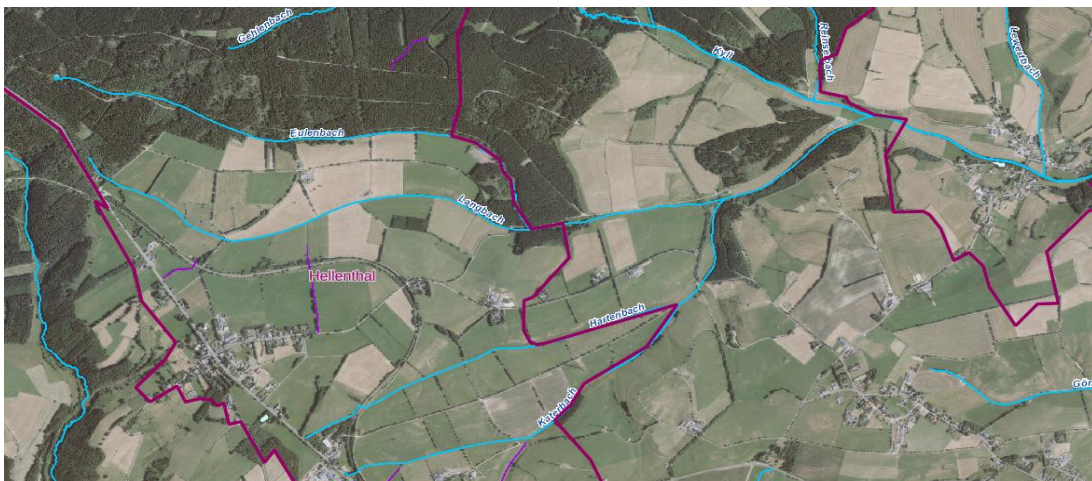


STUDIE

Restoration of the sponge function in wetland soils of the Rhine Basin-

Stakeholder information and water quality



Auftraggeber:

Wetlands International

Planer:



Straßenbau	-	Bauleitplanung
Wasserwirtschaft	-	Ing.-Vermessung
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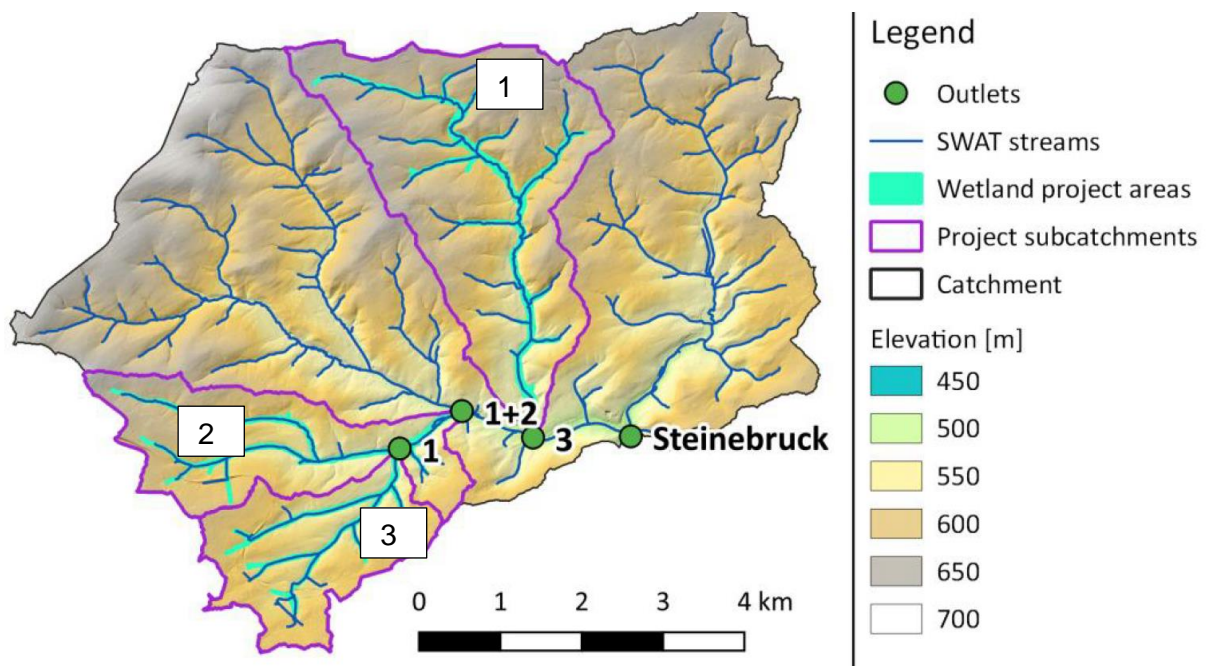
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Results of the research

2 General

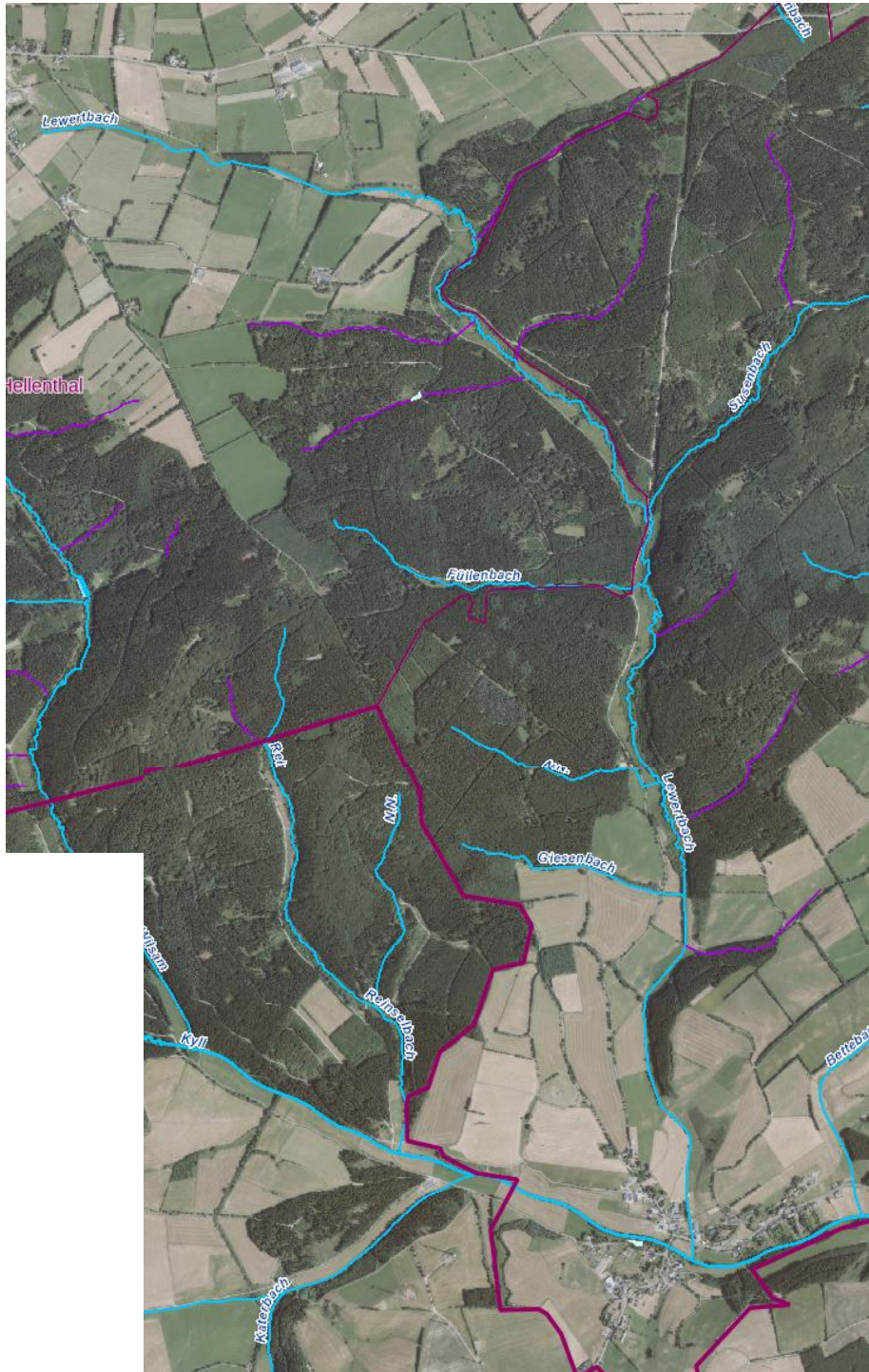
The catchment is divided into three project subcatchment. They belong to three district administrations (Verbandsgemeinde Gerolstein, Gemeinde Dahlem and Gemeinde Hellenthal) within the federal states Rheinland- Pfalz and Nordrhein Westfalen.



The watershed delineation combining land use classes, soil types, slope classes, and landscape units resulted in 31 subbasins.

3 Subcatchments

3.1 The subcatchment No. 1



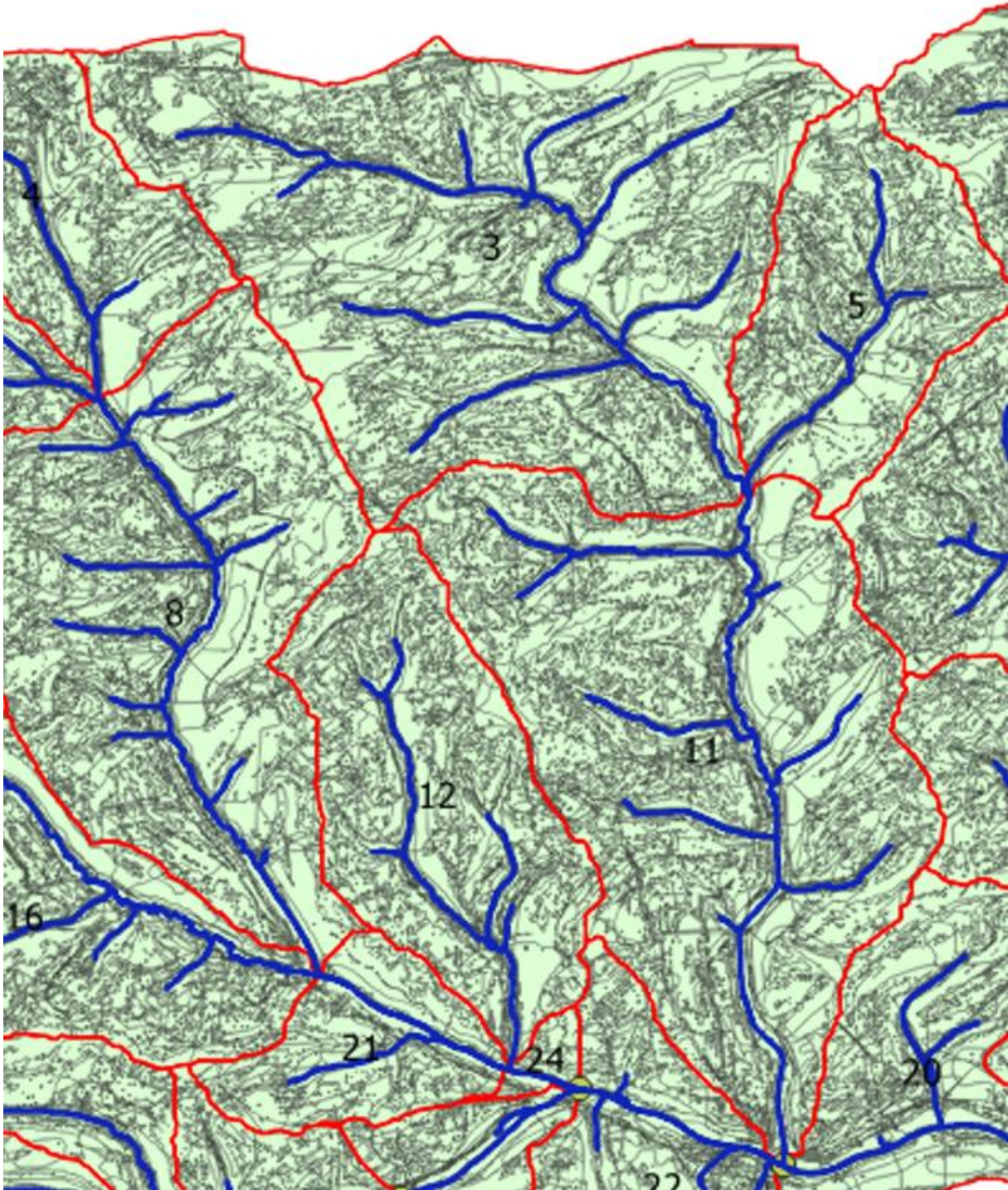


Abbildung 1. Subbasins in the subcatchment No 1.

To the Subcatchment No. 1 belong subbasin No. 3, No. 5 and subbasin No.11.

3.1.1 Subbasin No. 3

The following pictures were taken near Udenbreth, in the subbasin No. 3.



Abbildung 2. Landscape in the subbasin No.3

3.2 Subcatchment No. 2 and 3

To the Subcatchment No. 2 and 3 belong Subbasin No. 23, No. 27, No. 25, No. 26, No. 29, No. 30 and No. 31.

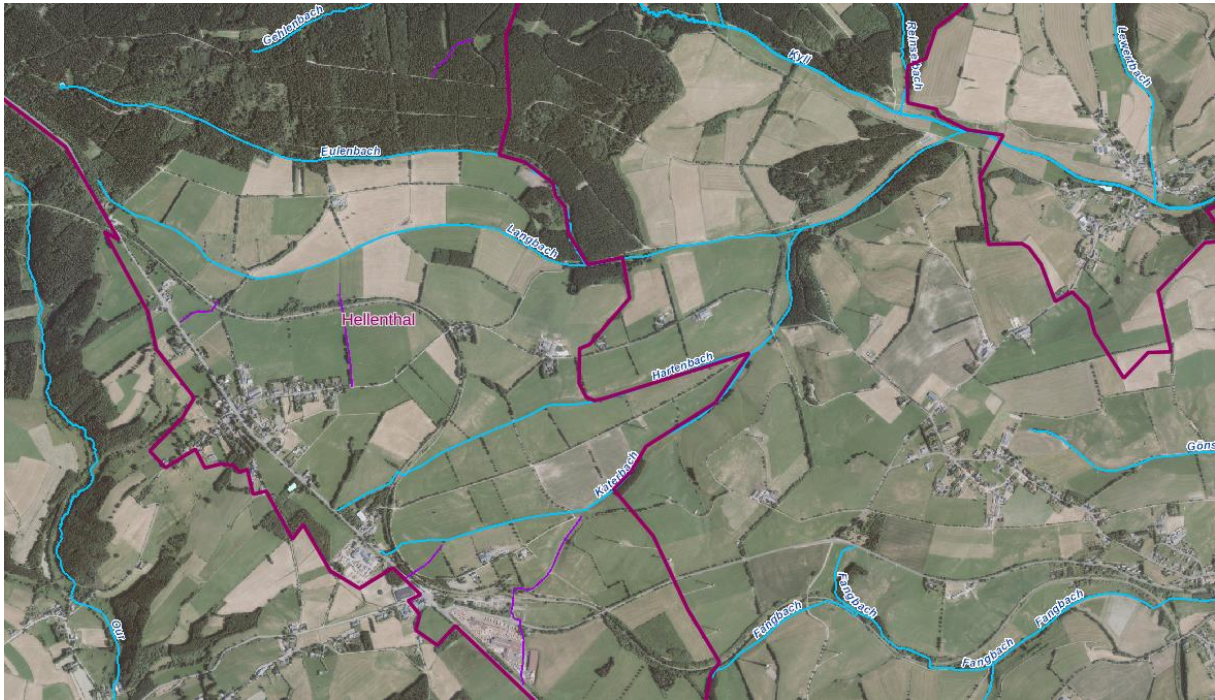


Abbildung 3. Overview of the subcatchment No 2 and 3.

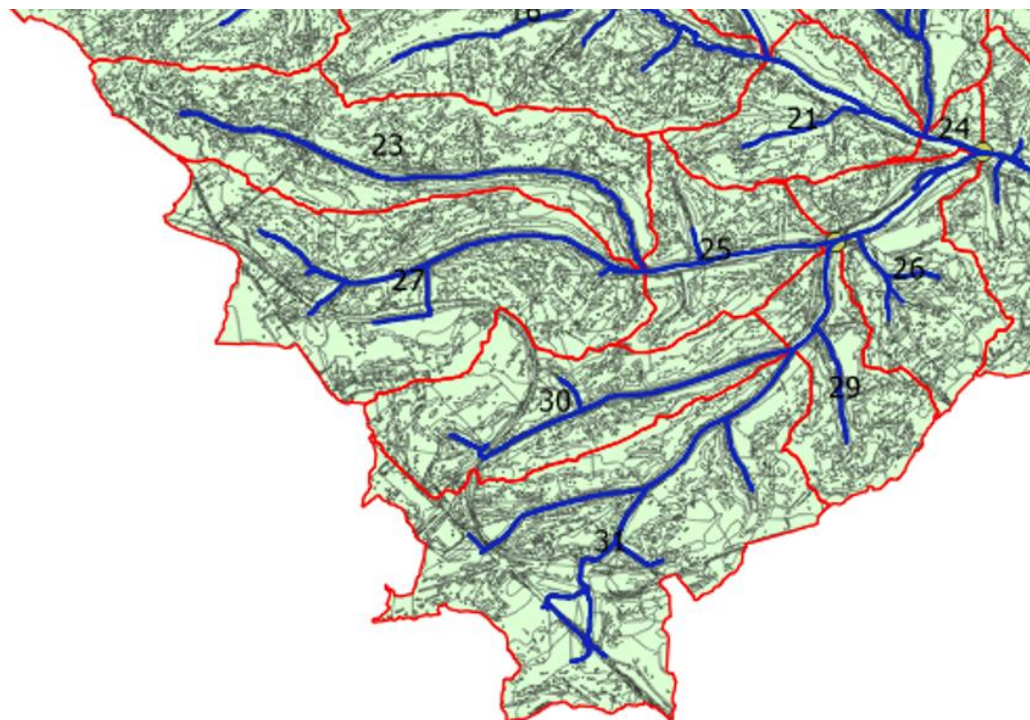


Abbildung 4. Overview of the Subbasins in the subcatchment No 2 and 3.

4 Water quality

The water quality measurements were downloaded from GeoDatenArchitektur Wasser Rheinland- Pfalz (<http://www.gda-wasser.rlp.de>)



Messstellenbezeichnung (name)	Datum	Bezeichnung	Status	Wert	Einheit
Kyll Mdg Kronenburger Stausee	26.01.2009	Ammonium	normal	0.02576	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Nitrat	normal	16.5	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Nitrat-N	normal	3.73	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Nitrit-N	kleiner als	< 0.005	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Sauerstoffgehalt	normal	12.8	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Sulfat	normal	9.28	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	pH-Wert	normal	8.0	-
Kyll Mdg Kronenburger Stausee	26.01.2009	Magnesium	normal	4.0	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Gesamtstickstoff	normal	3.9	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Gesamtphosphor als P	normal	0.01	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	elektrische Leitfähigkeit bei 25	normal	13.0	mS/m
Kyll Mdg Kronenburger Stausee	26.01.2009	Ammonium-N	kleiner als	< 0.02	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Natrium	normal	8.0	mg/L
Kyll Mdg Kronenburger Stausee	26.01.2009	Wassertemperatur	normal	1,8	°C

Abbildung 5. Parameter readings of the measuring point „Kyll Mdg Kronenburger See“.

Furthermore, a survey was made with farmers in the subbasin No. 3 to get more information about the usage of fertilizer, pesticides and herbicides.

Name	Frau Krüger	Herr Van Kann	Frau Jenniges	Herr Breuer	Herr Breuer
The farm	• 6 horses	• 60 ha land for milk production • 50-60 cows • own drinkingwater production	• 60 ha pastures, for meatproduction (cattles) • no milkproduction, • biological agriculture (certified) • 30 mother cows, 30 calves • 6 months (Nov-April) the cattles are outside	• 82 ha pastures • extensive agriculture	2 ha pastures with Vertragsnaturschutz to produce forage
Mowing	once a year to produce forage	3-4 x a year mowing own production of forage (Silage)	2x a year mowing own production of forage	3 x a year mowing	once a year, not before July (no grazing land)
Fertilizer	When	spring	when needed, no specific time (not in winter, see restrictions)	spring	/
	how often	once a year	once a year	once a year	/
	how much	the organic fertilizer from 6 horses	the organic fertilizer from the cows	80 kg/ha, (allowed are 170 kg/ha)	no usage
	what kind of	organic (liquid and solid) from horses	organic manure and organic liquid manure and liming when necessary (after soil analysis)	organic manure and organic liquid manure from cows	/
Pesticides, herbicides	how much	no usage	no usage	no usage	no usage

Abbildung 6. Survey on the usage of fertilizer, pesticides and herbicides.

5 Stakeholder information

Survey on droughts, floodings and nature based solutions where made (08.10 2020) with farms the subbasin No. 3. The results show, that the farmers are mainly following good practice without use of pesticides and only modest nutrient inputs.

Name	Frau Krüger	Herr Van Kann	Frau Jenniges	Herr Breuer	Herr Breuer
Drought experience	2019 and 2020	last 3 years the milk production was lower	last 3 years the production of forage was lower	last 3 years the production of forage and milk was lower	last 3 years the production of forage was lower
problems they have	grass did not grow anymore,			1/3 damage	1/3 damage
solutions they see	<ul style="list-style-type: none"> • second seed in Summer • collect rainwater and irrigate the pasture 			possible solutions could be: <ul style="list-style-type: none"> • drought resistant grass-species • reduce evaporation through solid manure 	
water availability, flooding	generell <ul style="list-style-type: none"> • The area is really wet • several springs • drainage system around the house • otherwise groundwater and surface water would flood the house 	drainage systems in the area prevent the pasture to get too wet for milk and forage production			
problems solutions they see		Renaturation of the Lewertbach	no problems		
Water quality		water quality of groundwater is good. Analysis show <2,5 g Nitrate but 0,114 g Mangan	water quality is good in drinking water		
Nature based solutions	drainage systems are important for her private house to not get flooded	<ul style="list-style-type: none"> • If drainage systems are removed the pasture gets rewetted and the land cannot be cultivated • Better solution for landowners and Afarmes is the renaturation of streams • In former times the land use around the Lewertbach was arable farmland • adjustment in the water system would not approve the conditions! 		<ul style="list-style-type: none"> • Support from programs is already fundamental for them to be profitable • Rewetting the grassland might effect the drained pastures aside (backwater in drainage systems) • On wet grassland no grazing or forage production is possible (mowing) 	
more information			The agricultural farms with milk production use fertilizer extensively, so they get support (support program)	<ul style="list-style-type: none"> • They use less fertilizer so they get support (support program) • The paper chase (purely automatic costs) is already really high for landowners, low prices for milk. • They are afraid, that they are not profitable anymore when the land is wetted 	

Abbildung 7. Survey on droughts, floodings and nature based solutions.

The Property maps where send by the municipality Hellenthal, owners can be defined for individual sites.



Abbildung 8. Property map of the subbasin No. 25 and No.26.

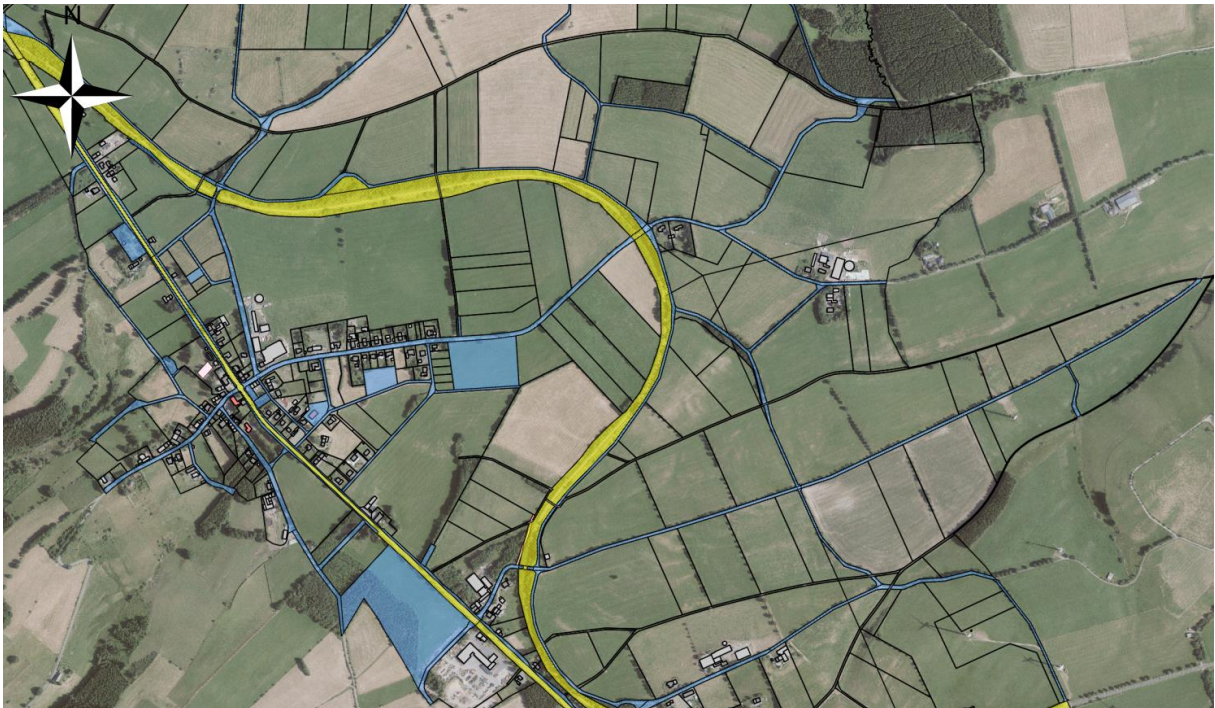


Abbildung 9. Property map of the subbasin No. 30, No. 27, No. 23, No. 29, No. 31.



Abbildung 10. Property map of parts of the subbasin No. 3.

6 Fertilisation and usage of phytosanitary products

Fertilizer regulations (since 1st May 2020) were transferred from the Dienstleistungszentrum Ländlicher Raum Rheinland-Pfalz.

(https://www.dlr.rlp.de/Internet/global/inetcntr.nsf/dlr_web_full.xsp?src=KWI71C21G0&p1=4W1H8283HY&p3=4H0SJ5100N&p4=6T14Z53D9J)

- 1) There is a period in the year where application of fertilizer is prohibited:

For cropland:

- after the harvest of the main fruit until 31st January all fertilizer with N-content > 1,5% (dry matter) are prohibited. This is valid for liquid manure, poultry manure, digestate, sewage sludge.
- From 1st December until 15th January solid manure and compost with N-content > 1,5% (dry matter) and manure > 0,5% P₂O₅ are prohibited.
- For vegetables, strawberries, soft fruits: 2nd December until 30th January
- Allowed: 30 kg Ammonium-N (60 kg N total /ha) until 1st October for intertillage, winter rape, winter barley

For grassland:

- Allowed: Liquid-organic and liquid-organic-mineral fertilizer up to 80 kg N total/ha
- Prohibited: fertilizer with N-content > 1,5% (dry matter) from 1st November to 31. st January.

In general N- and P-containing fertilizers are not allowed to be applied to flooded, water-saturated, snow-covered and frozen soils.

2) Restrictions near rivers

A supply of N or P is not permitted within 4 meter of the top of the bank slope top (BOK).

For sloped surfaces:

Distance from BOK	bias	Fertilizer restrictions from BOK
20 m	> 5 %	> 3 m
20 m	> 10 %	> 5 m
30 m	> 15 %	> 10 m

3) The total amounts of manure and fertilizer that can legally be applied:

- If more than **50 kg N / ha and year** are fertilized per crop, the requirement of fertilizer needs to be determined.
- For all crops in arable land and grassland, specific, site-specific upper limits for nitrogen apply, which must be determined according to specific requirements.
- There is an upper limit **of 170 kg N/ha and year** on average (organic or organic-mineral fertilizers)

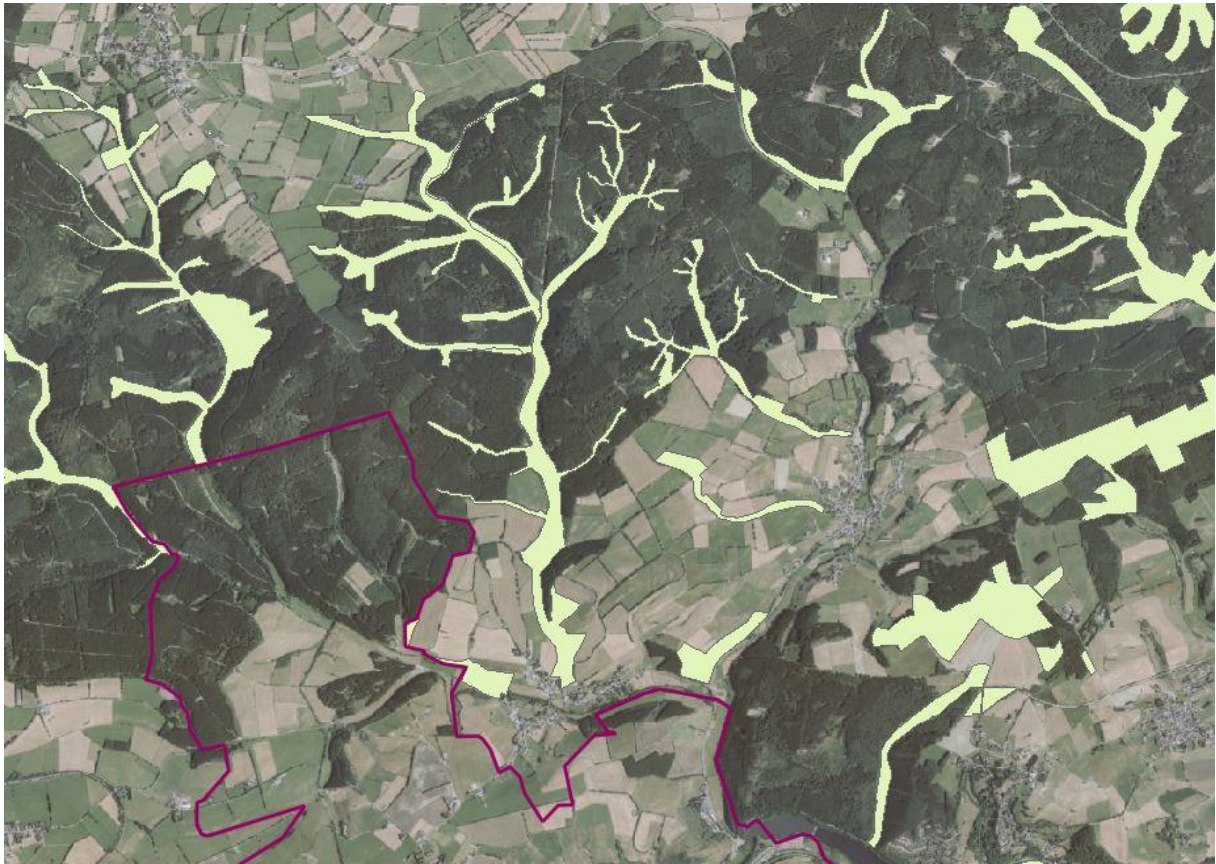


Abbildung 11. Nature reservation area.

Wittlich, October 2020

INGENIEURBÜRO
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Wasserbau	Konstr. Ingenieurbau
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