



UC4LIFE - The thick shelled river mussel (*Unio crassus*) brings Life+ back to rivers

LIFE10 NAT/SE/000046



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Project description:

Background

Many thick shelled river mussel (*Unio crassus*) populations have become extinct in Sweden. Remaining populations of this endangered species have become fragmented (at some 140 sites), with distribution confined to south-eastern Scandinavia. This decline is linked to habitat degradation (e.g. fragmentation, dredging and channelisation of watercourses) and the resulting scarcity of host fish. Declining host fish abundance leads to small mussel populations in which recruitment of young mussels cannot be maintained, so ageing populations slowly die out. Other problems concern drainage; historical water legislation requires landowners to dredge and clean rivers and streams, but at sites with populations of *Unio crassus* this conflicts with current EU legislation designed to protect rare species and vulnerable habitats. In addition, cutting down shading trees causes high water temperatures, homogenous habitat and increased amounts of suspended material, which negatively affects mussel and fish populations.

Objectives

The objective of the UC4LIFE project was to strengthen the conservation status of thick shelled river mussel (*Unio crassus*), which is classified as 'unfavourable' under the EU Habitats Directive, and improve the ecological status of the rivers

where it is found in Sweden. The project selected 12 sites (3 where mussels are already extinct) in which to identify and map host fish to ensure successful conservation actions (7 sites); to recreate natural river dynamics by restoring structures and processes beneficial for *Unio crassus* and host fish species (12 sites); and to rear and reintroduce juvenile mussels and glochidia-infected host fish to build up populations (2 sites) and to reallocate adult mussels to more favourable habitat (6 sites). The project also aimed to raise awareness for future river management at the 12 project sites through the platform of local water councils.

Results

UC4LIFE developed methods for rearing and reintroducing thick shelled river mussel (*Unio crassus*) into rivers where it has become extinct, for the first time in Scandinavia. The project identified and mapped host-fish species, and undertook large-scale restoration activities to create conditions favourable for the mussel and its host fish. Taking an integrated approach, the project combined conservation work with information activities and socio-economic modelling.

The project demonstrated innovative techniques for the rearing of thick shelled river mussel, to obtain the numbers needed for re-introducing the species into rivers, including the use of a re-circulation pump system in the rearing units and specially designed boxes for re-introductions. The mussel breeding facility at Hemmestorp Mill, built by the project, will continue to serve as a basis for future mussel breeding and reintroduction work in Sweden.

An evaluation of which fish species *Unio crassus* uses as hosts was conducted, by electrofishing over 168 km of river and laboratory identification. This showed that 13 of the 17 fish species caught had gills infested with glochidia (the larval stage of the mussel). Of these, the project team identified three species as the most-suitable host fish species for re-introduction activities. A total of 484 infested host fish were released into rivers, resulting in about 170 000 juvenile mussels released from the fish; 6 783 juvenile mussels obtained from laboratory fish were released into rivers; and 790 gravid adult mussels were reallocated to more suitable habitats in the project sites. These actions resulted in around 12 million glochidia being released in Fyleån Creek and about 13 million in Klingavälsån River, successfully reintroducing populations to these sites where the species had gone extinct.

Reintroductions and reallocations were directly linked to the implementation of large-scale restoration activities that improved environmental conditions for both the mussel and its host-fish species. These involved the recreation of habitat structures, including gravel river beds at two sites, the addition of boulders and woody debris, the planting of shading trees alongside streams, and the re-meandering of rivers at two sites. Various habitat improvements were achieved at all 12 project sites (totalling 267 km of river length). The project team also constructed two side channels, and removed or by-passed eight major migration barriers to increase connectivity in six rivers, which is important for host-fish movement.

Post-restoration monitoring confirmed an overall positive outcome for other

biotic variables in the rivers (e.g. invertebrates and fish). The combined results from the restoration work, the host-fish mapping, reintroductions and reallocation studies showed that the project significantly contributed to an overall increase in biodiversity as a consequence of the restoration efforts at the project sites. In addition to the direct conservation benefits, the restoration work has contributed to a more varied environment and an increase in connectivity. The results developed in the project can be easily replicated and have been already taken up by several initiatives.

The project conducted a widespread public engagement process, which achieved a high level of recognition in Sweden for both the mussel and for its habitats. The project directly contributed to the implementation of the Water Framework Directive and the Habitats Directive, by improving water quality and the conservation status of *Unio crassus*.

A holistic and integrated approach was undertaken, which combined the conservation work with information activities and socio-economic modelling. The project beneficiaries undertook an assessment of the socio-economic value of the restoration work at one of the project sites (Fyleån), which concluded that the restoration contributed to the recreational quality of the area.

Further information on the project can be found in the project's layman report and After-LIFE Conservation Plan (see "Read more" section).

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Environmental issues addressed:

Themes

Species - Invertebrates

Keywords

endangered species, river

Target EU Legislation

- Nature protection and Biodiversity
- Directive 92/43 - Conservation of natural habitats and of wild fauna and flora- Habitats Directiv ...
- COM(2011) 244 final “Our life insurance, our natural capital: an EU biodiversity strategy to 2020 ...
- Water
- Directive 2000/60 - Framework for Community action in the field of water policy (23.10.2000)

Target species

Cobitis taenia Cottus gobio Margaritifera margaritifera Salmo salar Unio crassus

Target Habitat types

- 3210 - Fennoscandian natural rivers
- 3260 - Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation

Natura 2000 sites

SCI	SE0230279	Tolefors-Lagerlunda
SCI	SE0310406	Emån (västra)
SCI	SE0410128	Mörrumsån
SCI	SE0410168	Bräkneån
SCI	SE0420250	Fyledalen
SCI	SE0430110	Klingavälsån-Karup
SCI	SE0220701	Vedaån
SCI	SE0220702	Svärtaån
SCI	SE0230355	Föllingsö
SCI	SE0230383	Storån vid Falerum
SCI	SE0230397	Kapellån vid Lagerlunda
SCI	SE0310805	Brusaån

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Beneficiaries:

Coordinator	County Administrative Board of Skåne
Type of organisation	Regional authority
Description	The County Administrative Board of Skåne is a governmental authority responsible for overseeing that the national goals laid down by the Swedish parliament and government are implemented in the county. Some 50 employees work on issues relating to the Water Framework Directive (WFD) and the conservation and managing of aquatic environments and Natura 2000 areas in the county.

Partners County Administrative Board of Jönköping, Sweden County Administrative Board of Blekinge, Sweden County Administrative Board of Östergötland, Sweden County Administrative Board of Södermanland, Sweden Karlstad University, Sweden

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Administrative data:

Project reference	LIFE10 NAT/SE/000046
Duration	01-JAN-2012 to 31-DEC -2016
Total budget	4,927,119.00 €
EU contribution	2,463,559.00 €
Project location	Sydsverige(Sverige)

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Read more:

Brochure	Title: "Åtgärder i Vedaån inom projektet Målbusslans återkomst" (4.71 MB) Editor: Länsstyrelsen Södermanlands län No of pages: 9
Leaflet	Title: "Målbusslans återkomst" (729 KB) Editor: Karlstad University No of pages: 4
Poster	Title: "The thick shelled river mussel (Unio crassus) brings LIFE+ back to rivers - As a RESTORE-partner?" (4.38 MB) Author: Ivan C Olsson, Jakob Bergengren, ... [et al] Year: 2012 Editor: Länsstyrelserna No of pages: 1
Project web site	Project's website
Project web site - 2	Project's Twitter page
Publication: After-LIFE Conservation Plan	Title: After-LIFE Conservation Plan (English/Swedish version) No of pages: 34
Publication: After-LIFE Conservation Plan	Title: Layman report (Swedish version) Author: Lundberg, S. & Österling, M. Year: 2016 Editor: Skåne County Administrative Board No of pages: 20
Publication: Guidelines-Manual	Title: "Return of the Thick-shelled River Mussel - Restoring floodplains, habitats and connectivity, using mussels and brains" Author: Jakob Bergengren, Jönköping County Administrative Year: 2016 Editor: UC4LIFE Project, Skåne County Administrative Board No

	of pages: 100
Publication: Layman report	Title: Layman report Author: Lundberg, S. & Österling, M. Year: 2016 Editor: Skåne County Administrative Board No of pages: 20
Publication: Management plan	Title: "The monitoring handbook of large freshwater mussels" (1.22 MB) Author: Jakob Bergengren, Ted von Proschwitz, ... [et al] No of pages: 42
Publication: Technical report	Title: "Host fish species of freshwater mussels in seven Swedish river systems: Technical report" (457 KB) Author: Martin Österling, Valentina Zülsdorff, ... [et al] Editor: Karlstad University No of pages: 17
Publication: Technical report	Title: "Host fish species of the thick-shelled river mussel (<i>Unio crassus</i>) in Swedish rivers: Technical report" (499 KB) Author: Martin Österling, Valentina Zülsdorff, ... [et al] Editor: Karlstad University No of pages: 16
Publication: Technical report	Title: "UNIO CRASSUS for LIFE: Inception Report Covering the project activities from 01/01/2012 to 31/08/2012" (737 KB) Author: Ivan Olsson (ed) Year: 2012 Editor: County Administrative Board of Skåne No of pages: 19
Publication: Technical report	Title: Project's Final technical report Year: 2016 Editor: County Administrative Board of Skåne No of pages: 81
Publication: Technical report	Title: "The thick-shelled river mussel (<i>Unio crassus</i>) - host fish suitability and rearing of juvenile mussels: Technical report" (602 KB) Author: Martin Österling, Lea D. Schneider Editor: Karlstad University No of pages: 18
Video link	"Byggnation av faunapassage i Bräkneån vid Trånhem och Tararp" (video link on Youtube) (
Video link	The UC4LIFE-project at Fyleån (video link on Youtube) (11:06)

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