Freshwater Pearl Mussel (*Margaritifera margaritifera*) - Belgium CON

Photograph: Joel Berglund (Wikimedia Commons)

Conservation status	IUCN Global & EU 27: Critically endangered BE (CON): U2 (+)
Protection status	HD: Annex II and V Bern Convention: Annex III and revised Annex I
Population (2007-2012)	EU27: > 43,200,000 – 64,200,000 individuals BE (CON): 1,600 – 2,000 individuals
MS with genuine improvement	BE (CON), DE (ATL)
Other MS	AT, CZ, DE (CON), DK, EE, ES, FI, FR, IE, LU, LV, PT, SE, UK

Summary: The Freshwater Pearl Mussel is a freshwater bivalve that frequently lives for more than 100 years. This species requires very clean well-oxygenated river habitats and has a complex life cycle that includes dependence on salmonid fish as larval hosts. The decline of this species has been attributed mainly to sediment accumulation in river bed gravels, which cuts off the supply of oxygen to juvenile mussels. As a result, most EU populations of adult mussels are no longer reproducing themselves.

Considerable efforts have been made to conserve the remaining populations of the species in eastern Wallonia (Belgium). Practical measures have included removal of fish barriers, construction of barriers to prevent cattle trampling mussels, removal of coniferous trees, restoration of deciduous riverine forests, investment in water treatment plants, restrictions on fishing activities and awareness raising campaigns. Important supporting aspects of the conservation efforts were monitoring actions, careful selection of areas where conservation actions were required, and the purchase of the most important sites. Captive breeding programmes have also been established, but these are slow and have not yet successfully reintroduced mussels into the rivers.

A total of 80 additional young pearl mussels have been found in the Anlier Rivulet as a consequence of improved water quality. This represents a significant step for the conservation of the species as no other project in Europe has so far managed to restore natural reproduction of the species by such water quality measures. Although no measurable improvements in the species have yet been reported elsewhere in Wallonia, the adoption of all actions under one overall long-lasting coherent strategy, supported by clear site targeting and land purchase, and the involvement of a wide range of stakeholders have been crucial to the project's success.

Background

Status and EU occurrence

The Freshwater Pearl Mussel (*Margaritifera margaritifera*)[1] is native to mainland Europe (Austria; Belgium; Czech Republic; Denmark; Estonia; Finland; France; Germany; Ireland; Latvia; Lithuania; Luxembourg; Norway; Portugal; Slovakia; Spain; Sweden; UK), and North European Russia (Moorkens, 2011).

Its conservation status in the EU is unfavourable-bad in all the biogeographic regions where it occurs (Alpine, Atlantic, Boreal, Continental and Mediterranean). Population estimates were only reported in the Alpine, Boreal

[1] Habitats Directive Article 17 species code 1029

and Continental regions, of which the Boreal is by far the largest. IUCN experts provided a European population estimate in 2010 of 1,282 sub-populations, comprising 423 million individuals, and predicted a European population in 2,100 of 204 sub-populations comprising 47 million individuals (Moorkens, 2011). This estimate tracks the predicted death of individuals, because most sub-populations have not successfully reproduced for many years but the adults live for over 100 years and, thus non-sustainable populations of adult mussels can persist for many years after negative changes in the habitat have occurred.

In Belgium, the Freshwater Pearl Mussel[2] populations still occur in the Continental Biogeographic Region in the south-western part of the country (Ardennes) in the headwaters of some watercourses in the Rulles, Sûre, Vierre and Our river basins. The species is found in the Natura 2000 sites Forest of Anlier (Semois) BE34052, Vierre valley (Semois) BE34047-49, Sûre valley (Moselle) BE34039 and Our valley (Moselle) BE33062-65 (LIFE02 NAT/B/008590 Layman Report, 2008). These are all transboundary rivers sharing basins with France, Luxembourg and Germany. Most populations are small, with only one population containing more than 1,000 individuals, situated at the Forest of Anlier (Semois).

Belgium reported the status of the species as unfavourable-bad with an improving trend in 2007 to 2012, in contrast to the deteriorating trend reported in the previous reporting period. The range was reported as favourable whilst all other factors were reported as unfavourable-bad. The population size was reported as 1,600-2,000 individuals, based on a statistically robust estimate extrapolated from the 90% of populations that were surveyed (Wibail et al, 2014). The area of habitat was calculated based on the survey data. The remaining populations consist only of old individuals (i.e. 60-80 years old), indicating that in general there is currently no successful reproduction happening (Wibail et al, 2014).

Ecological requirements

The Freshwater Pearl Mussel is a long-lived bivalve, frequently living for more than 100 years, particularly in northern Europe. Freshwater pearl mussels are generally dioecious, that is, individuals are either male or female. Its life cycle starts as a very small larvae, called a glochidium, measuring 0.6 to 0.7 mm long. Several million of these are ejected by each female Freshwater Pearl Mussel every year, following by male fertilization (Geist, 2010). The larvae develop by attaching themselves as external parasites to salmonid fish. The chances of a glochidium encountering its host and successfully parasitising it are very slim, and thus the species relies heavily on the presence of sufficient salmonid fish, namely Sea Trout (*Salmo trutta trutta*), Brown Trout (*Salmo trutta fario*) and Atlantic Salmon (*Salmo salar*) (Moorkens *et al*, 2017).

In Belgium only the Brown Trout serves as a host. When post-parasitic juveniles are subsequently detached from the gills, they require highly favourable environmental conditions to settle and develop successfully. Juveniles bury themselves into stream sediments (in the hyporheic zone, i.e. where ground and surface water mix) with low organic content, for a period of five years (Geist, 2010). Evidence shows that this is the most sensitive and critical phase in the life cycle. Individuals reach maturity at the age of 15 years, when they emerge from the sediments and become filter feeders.

The Freshwater Pearl Mussel requires very clean well-oxygenated river habitats to successfully reproduce. The species is found within stable cobble and gravel beds which contain very little fine material. This type of substrate allows for free water exchange between the open river and the water within the substrate. The continuous exchange of water ensures high oxygen levels in the substrate, which is essential for juvenile development. No inorganic silt, organic peat, and detritus should be present in the water as this material can not only block oxygen exchange but also consume oxygen as a result of decomposition processes. Extremely low levels of nutrients in the water are therefore also key for the species to complete its life cycle (Moorkens *et al*, 2017).

The Freshwater Pearl Mussel has poor mobility. It has been suggested that this species can be indirectly impacted by habitat fragmentation (Geist, 2010). However, there is no evidence showing that the species requires ecological connectivity between meta-populations in different river basins for its survival (ETC/BD 2014).

Pressures and threats

Eutrophication has been reported as a significant pressure on mussel populations in the past. The presence of filamentous algal mats, phytoplankton and detritus, along with inadequate flow rates, constitute highly detrimental conditions for the Freshwater Pearl Mussel since they disrupt the oxygen supply. However, according to IUCN experts, the overwhelming majority of population declines in Europe have been due to

[2] Moule perlière

sediment accumulation in the river bed gravels (eg Degerman et al 2009), which also cuts off the supply of oxygen to juvenile mussels (Moorkens 2011).

In Belgium, siltation and declines in water quality have also been reported as highly damaging to the conservation of the species. Factors related to the decrease in water quality include agricultural intensification, intensive grazing, fertilization, diffuse pollution to surface waters due to agriculture and forestry activities, and the discharge of untreated household sewage and wastewaters (LIFE02 NAT/B/008590 Layman Report, 2008; LIFE02 NAT/B/008590 Fiche, 2008).

The species is very sensitive to the deterioration of its natural habitat, and initiatives to stabilise riverbanks and riverbed re-profiling can be highly detrimental. The trampling effect of livestock in the river bed is a particularly significant source of concern in Belgium (LIFE02 NAT/B/008590 Layman Report, 2008; LIFE02 NAT/B/008590 Fiche, 2008).

Conifer afforestation has also been highlighted as a pressing factor in Belgium. The tree planting contributes to the release of sludge and silt into the river system due to wetland drainage and destabilization of the river bank. The impact of invasive non-native species such as the Musk Rat (*Ondatra zibethicus)* and the Racoon (*Procyon lotor*) is regarded as a contributing pressure (LIFE02 NAT/B/008590 Layman Report, 2008). The European Beaver (*Castor fiber*) may also have an impact on the species as a consequence of habitat modification (Motte, pers comm).

Unintentional crushing and locally deliberate killing of mussels in the hope of finding pearls have been reported as important pressures in the past.

Lastly, climate change has been identified as a significant threat across Europe, most likely as a result of increased water temperatures and its effects on the mussels and their trout hosts. Moderate flooding may have a positive effect by cleaning silts from gravel beds and riffles. However, an increased frequency of high flow occurrences and larger run-off events may be a cause for future concern.

Drivers of improvements: actors, actions and their implementation approaches

Organisers, partners, supporters and other stakeholders

Most actions were conducted in the context of LIFE project LIFE02 NAT/B/008590 'Pearl mussels Conservation of habitats of pearl mussels in Belgium', which was carried out between 2002 and 2007. The coordinating beneficiary of this project was the Ministère de la Région Wallonne represented by the Nature and Forest Department (Centre de Recherche de la Nature, des Forêts et du Bois), and the main partner was the NGO Natagora, an organization that campaigns for better nature conservation and also manages a number of Natura 2000 sites in Belgium. The Nature and Forest Department, and the NGOs Natagora and Natagriwal have engaged in widespread land purchase actions. The same stakeholders have been involved once the project ended in 2007 (Motte, pers comm).

A close collaboration was established with the Department of Natural and Agricultural Research (DEMNA/DG03), which has monitored the watercourses by, for example, monitoring the installation of beaver dams and enforcing legislation in relation to river fencing in Natura 2000 sites. The Fishing Unit of the Nature and Forest Department (DNF-SP/DGO3) assisted with population reinforcement actions, the collection of glochidia, the provision of ponds and trout, as well as the infestation of trout with larvae. These actions were coordinated by the DEMNA (Motte, pers comm).

Numerous other stakeholders have been involved in the conservation of the species, including farmers, fishermen, foresters and water quality authorities (LIFE02 NAT/B/008590 Layman Report). For instance, farmers have been involved through agri-environmental measures to finance the management of the reserves and the watershed, and public and private foresters have been mindful of the need to protect the rivers during the exploitation of the woods. Different regional, provincial and local authorities (i.e. SPGE, AIVE, DGO3, commune) have been in charge of financing and building a number of sewage treatment plants. Private owners whose lands are located next to mussel populations have become more aware of the need to protect the river bed and the mussels (Motte, pers comm).

Contributions / relevance of strategic plans

No official species strategic plan has been produced. However, the project itself was conceived as a strategic plan, and the monitoring and conservation actions have continued after the end of the project.

Measures taken and their effectiveness

The measures considered by Belgium to be highly important for the conservation of the species in the 2007 to 2012 period are listed below.

Application of conservation measures for *Margaritifera margaritifera* for 2007-2012 in Belgium Continental region

Measure	Type	Ranking	Inside or outside N2k	Broad Evaluation
1.2 - Measures needed, but not implemented	Legal	Medium	Both	Maintain Enhance
2.0 - Other agriculture-related measures	Legal Contractual	Low	Both	Maintain Long-term
2.1 - Maintaining grasslands and other open habitats	Administrative Contractual	High	Both	Maintain Enhance Long-term
2.2 - Adapting crop production	Legal	Low	Inside	Long-term
3.0 - Other forestry-related measures	Legal	Medium	Both	Maintain
3.1 - Restoring/improving forest habitats	Legal Administrative Contractual	Medium	Both	Maintain Long-term
3.2 - Adapt forest management	Legal Administrative	Medium	Both	Maintain Long-term
4.1 - Restoring/improving water quality	Legal Administrative	Low	Both	Maintain Long-term
4.2 - Restoring/improving the hydrological regime	Legal Administrative Contractual	Medium	Both	Maintain Long-term
4.3 - Managing water abstraction	Legal Administrative	Low	Both	Maintain
6.1 - Establish protected areas/sites	Legal Contractual	High	Both	Maintain Long-term
6.3 - Legal protection of habitats and species	Legal	High	Both	Maintain Long-term
6.4 - Manage landscape features	Contractual	Medium	Both	Long-term
7.0 - Other species management measures	Administrative	High	Inside	Enhance
7.2 - Regulation/ Management of fishery in limnic systems	Legal Administrative	Medium	Both	Maintain Enhance

Source: Belgium Article 17 report 2012 available at https://bd.eionet.europa.eu/article17/reports2012/

The Rulles, Sûre, Vierre and Our river basins are shared across borders, so transboundary collaboration is required to successfully conserve the species in the region.

In Belgium, monitoring actions were carried out to gather information from these river basins on mussel numbers, Brown Trout populations, habitat types and valley landscapes, along a total of 289 km of river. Water quality was monitored at 200 stations and sediment quality was analysed. This information was used to identify 600 'black points' along the rivers, i.e. areas where conservation action was required (LIFE02 NAT/B/008590 Layman Report). The best locations for the mussels and potential location for reintroduction were mapped, and management plans were produced based on the information provided by the preparatory actions (Herremans, pers comm).

Agreements were made with land owners to compensate for the loss of production from less damaging farming practices. The agreements included the removal of conifer plantations and a 30 year commitment to abandon the cultivation of conifers. The project financed the removal of 100 ha of coniferous trees with the objective of opening up the riverine habitats and restoring a network of humid meadows (LIFE02 NAT/B/008590 Layman Report). The project also purchased 175 ha of land from owners where the adoption of conservation measures was not possible.

In addition, a total of 150 ha of open habitats were restored and 16 ha of deciduous riparian forests were planted to provide shade. Fencing of 76 km of river bank, the construction of 10 wooden bridges and the installation of 119 drinking troughs had an important conservation impact as these measures aimed at preventing both damage to riverbanks and riverbed, as well as reducing trampling of mussels by livestock (LIFE02 NAT/B/008590 Layman Report). Hundreds of owners and farmers committed to maintain these structures (Herremans, pers. comm).

It should be noted that a LIFE project that focused on the conservation of the European Otter (*Lutra lutra*) on the Our and Sûre valleys in Belgium also carried out actions of benefit to the Freshwater Pearl Mussel (LIFE05NAT/B/000085 Fiche, 2012). These measures included land purchases, signing of management agreements with landowners, restoration of riverbanks, fitting of drinking troughs, cutting of spruce plantations along the floodplains and invasive species eradication.

Other measures that were implemented in the Ardennes (Belgium) during the LIFE02 NAT/B/008590 project included the release of more than 100,000 young mussels. Regular reintroductions of young pearl mussels have been carried out into semi-natural environments which have the necessary river conditions. A close collaboration between the fish farm of Achouffe (DNF) in Belgium and the rearing station at Kalborn in Luxembourg was established. Unfortunately, breeding efforts have not yet managed to establish new sub-populations in the region. The rearing process is very slow and the results showed that mussel survival rate in the breeding programme dropped sharply with age (none survived more than 4 years) and, therefore, individuals did not reach maturity (LIFE02 NAT/B/008590 Layman Report). In addition, some difficulties were encountered when the semi-natural sites dried out during severe drought episodes. However, the monitoring showed that the old mussels that are still alive are fertile.

Similar conservation actions aimed at the improvement of ecological conditions of breeding sites were carried out in the upper part of the River Our basin in Luxembourg, but also included the removal of dams and barriers or the installation of fish passes. An important role was also played by actions to enhance awareness about the project and its objectives among the local population and stakeholders, including fishing and hunting clubs, recreational operators and farmers (LIFE05 NAT/L/000116 Layman Report, 2012).

Funding sources (current and long-term) and costs (one-off and ongoing)

The most important source of funding has been EU funding through the LIFE programme, with co-financing by the relevant stakeholders. The two LIFE projects described above targeted the conservation of the species in Belgium (Annex 2). These LIFE projects have been crucial in the positive trend reported for the Freshwater Pearl Mussel in the country (Herremans, pers. comm).

The Pearl Mussel LIFE project was the continuation of existing land purchase actions in the region. Land purchase for nature has been funded by many different sources: the Actions by the EU for Nature (ACE) financial instrument, Actions by the Community for Nature Conservation (ACNAT) programme, Walloon Region, the NGO Natagora (formerly called Réserves Naturelles-RNOB and before that "Réserves Naturelles et Ornithologiques de Belgique"), donations from the "Fondation Roi Baudouin", donations by the members of Natagora to support land purchase, input of volunteers, and occasional support from private companies.

Farmers are funded to manage the restored grasslands on the valley bottoms through EU Common Agricultural Policy Rural Development Programme agri-environment schemes (Herremans, pers. comm).

Continuation of the monitoring of the species, of the sites and of the management is ensured by a half time scientist at the Walloon Region, by the local technicians of the forestry service of Wallonia and by a part time staff member at Natagora (Herremans, pers. comm).

Future actions

After the end of the Pearl Mussel LIFE project in 2007, most of the project actions (e.g. land purchase, removal of conifers groves, restoration of grasslands and riparian soft leaved forest) were continued, mostly using own funds. Collaboration with the rearing station at Kalborn in Luxembourg has continued, reintroduction actions of young mussels have been carried out, and reinforcement measures are taking place in Belgium by which trout are artificially infected by glochidia and released in the rivers. Currently the two same main beneficiaries (ie Walloon Region and Natagora) are implementing a new LIFE project LIFE11 NAT/BE/001060 'Herbages - Priority actions for grasslands and meadows in Southern Lorraine and the Ardenne' (LIFE11 NAT/BE/001060 Fiche, 2012). In addition, a new life project called 'Life Connection' that aims at developing further actions for the conservation of the species in the region has been recently devised and significant investments in the creation and improvement of sewage water treatment systems have been mobilised in downstream locations (Motte, pers comm).

The Freshwater Pearl Mussel will also benefit from current measures that focus on the restoration of the Our and Sûre rivers for the conservation of the threatened Thick Shelled River Mussel (*Unio crassus*) in Luxembourg as part of a LIFE project that started in September 2012 and is due to finish in February 2019 (LIFE11 NAT/LU/000857 Fiche, 2012). Other actions such as the control of Racoon and European Beaver populations are ongoing (Motte, pers comm).

No specific funding for the conservation of the Freshwater Pearl Mussel is planned under the Wallonia Prioritised Action Framework for 2008 to 2020.

Achievements

Impacts on the target species

Successful natural reproduction at the Anlier Rivulet (Rulles River Basin) has been recorded in 2017 as a consequence of improved water quality. This is the first time in 80 years that there is proof of reproduction of the species in Belgium (Motte, pers comm). The current total population at the site has been estimated as 1,283 individuals, of which 80 individuals are young mussels. Although the total population at the site has in fact decreased (i.e. 1,429 individuals in 2002 vs 1283 individuals in 2017), the presence of young individuals of several age classes (i.e. 6 to 10 years old) and the stabilization of the losses of the adult individuals at the site are seen as positive signs (Motte, pers comm).

However, due to the slow natural reproductive rate of the species and its high sensitivity to water quality, the actions that have been carried out have not yet yielded an increase in sub-populations or in numbers of the Freshwater Pearl Mussel at other locations in Belgium and, thus a general decline continues to occur and the near disappearance of the sub-populations is a reality (Motte, pers comm).

It should be noted that a minimum of 10 years have to elapse to observe any quantifiable results after the conservation measures have taken place. Therefore, it is important to highlight the numerous objectives that have been met as part of the conservation efforts, as described above.

Other impacts (e.g. other habitats and species, ecosystem services, economic and social)

The Freshwater Pearl Mussel plays an important role in the ecosystem as a filterer. Furthermore, since it is an umbrella species, a wide range of species, both aquatic and terrestrial, benefit from the measures aimed at the conservation of this species. For example, other fish, especially salmonids, and the Thick Shelled River Mussel are positively impacted in rivers. The Dipper (*Cinclus cinclus*), Kingfisher (*Alcedo atthis*), Black Stork (*Ciconia nigra*), European Otter and the butterflies Violet Copper (*Lycaena helle*) and Bog Fritilliary (*Boloria Eunomia*) also benefit from the conservation of the Freshwater Pearl Mussel (LIFE02 NAT/B/008590 Layman Report).

Lastly, it is worth mentioning the positive effects derived from the conservation of the species can be noticeable in the local economy as a consequence of an increase in tourism.

Conclusions and lessons learnt

The key targeted conservation measures that led to the improvements

- Monitoring of both the Freshwater Pearl Mussel and Brown Trout populations, combined with applied research activities, resulted in a better understanding of the key issues for conservation of the species. These measures led to the discovery of new populations in Belgium and enabled the targeting of restoration actions in the right places (e.g. the head of the watershed limit).
- Actions aimed specifically at improving terrestrial and aquatic riverine habitat such as the restoration of open habitat, the restoration of a network of humid meadows and deciduous riverine forests, coupled with concrete management actions that targeted cattle, have improved habitat conditions.
- Close collaboration between the breeding stations in Belgium and Luxembourg led to improvements in the understanding of the conditions required for successful introductions of young mussels into the rivers.

Conservation measures that have not been sufficiently effective

- Despite carrying out numerous practical measures targeting habitat improvements, in general actions have not yet resulted in the achievement of the very good water quality status required by the species in the region. However, it should be noted that it can take as long as 10 years after the implementation of measures before reproduction success can be verified.
- The breeding process has not yet established new subpopulations as it is very slow and young mussels have been subject to high rates of mortality.

Factors that supported the conservation measures

- Relatively continuous source of funding provided by the LIFE programme targeting species that share similar ecological requirements (i.e. Freshwater Pearl Mussel, European Otter and Thick Shelled River Mussel).
- Willingness of a wide range of stakeholders to contribute to the conservation of the species in Wallonia (Belgium).

Factors that constrained conservation measures

- The slow natural reproductive rate of the species limits its capacity to spread to other suitable available habitats. Ambitious but short-term objectives are not adequate for the conservation of the species.

Quick wins that could be applied elsewhere for the species

- Due to its high vulnerability to any disturbance, complex life cycle, the need for a strong host population and the fact that the species is largely dependent on external factors related to land use outside and upstream of the mussel sites, no quick wins have been identified.

Examples of good practice, which could be applied to other species

- The continuation of the actions carried out within the overall strategy in Belgium, as initiated by the LIFE02 NAT/B/008590 project, in a coherent manner after the project's completion, using a landscape perspective.
- The use of land purchase as the most efficient, effective and durable tool for the long term management of sensitive areas when financial resources are available.
- The active involvement of all the required sectors (i.e. national, regional and local authorities, water authorities, anglers, farmers and forestry workers) which helped shared knowledge, utilise all the available resources and raise public awareness.

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Authorship

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Annex 1. Status of Freshwater Pearl Mussel (*Margaritifera margaritifera*) at Member State and biogeographic levels

Favourable	FV	Unknown	XX	Unfavourable - inadequate	U1	Unfavourable - bad	U2

Qualifier (+) improving (-) deteriorating (=) stable (x) unknown (n/a) not reported

	2001-06	2007-12				
	Overall	Range	Area	Habitat	Future	Overall
FI (ALP)	FV	U1	U2	FV	U2	U2 (x)
SE (ALP)	U2	FV	U2	U1	U1	U2 (=)
EU (ALP) overall	U2	FV	U2	U1	U1	U2 (=)
DE (ATL)	U2	U2	U2	U2	U1	U2 (+)
DK (ATL)	U2	XX	XX	XX	XX	XX
ES (ATL)	XX	U1	U2	U2	U2	U2 (-)
FR (ATL)	U2	U2	U2	U2	U2	U2 (-)
IE (ATL)	U2	FV	U2	U2	U2	U2 (-)
PT (ATL)	U2 (-)	U2	U2	U2	U2	U2 (-)
UK (ATL)	U2 (-)	U1	U2	U2	U2	U2 (-)
EU (ATL) overall	U2	U1	U2	U2	U2	U2 (-)
EE (BOR)	U2 (-)	U2	U2	U2	U2	U2 (-)
FI (BOR)	U1	U1	U2	U2	U2	U2 (-)
LV (BOR)	U1 (-)	U1	U2	U2	U2	U2 (-)
SE (BOR)	U2 (-)	FV	U2	U1	U1	U2 (=)
EU (BOR) overall	U2	FV	U2	U2	U2	U2 (-)
AT (CON)	U2	U2	U2	U2	U2	U2 (-)
BE (CON)	U2 (-)	FV	U2	U2	U2	U2 (+)
CZ (CON)	U2	U2	U2	U2	U2	U2 (-)
DE (CON)	U2	U2	U2	U2	U2	U2 (-)
FR (CON)	U2	U2	U2	U2	U2	U2 (-)
LU (CON)	U2	U2	U2	U2	U2	U2 (-)
SE (CON)	U2	FV	U2	U1	U2	U2 (-)
EU (CON) overall	U2	U2	U2	U2	U2	U2 (-)
ES (MED)	U2	U1	U2	U2	U2	U2 (-)
PT (MED)	U2	U2	XX	U1	U2	U2 (x)
EU (MED) overall	U2	U2	U2	U2	U2	U2 (-)

Source: Member State Article 17 reports as presented on EIONET https://bd.eionet.europa.eu/article17/reports2012/

Annex 2. LIFE Nature Projects in Belgium that aimed to help conserve the Freshwater Pearl Mussel (*Margaritifera margaritifera*)

Project Title	Project N°	MS	Type Of Beneficiary
Pearl mussels - Conservation of habitats of pearl mussels in Belgium	LIFE02 NAT/B/008590	BE	Regional authority
Loutre BeLu 2005-2006 - Restoration of European Otter habitats (BE & LU)	LIFE05 NAT/B/000085	BE	Park-Reserve authority

Source: Life Programme database, projects with *Margaritifera margaritifera* listed as a key word