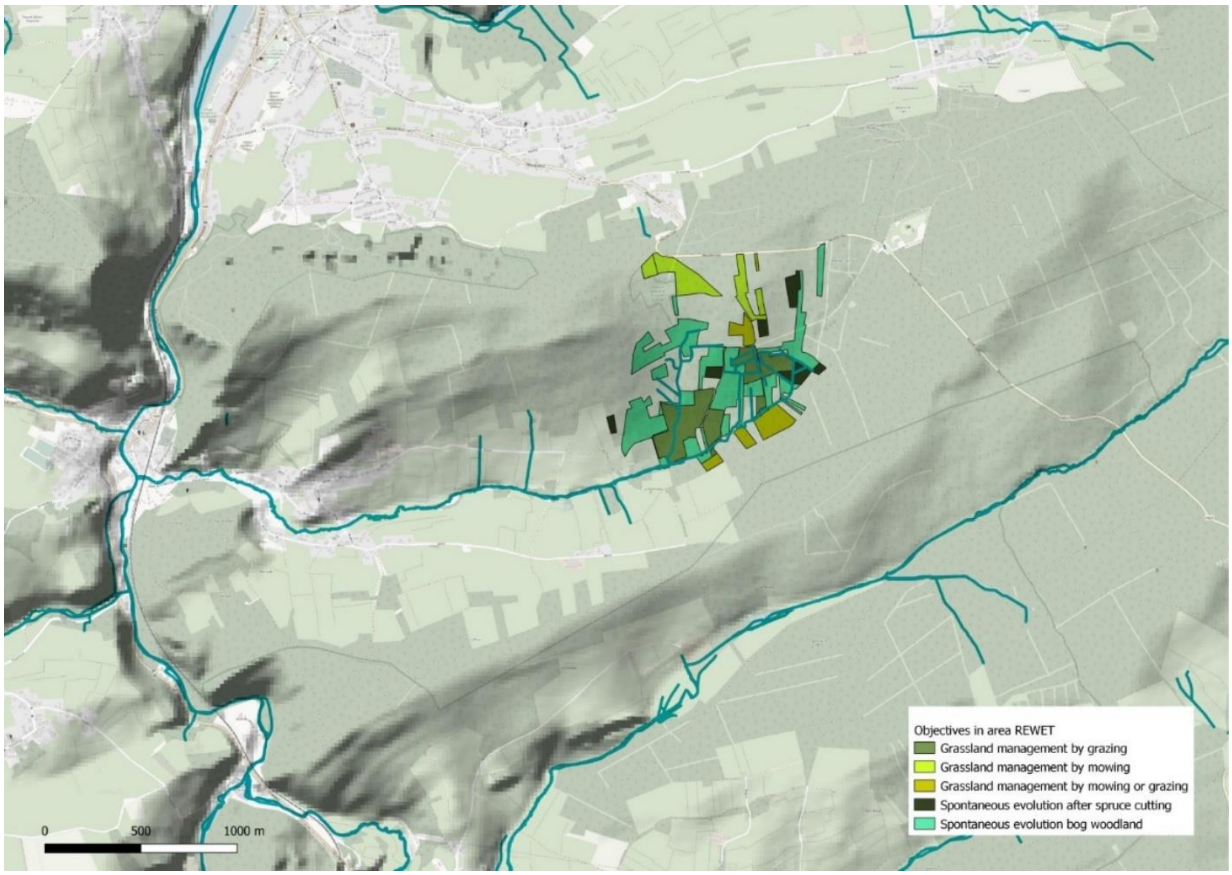


Figure 2: Project site River Bêche near the community of Vielsalm

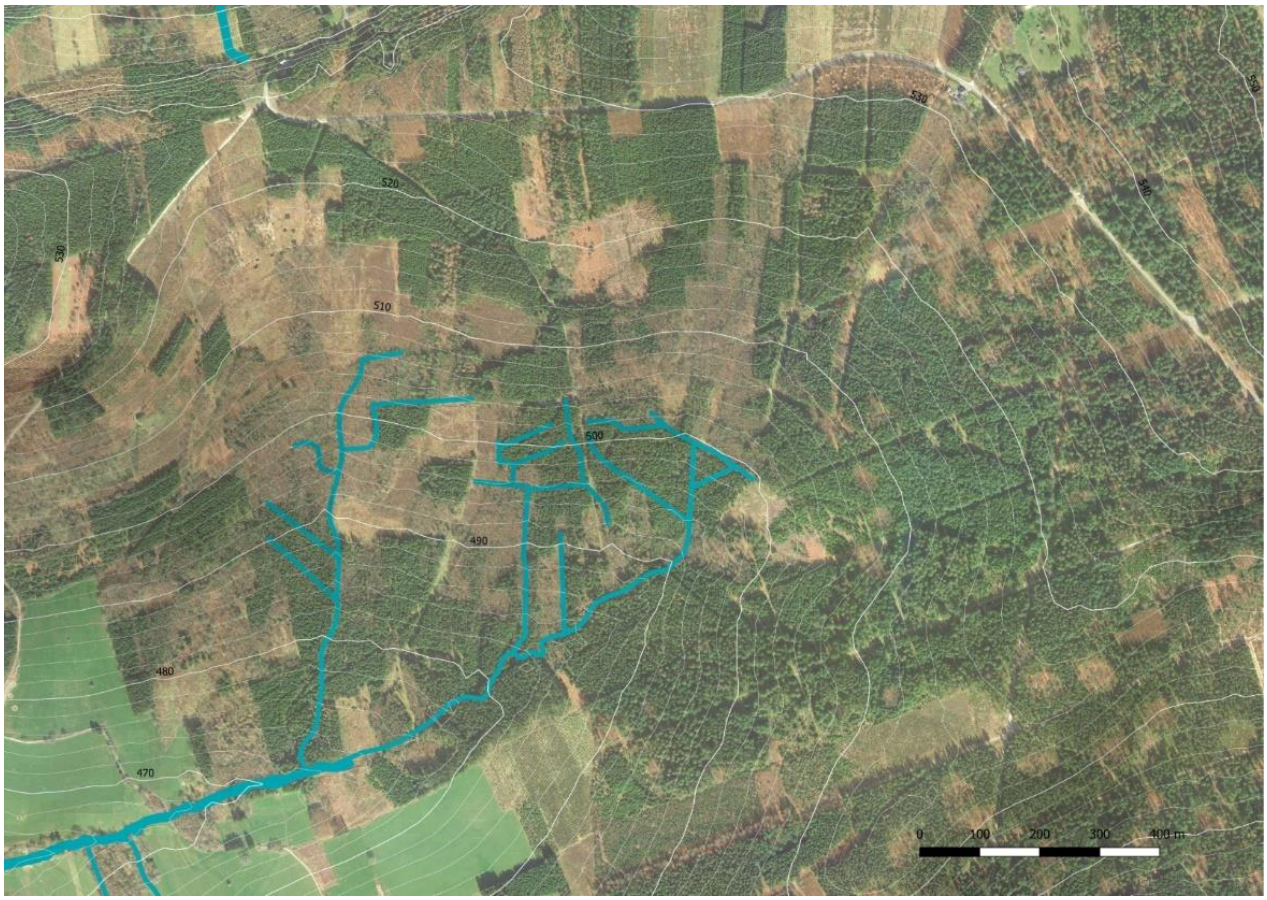


Figure 3: Detail of the project area with clearly visible the drainage network and height lines.

Figure 4: Drainage channels in the upstream Bêche river catchment

Proposed restoration measures River Bêche

The restoration measures in the river Bêche are aiming to delay the water discharge by blocking drainage channels and raising the riverbed with soil and wood supplementation.
The proposed measures will be implemented at every two altimeters (figure 5).

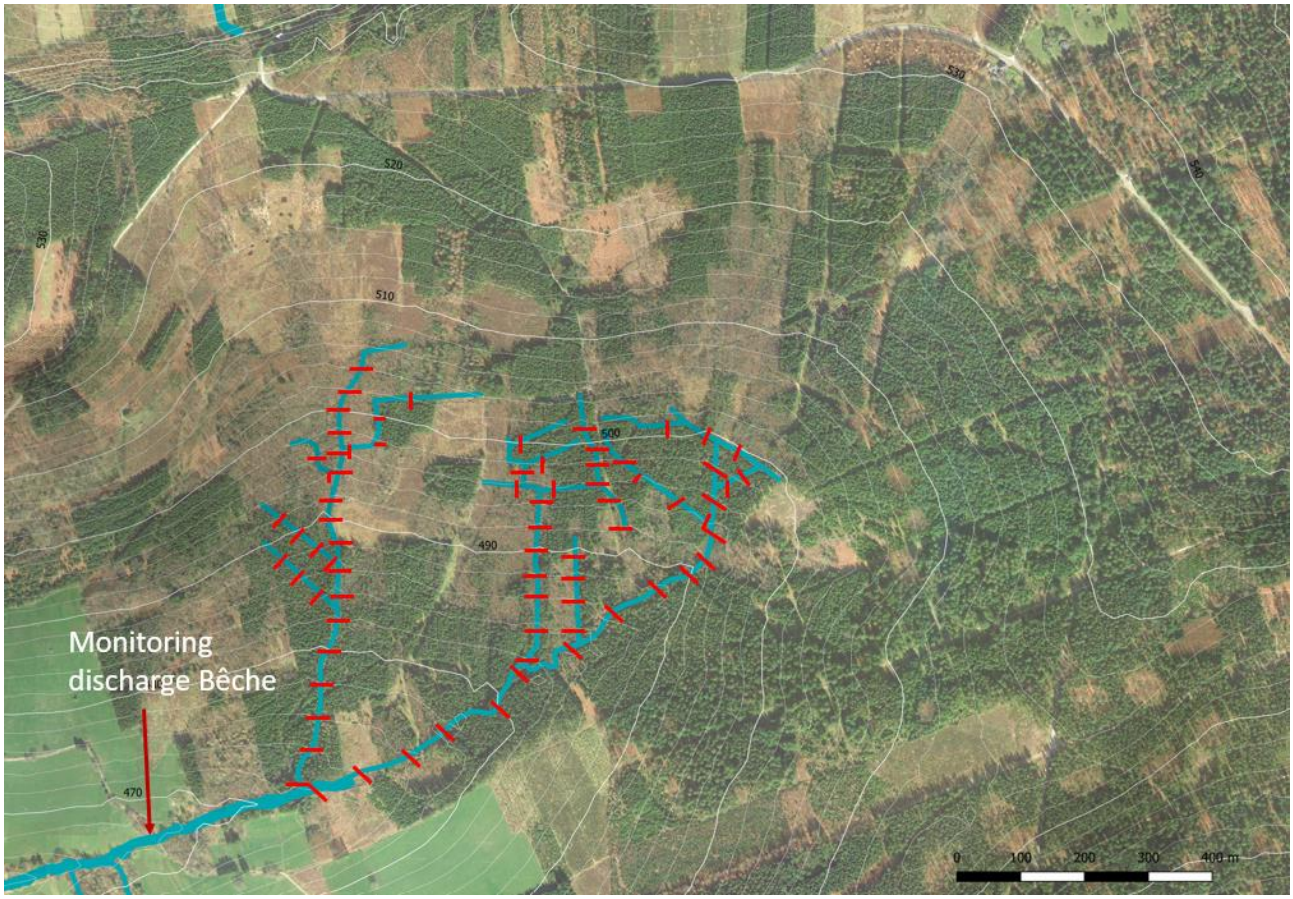


Figure 5: Detail of the project area with clearly visible the drainage network and height lines. The proposed blocking of drainage is shown by a red line and will be implemented at every two altimeters.

The blocking of the drainage channels and raising of the river bed will be carried out with wooden logs and soil as is shown in figure 6.

Figure 6: Example of the blocking of drainage channels with wooden logs (left) and the effect on the hydrology (right)

Figure 7: Fallen trees blocking the stream in the Kyll river

Monitoring restoration measures river Bêche

Hydrological effects

The effects of the retention measures on the water discharge will be monitored at the end of the project area (figure 5) with mobile measurement equipment. The monitoring has started at November 2022 out and will last until the end of the REWET project. The hydrological monitoring will be supplemented with visual observations during raining events.

Carbon fluxes

The river Bêche is the preferred location for the placement of the Eddy Coveriance tower, but also the most challenging location. A field visit in March will show the feasibility of placing the EC tower in the Bêche project area.

Habitat restoration

Natagora is monitoring the habitat restoration after rewetting the area (check).

!!Permission local authorities
!! Stakeholders
!! Ownership
!! Beche Category 3 have to permission: permits: some time

The river Emmels

The Emmels is a small tributary of the Amel situated in between Sankt-Vith and Amel. This upstream valley has been restored by change of land use and removing of drainage channels in 2005. The area is owned and managed by nature organisation Natagora. The valley next to the Emmels, the Meyeroderbach is still in agricultural use and therefore it's enlarged with drainage channels. By improving the natural water retention of the Emmels and comparing it to discharge of the Meyeroderbach the retention potential of restored upstream valleys will be examined in this project.

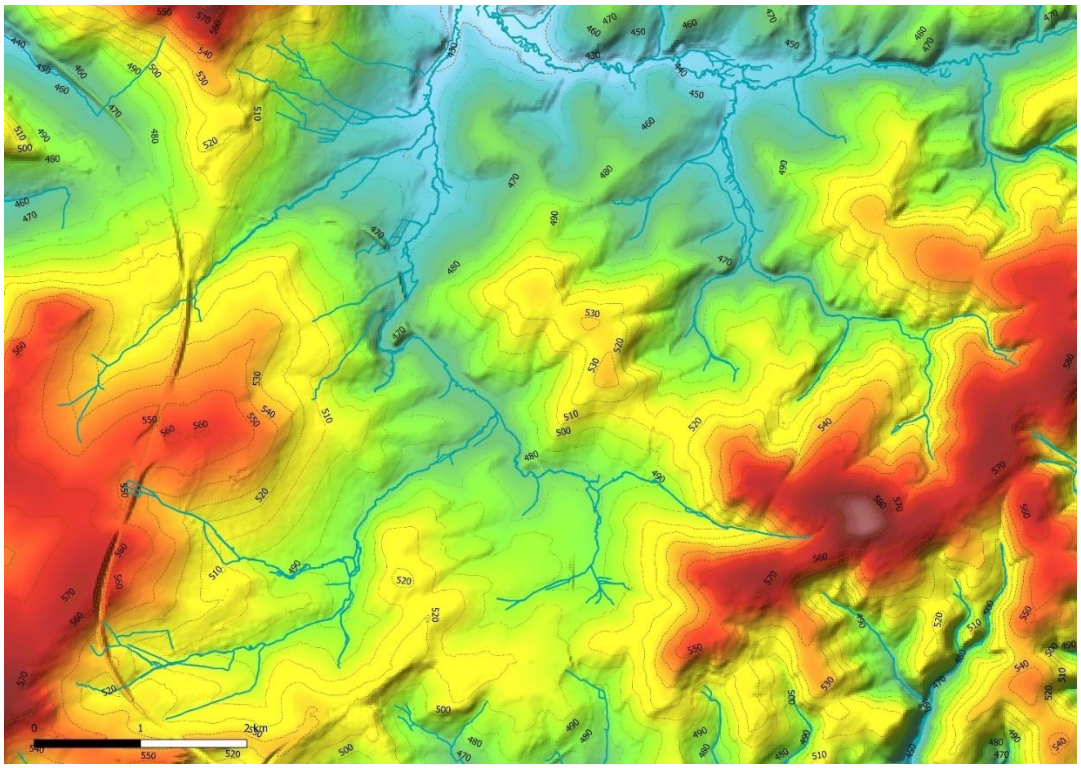


Figure 5: Upstream catchment of the river Emmels and Meyeroderbach, natural valleys and drained valleys are both present.

Figure 6: Natural valley in the river Emmels

Rewet: Directly contact
Ownership

Proposed restoration measures River Emmels

Together with Natagora we are going to examine hydrological improvements in the natural valley of the Emmels and the surrounding forest. There may be chances to optimise the natural water retention. Due to agricultural use rewetting of the drained tributary of the Emmels might not be possible.

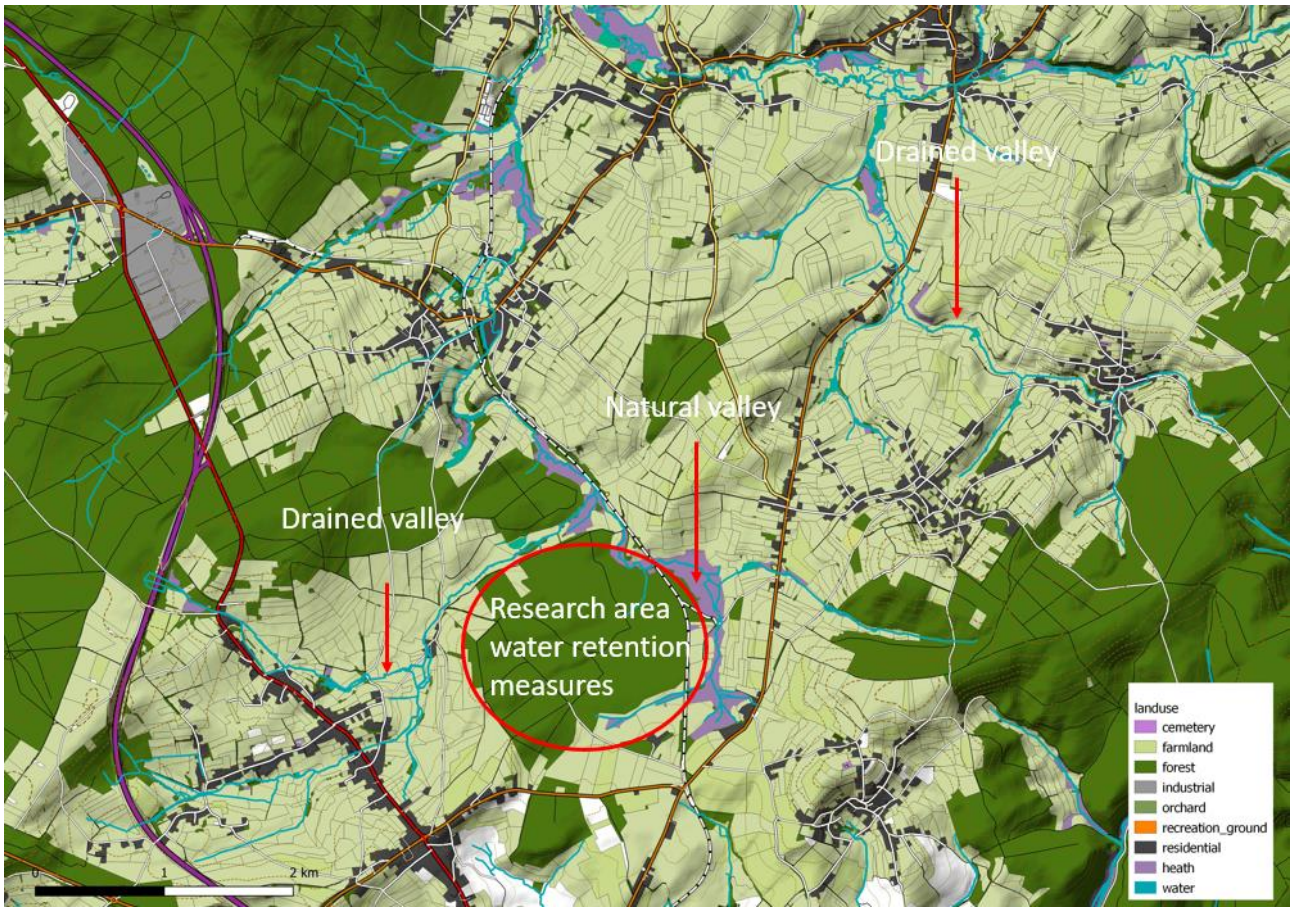


Figure 7: Research area in the river Emmels for natural water retention measures

Figure 8: Natural water retention measures might be implemented in this upstream branch

Monitoring restoration measures river Emmels

Hydrological effects

The effects of the retention measures on the water discharge will be monitored at three locations in the river Emmels and one location at the Meyeroderbach.

Figure 9: Hydrological measuring Emmels. One measuring point in the agricultural stream, one in the natural stream and one measuring point when the two streams are combined.

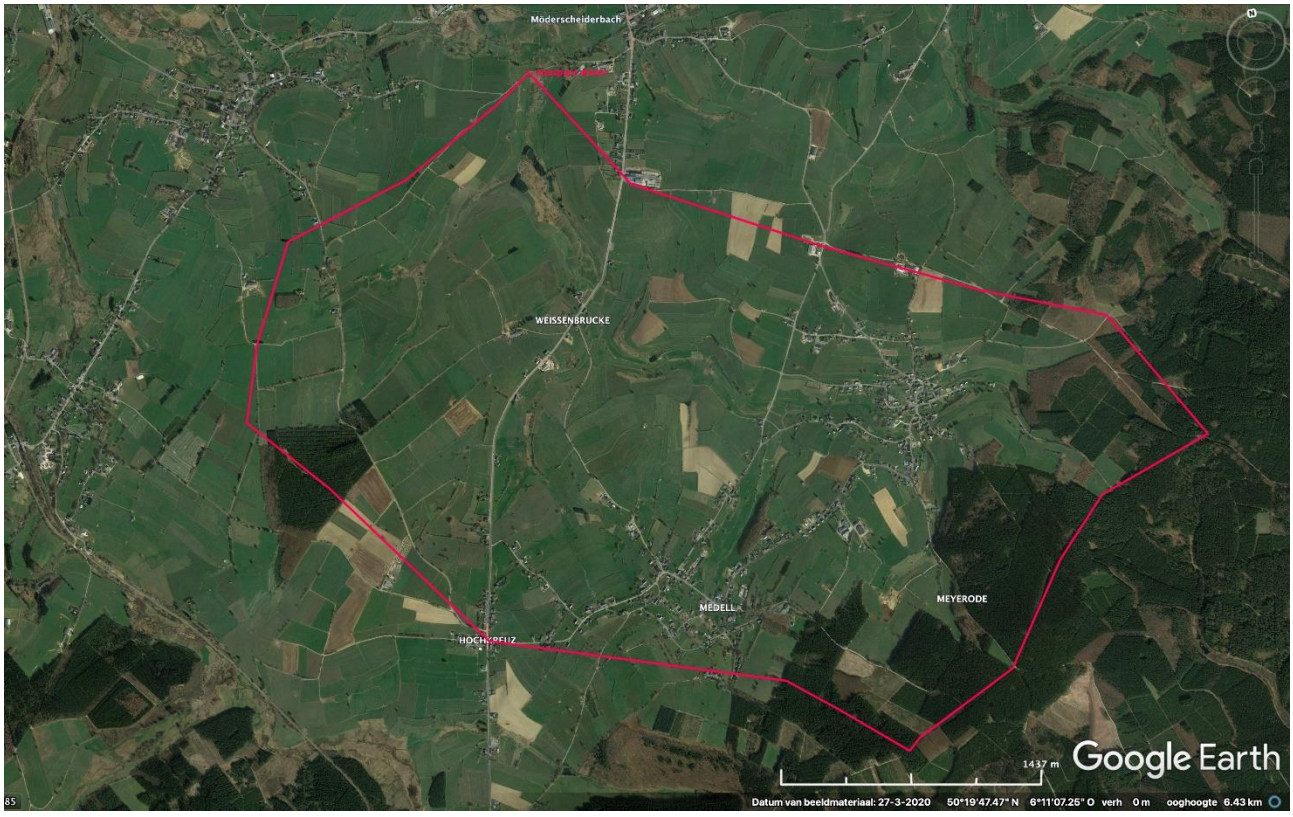


Figure 10: One measuring point at the end of the Meyeroderbach

Carbon fluxes
The river Bêche is the preferred location for the placement of the Eddy Coveriance tower, but also the most challenging location. A field visit in March will show the feasibility of placing the EC tower in the Bêche project area. When placement is more suitable in the river Emmels location then the tower can be place in this area as well.

Habitat restoration
Natagora is monitoring the habitat restoration after rewetting the area (check).

Planning

The planning for the restoration measures and monitoring will be made in consultation with Natagora and in line with the REWET proposal deliverables.