

# Restoration of *Unio crassus* rivers in the Luxemburgish Ardennes LIFE11 NAT/LU/857



natur&emwelt



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Annex / D2 Fish monitoring



LE GOUVERNEMENT  
DU GRAND-DUCHÉ DE LUXEMBOURG  
Ministère du Développement durable  
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LE GOUVERNEMENT  
DU GRAND-DUCHÉ DE LUXEMBOURG  
Ministère de l'Agriculture,  
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Protection des consommateurs



# 1 Fish Monitoring in the main streams of Our and Sûre by electric fishing

## 1.1 River Our

### 1.1.1 Maps Grossenauel



Figure 1: Overview Grossenauel



Figure 2: Detail Grossenauel

### 1.1.1.2 Results of the site Grossenauel

Table 1: Species and number of species caught in the respective year

Species / Number	2013	2015	2017
<i>Alburnoides bipunctatus</i>	7	22	24
<i>Barbatula barbatula</i>	45	74	112
<i>Barbus barbus</i>	1	0	0
<i>Chondrostoma nasus</i>	0	0	2
<i>Cottus gobio</i>	48	94	178
<i>Gasterosteus aculeatus</i>	0	0	0
<i>Gobio gobio</i>	8	2	27
<i>Lampetra planeri</i>	0	0	0
<i>Pacifastacus leniusculus</i>	0	3	0
<i>Phoxinus phoxinus</i>	340	382	248
<i>Salmo trutta fario</i>	10	24	12
<i>Squalius cephalus</i>	7	0	3
<i>Thymallus thymallus</i>	0	0	4
$\Sigma$	466	601	610

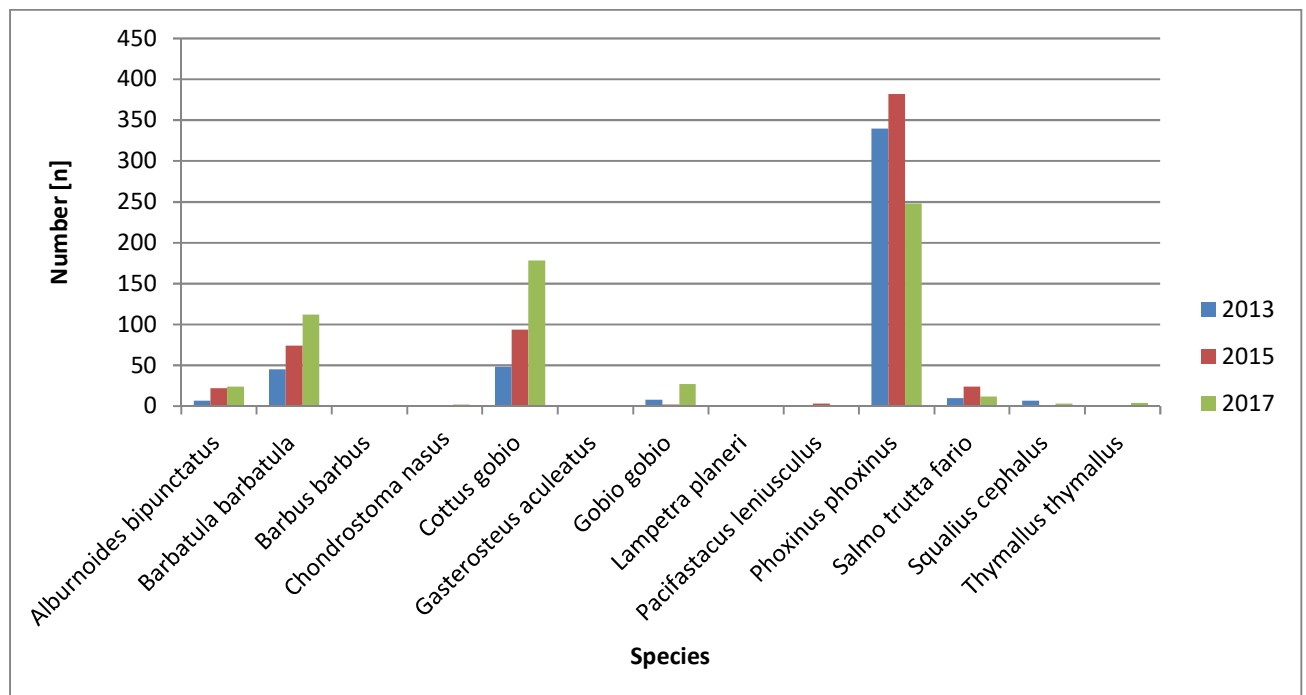


Figure 3: Number of fish individuals of the different species in the years 2013, 2015 and 2017 at the site Grossenauel

Figure 3 shows the results of the electric fishing at the site Our/ Grossenaue. The main host fish for *Unio crassus* (*Phoxinus phoxinus*) was the most dominant fish species throughout the years. From the minnows caught, 10 were always used to check the natural infestation rate on the gills. Figure 4 shows, that in all years minnows were naturally infested with *Unio crassus*. The mean intensity was with only 1-3 larvae per infested fish low.

#### 1.1.1.2 Natural infestation of minnows with larvae from *Unio crassus* at the site Grossenaue

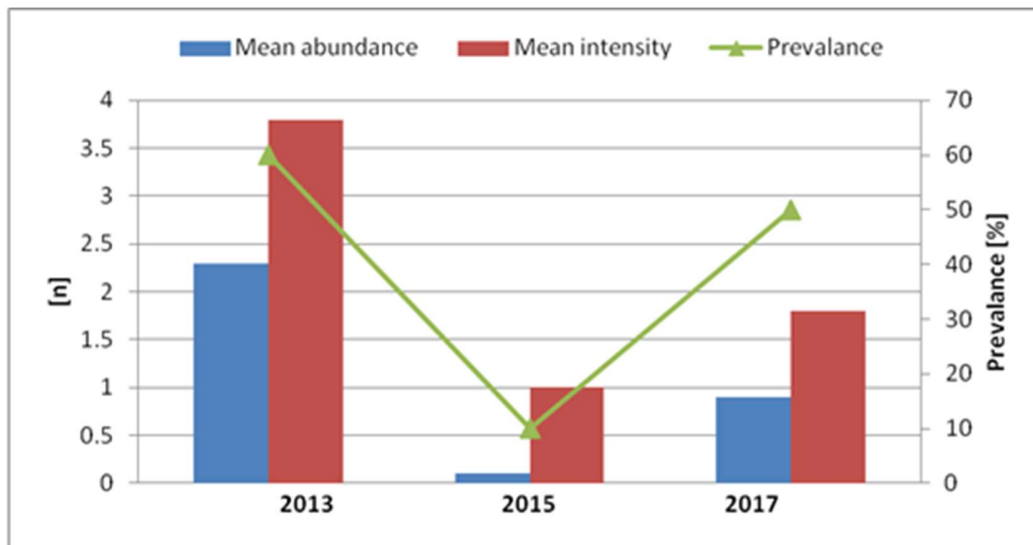


Figure 4: Natural infestation of Minnows at the site Grossenaue in the years 2013, 2015 and 2017

*Mean Intensity:* This is the mean number of parasites (here glochidia in the gills) found in or on the infested hosts (the zeros of uninfested hosts are excluded).

*Mean abundance:* This is the mean number of parasites found in all hosts (involves the zero values of uninfested hosts).

*Prevalence:* This is the proportion of infested hosts among all the hosts examined.

## 1.1.2 Maps Dornaualsmühle

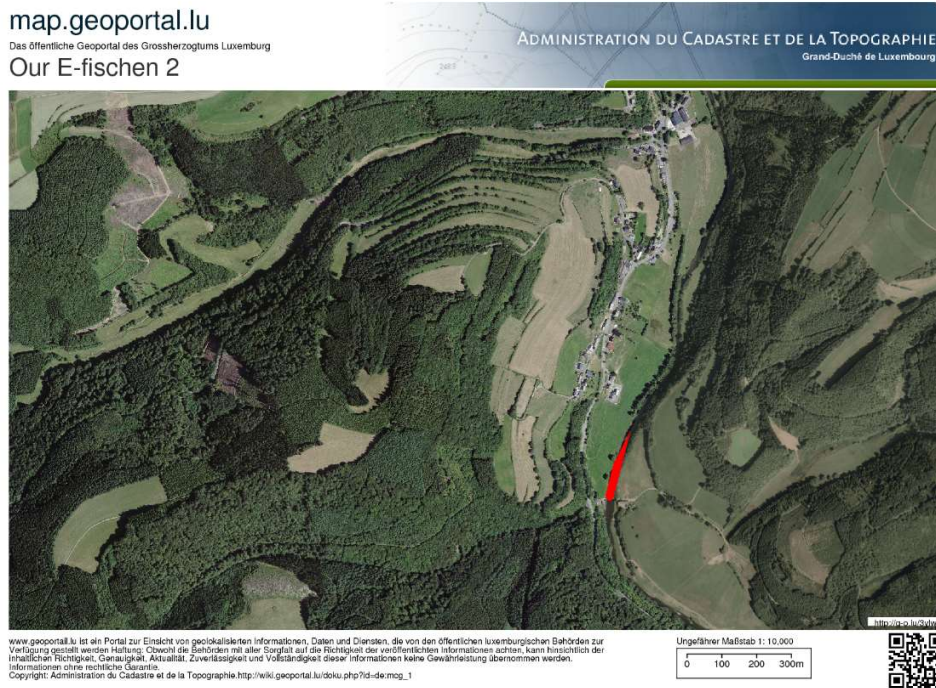


Figure 5: Overview Dornaualsmühle



Figure 6: Detail Dornaualsmühle

### 1.1.2.1 Results of the site Dornaulsmühle

Table 2: Species and number of species caught in the respective year at Dornaulsmühle

Species / Number	2013	2015	2017
<i>Alburnoides bipunctatus</i>	13	42	17
<i>Barbatula barbatula</i>	77	217	319
<i>Barbus barbus</i>	18	1	5
<i>Chondrostoma nasus</i>	6	0	6
<i>Cottus gobio</i>	14	58	98
<i>Gasterosteus aculeatus</i>	0	0	0
<i>Gobio gobio</i>	3	0	3
<i>Lampetra planeri</i>	0	0	3
<i>Pacifastacus leniusculus</i>	0	0	0
<i>Phoxinus phoxinus</i>	321	196	225
<i>Salmo trutta fario</i>	3	63	1
<i>Squalius cephalus</i>	10	0	6
<i>Thymallus thymallus</i>	0	0	0
$\Sigma$	465	577	683

In the year, 2013 minnow was the most abundant fish species. In the years 2015 and 2017 stone loach became the most abundant species. However, minnow was also in the years 2015 and 2017 still present in high numbers.

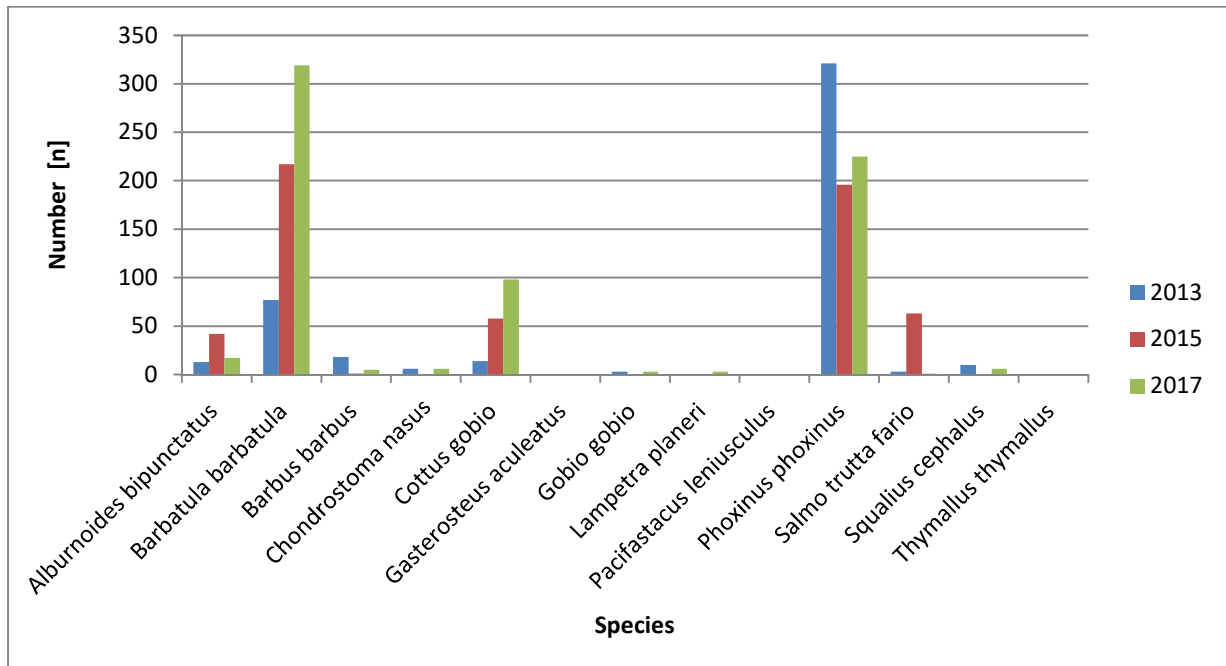


Figure 7: Number of fish individuals of the different species in the years 2013, 2015 and 2017 at the site Dornaulsmühle

1.1.2.2 Natural infestation of minnows with larvae from *Unio crassus* at the site Dornaualsmühle

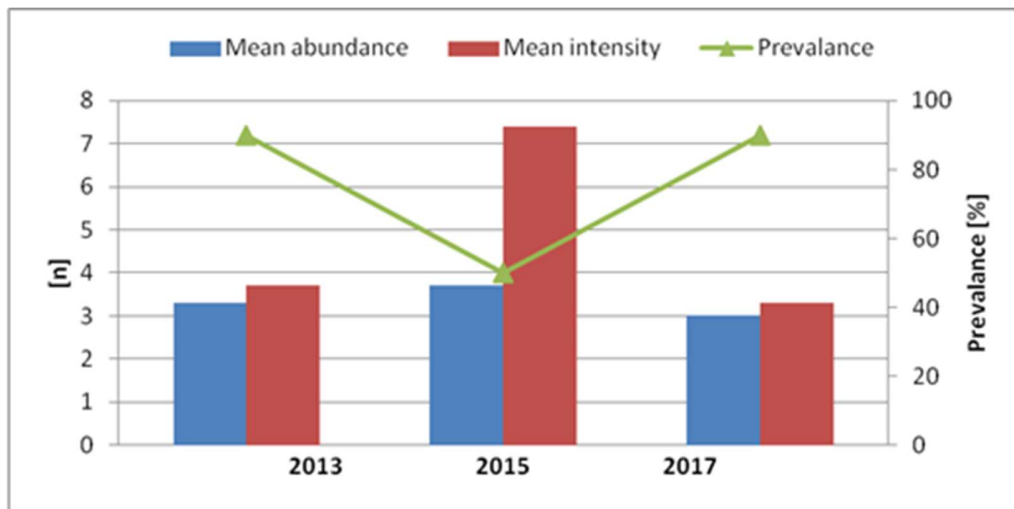


Figure 8: Natural infestation of Minnows at the site Dornaualsmühle in the years 2013, 2015 and 2017

At the site Dornaualsmühle 50% of the Minnows were always infested with a mean number of 3-7 glochidia per fish

Overall the natural presence of infested fish at both sites in the river Our is a good sign.

## 1.2 River Sûre

### 1.2.1 Maps Esperbesch



Figure 9: Overview Esperbesch



Figure 10: Detail Esperbesch



### 1.2.1.1 Results of the site Esperbesch

Table 3: Species and number of species caught in the respective year at Esperbesch

Species / Number	2013	2015	2017
<i>Alburnoides bipunctatus</i>	1	10	82
<i>Barbatula barbatula</i>	104	309	132
<i>Barbus barbus</i>	0	0	0
<i>Chondrostoma nasus</i>	0	0	0
<i>Cottus gobio</i>	9	25	48
<i>Gasterosteus aculeatus</i>		0	0
<i>Gobio gobio</i>	11	47	130
<i>Lampetra planeri</i>	1	0	0
<i>Pacifastacus leniusculus</i>	18	58	13
<i>Phoxinus phoxinus</i>	249	476	1170
<i>Salmo trutta fario</i>	10	7	3
<i>Squalius cephalus</i>	0	1	5
<i>Thymallus thymallus</i>	0	0	0
$\Sigma$	403	933	1583

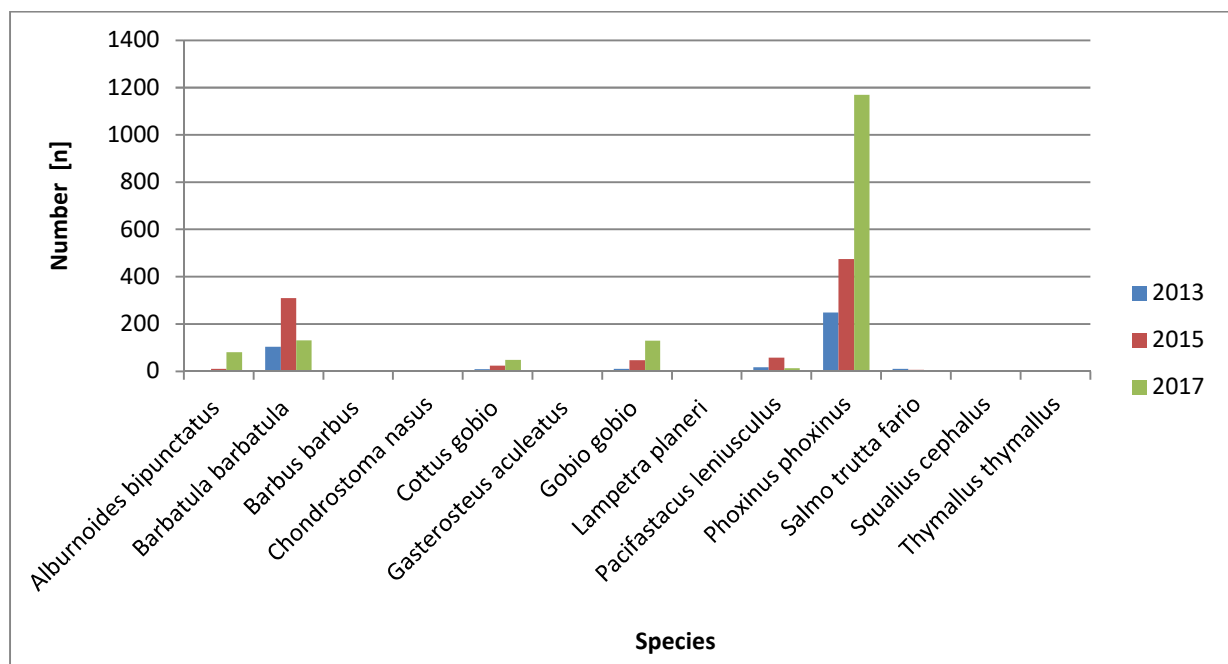


Figure 11: Number of fish individuals of the different species in the years 2013, 2015 and 2017 at the site Esperbesch

Figure 11 and Table 3 show the results of the electric fishing at the site Sûre/Esperbesch. The main host fish for *Unio crassus* (*Phoxinus phoxinus*) was present in high numbers which is a good sign for this river stretch concerning the availability of host fish for the thick shelled river mussel.

#### 1.2.1.2 Natural infestation of minnows with larvae from *Unio crassus* at the site Esperbesch

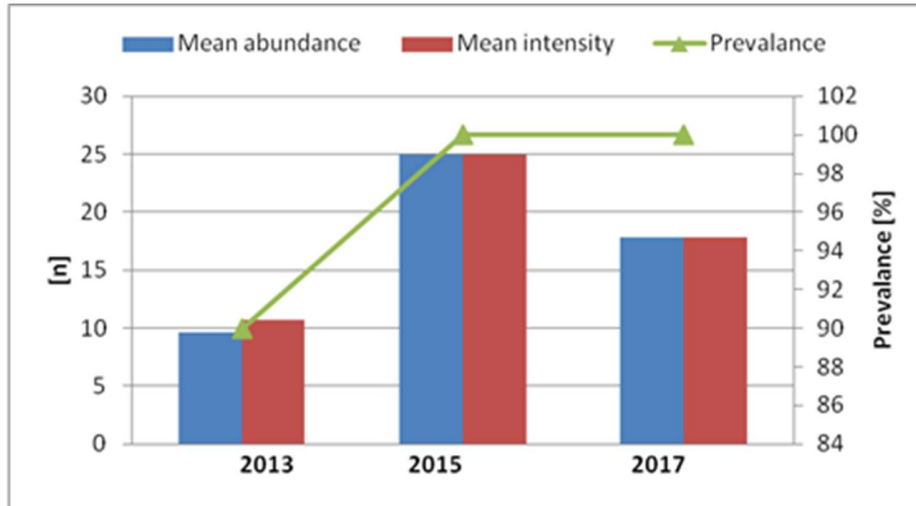


Figure 12: Natural infestation of Minnows at the site Esperbesch in the years 2013, 2015 and 2017

As for the river Our, from the minnows caught, 10 were used to check the natural infestation rate on the gills. All fish were infested in the years 2015 and 2017 (prevalence=100%) with a mean number of 10-25 glochidia per fish, which represents a high natural infestation level (see Figure 12.).

## 1.2.2 Maps Moulin de Bigonville



Figure 13: Overview Moulin de Bigonville



Figure 14: Detail Moulin de Bigonville

### 1.2.2.1 Results of the site Moulin de Bigonville

Table 4: Species and number of species caught in the respective year at Moulin de Bigonville

Species / Number	2013	2015	2017
<i>Alburnoides bipunctatus</i>	1	20	2
<i>Barbatula barbatula</i>	322	171	200
<i>Barbus barbus</i>	0	0	2
<i>Chondrostoma nasus</i>	5	3	1
<i>Cottus gobio</i>	5	11	53
<i>Gasterosteus aculeatus</i>	0	26	42
<i>Gobio gobio</i>	33	120	273
<i>Lampetra planeri</i>	0	0	2
<i>Pacifastacus leniusculus</i>	0	0	14
<i>Phoxinus phoxinus</i>	126	675	1075
<i>Salmo trutta fario</i>	1	10	0
<i>Squalius cephalus</i>	0	8	3
<i>Thymallus thymallus</i>	2	0	0
$\Sigma$	495	1044	1667

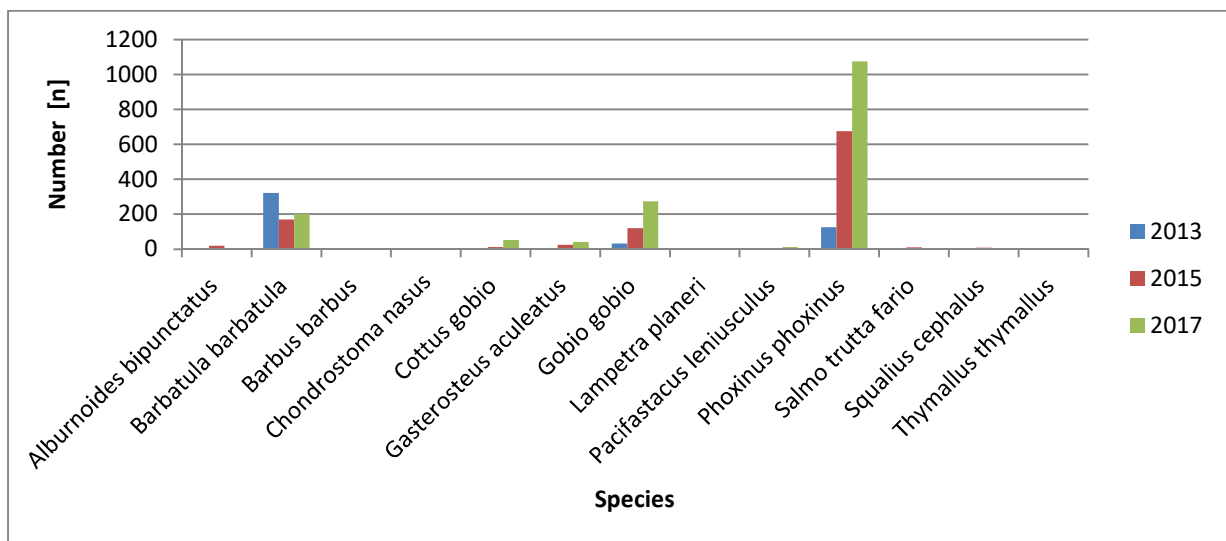


Figure 15: Number of fish individuals of the different species in the years 2013, 2015 and 2017 at the site Moulin de Bigonville

### 1.2.2.2 Natural infestation of minnows with larvae from *Unio crassus* at the site Moulin de Bigonville

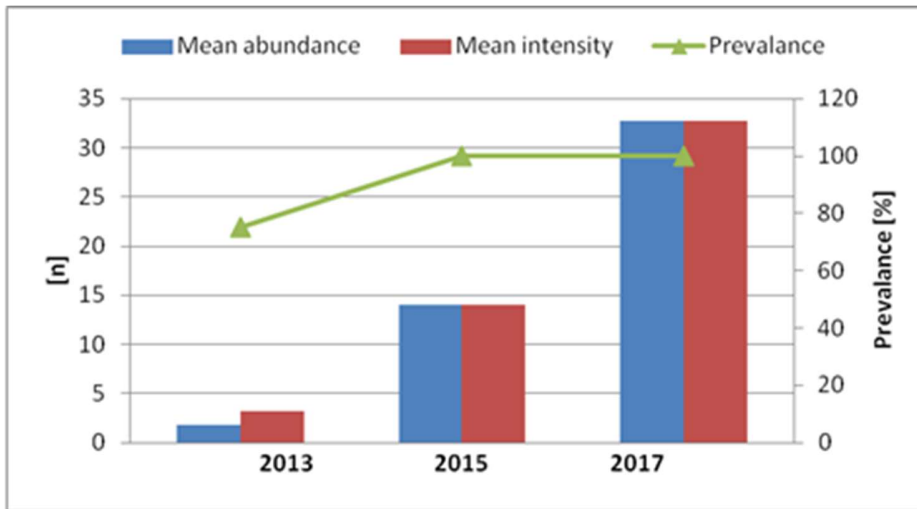


Figure 16: Natural infestation of Minnows at the site Moulin de Bigonville in the years 2013, 2015 and 2017

Also at the other site analysed in the river Sûre, Moulin de Bigonville all fish were infested in the years 2015 and 2017. The mean number of glochidia per fish of the infested fish ranged between 2 in 2015, 14 in 2015 to 32 in 2017. Especially in the year 2017 this is a high level of infestation.

From the nine host fish species known from literature, five species are present in the river Sûre and Our (*Chondrostoma nasus*, *Cottus gobio*, *Gasterosteus aculeatus*, *Phoxinus phoxinus* & *Squalius cephalus*). Although the three spined Stickleback is not listed in Table 1 and 2, it was nevertheless observed in the river Our, close to the Mill of Kalborn. In both rivers, the European Minnow (*Phoxinus phoxinus*), the best host fish in our region is even the most abundant species. In both rivers, the minnow always showed a natural infestation with larvae of *Unio crassus*.

## 2 Fish Monitoring at the tributaries of Our and Sûre by electric fishing

### 2.1 River Our tributaries 2013

The following tributaries (see Table 5 and Figure 17) were analysed by electric fishing in the river Our catchment in December 2013. Between 1 and 3 sites were analysed per tributary, depending on the connectivity and size of the respective stream.

Table 5: Tributaries of the river Our analysed by electric fishing in 2013

Date	Tributary	Sites	Species	Individuals
02.12.2013	Träsbech	2	2	29
03.12.2013	Fallbech	1	0	0
03.12.2013	Etterbaach	1	0	0
03.12.2013	Holzbech	2	1	22
06.12.2013	Houschterbaach	3	2	83
06.12.2013	Gemünder Akeschterbaach	1	1	30
03.12.2013	Stolzebuerger Akeschterbaach	2	1	6
05.12.2013	Klangbaach	1	1	23

As expected, bullhead and brown trout could be found in these small tributaries. As bullhead acts as second most important host fish for *Unio crassus* it is important to improve the connectivity of the tributaries with the main stream. The Fallbech and Etterbach have no connectivity with the main stream due to a large pipe-construction under a larger road and no fishes were detected in these tributaries. Both tributaries are rather small and removing these two obstacles makes no sense. A migration obstacle was removed at the Ruederbaach in 2017 and at the Houschterbaach in 2018.

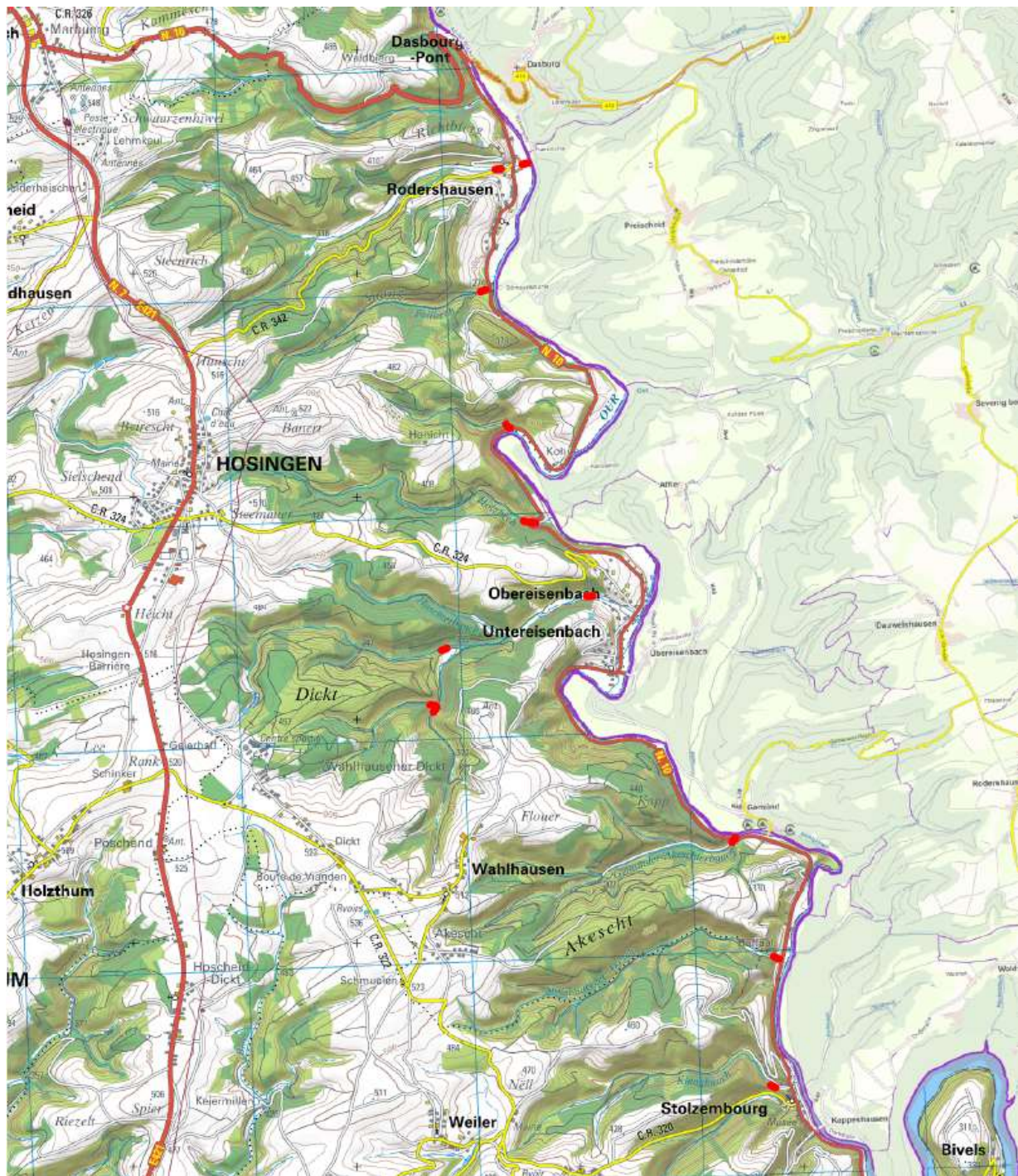


Figure 17: Location of the electric fishing spots (red dots) in river Our catchment between Dasbourg and Stolzenbourg

## 2.2 River Sûre tributaries 2013

The following tributaries (see Table 6 and Figure 18) were analysed by electric fishing in the river Sûre catchment in December 2013. Between 2 and 3 sites were analysed per tributary, depending on the connectivity and size of the respective stream.

Table 6: Tributaries of the river Sûre analysed by electric fishing in 2013

Date	Tributary	Sites	Species	Individuals
04.12.2013	Syrbaach	3	8	128
04.12.2013	Froumicht	2	2	12
05.12.2013	Schwärzerbaach	3	2	71

The Syrbaach is already a larger tributary and 8 different fish species could be detected. Froumicht and Schwärzerbaach are two smaller tributaries with its typical fish species, Brown trout and Bullhead. In the Schwärzerbaach a pipe construction stop's the fish migration about one kilometer upstream from the confluence with the river Sûre. The fish migration obstacles in the river Schwärzerbaach got removed between 2014 and 2015. The obstacle at the Froumicht was removed in 2018.



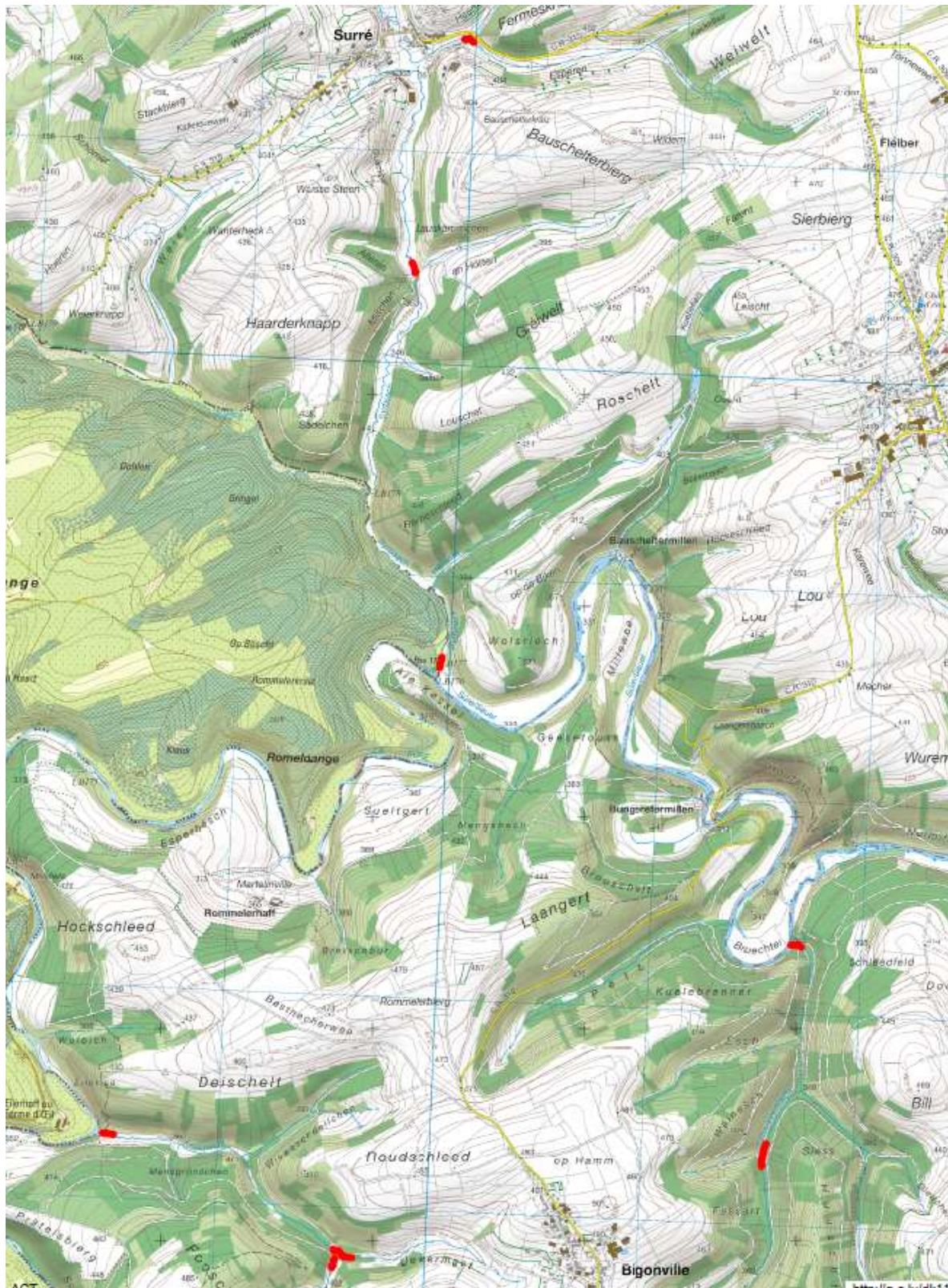


Figure 18: Location of the electric fishing spots (red dots) in river Sûre catchment

## 2.3 River Our and Sûre tributaries in the year 2016

In 2016 electric fishing activities were again foreseen in some of the tributary streams, of the river Our an Sûre. The intent was to check the fish population in some of the tributaries, but more important, to check if the transformed obstacles had become meanwhile passable for upstream swimming fish.

Table 7 gives an overview of the electric fishing activities on the tributaries in 2016.

Table 7 : Electric fishing activities at the tributaries in 2016

Date	Tributary	Intent (fish population <b>FP</b> or migration obstacle <b>MO</b> )	Number of species	Individuals	Remark
<b>Our catchment</b>					
23.11.2016	Traesbech	FP	2	12	/
23.11.2016	Huschterbaach-mouth	FP	3	37	/
23.11.2016	Huschterbaach-obstacle	MO	1	19 (downstream obstacle)	Obstacle not yet remodelled  No fish individuals after the obstacle
23.11.2016	Gemünder-Akescht - mouth	FP	1	7	/
23.11.2016	Gemünder-Akescht - obstacle	MO	0	0	No fish individuals before and after the obstacle
23.11.2016	Ruederbaach	MO	1	1	Obstacle not yet remodelled Fish individual before obstacle  No fish individuals after the obstacle

Süre catchment						
30.11.2016	Syrbaach mouth	-	FP	5	77	/
30.11.2016	Froumicht obstacle	-	MO	2	6	Obstacle not yet remodelled  No fish individuals before obstacle  No fish individuals after the obstacle
30.11.2016	Schwärzerbaach - obstacle 1		MO	1	6	Obstacle already removed  2 fish individuals before and 4 fish individuals after transformed migration obstacle
30.11.2016	Schwärzerbaach - obstacle 2		MO	1	4	Obstacle already removed  1 fish individual before and 3 fish individuals after transformed migration obstacle
30.11.2016	Schwärzerbaach - obstacle 3		MO	1	4	Obstacle already removed  0 fish individuals before and 4 fish individuals after transformed migration obstacle

Due to low water levels during late summer and autumn the number of individuals was low in all tributaries. The expected composition of species was present in the lower parts of the streams as well as with trout and bullhead in the more upper parts. At the Schwärzerbaach three migration obstacles have meanwhile been transformed and in November 2016 we were able to see that the transformation was a success. Small trout were again present in all parts of the river (see Table 7 and Figure 19).

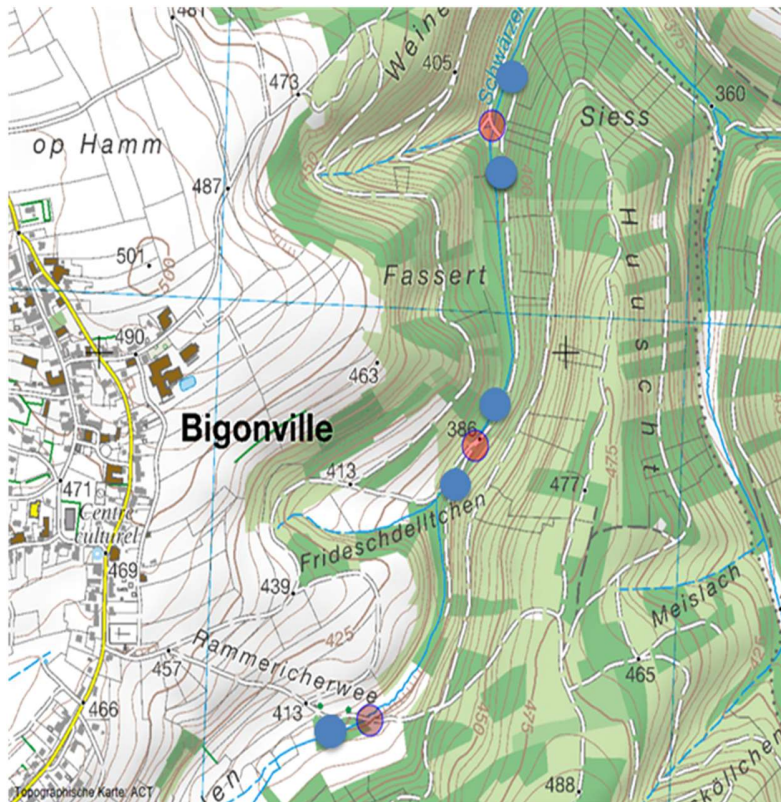


Figure 19: Schwarzerbaach with location of the transformed migration obstacle (red dots). Blue dots indicate the presence of brown trout during the electric fishing in November 2016

## 2.4 River Our and Sûre tributaries in the year 2018

In 2013, the fish fauna of eight tributaries from the river Our and three tributaries from the river Sauer was investigated. This exercise was repeated in 2016 and 2018. In 2018 not all tributaries were analysed again but the focus was given, as in the year 2016, to those tributaries where fish migration obstacles got removed. For 2018 this was at the Ruederbaach and Houschterbaach. In the river Our catchment and at the Froumicht in the river Sûre catchment. Table 8 and 9 summarise again all electric fishing activities at the tributaries of the river Our and Sûre between 2013 and 2018.

The transformation of the obstacle at the Ruederbaach took place in Winter 2017. One-year later, one single brown trout was caught below the transformation. At the Houschterbaach we detected no fish at all in 2018, neither below, nor above the removed obstacle. The removal at Houschterbaach took place in autumn 2018. Taken into account the hot and dry summer in 2018, leading to a nearly completely dry out of the Houschterbaach, it is not surprising that no fish had returned to the upper part by December 2018. We made the same observation at the Froumicht. Also here, no fish were detected in the section above the removed obstacle so shortly after the transformation and only two stone loaches were detected below.

Table 8: Electric fishing activities on the river Our tributaries

Date	Tributary	Sites	Species	Individuals
02.12.2013	Träsbech	2	2	29
03.12.2013	Fallbech	1	0	0
03.12.2013	Etterbaach	1	0	0
03.12.2013	Holzbech	2	1	22
06.12.2013	Housterbaach	3	2	83
06.12.2013	Gemünder Akeschterbaach	1	1	30
03.12.2013	Stolzebuerger Akeschterbaach	2	1	6
05.12.2013	Klangbaach	1	1	23
23.11.2016	Träsbech	1	2	12
23.11.2016	Housterbaach	2	3	56
23.11.2016	Gemünder Akeschterbaach	2	1	7
23.11.2016	Ruederbaach	1	1	1
12.12.2018	Housterbaach	1	0	0
12.12.2018	Ruederbaach	1	1	1

Table 9: Electric fishing activities on the river Sûre tributaries

Date	Tributary	Sites	Species	Individuals
04.12.2013	Syrbaach	3	8	132
04.12.2013	Froumicht	2	2	12
05.12.2013	Schwärzerbaach	3	2	71
30.11.2016	Syrbaach	1	5	64
30.11.2016	Froumicht	1	2	6
30.11.2016	Schwärzerbaach	3	1	14
12.12.2018	Froumicht	1	1	2
12.12.2018	Schwärzerbaach	1	1	1



Figure 20. Electric fishing at the Froumicht in 2018 and brown trout from the Ruederbaach



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