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

March 1st 2015 – February 29th 2016

Progress Report II

LE GOUVERNEMENT DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère du Développement durable et des Infrastructures
Département de l'environnement

LE GOUVERNEMENT DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Agriculture, de la Viticulture et de la Protection des consommateurs

CHAMBRE D'AGRICULTURE LUXEMBOURG

Progress Report II

1st March 2015 to 29th February 2016

Reporting Date

29 February 2016

« Restoration of Unio crassus rivers in the Luxemburgish Ardennes »

Resto-unio

Project location:	Vallée de l'Our de Ouren à Dasburg Pont LU0001002 Vallée Supérieure de la Sûre / Lac du barrage LU0001007
Project start date:	01.09.2012
Project end date:	28.02.2018
Total budget	2.057.068 €
EC contribution:	1.028.534 €
(%) of eligible costs	50 %

Data Beneficiary

Name Beneficiary	Fondation Hëllef fir d'Natur
Contact person	Alexandra Arendt
Postal address	2, Kierchestross, L-9753 Heinerscheid Luxembourg
Telephone	+352 - 26908127-31
Fax:	+352 - 26908127-33
E-mail	al.arendt@naturemwelt.lu
Project Website	www.unio.lu

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2 LIST OF ABBREVIATIONS

MA:	Ministère de l'Agriculture, de la Viticulture et du Développement rural
MDDI:	Ministère du Développement durable et des infrastructures
MIGR:	Ministère de l'Intérieur et à la Grande Région
FMCS:	Freshwater mollusk conservation society
U. C.:	*Unio crassus*
WFD:	Water framework Directive
ANF:	Administration de la Nature et des Forêts
ASTA:	Administration des Services Techniques de l'Agriculture
M.m.:	*Margaritifera margaritifera*
PDR:	Plan de développement rurale
RDP:	Rural development programme
AEM:	Agri environment measures
LIST:	Luxembourg institute of science and technology
QD:	Qualifizieren-Dimensionieren

3 SUMMARY

3.1 General progress and assessment

Action A1: Localisation des zone à risques d'érosion	
Progress: After the mapping of the main hotspots of sediments a list has been set up.	To realise till next report: The action is finished.
Action A2: Planification des mesures de restauration	
Progress: A restoration measure plan has been set up. It's the base for the measures to be done in the project.	To realise till next report: The action is finished.
Action A3: Planification de la surveillance de la qualité de l'eau et du substrat interstitiel	
Progress: Sampling points were chosen, Sampling equipment has been bought and installed on both river basins, Our and Sûre.	To realise till next report: The action is finished.
Action A4: Mise en place de la technique d'élevage pour *Unio crassus*	
Progress: All the permissions are available. The exchanges with American specialists are done. A rearing protocol has been set up.	To realise till next report: The rearing protocol has to be translated in English.
Action A5: Contribution à l'élaboration des plans de gestion Natura 2000 "Our" et "Haute Sûre"	
Progress: The management plan of the Our is definitive. The management plan of the Haute-Sûre is in elaboration.	To realise till next report: Plans have to be published as "arrêté ministériel".
Action B1: Acquisition de terrains le long de l'Our, de la Sûre et de leurs affluents	
Progress: Land purchase of 461,1 Are (57,64 %).	To realise till next report: Continue land purchase.
Action C1: Interventions pour réduire l'apport en sédiments fins dans le réseau hydrographique	
Progress: fences: • 1.565 m have been built, 6 watering places created, 4 cattle passages built. • AEM done: 2 contracts for biodiversity • Installing of water evacuation grids: 0 • Restoration of the riverbed "Feierbech"	To realise till next report: • Installing fence. • AEM • Installing water evacuation grids

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Action C2: Transformation d'obstacles à la migration des poissons sur les cours d'eau tributaires	
Progress: 3 fish obstacles are transformed. 2 are planned, for 1 more the choice of the site is accepted by both Administrations AGE and ANF	To realise till next report: Finalise the planning and execute the foreseen measures.
Action C3: Amélioration du substrat par dépôt de gravier	
Progress: The yearly dumps of gravel on Our (118,59 m^3) and Sûre (76,10 m^3) have been done.	To realise till next report: Add 100 m^3 to the river Our, add 150 m^3 gravel to the river Sûre.
Action C4: Elevage de *Unio crassus* pour la Grande Région	
Progress: 1.800 minnow were infested with U. c. larvae, 23.000 juvenile mussels collected. +/- 1260 young mussels of the Our and +/- 1509 young mussels of the Sûre were placed in 4 different systems (detritus box, sand aquaria, sand channel and gravel box).	To realise till next report: Start all the necessary preparations for fish infestation. Continue culture with the mussels from the previous years, and collect new mussels. Three year old mussels will be released in the rivers for the first time in the project.
Action C5: Régulation de la prédation du rat musqué	
Progress: 78 muskrats have been trapped on the river Our, 39 on the river Sûre.	To realise till next report: The muskrats are captured all over the year.
Action D1: Surveillance de la qualité de l'eau et du substrat interstitiel	
Progress: Measuring of water quality and turbidity continues at both catchments and in their tributaries. (635 samples). The piloting committee was informed about problematic points.	To realise till next report: Continue the monitoring of the water quality and the interstitial.
Action D2: Monitoring des poissons hôte	
Progress: Electric fishing activities at the river Our and Sauer in summer 2015 were done. Investigation of the natural infestation rate.	To realise till next report: Next electric fishing on the tributaries in 2016.
Action D3: Suivi de *Unio crassus* dans son milieu naturel	
Progress: Monitoring of 20,7 km (69%) on the river Our and 9 km (50%) on the river Sûre. • Mean density: 0,03 ind/m^2 • Survival rate of the tagged mussels: between 67% and 83% • Fertility control has been done	To realise till next report: Continue mussel monitoring. Control of the tagged mussels. Sampling and analysis of the sediment fractions on the mussel banks. Supervise the released mussels.
Action D4: Monitoring et évaluation de l'impact des mesures concrètes	

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Progress: The success of the restoration measures is evaluated by the following indicators: water quality, quality of substrate and host fish population.	To realise till next report: Continue the monitoring of the impact.
Action D5: Analyse de l'impact socio-économique du projet et de l'effet sur les écosystèmes	
Progress: Collect data and information for the final report. We asked a scientist of LIST to tackle this topic.	To realise till next report: Prepare the analyse with the help of an expert.
Action E1: Information et sensibilisation des acteurs concernés	
Progress: • Two seminars and 1 workshop for farmers took place • 40 meetings with authorities and stakeholder • many e-mails and telephone conversations	To realise till next report: • Organize the next farmer information event • Organize water forum for the river Our and Sûre catchments • Stay in contact with stakeholders
Action E2: Sensibilisation du grand-public	
Progress: • Visit of 624 persons at the mill • Press release: 11 articles • Film: first sequence for the film • Installation of Natura 2000 room started	To realise till next report: • Continue with press releases and visits • Create project movie • Create A0 information boards • Finalise Natura 2000 room
Action E3: Création d'un site Web	
Progress: Website fully accessible in all three languages (FR, EN and DE)	Keep internet site up to date with news and downloads.
Action E4: Organisation de séminaires	
Progress: First seminar took place in November 2015 (about 80 persons from 20 nations)	To realise till next report: Start organizing the second seminar about restoration measures.
Action F1: Gestion et encadrement du projet	
Progress: Fourth piloting committee. Writing of the Progress report.	To realise till next report: Fifth piloting committee. Writing of the Progress report.
Action F2: Echange du savoir avec d'autres projets: LIFE et autres	
Progress: Constant exchange with colleagues working in LIFE-Mussel-Projects by email and phone. Presentation of the project at	To realise till next report: Continue exchange with Life projects and others. Take part in scientific seminars.

international meetings.	
Action F3: Plan de conservation After-LIFE	
Progress: Not scheduled for the moment.	To realise till next report: Not scheduled for the moment.

3.2 Problems encountered

- Technical aspect

A delay occurred for the negotiation of AEM measures and the installation of the water gutters as both depend on the official announcement of the national agrarian legislation. The Luxemburgish Government will finalise the national law in spring 2016, so that we will begin promoting AEM measures and counselling farmers from spring on. Both Nature Parks of Our and Sûre have selected agricultural land where we will negotiate together with the Parks biodiversity contracts with farmers. With the help of the National Chamber of Agriculture we plan to set up AEM measures for the hot spots of erosion on farmland listed on the priority list of the "Restoration measure plan" sent to CE on 30.06.2014.

The pilot project on the small catchment Feierbech, started in January 2015. It is not a direct solution to the specific problem detailed above, but the results of this project will help us in determining AEM measures and the sensitization effect of the farmers via this project is given.

The installation of water gutters depends in most cases of a renewal of the forestry or rural ways. The subsidies have to be asked to ASTA and are allocated via PDR. A big part of our gutters are planned (see under C1) and the procedure will start this year.

So, it is a fact that till now we were not able to implement this aspect of action C1 and that this measure will start much later than planned. Fortunately we have an under-spending of the personal costs for about 6 months and we are sure that this supplementary period could help us to finalize successfully those measures.

- Financial aspect

There is a large under-spending for the category "Other cost", at least 50.000€. The service for the water measuring stations cost less than foreseen. In order to increase our knowledge about parameters being able to counter the mussel release we would like to relocate a part of the budget for pesticide analyses.

Why do we need pesticide analyses?

Aquatic organisms may absorb dissolved chemicals directly from water through respiratory organs (e.g., gills), through the body surface, or may ingest chemicals through intake of contaminated sediments or food.[1]

Freshwater mussels are known for accumulating pesticides in their body. The uptake is much higher because water exposure is the main route of uptake. A disadvantage of *Unio crassus* is its low metabolism which increases the accumulation. [1]

Biocides have frequently been shown to be toxic to mussels of all species, but with great variation in the level of toxicity in relation to the species of mussel concerned, life cycle stage, physiological status, and water quality variation. Little work has been carried out on the chemical parameters that influence the survival and distribution of the freshwater pearl mussel (*Margaritifera margaritifera*) and not much more on related unionid mussels, either in Europe, North America or elsewhere. [2]

The FFH -VP-Info of "Bundesamt für Naturschutz", Germany gives lot of information about the impact of organic products and pesticides on *Unio crassus*. The species *Unio crassus* is endangered because of its high expectation of life, long-term reproduction and low population in our project area.

Therefore we want to know about the concentration of some selected pesticides in our rivers. In a next step we would like to analyse dead mussels to see any accumulation in their bodies.

These results may give us a more arguments for reducing pesticides in NATURA 2000 areas.

We will have a meeting (foreseen 18.04.2016) with Tom Galle from LIST (Luxembourg Institute of Science and Technology) who will discuss with us possibilities to measure pesticides in the river Our. In the river Sûre long term measurements by the LIST are already in progress but the results are not published yet. We do not know any costs for this long term pesticides monitoring.

Pesticides can be measured by different labs in Luxembourg, Germany and Belgium. One analyses will cost around 400€- (including about 15 different parameters). The costs for analysing mussels are not yet known.

Several measures during the season would be necessary to have an overview which pesticides are all time detectable and are accumulated in the mussels. This can be useful for further interpretation of the influence of pesticides on mussels and their reproduction. [3]

[1] T. Katagi, D.M. Whitacre (ed.), Reviews of Environmental Contamination and Toxicology 1 Volume 204, Reviews of Environmental Contamination and Toxicology 204, DOI 10.1007/978-1-4419-1440-8_1, C Springer Science+Business Media, LLC 2010

[2] Young, M. (2005): A literature review of the water quality requirements of the freshwater pearl mussel (*Margaritifera margaritifera*) and related freshwater bivalves., Scottish Natural Heritage Commissioned Report No. 084 (ROAME No. F01AC609d).

[3] Nagel, K.-O. (2002): Muschel, Mensch und Landschaft. Zusammenhänge zwischen Landnutzung und Bestandsentwicklung bei Flussmuscheln., Naturschutz und Landschaftsplanung 34 (9): 261-269.

As we worked in accordance with the schedule we will have achieved the action of gravel deposition on the river Our in autumn 2016, whereas on the Sûre only in 2017. This measure is part of the official Natura 2000 management plans of the Our and the Sûre too, as the creation of a sediment free substratum is positive for the minnow, the main host fish for *U. c.* and for many aquatic macro-

invertebrates. We foresee an additional drop of 100 m^3 on the same location in the Our in 2017, with a left-over of the budget.

At the moment we do not know if a special budget has to be allocated to the signal crayfish as two employees of ANF are assisting us trapping this invasive species.

4 ADMINISTRATIVE PART

4.1 Project management.

The setup of the project management and composition of the project team is described under Action F1. Meetings with stakeholder or other groups and persons relevant for the project management are always mentioned in the respective description of the action (see chapter 5).

4.2 Organigramme

- Constitution of the project team:
  - Coordinator 60%: Alexandra Arendt biologist
  - Scientific 1 50%: Frankie Thielen Dr. rer. nat and 50% on an other non EU project
  - Scientific 2 50%: Sonja Heumann Dr. tech.
  - Technician 100%: Léo Klein environmental technician, left in December 2014, is replaced by Karin Michels from January 2015
  - Secretary/accountancy: Patricia Heinen secretary 40% (LIFE 11 NAT/LU/857) 20% (LIFE 11 NAT/LU/858) 20%(LIFE 13 NAT/LU/ 782)

- Allocation of the different missions to each team member:
  - Alexandra Arendt is charged with the coordination of the project, the realisation of measures in the agricultural context.
  - Frankie Thielen and Karin Michels are responsible for the rearing station and the tasks related to the mussel breeding.
  - Sonja Heuman's principal mission is the water quality survey, the monitoring of the measures and the realisation of measures.
  - Patricia Heinen deals with accounting, timesheets and correspondence.
  - Each team member contributes in informing the public. Whenever an action needs higher personal input the other members will give the needed support.

- Every Monday 15 minutes team meeting: information about the happenings for the coming week (meetings, field work, help needed for special tasks...).

- Monthly team meetings (1 to 2 hours): review of the task's progresses, discussion of problems, working out of solutions. Written reports.

- Monthly meeting with the Fondation Hëllef fir d' Naturs' director: validation of work content and proceeding. Written reports.

- Monthly meeting between the director and the administrative council of Fondation Hëllef fir d'Natur. If necessary aspects dealing with the Life Unio project are mentioned. Written reports.

- Meetings with stakeholders or other groups and people relevant for the project management are always mentioned in the respective description of the action (see chapter 5).

- The project Organigramme is the following (see Figure 1):

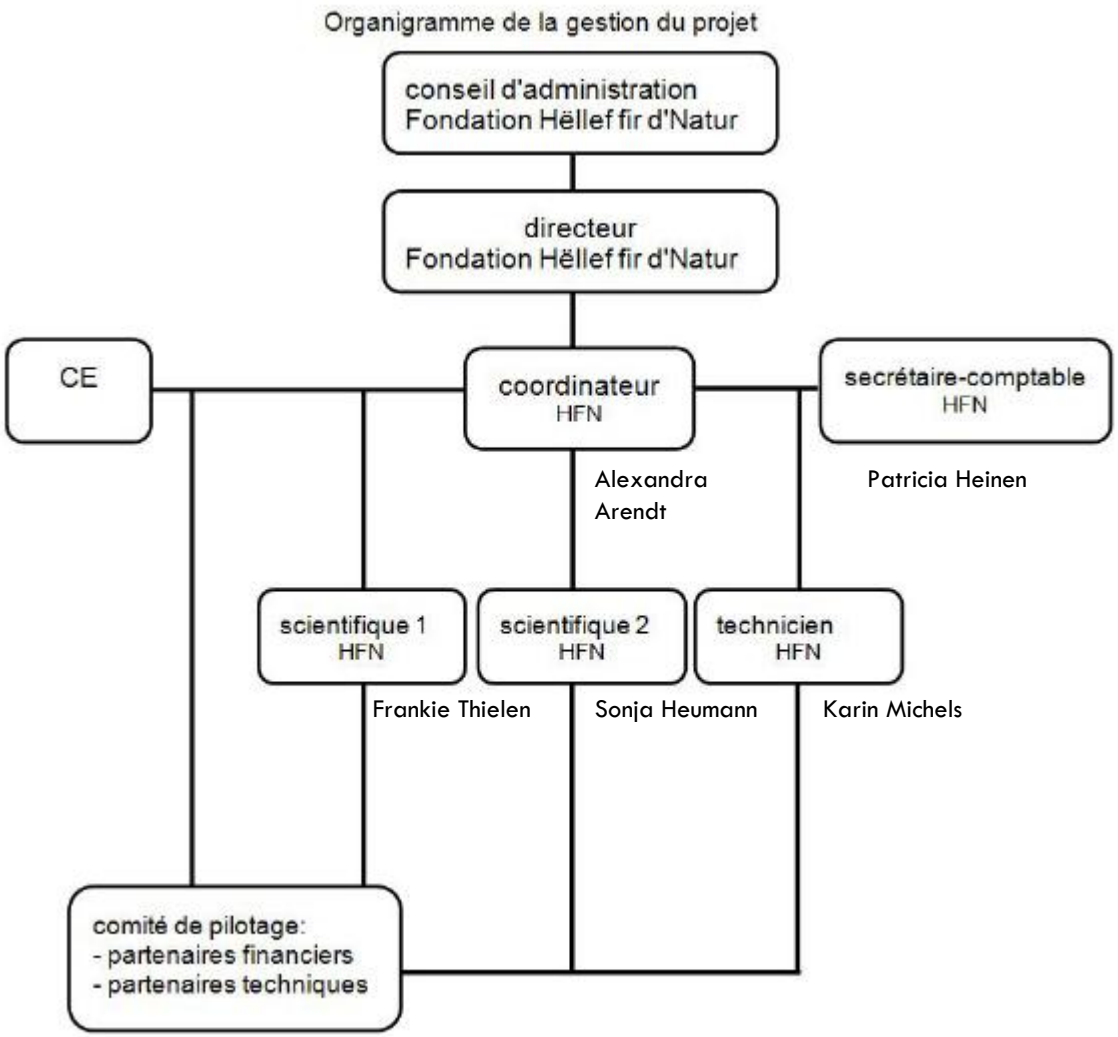


Figure 1: project Organigramme

- Till now no amendment to the Grant Agreement has been necessary, as only the name changed from Fondation Hëllef fir d'Natur to natur&ëmwelt-Fondation Hëllef fir d'Natur and there is no change of the statutes.

- The first march 2015 natur&ëmwelt-Fondation Hëllef fir d'Natur got a new president, namely Mr. Patrick Losch.

- The Partnership agreements with MA and MDDI have been submitted with the Inception report while the one with MIGR has been submitted with the Progress report.

4.3 Delivered Reports

The inception report has been delivered on 28th February 2013

The first progress report has been delivered on 28th February 2014

The mid-term report has been delivered on 28th February 2015

5 TECHNICAL PART

5.1 General progress of the actions

5.1.1 Action A1: Localisation des zone à risques d'érosion

The load of fine sediments and nutriments in the river system is one of the main factors responsible for the decline of *Unio crassus*. *Therefore,* the project focuses on the reduction of the entrance of fine sediments and nutrients in the water courses, especially in the tributaries of the rivers Our and Sauer. The main intent of this action is to localize the hot spots of erosion.

➢ Progress/results

For both river basins a mapping of the main different entrances of fine sediment into the water courses

- Erosion of and on farmland
- Erosion on or beside forestry and rural roads
- Spruce trees next to the river
- Cattle trampling

has been done.

The hotspots have been evaluated, rated and priority lists have been set up for all types of entrances of fine sediment in the water courses (see action A2).

The action is finished.

For the final report the list of the hotspots will be updated and will be part of the After-Life conservation plan.

➢ Realised

List of hot spots of erosion.

➢ Problems encountered/delays

No major problem.

Slight delay for the action; however the mapping was finished in May 2014 so that we could send our "Erosion report" on 30th June 2014 to the European Commission (see action A2)

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A1																				

planned
realized

➢ Complementary action outside LIFE

5.1.2 Action A2: Planification des mesures de restauration

The initial mapping phase of "hot spots" of erosion, as foreseen under the action A1, will allow deciding where negative points have to be resolved and will lead to the concrete planning phase of the following restoration measures:

1. The installation of 2km of fences, 5 cattle watering installations, 3 bridges for cattle.
2. Construction of 60 water evacuation systems on agricultural and forestry roads.
3. 40 agro-environmental measures
4. Restoration of a river bed

➢ Progress/results

A written document called the" Restoration measure plan" with priority lists has been set up and submitted to CE on 30.06.2015. The priority lists contain precise information on the detected problems, their localization, a link to www.geoportail.lu and a description of adapted restoration measures that could be realized during the project. Furthermore we dispose of the data of the owners or/and land users.

The action is finished.

➢ Realised

Restoration measure plan

➢ Problems encountered/delays

No others problems or delays encountered.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A2																				

planned
Realized

➢ Complementary action outside LIFE

5.1.3 Action A3: Planification de la surveillance de la qualité de l'eau et du substrat interstitial

The planning of the water measurement stations and other equipment needed for water quality survey is part of this action.

➢ Progress/results

A redox-electrode (Geist & Auerswald, 2007) was delivered in January 2013. In March (04.03.2013) was a meeting in Munich combined with a workshop to learn the handling. In July 2014 another workshop was hold in river Our.

In June 2013 the company Hach-Lange installed 4 probes (nitrate, ammonium, chloride and potassium) at our Lab in Kalborn in order to see if the equipment would fit our needs. In August 2013 the whole equipment (nitrate, ammonium, chloride and potassium; conductivity, turbidity, oxygen and pH-value) was ordered and installed in September 2013.

A second system (OTT) was installed in March 2014. This is a mobile online monitoring system with several parameters (temperature, pH value, oxygen, conductivity, turbidity and nitrate). It is used for the monitoring of Syrbaach (Sure).

The action is finished.

➢ Realised

The redox-electrode was delivered. Data are available (D1 and D4).

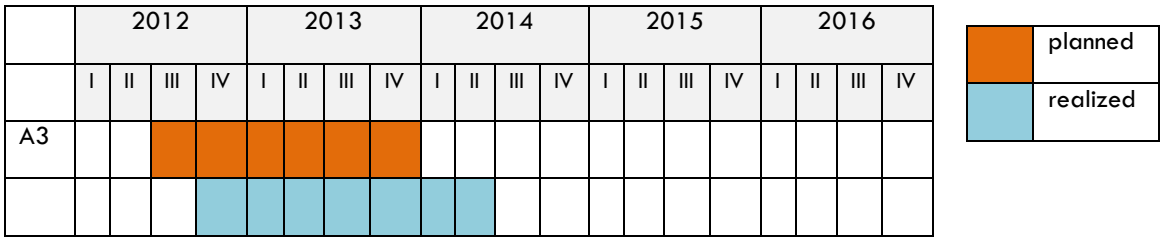
Online monitoring system was installed at the Mill in Kalborn in September 2013. Data are available (D1)

Mobile online monitoring system was delivered in March 2014. Data are available (Action D4).

➢ Problems encountered/delays

As already written under section 3.2 the service for the water measuring equipment, foreseen under other costs, will be less as calculated at the beginning of the project. This is due to the fact that no "wet-chemical" probes are used which need much more service effort. Therefore we intend to make additional pesticide measurements of the river Our water and mussel tissue. A description of these additional measurements and relevant costs is given in section 3.2.

No others problems or delays encountered.



- **Complementary action outside LIFE**

5.1.4 Action A4: Mise en place de la technique d'élevage pour *Unio crassus*

The intent of this action is to plan and organize all the necessary steps to install a culture procedure for *Unio crassus* at the rearing facility at the mill of Kalborn.

➢ Progress/results

Authorisation

All permission from the MDDI to handle *Unio crassus* in the river Our and Sûre were organized.

Exchange with experts from USA

As planned in the Mid-Term Report, an expert from the USA stayed two days (November 30th and December 1st, 2015) at our rearing facility after the seminar (see action E4) and helped doing some more experiments with the cell counter. The expert who stayed was Megan Bradley from Marion, Virginia Department of Game and Inland fisheries - Aquatic Wildlife Conservation Center, Virginia. As foreseen under this action, the LIFE project covered her travel and accommodation costs.

Developing and writing a rearing protocol

A rearing protocol including all the necessary steps for the culture of *Unio crassus*, including a discussion of the first results was written and is available online at our internet site (http://www.unio.lu/files/55852.pdf) since August 2014 as planned. An English version with adaptations will be realized until the end of the project.

➢ Realised

Permission Letter for the river Our and Sûre valid until 28.02.2018.

Visit of freshwater rearing facilities in the USA.

Visit of an expert from the USA in Luxembourg.

Technical document about rearing method (http://www.unio.lu/files/55852.pdf).

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A4																				

planned

realized

➢ Complementary action outside LIFE

5.1.5 Action A5: Contribution à l'élaboration des plans de gestion Natura 2000 "Our" et "Haute Sûre"

Contribution to the management plans for the 2 Natura 2000 project areas on the river Our and the river Sûre. The Life team will give scientific assistance to the consultant office in charge of working out management plans. During public hearings the team will contribute with details about the aquatic biotope.

➢ Progress/results

- Management plan Our: plan de gestion version abrégée
    - Completion in December 2015
    - Presentation to ANF 21th of January 2016
    - Presentation to Naturpark Our, Water Administration 4th of February 2016
    - Official publication on the ministries internet site emwelt.lu 16th of March 2016
    - Publication of the "arrêté ministériel" in the period of 2016-2017
- Management plan Sûre: plan de gestion version abrégée.
    - Completion in March 2016
    - Official publication on the ministries internet site emwelt.lu 21th of June 2016
    - Publication of the "arrêté ministériel" in the period of 2016-2017

With their clearly and precisely defined measures the management plans both will serve as an adopted base of the After Life Conservation plan.

➢ Realised

- Management plan Our: plan de gestion version abrégée (definitive version) (see Annex 1).
- Management plan Sûre: plan de gestion version abrégée (temporary version) (see Annex 1).

➢ Problems encountered/delays

Our contribution to the management plans went over a longer period than foreseen, but Luxemburgish government will adopt the plans before the end of the project.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A5																				

planned
realized
new plan

➢ Complementary action outside LIFE

5.1.6 Action B1: Acquisition de terrains le long de l'Our, de la Sûre et de leurs affluents

It is foreseen to acquire 8 ha of land on the catchment area of the river Our and the river Sûre.

➢ Progress/results

Land purchasing has been signed by a notary for 461,1 Are (57,64 %). For 80,6 Are the notarial acts are under progress. Ongoing negotiations for about 2 ha. 354,3 Are have been bought on the catchment Our, 106,8 Are have been bought on the catchment Sûre. They are bought for a mean price of 72 €/Are (notarial deeds included).

Restoration measures have been done ore are undergoing (see Annex 2)

➢ Realised

Detail of land purchase, Notarial act, aerial photo with the localisation of the acquisitions, explanation of QD concept (see Annex 2)

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
B1																				

planned
realized

➢ Complementary action outside LIFE

5.1.7 Action C1: Interventions pour réduire l'apport en sediments fins dans le réseau hydrographique

This action will lead to:

1. Installation of 2km of fences, 5 cattle watering installations, 3 bridges for cattle.
2. Construction of 60 water evacuation systems on agricultural and forestry roads.
3. 40 agro-environmental measures
4. Restoration of a river bed

➢ Progress/results

1. Installation of fence (2000m), watering tanks (5), cattles passage (3)

78% of the fencing has been done. Several meetings with landowners and/or Administration of Forest and Nature: 03.06.2015, 06.07.2015, 10.07.2015, 09.09.2015, 21.10.2015, 01.01.2016 and with the firm charged with the execution of the fencing.

The targets will be reached within the foreseen budget without problem.

Table 1: measures realised

Catchment area	Tributary	Lieu-dit	Fence (m)	watering	cattle passage	status
Our	Roupelsbaach		380	1	2	done
Our	Stroumbaach	Folkesbour	650	2	0	done
Our	Stroumbaach	Enkerich	500	2	2	done
Our						done
Sûre	Bollertsbaach		35	1	0	planned spring
	Syrbaach		20	2	0	2016
		Total:	1585	8	4	

2. AEM (Mesures agri-environnementales)

The Luxemburgish Government will finalise the national law in spring 2016, so that we will begin promoting and counselling farmers from spring on. Both Nature Parks of Our and Sûre have selected agricultural land where we will negotiate together with the Parks biodiversity contracts with farmers. With the help of the National Chamber of Agriculture we plan to implement the topics set up on the priority list "Erosion on and of farmland" under "A2: Restoration measure plan" sent to CE in 30.06.2014.

Meanwhile we continue working on the "Pilotproject Feierbech" and collecting information. In the catchment area on the Feierbech, a tributary of the Our river, soil probes were done on 27 parcels from March 2015 to December 2015. The goal is to know the concentration of nitrogen in the soil and a comparison with the water sampling is done (see Annex 3). A meeting with the counselors of the national agriculture chamber and ASTA to discuss the "Pilotproject Feierbech" took place on 29th of

February 2016. These results will help us to get a better understanding of the impact of the current farming on the water quality on the scale of a small catchment area. It clearly has a demonstrating character. On 15th of March 2016 a next meeting with the farmers will take place

3. Water evacuation grids

0% of grids installation has been done as for the renewal of the ways subsidies are needed from ASTA. But depending from the PDR for the moment these measures are blocked as the agricultural law is not yet published.

Table 2 . Agreements for water evacuation grids to be installed

Catchment	River	length (m)	nb. of water evacuation grids	status
Sûre	Syrbaach	650	15	planned
Sûre	Schwaerzerbaach	50	2	planned
Our	Roderbaach	500	15	planned
Our	Feierbech	1200	19	planned spring 2016
		2.400	51	

As only the grids will be installed and there is no renewal of the forestry way, Feierbech can be realised in 2016 when the work on the main road C.R 339 from Heinerscheid to Tintesmillen will be achieved. Meeting 22.10.2015 with ANF.

4. Restoration of riverbed

Meeting with ANF 23.11.2015 was probably the last for the Heinerscheiderbaach. In all the meetings with specialists we had till now nobody could make us a satisfactory proposal. The bed of the Heinerscheiderbaach gets stable about 1km downwards of the erosion problem.

That's why we initiated the restoration of the river bed on lower part of the Feierbech (see Annex 3)

➢ Realised

- Demonstration Project "Feierbech" (see Annex 3)
- Restoration of the river bed on lower part of the Feierbech (see Annex 3)

➢ Problems encountered/delays

Slight delay but no problems encountered so far.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
C1																				

planned
realized

➢ Complementary action outside LIFE

5.1.8 Action C2: Transformation d'obstacles à la migration des poissons sur les cours d'eau tributaires

The intention of this action is to remove or transform 6 migration obstacles for fish in order to make them passable again.

➢ Progress/results

Set up of a priority list for the fish obstacles that has been sent to the Water administration to plan the measures. Obstacles to be transformed are retained on the tributaries Ettebaach, Gemünder Akeschterbaach, Holzbech, Huuschterbaach and Traesbech for the river Our. Schwärzerbaach, Froumicht, Bëllerbaach, Haemicht and Syrbaach are the selected tributaries for the river Sûre. Together with Administration of Water, Administration of Forest and Nature and the local forest ranger we decided which obstacles should finally be removed or transformed.

Several meetings with the Administration of Water, Administration of Forest and Nature and landowners:

02.03.2015, 14.04.2015, 29.04.2015, 07.05.2015, 10.06.2015, 06.10.2015, 27.10.2015, 03.12.2015, 03.02.2016

In our proposal we wanted to remove or restore 3 obstacles in each catchment area but there are now 4 obstacles in the catchment area of Sure. 3 of these obstacles are in the tributary "Schwärzerbaach".

The tributary "Schwärzerbaach" (catchment area Sure) is one of the cleanest streams in that area. There is very less income of sewage and no farming next to the stream. Most of the meadows are used in a sustainable manner. Therefore we decided go on with the restoration of this stream.

The demands for the authorisations for the removal of 4 fish obstacles were sent to the Administration of Water and the Administration of Forest and Environment and all projects were accepted.

In agreement with the forest ranger, the Administration of Water (AGE) and the Administration of Forest and Environment (ANF) a bed lifting next to the last of tube in Schwärzerbaach was planned. But in summer 2015 the local community and the forest ranger decided to restore the forestry road above the tube. In this case it would be better remove the tube and build a bridge.

We have to plan now a bridge together with the Administration of Water, to purchase the land or have an agreement of the landowner.

Another project is planned (Huschterbach, catchment area Our) and the demand should have be sent in June 2015 to the Administration of Water and the Administration of Forest and Environment. There is a second forestry road which should be kept. This fact in combination with narrow space makes the planning difficult. The Administrations (AGE and ANF) will decide the ongoing after the land purchase or the agreement of the landowners.

Table 3: Obstacle transformations

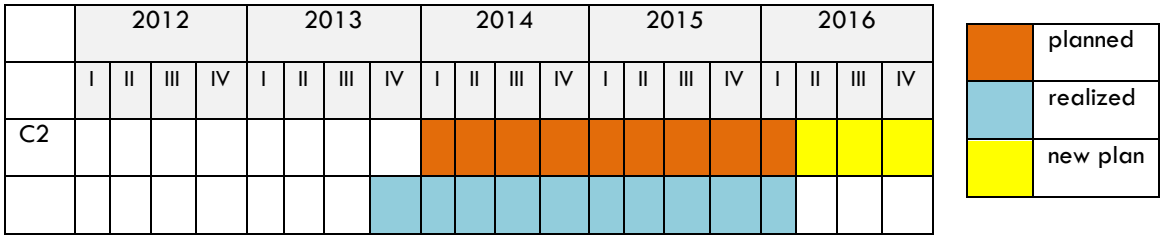
Catchment area	Tributary	Obstacle	Planned	Status
Sûre	Syrebaach	Ford - restoration	100%	Done, June 2015
Sûre	Schwärzerbaach	Big tube – removal of the tube and building a bridge	100%	Done, October 2015
Sûre	Schwärzerbaach	Tube – removal and building a bridge	100%	Done, October 2015
Sûre	Schwärzerbaach	Tube – lifting the river bed Tube removal, building a bridge and restoration of the forestry road	100% 10 %	planned in discussion
Our	Huschterbaach	Big tube – removal and building a bridge	25%	Purchase of land, planning of the bridge
Our	Roderbaach	Tube and rectangular water course	10%	In progress

➢ Realised

- Ford restoration of Syrbaach/ Sure, Removal of two tubes Schwärzerbaach/ Sure (Annex 4)

➢ Problems encountered/delays

The time plan for this action is longer, but the action will be achieved and the success will be controlled within the project.



➢ Complementary action outside LIFE

5.1.9 Action C3: Amélioration du substrat par dépôt de gravier

The intention of this action is to improve the quantity and quality of the river substratum in both rivers by the creation of clean gravel depots at five sites in each river.

➢ Progress/results

Dump of 118,59 m^3 of gravel (16-32 mm) in the Our at the sites named Feischbur, Hiour, Kalbermillen and Groussenauel in September 2015.

Dump of 76,10 m^3 of gravel (16-32 mm) in the Sûre at the sites named Eilerhaff (2 separate places), Esperbech and Aale Kessel in October 2015.

As one can see the dumps of gravel were not precisely 100 m^3 as the amount depends on the type of the truck, loading the gravel.

After having seen how the gravel is transported by the river we plan to drop 200 m^3 in the river Sûre in 2016 in order to readjust the amount of gravel.

Table 4: amount of gravel and prognostic figures

status	done	done	done	to do	to do	achieved	
year	2012, 2013	2014	2015	2016	2017	2018	sub-total
amount gravel Our (m^3)/year	203,29	127,94	118,59	100,00	achieved	achieved	549,82
amount gravel Sûre (m^3)/year	0,00	95,98	76,10	150,00	150,00		472,08
						total:	1021,91
						nb. tons (T)	1839,43

Table 5: costs of the gravel dumps and prognostic figures

costs/year	2012, 2013	2014	2015	2016	2017	2018	sub-total
external assistance	1.900,95 €	5.674,10 €	2.103,66 €	*2.500,00 €	2.500,00 €	achieved	14.678,71 €
other costs	7.364,14 €	8.403,18 €	7.421,28 €	12.000,00 €	4.000,00 €	achieved	39.188,60 €
total:	9.265,09 €	14.077,28 €	9.524,94 €	14.500,00 €	6.500,00 €	0,00 €	53.867,31 €

*prognostic figures

The last calculation showed us that we will reach the fixed objectives within the foreseen budget, as the external assistance probably not will be overstepped and the other costs will be about 40.000 € against a foreseen budget of 36.000 €. The difference will be counterbalanced within the category "other costs".

➢ Realised

Dump of a total of nearly 100 m^3 gravel in each river each year.

➢ Problems encountered/delays

As we started with the gravel deposition a year later on the Sûre we will also finish a year later that means the last deposition on the Sûre will be done in 2017.

On the river Our the action is achieved in 2016. As the measure is positive for the minnow, the main host fish for *U. c.*, we would make an additional drop in the Our in 2017 with a left-over of the budget.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
C3																				
							Our				Our	Sûre								

planned
realized

➢ Complementary action outside LIFE

5.1.10 Action C4: Elevage de *Unio crassus* pour la Grande Région

The action deals with all the necessary steps to culture juvenile *Unio crassus* at the rearing facility at the mill of Kalborn.

➢ Progress/results

In the report period, more than 1800 minnow were infested with *Unio crassus* larvae and more than 23.000 juvenile mussels could be collected (for details, see Table 6).

➢ Realised

Rearing steps 2015

- 24.04.2015: Transfer of *36* adult *Unio crassus* from the river Sauer to the rearing facility. 22.04.2015: Transfer of *63 Unio crassus* from the river Our to the rearing facility.
- 10.04 – 07.05.2015: Capture of host fish *Phoxinus phoxinus,* 1452 individuals in the river Our.
- 27.04.2015 -20.05.2015: Infestation of *649* fish with river Our mussels. Infestation of *803* fish with river Sauer mussels.
- 26.05.2015 - 07.07.2015: Collection of *7007* juvenile Mussels from the river Our and *16122* from the river Sauer.

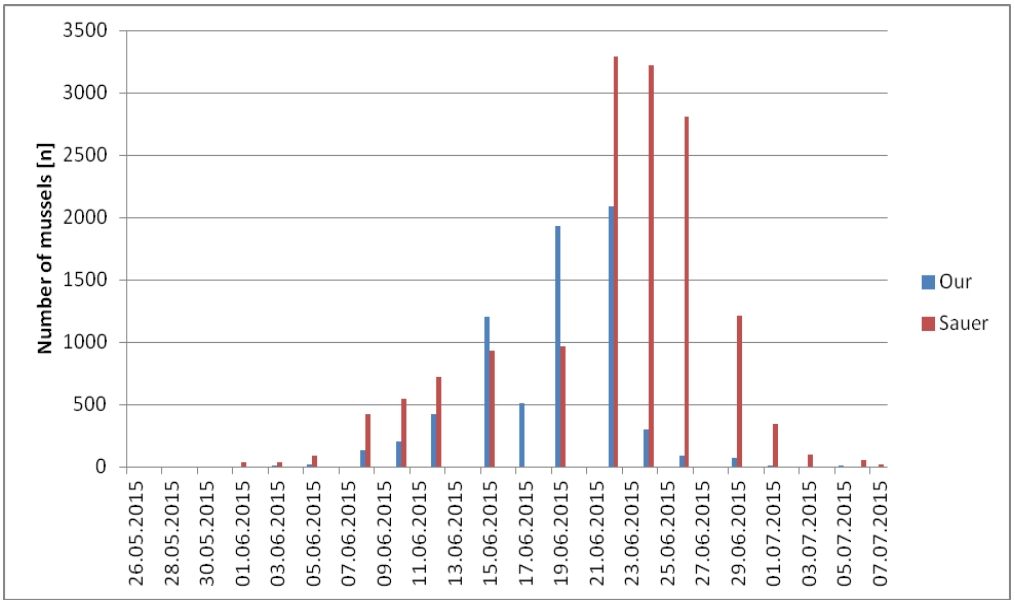


Figure 2: Mussel collecting in 2015

- 12.06.2015 release of 300 infested fish in the river Sauer
- 22.06.2015 release of 452 infested fish in the river Our
- 24-06-2015 and 29.06.2015 release of 563 infested fish in the river Sauer

Table 6: Summary of rearing activities in season 2013, 2014 and 2015

	Promised / realized 2013	**Promised / realized 2014**	**Promised / realized 2015**
Fish infestation	400/563 (+320 *S.trutta*)	400 /665	400/1895
Release in cages	200/100 +170 released without cage	200/0	200/1315 released without cage
Use in collecting installation	200/523	200/665	200/450
Juvenile mussels collected	5000/2693	5000/4234	5000/23129

So far no juvenile mussels were released in the main stream of the river Our and river Sauer. However first *Unio crassus* origination from the river Our were released in the rearing channel in gravel boxes (9 boxes with 15-20 mussels). The boxes were controlled on July 17 2015 (see also action D4). 137 mussels had survived so far, which gives us an overall survival of 76%. Also the 5 hole cages, installed in 2014 in the mill race way were checked in July 2015. Only 5 out of 120 mussels had survived. This makes the hole cages unsuitable for juvenile mussel and no new hole cages were installed in 2015.

However on July 20, two more gravel boxes with 44 mussels from the river Our and one box with 3 mussels from the river Sauer were introduced into the rearing channel. All the boxes will be checked again in Summer 2016.

At the moment juvenile *Unio crassus* from both strain, Our and Sauer, are grown out in 4 systems:

- Detritus Boxes
- Sand Aquaria
- Sand Channels
- Gravel Boxes in the outside rearing channel

Table 7 gives and overview about the number of animals in the respective systems (status October 2015).

Table 7 Number of juvenile mussels in the respective rearing systems

Year		Detritus Box	Sand Aquaria	Sand Channel	Gravel Box	Total
2012	**Our**	0	0	0	137	137
	Sauer	0	0	0	0	0
2013	**Our**	0	263	150	44	457
	Sauer	0	72	2	3	77
2014	**Our**	0	413	24	0	437
	Sauer	0	536	145	0	681
2015	**Our**	560	700	>500	0	1260 +?
	Sauer	659	850	>500	0	1509 +?
Total						**4530 +?**

In the year 2015 we made several measurements with the cell counter to see if and how the mussels filter the algae food out of the water. An experiment using a sand aquaria with and without mussels showed, that within 24 hours all algae are filtered out of the water (see Figure 3). Furthermore we could also show that in the larger sand channels the algae are reduced quite quick in the presence of mussels (see Figure4). According to Megan Bradley from the USA constant algae concentrations of 0,4 - 1,0 * 10^6 μm^3/ml are suitable for most freshwater mussels. Constant algae concentrations can only be achieved by the installation of automatic feeding systems. One installation with 4 sand channels and automatic feeding was already build and will be stocked with the new mussels in 2016.

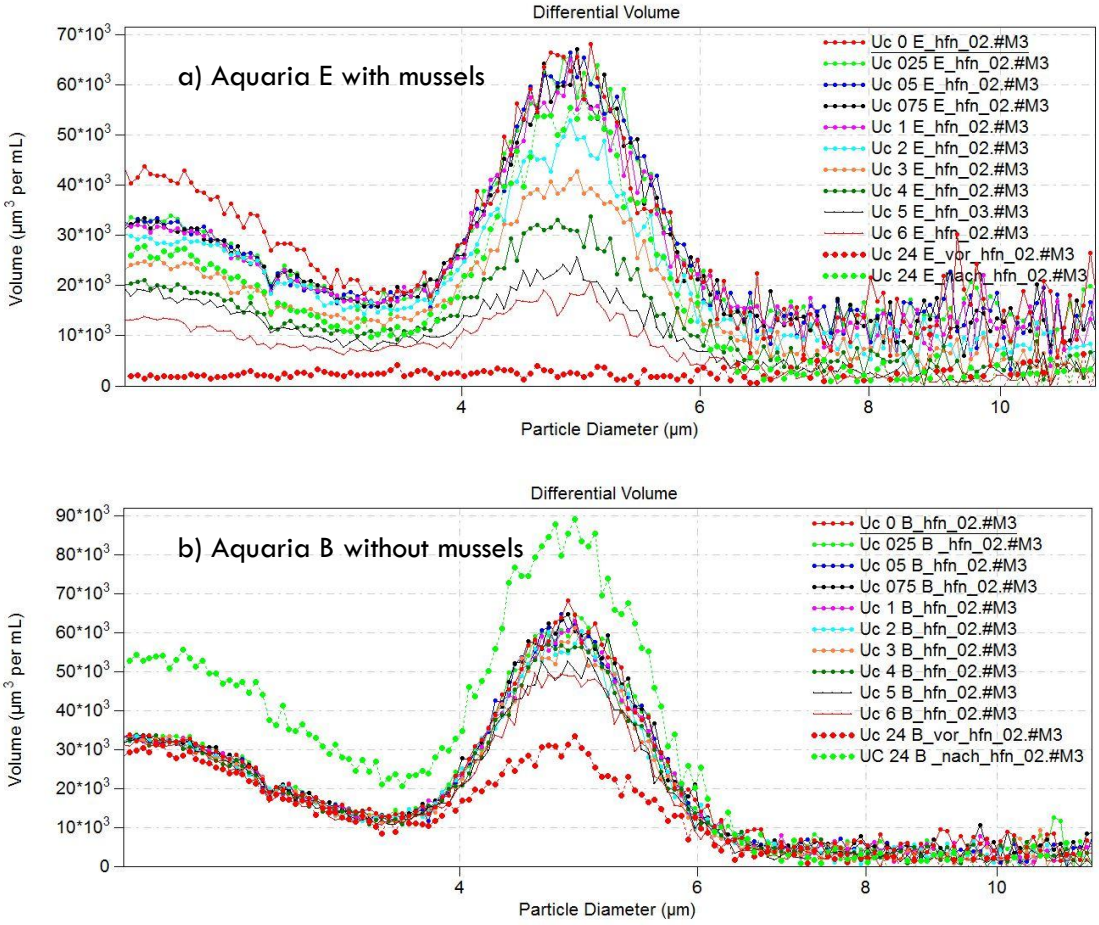


Figure 3: Filtering of algae from the water in an aquaria with mussels a) compared to an aquaria without mussels b). The numbers 0=feeding and 05, 1, 2, 24 etc refer to the numbers of hours after the feeding.

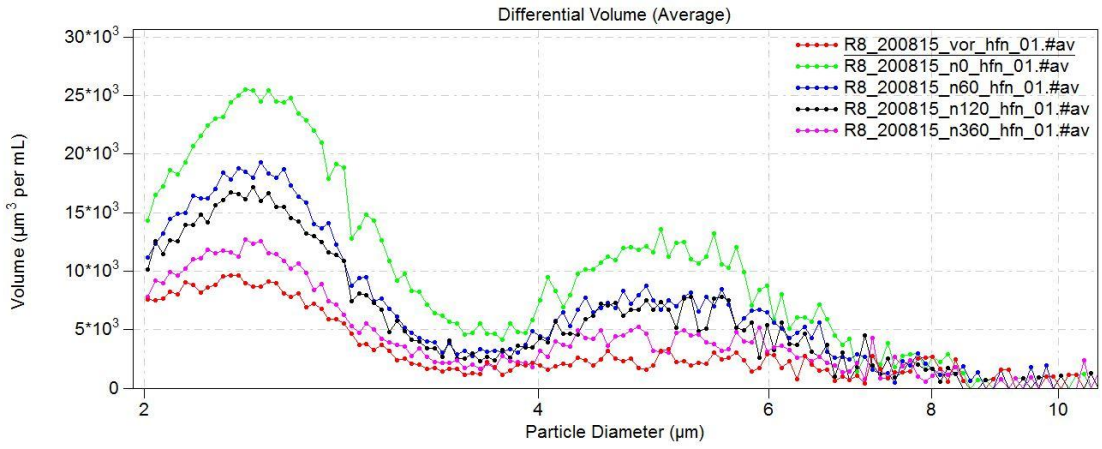


Figure 4: Reducing of the algae concentration in a large sand channel by Unio crassus within 6 hours.

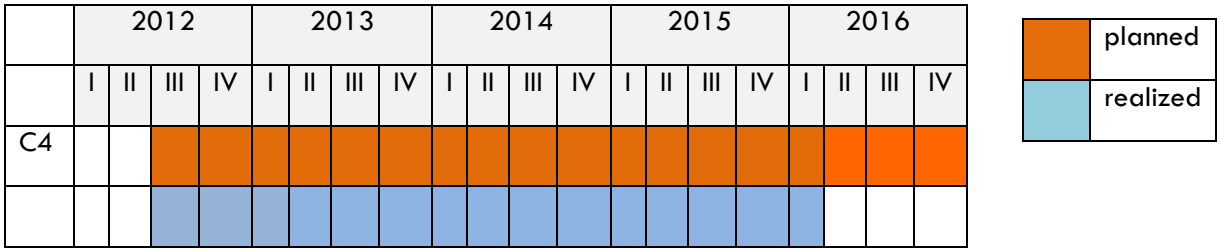
Progress Report II

➢ Problems encountered/delays

- **Problem:** Installation of cages in the river Sûre and Our is difficult due to often high water levels (Thunderstorms).

➢ **Solution:** This problem cannot be foreseen. If impossible in the respective year, no infested fish will be released in cages but instead be released without a cage as in 2015. By releasing the fish with a cage, the area of the dropping of the mussel seed can be controlled. This is of course not possible by releasing the fish without cage. With the method "without cage", however much higher numbers of fish can be released (in 2015 1315 instead of only 200) and the impact will probably be even higher but will be hard to prove.

The time plan for this action is on schedule.



➢ Complementary action outside LIFE

As the years before, we took care of three Aquaria with Unio crassus mussels from Germany and Switzerland for colleagues from the ecological company ecolo-gis. Contact with many other mussel projects exist and are also listed under action F2.

5.1.11 Action C5: Régulation de la prédation du rat musqué

The muskrat are captured twice the year to reduce and/or to maintain the populations at a low level in the mussel rivers.

➢ Progress/results

The constant low water level and the warm weather conditions in 2015 were favourable to the muskrat's migration what can be noticed at the higher capturing number.

To our knowledge the job is well done, as we don't notice any loss of mussels by the muskrats' activity

At the end of the year on one hunter has done the job alone as the second hunter retired. From the 15th of February on a new person has been employed by the ANF and is learning the capturing techniques. Table 8 gives an overview on the number of muskrats caught in the respective rivers.

Table 8: Caught muskrat at the river Sûre and Our throughout the year 2012-2015

Capturing period/ nb. of muskrats	2012	2013	2014	2015	**Total**
River Our	8	34	46	78*	**166**
River Sûre	3	19	21	39	**82**

*whereof 10 muskrats were trapped in the rearing channel near the rearing station

During the mussel monitoring in June 2015 at the river Our near Tintesmillen, about 2km south from the Kalbermill, we noticed a very high density of *Pascifastacus leniusculus*. On the 22nd of June we requested the permission from the Ministry of the Environment to capture the crayfish. The aim is to get experience on how to manage at its best this invasive species in the future and if necessary, to get help doing the capture. A visit in presence of the ANF took place on 10th of July 2015. The two persons in charge of muskrat trapping can help in capturing the crayfish too.

From July to October 2015 we tried two methods to manage the species in question (see the table 9 below). Crayfish were caught by hand net or by crayfish trap. The capturing of 1.020 crayfishes took 36,25 hours. Even if trapping by hand is more time consuming than placing traps, the efficiency of the first method is higher. Taking into account the number of working hours, 33 animals/hour were trapped by the use of hand nets and 16 animals/hour by placing traps.

Table 9: Comparison of two crayfish trapping methods

Datum	Methode	Anzahl	Dauer	Zeitaufwand	Personen	Zeitaufw.	Strecke	< 9 cm	> 9 cm	Total
		Reusen		Stunden +/-	Stk.	Stunden +/-	Meter +/-	Stk.	Stk.	Stk.
10/07/15	Hand			1	2	2	30	7	23	30
10/08/15	Hand			2	4	8	250	45	208	253
10/08/15	Hand			1	2	2	250	45	90	135
26/08/15	Hand			3	1	3	100	50	115	165
26/08/15	Reusen	2	3	0,25	1	0,25	20		2	2
28/08/15	Reusen	6	48	1	1	1	120	2	2	4
11/09/15	Hand			2	2	4	100	33	89	122
18/09/15	Reusen	2	6,5	0,5	1	0,5	10	3	9	12
21/09/15	Reusen	2	7	0,5	1	0,5	10		8	8
23/09/15	Reusen	2	40	0,5	1	0,5	10	2	9	11
25/09/15	Reusen	2	40	0,5	1	0,5	10		5	5
30/09/15	Reusen	5	7	1	1	1	30	7	1	8
01/10/15	Hand			0		0			1	1
02/10/15	Reusen	5	40	1	1	1	30	10	5	15
21/10/15	Reusen	6	40	1	1	1	60	7	12	19
21/10/15	Reusen	6	3	0,5	2	1	60	10	17	27
21/10/15	Hand			2,5	3	7,5	200	105	55	160
21/10/15	Reusen	6	5	0,5	1	0,5	60	3	3	6
22/10/15	Reusen	6	24	0,5	1	0,5	60	2	0	2
23/10/15	Reusen	5	24	0,5	1	0,5	60	8	3	11
23/10/15	Reusen	5	8	0,5	1	0,5	60	4	6	10
26/10/15	Reusen	5	63	0,5	1	0,5	60	11	3	14
	Aktionen			Zeitaufwand pro Methode (St.)						
	Hand	Reusen		Hand	Reusen			< 9 cm	> 9 cm	Total
	5	358,5		26,5	9,75			354	666	**1020**
Total	866	154		**36,25**						
%	85	15	%	73	27	%				
			Hand:	33	Krebse/Stunde					
			Reuse:	16	Krebse/Stunde					

Meanwhile we have many data about this species from all over Luxembourg and it would be very useful to set up an national "Action plan for *Pascifastacus leniusculus"* in order to manage this species, mainly in sensitive habitats.

➢ Realised

Details of the capturing period 2015 and place and number of trapped muskrats as well as the request for capturing *P. leniusculus*. is given in Annex 5.

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
C5																				

planned

realized

➢ Complementary action outside LIFE

5.1.12 Action D1: Surveillance de la qualité de l'eau et du substrat interstitiel

The water quality is a key issue for the protection of the thick shelled river mussel and is monitored within this action.

➢ Progress/results

Once a week a sample from each river is taken and analyzed. The parameters temperature, pH value, conductivity, turbidity, oxygen concentration, ortho-phosphate, nitrite, ammonium, chloride and nitrate were determined.

- Water quality and turbidity

The online monitoring system on the river Our worked with minor problems.

The mobile online monitoring system in the Sûre catchment is working since August 2014 at the river Syrbaach. The probe was mounted stationary next to the new discharge measurement of the Administration of Water (October 2015) to prevent it from flood and vandalism. During the wintertime the maintenance of the probe is difficult because of often high water levels with high velocity. Therefore required calibrations are missing and some of the data cannot be used.

The water quality of the tributaries and their springs has been sampled three times in the last period.

635 samples of the rivers, streams and springs were measured in the period between February 2015 to February 2016 - 120 samples of river Our and Sûre, 115 samples of tributary mouths and 300 samples of springs. 100 samples were analysed from points where restoration measures took place, new or interesting points. Table 10 gives an overview of some water parameters from the river Our and Sûre, given as annual mean.

Table 10: Annual mean of several water parameters from the river Our and Sûre

Parameter	Our (Kalbermillen) Annual mean	Sûre/ Moulin de Bigonville Annual mean
Discharge [m³/s]	5,9 (Ouren)	4,1 (Bigonville)
Water temperature [°C]	10,3	10,4
Conductivity [µS/cm]	150	155
Turbidity [FNU]	5,6	7,9
Nitrate [mg/L]	13,0	13,4
nitrite [mg/L]	0,04	0,05
ammonium [mg/L]	0,05	0,08
chloride [mg/L]	17,4	19,7

The "Comité de Pilotage" was informed in December 2015 and February 2016 about the water quality of the sampled rivers and tributaries and about places where major pollution was observed (see action F1). The goal is to solve them in near future.

In July 2015 we collected eleven samples of the springs whose concentration of several metals and pesticides were determined by the laboratory of the Water Administration (see Annex 6). The degradation product of Metazachlor was found in all of our samples.

In the last year we planned measures (see A2) to reduce the income of fine sediment. The efficiency of these measures should be documented and therefore sediment boxes were placed at the area of 4 restoration points. One point (Syrbaach) was removed after losing several boxes because of the high speed of the water and vandalisms (see D4).

A turbidity logger was bought in June 2015 and placed in Schwärzerbaach. During the construction of the bridges the logger and the sediment boxes were removed. In January 2016 river water entered the logger and it has been sent for maintenance. The maintenance was carried out by at the firm's expense.

The online measurement station at the Moulin de Bigonville from the Water Administration was installed in December 2015. So far no data are available.

- Quality of interstitial

To have an overview over the quality of the interstitial, redox measurements are done (see more details under action D4).

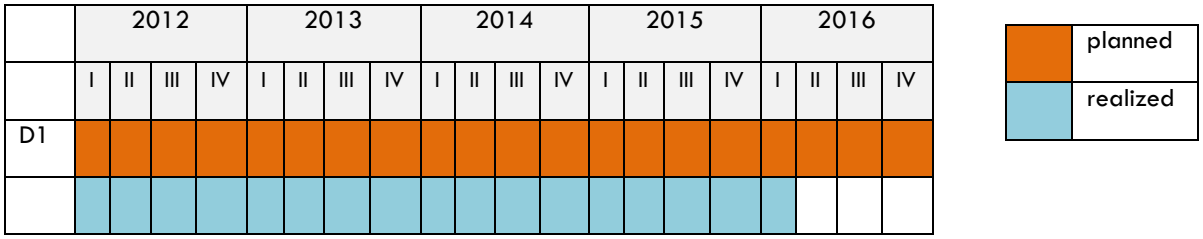
Annex 6 shows graphs of the measurements of the rivers, their tributaries and other data dealing with the water quality.

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.

Because of lower costs for the maintenance of the online measurement station we have a surplus in budget of +/- 50.000 euro (see point 3.2).



➢ Complementary action outside LIFE

5.1.13 Action D2: Monitoring des poissons hôte

This action should give an overview about the host fish population in both rivers (Our and Sûre) and their tributaries.

➢ Progress/results

A permission from the MIGR to perform electric fishing in the river Our and Sûre and the respective tributaries was issued on November 25, 2013 and is valid until 2015. The demand to obtain a new permission for the remaining runtime of the project was already sent out in January 2016 and a new permission was obtained in February 2016 (see Annex 7).

In 2015 electric fishing activities were again foreseen in the two main stream, Our and Sûre.

- 22.05.2015: Electric fishing took place at the river Sûre (Moulin de Bigonville, Wolsriech + Moulin d'Oeil, Esperbesch).
- 03 and 05. 06.2015: Electric fishing took place at the river Our (Grossenauel + Dornaulsmühle).

Figure 5 shows the results of the electric fishing at the site Sauer I/ Esperbesch (Moulin d'Oeil). The main host fish for *Unio crassus* (*Phoxinus phoxinus*) was present in high numbers which is a good sign for this river stretch. From the minnows caught, 10 were used to check the natural infestation rate on the gills. All fish were infested with a mean number of 25 glochidia per fish, which represents a high natural infestation level (see Table 11). Also at the other site analysed in the river Sauer all fish were infested with a mean number of 13,7 glochida per fish (see Table 11). Two stickleback investigated from the site Bigonville showed very high infestation rates. This fish species could therefore also be used as a host fish for the culture.

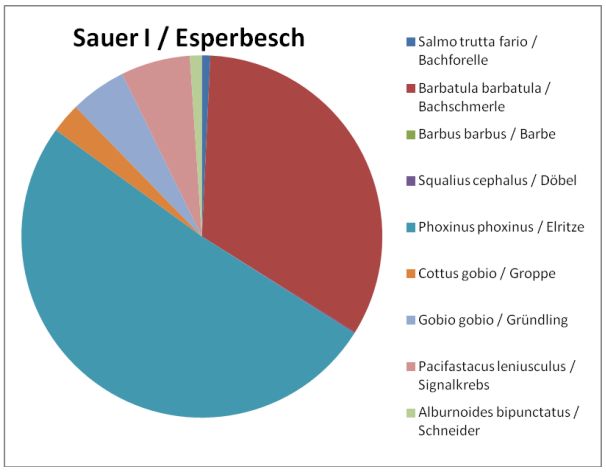


Figure 5: Fish composition in the river Sûre (site Esperbesch / Moulin d'Oeil) in 2015

Figure 6shows the results of the electric fishing at the site Our/ Grossenauel. The main host fish for *Unio crassus* (*Phoxinus phoxinus*) was the dominant fish species. From the minnows caught, 10 were used to check the natural infestation rate on the gills. However only one minnow was infested with one glochida at the site Grossenauel (see Table11). At the site Dornaulsmühle 50% of the Minnows were infested with a mean number of 7.4 glochidia per fish (Table 11). Overall the natural presence of infested fish at both sites is a good sign. The observation of much higher natural infestation levels at the river Sauer could also be due to the fact that the investigation at the river Sauer took place earlier and most minnows still carried the glochidia, whereas two weeks later at the river Our some mussels had already completed their transformation and were lost by the fish. At the rearing facility the mussels started to drop at the beginning of June but the peak was only reached by June 20 (see Figure 2 / section C4).

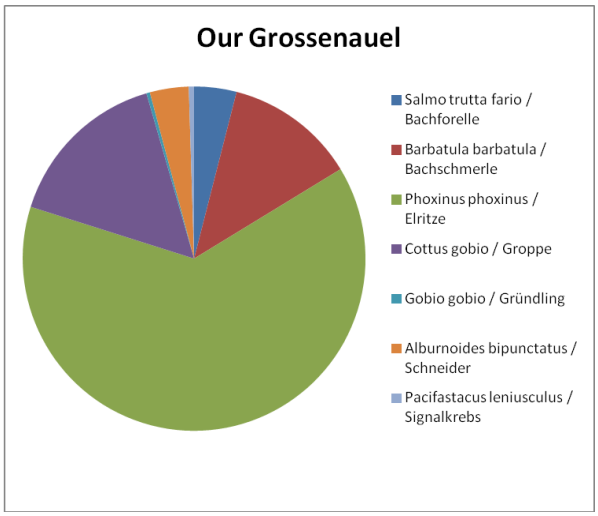


Figure 6: Fish composition in the river Our (site Grossenauel) in 2015

Table 11: Infestation parameters in the river Our and Sauer in the year 2015

		Mean abundance	**Mean Intensity**	**Prevalence [%]**
Our Grossenauel	***Phoxinus phoxinus n=10***	0.1	1	10
Our Dornaulsmühle	***Phoxinus phoxinus n=10***	3.7	7.4	50
Sûre Oeil	***Phoxinus phoxinus n=10***	25	25	100
Sûre Bigonville	***Phoxinus phoxinus n=10***	13,7	13,7	100
	***Gasterosteus aculeatus* n=2**	72	72	100

➢ Realised

As foreseen under this action:

In 2015: Electric fishing at the river Our and river Sûre at 2 sites in each case. Investigation of the natural infestation rate.

In 2015: Electric fishing at the river Our in April 2015 to obtain host fish (*Phoxinux phoxinus*) for the infestations with glochidia from *Unio crassus*.

➢ Problems encountered/delays

The date of the next electric fishing at the river Our (03 and 05.06) should the next time (2017) be earlier in order that the natural infestation has taken place but no transformation has occurred. However no precise date can be given as the infestation- and transformation are temperature driven and will change from year to year

No other problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
D2																				

planned
realized

➢ Complementary action outside LIFE

5.1.14 Action D3: Suivi de *Unio crassus* dans son milieu naturel

The status of the *Unio crassus* populations in both rivers (Our and Sûre) was last investigated in 2003. To gain new information about the population size, age structure and habitat use, the intent of this action is to monitor the mussel population in both rivers.

➢ Progress/results

- Estimation of *Unio crassus* population size and density:

At the river Our 69 % of the survey has been done (20,7 km for a total length of 30 km).

Size: 3.719 mussels alive and 1.442 shells have been counted.

Mean density: 0,03 ind/m^2.

The monitored section nearly matches the one prospected in earlier periods. In the year 2003 393 mussels were counted (9.030 estimated) and in the year 1990 883 were counted (5.654 estimated).

At the river Sûre 50 % of the survey has been done (9 km for a total length of 18 km).

Size: 1.290 mussels alive and 1.329 shells have been counted.

Mean density: 0,03 ind/m^2.

The monitored section nearly matches the one prospected in earlier periods. In the year 2003 10.442 mussles were counted (31.139 estimated).

While the visual method by bathyscope allows a high rate of exploration, a quick cover of a large area and delivers qualitative data, it cannot give certain quantitative results as fully burried individuals are not visible. The difference between the abundance visually observed and that obtained from sediment excavation can vary from 1 to 10 (Lamand F., Beissel J.-N 2014: Comparaison of visual observation and excavation to quantify density of endangered freshwater mussel *Unio crassus* in rivers in north-eastern France. Knowledge and Management of Aquatic Ecosystems (2014) 413, 11.

- Estimation of *Unio crassus* survival rate:

Mussels were marked at 3 banks, see Table 12, 13 and 14.

Table 12: river Our, near the mill channel of the Kalbermill,

recovery: 24 of 114	marked	mussels	alive	empty
number	114	24	16	8
survival rate (%)			**66,67**	

Table 13: river Our, underneath the camping Kohnenhaff

recovery: 22 of 108	marked	mussels	alive	empty
number	108	22	18	4
survival rate (%)			**81,82**	

Table 14: river Sûre, underneath moulin de Bigonville

recovery: 41 of 75	marked	mussels	alive	empty
number	75	41	34	7
survival rate (%)			**82,93**	

About 20% of the marked mussels were relocated, whereas the survival rates ranged between 66 % and 82 %. Even if one year is not enough to make definitive prognostics we can pretend that the survival rates are too low to preserve the species. Nitrate has a key function in the evaluation of the nutriments in the aquatic ecosystem. *Unio crassus* prefers rivers with levels below 10mg/l NO_3. Under D1 we can see that the measured values are higher and therefore unfavorable for the mussels.

Sediment analysis:

Results were detailed in the midterm report. We do not intend to determine every year the fractions of the sediment. The next analyses are foreseen for 2016.

- Fertility control:

22.04.2015 Transfer of 63 animals for breeding from river Our above the Camping du barrage de Stolzembourg to the rearing station.

24.04.2015 Transfer of 36 animals for breeding from river Sûre above moulin de Bigonville to the rearing station.

After the release of their glochidia the mussels were placed back to the same sites in the rivers (15.07 on the Sûre and 18.07 Our).

- Mussel release

A first trial has been done with mussels set in gravel boxes in the mill rearing channel from May on in 2015.

We intend to release the first mussels into the river Our and Sûre this year.

Progress Report II

River Our. Release of 10 individuals per site on the banks near to the Kalbermill and below the site Kohnenhaff in May 2016. Their fitness will be checked in September.

River Sûre. Release of 10 individuals on the banks below the mill of Bigonville in May 2016. Their fitness will be checked in September 2016.

➢ Realised

Table 15: Summery of the mussel survey at the river Our and Sûre

	Our (30 km)	**Sûre (18 km)**
Prospected (km)	20,7	9
mussels alive	3.719	1290
empty shells	1290	1329

- Monitoring site Our
- Monitoring site Sûre

➢ Problems encountered/delays

No other problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
D3																				

planned
realized

➢ Complementary action outside LIFE

5.1.15 Action D4: Monitoring et évaluation de l'impact des mesures concrètes

The aim of this action is to develop and apply a pre- post-monitoring protocol in order to evaluate the effectiveness of the used restoration methods.

➢ Progress/results

The initial status quo of water quality and population of *Unio crassus* will be used as reference for the evaluation of prospective measures.

The success of the restoration measures is evaluated by the monitoring of concrete parameters (water quality, turbidity, quality of substrate and the host fish population).

On selected places, where we will do or have done measures, (as seen in Table 16 below) an intensive monitoring is done. That means that on these sites a water sample is taken once per week, sediment traps are installed, interstitial quality will be measured and the host fish population is monitored.

The monitoring of the water quality of the rivers Our, Sûre and their tributaries is in operation. (see action D1).

The evaluation of the water quality at the places where we have done measures isn't easy. The water quality is strongly influenced by the rain. Therefore for the moment no positive changes except for the turbidity are observed. The same result is observed by evaluating the content of sediment traps. We hope that the water quality will improve in future as it is the case for the following examples: CATER Basse Normandie, 2010. Evaluation des impacts du piétinement du bétail sur les cours d'eau Bas-Normands http: //www.caterbn.fr, ROSILLON et al., 2005. Impact de l'abreuvement du bétail sur la qualité écologique des cours d'eau: étude de cas en Région wallonne de Belgique. Cahiers de l'ASEES 10: 59-70

The river beds downstream of the gravel input were monitored. Therefore we measured the redox potential in the free flowing water, in the interstitial at 5cm depth and if possible in the interstitial at 10 cm depth. The average ratio between the free water and 5 cm depth was in the river Our about 52% and in the river Sûre about 47%. This means, that it comes to a loss of oxygen of about 50% in 5 cm depth. At least in pearl mussel river, where the use the redox potential, is well established the loss in 5 cm depth should not exceed 25%. However recent studies in *Unio crassus* rivers (Denic et al. 2013, Physiochemical assessment of *Unio crassus* habitat quality in a small upland stream and implications for conservation HYDROBIOLOGIA 735(1) revealed no significant difference in the loss of the redox potential at 5 and 10 cm depth between colonized and non colonized stretches. More detailed results about the redox measurements can be seen in Annex 8.

The composition of the host fish population was already monitored at all relevant sites (see D2).

The monitoring of the *Unio crassus* population in its natural environment started in spring 2013 (see D3).

The mussel breeding started in spring 2013 (see C4).

In 2014 first *Unio crassus* were released in gravel cages in the rearing channel at the mill of Kalborn (see also action C4). As foreseen under this action we checked the survival and growth of the released mussels. Figure 7 shows the results obtained from the 9 cages checked on July 17, 2015. Overall 76% of the mussels had survived, which is a positive development. No growth rate is given for box 2 as the initial length was not measured. The negative growth rate in box 4 is only due to the loss of a few larger mussels. Among the 9 boxes an average growth of 33% was obtained which we also judge as good.

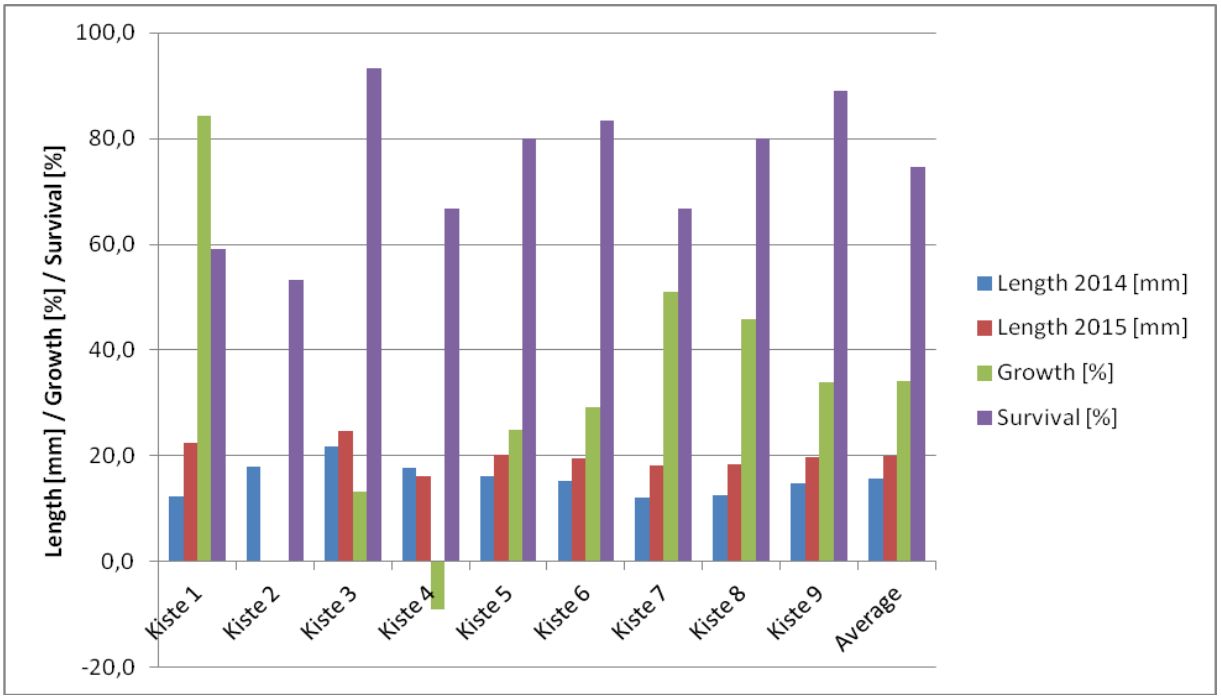


Figure 7: Survival and growth of the mussels released in gravel cages

➢ Realised

A good overview about water quality (D1), host fish population (D2) and *Unio crassus* population (D3) is achieved. For water quality see for instance Annex 6 and Annex 8.

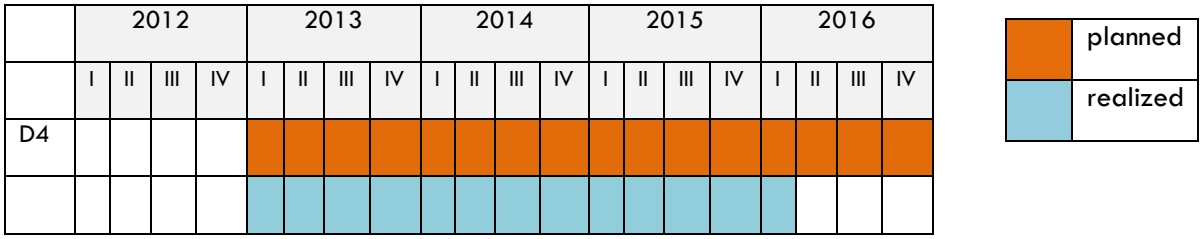
Table 16: Monitoring a restoration sites

River/ Tributary	Measures	Water quality	Sediment traps	Interstitial quality	Host fish population
Sûre - Schwärzerbaach	Remove tube and build a bridge (2 times done, 1 planned, see C2)	yes	yes	planned	yes
Sûre - Syrebaach	Restore of a ford (done)	yes	yes	planned	yes
Our - Roupelsbaach	Fencing spring and stream (done)	yes	yes	planned	planned
Our - Folkesbur	Fencing spring and stream (done)	yes	yes	planned	planned
Our - Huschterbaach	Remove tube and build a bridge (planned)	yes	yes	planned	yes
Our	Gravel (done)	yes	no	yes	yes
Sûre	Gravel (done)	yes	no	yes	yes

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.



➢ Complementary action outside LIFE

5.1.16 Action D5: Analyse de l'impact socio-économique du projet et de l'effet sur les écosystèmes

The objective is to assess the impact of the Life Nature project on the welfare of the region and its populations.

➢ Progress/results

February 2015 first contact with a scientist of L.I.S.T (Luxemburgish Institute of Technology) to get a meeting.

➢ Realised

No deliverables are foreseen for the moment.

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
D5																				

planned
realized

5.1.17 Action E1: Information et sensibilisation des acteurs concernés

The reduction of the input of fine sediments in the aquatic ecosystem is of great importance in the present Life project. This action intends to inform all actors responsible for water quality in the river catchment and tries to motivate them to help to enhance the water quality.

➢ Progress/results

We try to keep a good contact and to have regular exchange with the different authorities and with the farmers of the project area.

In the report period 40 meetings with stakeholders (Local community, Water Administration, Administration responsible for the road constructions, Ministry of the environment, Nature parks, Nature and Forest Administration, Chamber of agriculture...) concerning the topics water quality, restoration measures, Natura 2000, agriculture etc. took place (see Annex 9) Several e-mails were sent to different stakeholders to point out some major problems seen in the catchments (major problems were presented at the 4th comité de pilotage see action F1).

A meeting on developing a common strategy for the preservation of both mussel species *U.c.* and *M.m.* with the German neighbours will take place on March 23th 2016 in Willwerath (D).

The two most important meetings, as many stakeholders attended them, were surely the 2nd and 3rd information events for farmers:

- 04.03.2015: 2nd Seminar for farmers "Use of pesticides. How can negative effects be reduced", about 40 participants. (Program and invitation see Annex 9).
- 23.09.2015: 3rd Seminar and workshop for farmers "Soigner la terre pour nourrir les hommes". practical field demonstration on arable land close to Kalborn (25 participants) and seminar in the evening in Luxembourg City (50 participants) (see Annex 9).

For the small catchment of the Feierbech we were regularly in contact with farmers, a next meeting to discuss the results from 2015 will take place on 15th of March 2016. (see action C1).

The information leaflet for the farmers will be produced, after the last information event for the farmers, since the content of the leaflet will focus on the information given during these information events.

➢ Realised

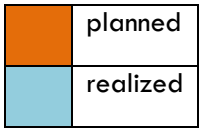
- We had about 40 meetings and contacts with authorities and other actors in 2015 (see Annex 9).
- Second Management Plan (2015-2021) considering the EU Waterframework Directive: statement
- In the report period, the following information activities for the stakeholder took place as planned:
- 04.03.2015: 2nd Seminar for farmers
- 23.09.2015: 3rd Seminar and workshop for farmers

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule. Contact with different stakeholders is constantly and is not only restricted to the periods highlighted in orange in the table below.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
E1																				



➢ Complementary action outside LIFE

A written statement to the Second Management Plan (2015-2021) considering the EU Water framework Directive was send to the Ministry of Sustainable Development and Infrastructure Department Environment in August 2015. Major problems in relation to water quality and hydromorphology on the Sûre and Our catchments were explained and proposals were given (see Annex 9). We got a thank-you letter but without a precise tangible feedback for our advice to the water management plan. (Annex 10).

5.1.18 Action E2: Sensibilisation du grand-public

This action tries to inform people about the sense of the Natura 2000 network and the overall intent of the project by the following means:

1. Information of the population: 1 session/river at the beginning and end of the project.
2. Press release: 100-150 articles
3. Project Flyer: 1
4. Notice board: 2
5. Film: 1
6. Exhibition: 1
7. Natura 2000 visiting room: 1

➢ Progress/results

1. Information of the population:

   Groups of people visiting the mill are informed all over the year and in 2015 about 624 people of all ages visited the rearing facility at the mill of Kalborn (see Annex 11, Table 17 and figure 10).

   Furthermore we participated at five information events in 2015:

   - 14.03.2015: natur &ëmwelt Kongress (talk about the project, 50 people)
   - 22.03.2015: interactive information event at the Wasserfest from the Naturpark Uewersauer (250 people)
   - 31.05.2015: interactive information event at the Lernfest in Wintger organised by Leader (75 people)
   - 30.06.2015: presentation of our project during the Continental, Pannonian, Black Sea & Steppic Kick-off Seminar in Luxembourg City organized by the Luxembourg Government, department of the environment (50 people, see figure 12).
   - 02.08.2015: interactive information event at the Naturparkfest from the Naturpark Our (250 people, see figure 11)

2. Press release: 11 articles in 2015 (Annex 11).

   - Appearance of our interactive information event on TV, RTL Luxembourg 22.05.2015.
   - Radio interview at the radio program "Greng Minutten" 16.12.2015.

3. Project Flyer
   - The Flyer is finished and available in 3 languages (German, French and English). Nothing new was done here in 2015.

4. Notice board
   - Work will start in 2016 as planned in the midterm report. Pictures and material which can be added on the notice boards are already collected.

5. Film
    - Some first images were taken in 2015 (aerial view of the mill of Kalborn, river Our, rearing channel, see figures 8 and 9). More material will be recorded throughout the year 2016.

6. Exhibition:
    - The exhibition was presented at only one event in 2015 (Knowledge market) and is meanwhile installed permanently at the mill. As more and more people visit the mill this is the best location to attend most interest.

7. Natura 2000 visting room:
    - A first meeting with a graphic design company to plan the appearance of the nature 2000 room (Atelier Kurth) took place on January 16. Offers to equip the room with didactic material (binoculars, projector, screen) were already obtained and some material was ordered (small didactic material like forceps).

➢ Realised

Flyer, 5 exhibition boards, different press articles in printed and online media.

About 2795 people were informed during different visits and other events during the last years (Table 17).

In 2015 a new record with 1299 people was obtained. (see Annex 11).

Table 17: Number of people directly informed about the LIFE project in the last years

	2012	2013	2014	2015	Total
Visitors at the mill	46	261	589	624	
People informed during other events	300	200	100	675	
Total	346	461	689	1299	**2795**

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
E2																				

planned
realized

Figure 8: Picture of rearing channel

Figure 9: Picture of river Our with valley

Figure 10: Children searching for life in the river Our during a visit of the rearing facility.

Figure 11: Information desk at the "Naturparkfest Our 2015"

Figure 12: Our information stand at the knowledge market.

➢ Complementary action outside LIFE

- 09.05.2015: Inauguration of the new building of the Kalbermill in presence of the States' Secretary of the Ministry of the Environment, the Major of Clervaux and local guests (about 80 persons). At this opportunity the missions of the rearing station, the Natura 2000 room and the Life project were explained. The transformation of the building was realised for a global budget of 825.000 €, financed by the Foundation "Oeuvre Nationale de Secours Grande-Duchess Charlotte" with an amount of 750.000 €.
- The Canadian Bank HSBC accepted in September 2015 to sponsor the Kalber mill within their "Water programme" with an amount of about 50.000 Euro. The goal is the education of children and young people. With the budget the room under the roof will be equipped with didactic material, a flyer will be designed and send to schools.
- We tried to gain SEO Société électrique de l'Our for a Cooperation Project with the Kalbermill. Its known that the dam built in the 1950 on the river Our near Vianden prohibits the migration of fish and SEO must regularly empty the artificial lakes because of huge amounts of sediments. After a meeting in 2014 and several discussions we got a letter in June 2015 informing us that no financing is possible (Annex 12). On 28th of January 2016 the LIFE Unio team asked in an informal encounter the Minister of Sustainable Development and Infrastructure Department Environment to support the idea and to convince the Minster of Economy of such a "win win" project for the river Our.

5.1.19 Action E3: Création d'un site Web

Creation of a website. The project homepage will give the opportunity to inform all interested persons about the progress of project. Furthermore technical documents, provided as download, should help other projects working in a similar field.

- **Progress/results**

Since June 2013 the website is fully accessible in all three languages (English, French and German).

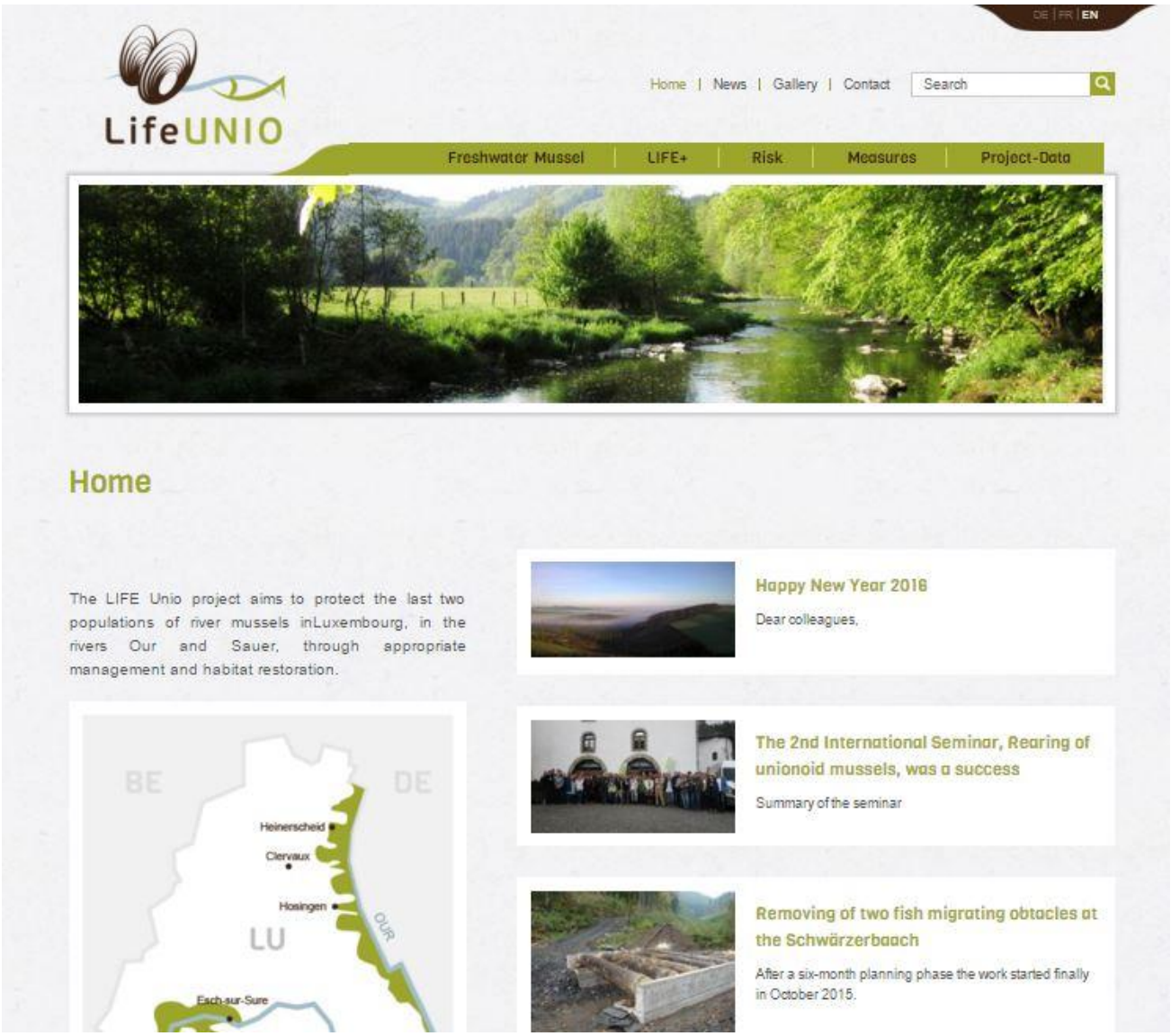
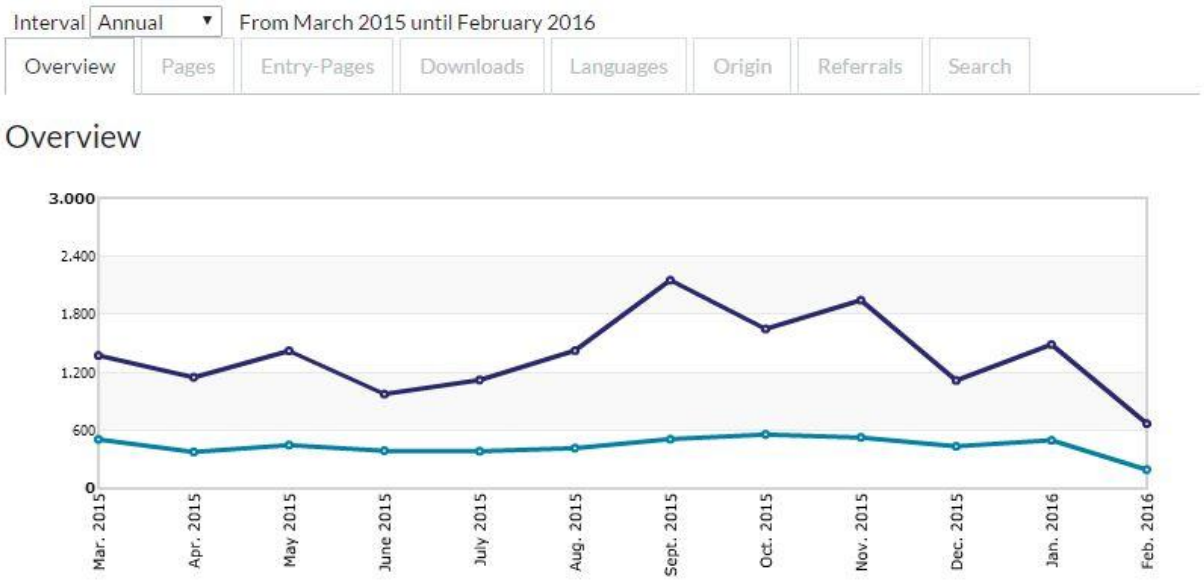


Figure 13: Screenshot of the entrance page

To keep the site attractive we try to add news at least once per month. In 2015 more visits occurred during the months September, October and November. This was mainly due to the seminar information given on the website. Meanwhile we have about 434 visitors per month. Last year it was 329/month. So we have meanwhile >100 visitors more per month compared to last year. For some more web statistics see also Figure 14 .



General overview of the website frequentation total and average values

INFORMATION	TOTALS	Ø AVERAGE
Hits	**25.421** Hits	**2.118** Hits / Month
Visits	**16.449** Visits	**1.370** Visits / Month
Visitors	**5.213** Visitors	**434** Visitors / Month

Details of website frequentation grouped by date

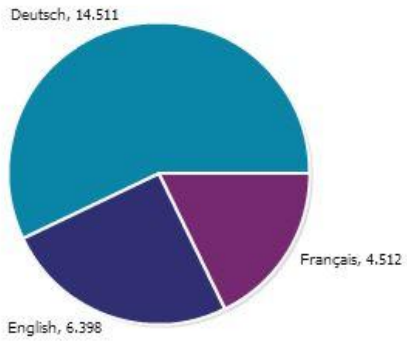
DATE	VISITS	VISITORS	HITS	TRENDS
February 2016	666	191	969	
January 2016	1.485	494	2.058	
December 2015	1.113	432	1.801	
November 2015	1.943	525	2.618	
October 2015	1.645	556	2.646	
September 2015	2.149	506	2.792	
August 2015	1.421	414	2.107	
July 2015	1.118	382	1.730	
June 2015	972	388	1.946	
May 2015	1.420	446	2.130	
April 2015	1.146	374	1.838	
March 2015	1.371	505	2.786	

Interval Annual From March 2015 until February 2016

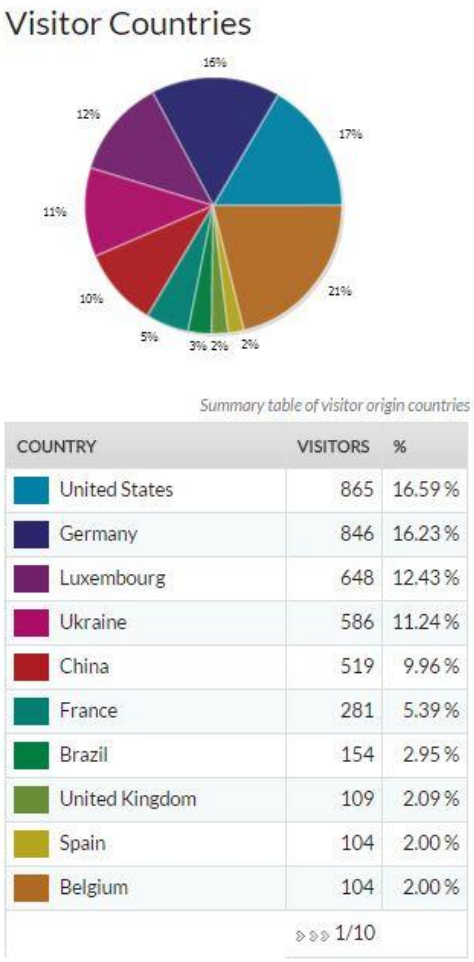
Overview | Pages | Entry-Pages | Downloads | Languages | Origin | Referrals | Search

Languages

List of languages in which your website was visited



LANGUAGE	HITS	%
Deutsch	14.511	57.08 %
English	6.398	25.17 %
Français	4.512	17.75 %



Summary table of visitor origin countries

COUNTRY	VISITORS	%
United States	865	16.59 %
Germany	846	16.23 %
Luxembourg	648	12.43 %
Ukraine	586	11.24 %
China	519	9.96 %
France	281	5.39 %
Brazil	154	2.95 %
United Kingdom	109	2.09 %
Spain	104	2.00 %
Belgium	104	2.00 %
	⋙ 1/10	

Figure 14: Web statistics

The most used language on the website is German at the moment, followed by English and French. The number of visitors and visits is increasing since June 2013. The mentioning of the website "www.unio.lu" at every event and in every publication will help to increase the number of visits.

➢ Realised

Website in three languages realised and news or documents added +/- 12 times a year.

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
E3																				

planned

realized

➢ Complementary action outside LIFE

5.1.20 Action E4: Organisation de séminaires

To promote the scientific exchange with other Life projects or other scientists working in the same field, two scientific seminars are planned within the project.

➢ Progress/results

The first seminar about the rearing of unionoid mussels was organized in the last week of November 2015.

Some seminar facts:

81 participants from 20 countries

26 oral presentations

22 poster presentations

visit of the rearing station at the mill of Kalborn

Summary of the seminar

During the last week of November 2015 the second international seminar about rearing of unionoid mussels took place at the "centre culturel" in the castle of Clervaux.

After the welcome reception on Tuesday evening, with greeting words from the Mayor of Clervaux Emil Eicher, the scientific program started on Wednesday morning. The vice president from natur & ëmwelt / Fondation Hëllef fir d'Natur Claude Meisch gave a short introduction to the international audience about the area and the work of natur & ëmwelt.

The first session started with an introduction talk from Prof. Dr. Jürgen Geist from the Technical University of Munich about the necessity of supportive breeding. Talks about the first steps of freshwater mussel development on the gills of their host fish followed. After lunch the second sessions chaired by Dr. David Zanatta from the Central Michigan University highlighted some genetic aspects which can be considered for captive breeding followed directly by a few talks dealing with more technical aspects of freshwater mussel culture and some experiences made with different techniques used. After the last talk the poster presentation followed up and closed the first day.

The second day started with an overview of the long history of mussel propagation in the USA given by Prof. Dr. Chris Barnhart from Missouri State University and led over to the presentations of some long term experiences in rearing the freshwater pearl mussel *Margaritifera margaritifera*. Furthermore rearing projects from France, Germany and Virginia were presented. During session IV in the afternoon chaired by Dr. Evelyn Moorkens from the republic of Ireland mussel projects from UK and Sweden were given. The presentation of a movie about the thick shelled river mussel project "ucforLife" in Sweden closed the scientific program. The rest of the evening was reserved for the social program including the visit of the UNESCO Memory of the World Photo Exhibition: The Family of Man by Edward Steichen and the official seminar dinner.

On the last day Dr. Karel Douda from Czech University of Sciences in Prague chaired the last sessions with interesting talks about the habitat requirements of *Unio crassus* in Bavaria and two talks about freshwater mussel projects in Portugal and Spain.

Before the audience left by bus to the visit of the rearing facility at the mill of Kalborn, the LIFE Unio team gave a short presentation about the work done at the mill of Kalborn. Having arrived at the mill, lunch was served and the scientist could walk around and became explanations about the different rearing systems used at the mill of Kalborn. With the return of the Bus to Clervaux in the late afternoon the seminar ended.

Figure 15: Mayor Emil Eicher gives a welcome and seminar audience during the meeting

Figure 16: Participants of the second international seminar about rearing of unionoid mussels

➢ Realised

The 1st seminar took place as planned in the midterm report.

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is changed as discussed in the midterm report.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
E4																				

	planned
	Realized
	New plan

Progress Report II

5.1.21 Action F1: Gestion et encadrement du projet

➢ Progress/results

Project management staff:

The definitive composition of the project staff is the following:

Coordinator 60%: Alexandra Arendt biologist

Scientific 1 50%: Frankie Thielen Dr.rer.nat.

Scientific 2 50%: Sonja Heumann Dr. tech.

Technician 100%: Karin Michels environmental technician

Secretary/accountancy 40%: (LIFE 11 NAT/LU/857) 20%: (LIFE 11 NAT/LU/858) 20%: (LIFE 13 NAT/LU/ 782): Patricia Heinen secretary

Piloting committee

Our fourth meeting of the piloting committee took place on 09.12.2015. The goal of the meeting was to show to the partners remaining problems within the project sites to be solved with their help.

Grant agreement

The grant agreement of the MIGR has been signed on 11 march 2013

➢ Realised

- Report from the 4th piloting committee (see Annex 13).

➢ Problems encountered/delays

No other problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
F1																				

planned

realized

5.1.22 Action F2: Echange du savoir avec d'autres projets: LIFE et autres

The intent of this action is the regular exchange with all other project (Life, but also others) working in the field of freshwater mussel conservation. This achieved by attending scientific meetings and regular email exchange with other experts.

➢ Progress/results

During the report period we attended the following scientific seminars and visited other river restoration projects in Belgium. The organizing of our seminar brought new exchange and contact with other project. The process of organizing the seminar took a lot of time so less time was spent in 2015 to visit other projects.

- **28.04.2015**: Presentation of the results obtained during the practical course in the river Our catchment (Feierbech) of the students from the University of Trier (Institut für Physische Geographie).
- **30.06.2015**: presentation of our project with an information stand during the Continental, Pannonian, Black Sea & Steppic Kick-off Seminar in Luxembourg City organized by the Luxembourg Government, department of the environment.
- **5.-10.07.2015:** The 9thSymposium for European Freshwater Sciences, Geneva, Switzerland / Oral presentation by Sonja Heumann: Need of physiochemical monitoring in mussels habitat restoration.
- **08.07.2015:** Visit of a river restoration project: "Visite de la renaturation du cours d'eau de l'Aire à Genève".
- **13.07.2015:** Visit of a river restoration project close to London (UK) (Friends of the river Crane Environment) with Mr. Paul Leonard.
- **18.07.2015:** Participation at the: Geo Tag der Artenvielfalt 2015/ Biodiversitäts-Tag 2015. Event in the village Roth at the Our http://www.environnement.public.lu/actualites/2015/05/12_biodiversitaetstag_2015/flyer_biodiversitaetstag_2015.pdf
- **23. - 24.11.2015:** Organisation of the CEN Workshops in Clervaux/ Luxembourg. 10 participants from 9 countries.
- **24. - 27.11.2015:** Organisation of the: 2nd International seminar on the rearing of unionoid mussels in Clervaux/ Luxembourg. 81 participants from 20 countries (see action E4).
- **15.02.2016**: Visit of river

We also participated in the preparation of an important scientific publication involving scientist from 26 European countries on the status quo of freshwater mussels in Europe. The paper was recently published in

biological reviews: *Conservation status of freshwater mussels in Europe: State of the art and future challenges. Article in Biological Reviews · January 2016 /© 2016 Cambridge Philosophical Society / Impact Factor: 9.67 · DOI: 10.1111/brv.12244*
No extra costs for the LIFE Unio project were related to the publishing of this scientific paper.

We still plan to visit the other LIFE project dealing with *Unio crassus* in Sweden. Our preliminary plan is to visit the project in July 2016.

Regular email exchange and other contacts were also in 2015 ongoing with the following projects and experts:

- UC for Life Sweden (http://www.ucforlife.se/en/).
- LIFE+ Project Margal-Ulla Galicia Spain (http://margalulla.xunta.es/en).
- LIFE+ France « Rivières vivantes de Bretagne et de Normandie : Mobilisation pour le retour de la moule perlière d'eau douce » (http://www.life-moule-perliere.org/accueilmoule.php).
- Austrien Freshwater Pearl Mussel Project (http://www.flussperlmuschel.at)
- Rachel Mair White Sulphor Springs National Fish hatchery (http://www.fws.gov/northeast/wssnfh/).
- Prof. Dr. Chris Barnhart, Missouri State University (http://courses.missouristate.edu/ChrisBarnhart/home/Default.htm).
- Megan Bradley Aquatic Wildlife Conservation Center, Marion, Virginia, see also action A4 (http://www.dgif.virginia.gov/awcc/)
- Jürgen Geist group TU München (http://fisch.wzw.tum.de).
- Heidi Sehlheim, Charlotte Bontinck and Grégory Motte, Projekt Habitat Euregio + Biologische Station Aachen, Parc naturel hautes fagnes (http://www.euregio-mr.com/de/service/archiv/2010/das-projekt-201ehabitat-euregio201c).
- Arno Schwarzer ECOLOGIS(http://www.ecolo-gis.de)
- Dr. Manuel Seeger, Institut für Physische Geographie, University Trier, Germany (http://www.uni-trier.de/index.php?id=18521)

➢ Realised

See above

➢ Problems encountered/delays

No problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
F2																				

planned

realized

Complementary action outside LIFE

5.1.23 Action F3: Plan de conservation After-LIFE

Action to install a afterlife program

➢ Progress/results

For both project sites the Natura 2000 areas' priorities and measures are defined very precisely in the management plans worked out under A5 where the Life Unio team contributed (see annex under A5/ 7.2.1 Aue &Wasser: Operative Maßnahmen 2016-2026). Clear objectives and figures are given for each section of the rivers and for the tributaries as well, so that this information deliver a good base for the future After-Life conservation plan.

➢ Realised

No deliverables are foreseen for the moment.

➢ Problems encountered/delays

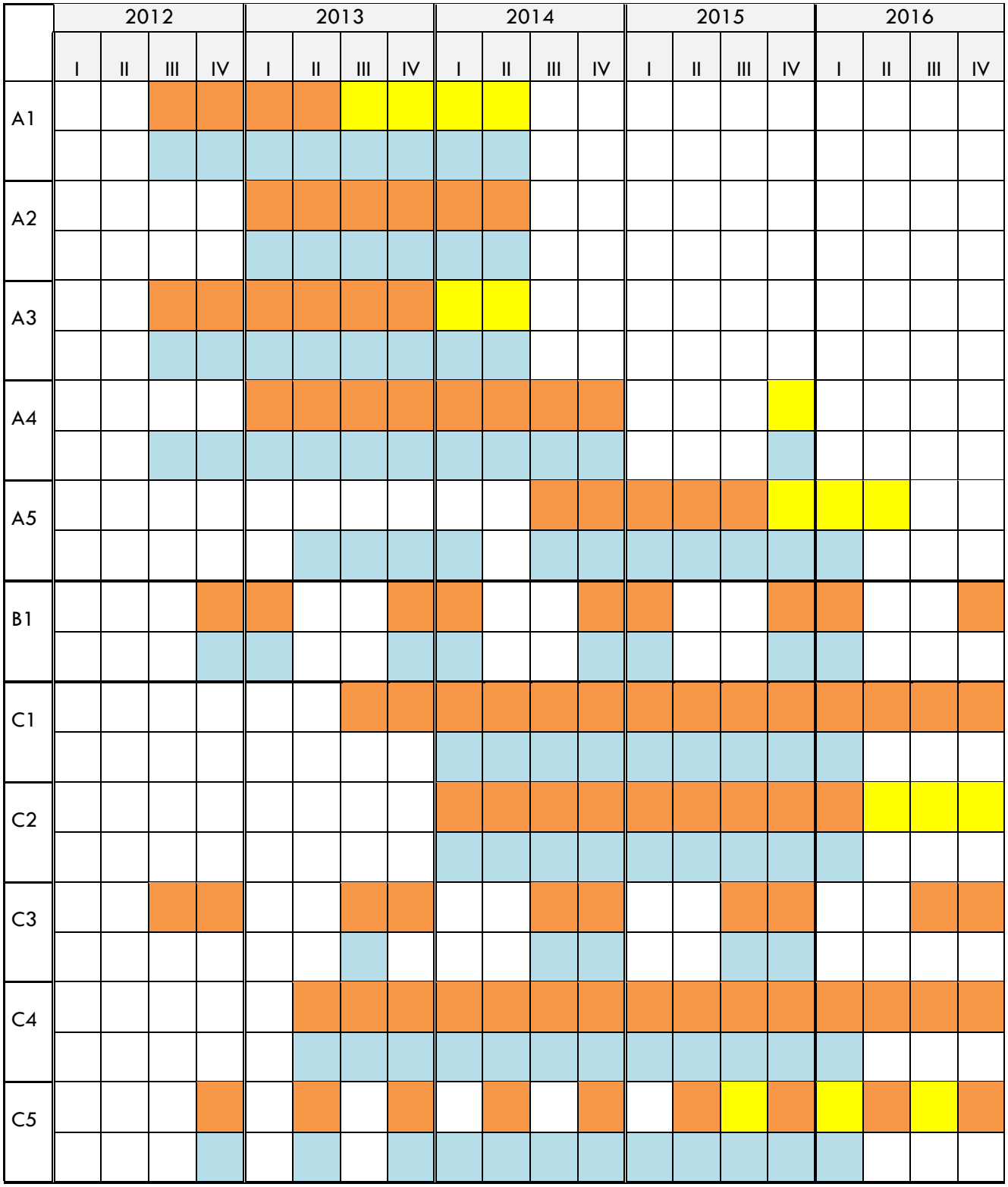
No problems encountered so far.

The time plan for this action is on schedule.

	2012				2013				2014				2015				2016			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
F3																				

	planned
	realized

5.2 Overall Timetable



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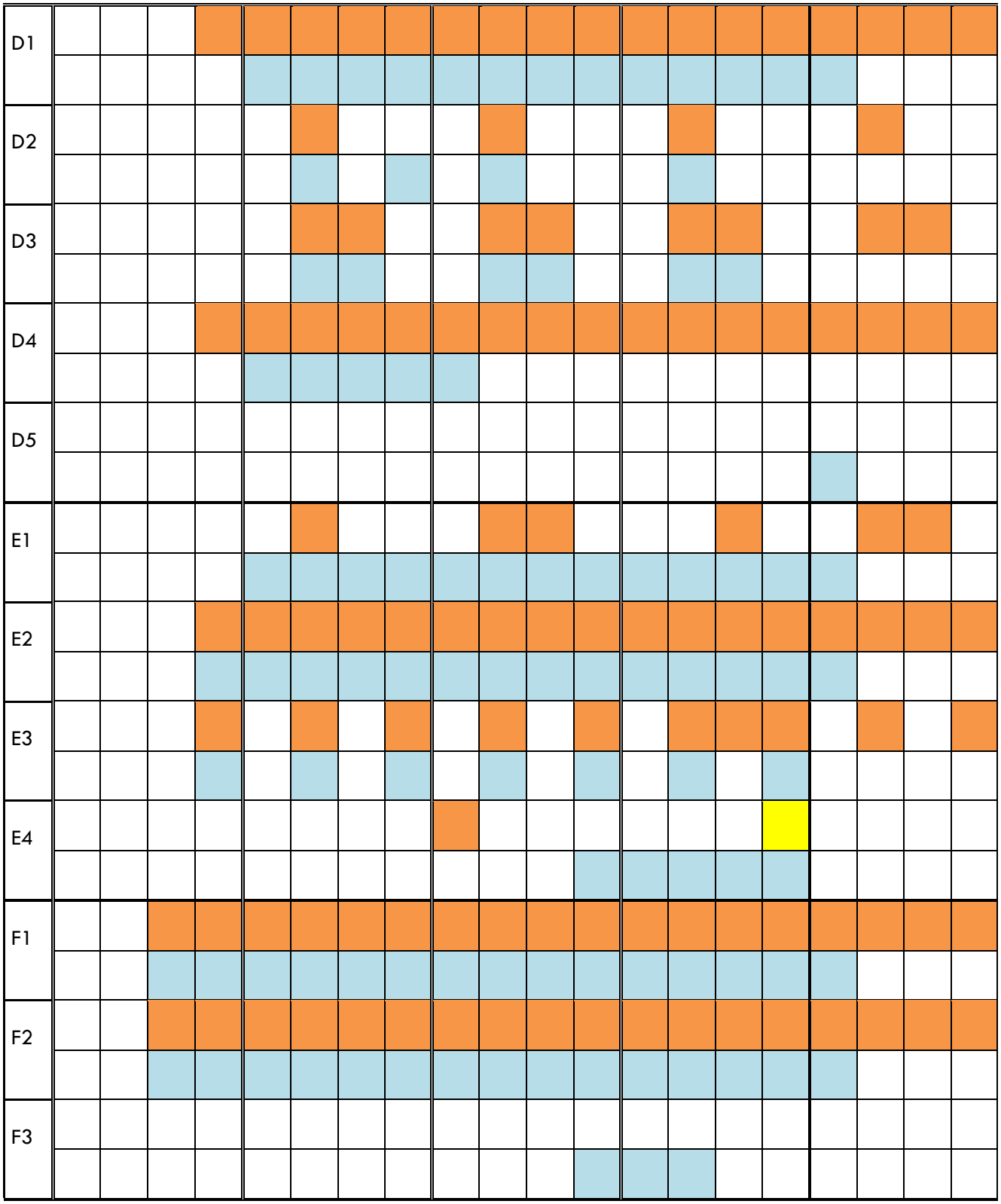
D1
D2
D3
D4
D5
E1
E2
E3
E4
F1
F2
F3

	planned
	realized
	intent

5.3 Impact

Nature & Biodiversity: Indicate as appropriate for each site of the project and overall, the impact of your project so far on the species/habitats targeted, and on the other/species/habitats present on the site(s).

In the river Our and Sûre valley the fencing activities (1,5 km) showed a reduction of the turbidity in the respective streams (Roupelsbaach and Schärzerbaach, Annex 8). Although these are only preliminary results, this is a positive development as it shows that the amount of fine sediments being spilt into the main streams, holding the mussel population, is reduced.

In both rivers the dumping of gravel helped to create new gravel banks in the main streams. Although redox measurements showed that these newly created gravel banks tend to clog again, they can still be used by the most important host fish *Phoxinus phoxinus* as spawning ground. Approximately 400 m^2 of gravel banks were created in the river Our and 420 m^2 of gravel banks were created in the river Sûre.

The removal of two migrating obstacles in the Schwärzerbaach helped to reconnect 2 km of this tributary with the main stream Sûre.

The rearing activity produced so far around 1200 mussels from the river Our and 1500 from the river Sûre. If these mussels are released, the "observed" Our population will be augmented by 30% and the "observed" population in the river Sûre by 50%.

Indirect impacts: Indicate any indirect impacts of the project (e.g. local authorities near the project may have been inspired by the project to invest time/money or adopt the project's approach to the conservation/environmental issue in question)

The good contact with the local municipality from Clervaux and their knowledge about our LIFE Unio project helped to develop a plan to remove and transform the pipe construction under the road entering the camping site at Tintesmillen. This action will reconnect the small stream Feierbech again with the river Our and the cost connected to this project are covered outside the LIFE project.

At the beginning of the project we presented our project in both catchments, Our and Sûre. The forest ranger from the municipality of Rambrouch (Sûre catchment) was highly interested in the project and helped to install 10 water evacuation grids during the renewal of the forest road beside the Schwärzerbaach. This action was financed outside LIFE.

In our "Pilotproject Feierbech" we are in close contact with some of the local farmers due to the regular meetings and exchange about the results of the soil and water samples. The farmers get to a greater extent interested in the target species, the thick shelled river mussel (*Unio crassus*) as they ask more and more questions about the well doing of the mussels. We think that this is a good development as people only tend to protect what they know.

The trapping of the signal crayfish motivated some other people in the river Our area to catch this species which might help to reduce the numbers of this invasive species.

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Other indirect impacts are the financial support by the Foundation " Oeuvre Nationale de Secours Grande-Duchess Charlotte " and the bank HSBC as already described under the point complementary action outside LIFE in action E2 and below (see 5.4).

5.4 Outside LIFE

Summarise the different actions taking place outside the framework LIFE project (i.e. not financed by LIFE) but that are complementary to the project and add to its impact (if applicable).

- A written statement to the Second Management Plan (2015-2021) considering the EU Waterframework Directive was send to the Ministry of Sustainable Development and Infrastructure Department Environment in August 2015. Major problems in relation to water quality and hydromorphology on the Sûre and Our catchments were explained and proposals were given (see Annex9 and action E1).

- The transformation of the house at the Kalbermill building was realised for a global budget of 825.000 €, financed by the Foundation "Oeuvre Nationale de Secours Grande-Duchess Charlotte" with an amount of 750.000 €. Destination: welcome and sensitisation of school classes (see E2).

- Sponsoring of 50.000 € by the Canadian Bank HSBC within their "Water programme" equipment with didactic material of room within the transformed part of the Kalbermill (see E2).

- Meetings with SEO Société électrique de l'Our for a Cooperation Project with the Kalbermill.

6 FINANCIAL PART

6.1 Costs incurred

SUMMARY OF COSTS INCURRED

Project Costs Incurred (22/02/2016)

Cost Category	Budget according to the grant agreement	Costs incurred within the project duration	% of total costs
Personnel	€ 1.089.312,00	€ 597.270,29	55%
Travel	€ 38.049,00	€ 11.469,60	30%
External assistance	€ 272.100,00	€ 98.582,81	36%
Durable goods - Equipment	€ 222.100,00	€ 127.123,44	57%
Land/rights purchase/lease	€ 81.600,00	€ 23.974,40	29%
Consumable material	€ 31.939,00	€ 12.446,96	39%
Other direct costs	€ 238.413,00	€ 84.685,29	36%
Overheads	€ 83.555,00	€ 44.467,47	53%
TOTAL	**€ 2.057.068,00**	**€ 1.000.020,25**	49%

Spending rate of cost categories lays between a minimum of 29% (land purchase) and a maximum of 57% (durable goods) for a project runtime of about 63%.

Personnel costs: Till now we were not able to implement the AEM and the installation of water evacuation gutters foreseen under action C1. Due to the late finalisation of the RDP these measures are delayed and only can start in spring 2016. Fortunately we have an under-spending of the personal costs for about 6 months and we are quite sure that this supplementary period could help us to finalize successfully those measures.

Travel: The LIFE team visited few projects abroad. In 2014 and 2015, no visit has been done, and therefore traveling costs are low. A visit to the Swedish LIFE project is planned in 2016.

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External assistance: A big part of the budget is dedicated to the transformation of the fish migration obstacles. The costs were lower than estimated as we worked with firms familiar with the type of bridge we needed. But there are three more construction sites to be done. Another money consuming measure is the installation of water evacuations grids and the fencing. In order to tackle additional threats which were identified in action A, we propose to carry out more measures than foreseen (i.e. evacuation grids, fencing, etc.). These measures are essential to improve the conservation status of the target species in a significant way. These additional costs can be carried out within the foreseen budget.

Durable goods - Equipment: This category is balanced. Next investment to be done is the equipment of the Natura 2000 room.

Land purchase: With 29% the lowest category. This can change depending from the type of land we will acquire and its price/are.

Consumable material: This category is low, but as it is a small budget it can be counterbalanced by other categories if necessary.

Other direct costs: There is a large under-spending. The water measuring stations in service cost fewer than foreseen. In order to increase our knowledge about parameters being able to counter the mussel release we would like to relocate a part of the budget for pesticide analyses. Pesticides have a high impact on the target species. By monitoring/analysing this threat we will be able to suggest future policy and propose possible measures to mitigate the impact of pesticides. As we will have reached the proposed amount of gravel for the river Our in 2016, we would wish to continue this measure for one year due to the success of the previous gravel deposits. These additional deposits will increase the conservation status of the target species At the moment we do not know if a special budget has to be attributed to the signal crayfish as to employees of ANF are assisting us.

Overheads: This category is balanced.

With 50% of expenditure we have a large under-spending for the moment. As already explained under the categories there are measures that will be realized soon. In case of financial surplus we will carry out additional measures essential to the conservation status of the target species.

Action detail

Action number and name	Foreseen costs	Spent so far	Remaining	Projected final cost
Action A: Preparatory actions, elaboration of management plans and/or of action plans				
A1	21.065,00 €	11.189,69 €	9.875,31 €	
A2	41.679,00 €	13.847,82 €	27.831,18 €	
A3	53.745,00 €	37.757,31 €	15.987,69 €	
A4	27.302,00 €	14.505,54 €	12.796,46 €	
A5	19.999,00 €	10.646,13 €	9.352,87 €	
Action B: Purchase/lease of land and/or compensation payments for use rights				
B1	99.679,00 €	33.567,79 €	66.111,21 €	
Action C: Concrete conservation actions				
C1	124.578,00 €	39.026,34 €	85.551,66 €	
C2	131.152,00 €	51.848,63 €	79.303,37 €	
C3	58.562,00 €	42.907,25 €	15.654,75 €	
C4	527.770,00 €	291.555,76 €	236.214,24 €	
C5	7.917,00 €	5.020,44 €	2.896,56 €	
Action D: Monitoring of the impact of the project actions (obligatory only if there are concrete conservation actions)				
D1	125.884,00 €	37.807,64 €	88.076,36 €	
D2	28.802,00 €	15.004,78 €	13.797,22 €	
D3	34.583,00 €	17.687,33 €	16.895,67 €	
D4	27.856,00 €	9.824,43 €	18.031,57 €	
D5	14.107,00 €	0,00 €	14.107,00 €	
Action E: Public awareness and dissemination of results (obligatory)				
E1	36.292,00 €	16.374,43 €	19.917,57 €	
E2	115.422,00 €	43.067,81 €	72.354,19 €	
E3	20.821,00 €	14.317,04 €	6.503,96 €	
E4	28.774,00 €	12.414,23 €	16.359,77 €	
Action F: Overall project operation and monitoring of the project progress (obligatory)				

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F1	348.039,00 €	195.467,86 €	152.571,14 €	
F2	79.485,00 €	41.714,54 €	37.770,46 €	
F3		0,00 €	0,00 €	
TOTAL:	**2.057.068,00 €**	1.000.020,25 €	1.057.047,75 €	

7 ANNEXES

All annexes as listed in the text above can be found in the extra Annex document.

Annex 1: Action A5: Contribution à l'élaboration des plans de gestion Natura 2000 "Our" et "Haute-Sûre"

- Management plan Our: plan de gestion version abrégée (definitive version)
- Management plan Sûre: plan de gestion version abrégée (temporary version)

Annex 2: Action B1: Acquisition de terrains le long de l'Our, de la Sûre et de leurs affluents

- Land purchase, Notarial act, aerial photo with the localisation of the acquisitions, explanation of QD concept

Annex 3: Action C1: Interventions pour réduire l'apport en sédiments fins dans le réseau hydrographique

- Demonstration Project "Feierbech".
- Restoration of the river bed on lower part of the Feierbech

Annex 4 : Action C2: Transformation d'obstacles à la migration sur les cours d'eau tributaires

- Ford restoration of Syrbaach/ Sure, Removal of two tubes Schwärzerbaach/ Sure

Annex 5: Action C5: Régulation de la prédation du rat musqué

- Muskrat-trapping 2015
- Request for capturing *P. leniusculus*.

Annex 6: Action D1: Surveillance de la qualité de l'eau et du substrat interstitiel

- Measurements of the rivers, their tributaries and other data of the water quality

Annex 7: Action D2: Monitoring des poissons hôtes

- Authorisation to conduct electric fishing in the river Our, river Sûre and tributaries

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Annex 8 : Action D4: Monitoring et évaluation de l'impact des mesures concrètes

- Monitoring of the measures impact

Annex 9 : Action E1: Information et sensibilisation des acteurs concernés

- Meetings with stakeholders
- Second Management Plan (2015-2021) considering the EU Waterframework Directive: statement
- 2nd Seminar for farmers "Use of pesticides.
- Practical field demonstration

Annex 10: Action E1: Information et sensibilisation des acteurs concernés

- Letter from the "Adminstration de la gestion de l'eau"

Annex 11: Action E2: Sensibilisation du grand-public

- List of visitors
- Press releases

Annex 12: Action E2: Sensibilisation du grand-public

- Letter from the SEO

Annex 13: Action F1: Gestion et encadrement du projet

- Report from the 4th piloting committee

Annex 14 : Action F2: Echange du savoir avec d'autres projets: LIFE et autres

- Visit of river restoration projects with the company Stream & River Consult in Belgium