



## Pearls in Peril

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by thefreshwaterblog

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An adult freshwater pearl mussel on a stream bed. Image: J Webley/SNH

The freshwater pearl mussel (*Margaritifera margaritifera*) is an extremely long-lived species of mollusc (a 134 year old mussel was found in Estonia in 1993), found in fast flowing rivers and streams across Europe. The pearl mussel produces small, beautiful pearls inside its thick shell which is anchored to the riverbed. However, freshwater pearl mussels are subject to increasing pressure, and their populations across Europe are listed as threatened by the IUCN due to habitat loss, declining water quality and illegal harvesting to provide pearls for jewellery.

**Pearls in Peril** is a **European Union LIFE** project set up to protect and conserve populations of freshwater pearl mussels in Great Britain. We spoke to project manager Jackie Webley from Scottish Natural Heritage to find out more about this fascinating species and the project's important work.

**Freshwater Blog: Freshwater pearl mussels are an absolutely fascinating species, although I'd guess that not many people know a lot about them. Can you tell me a little about their ecology? How are freshwater mussel populations faring in Britain at the moment?**



Freshwater pearls. Image: riverdee.org.uk

Jackie Webley: Few people are fully aware of the significance of the freshwater pearl mussel, a species that lives 'hidden' in cold, fast-flowing rivers, yet is embedded in our history, culture and biodiversity. The freshwater pearl mussel is incredibly important as it filters river water, removing tiny particles for nourishment and by doing so helping to clean the water and benefiting other river wildlife.

The lifecycle of the freshwater pearl mussel is extraordinary. Adult mussels release up to 4 million microscopic larvae each summer. The larvae look like

tiny mussels. They hold their shells open until they are inhaled by a young fish (Atlantic salmon or trout) then they snap shut on the fish gills. This association does not appear to harm the fish. The chances of a larva meeting a suitable fish are very low; only four in every million will do so. Nearly all are swept away by the river. The larvae remain on the gills of the fish and grow in this oxygen-rich environment until the following spring, when they drop off. They must land and burrow into clean, sandy or gravelly substrates in order to survive; if they land in silt or mud they will suffocate. The larvae that do survive can live for over hundred years, making them one of the longest-lived invertebrates.

The species has suffered a catastrophic decline globally and Scotland is now the stronghold of the remaining UK population. In Britain the freshwater pearl mussel is in urgent need of conservation action. Many of the rivers supporting this species contain old populations with no signs of reproduction, which is worrying as the freshwater pearl mussel is a barometer of the health of our river ecosystems.

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Features, interviews and analyses on freshwater conservation, science and policy, edited by the European Union funded **MARS project**.

For comments, ideas and submissions, you can contact us here: [info \[at\] freshwaterblog.eu](mailto:info@freshwaterblog.eu)



The blog was founded and run between 2010-14 by the **BioFresh project**, an EU-funded international project that built a global information platform for scientists and ecosystem managers with access to all available data describing the distribution, status and trends of global freshwater biodiversity.



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Freshwater mussel larvae on the gills of a trout. Image: J Webley / SNH

#### Why are freshwater pearl mussel populations in decline?

Freshwater pearl mussels have been, and still are, affected by a range of factors causing their decline such as illegal pearl fishing, silt and soil washing into water courses, pollution and unauthorised river engineering. Mussels rely on young Atlantic salmon and trout to complete their lifecycle meaning declines in these fish will affect the survival of freshwater pearl mussels. Climate change is also considered to threaten the future of this species. A predicted increase in strong, fast flowing currents can dislodge pearl mussels from the river bed washing them downstream. Alternatively, an increase in drought conditions will result in low water levels, high water temperatures and reduced availability of oxygen. Under these parameters freshwater pearl mussels are too stressed to reproduce and mussel beds found along the river margins are likely to die from exposure.

#### Which rivers support the last populations?

In the last 100 years more than one-third of rivers in Scotland that used to contain mussels, no longer do so. England and Wales each have one viable population that is reproducing and collectively have an estimated population of 500,000 mussels. The UK estimated total population is 12 million, the majority of these surviving in Scotland and most of these occurring in just a few rivers.

#### Were populations once more widespread?

Freshwater pearl mussels used to be widespread and could be found in many rivers throughout the UK. There are a total of 23 sites in the UK that are designated for freshwater pearl mussels, other rivers where they are present are generally not mentioned due to a continuing risk from illegal pearl fishing.



Tree planting to create new habitat on the banks of the Upper River Dee. Image: J Webley / SNH

#### Tell us about the Pearls in Peril project: how are you working to conserve mussel populations?

Pearls in Peril (PIP) is an ambitious £3.5million LIFE project that aims to safeguard the future of the freshwater pearl mussel by implementing a range of conservation measures across 21 designated sites. The project will run until September 2016 and includes rivers in England, Scotland and Wales.

The project is working to conserve mussels through practical measures such as ditch blocking, tree planting and fencing off river banks to restrict livestock access. These measures reduce silt and soil inputs, prevent bankside erosion, provide shade to reduce water temperatures and provide food and habitat for fish. PIP is working to restore river bed habitats where these have been destroyed from historic river engineering, is conducting artificial encystment (introducing freshwater pearl mussel larvae onto fish gills) and undertaking a range of monitoring actions.

PIP employs a Riverwatcher who is working to increase awareness of wildlife crime affecting pearl mussels, educating local communities on 'what to look out for' and 'how to report' information. The Riverwatcher works closely with Police Scotland and the National Wildlife Crime Unit sharing intelligence and reporting incidents. Through the project partners, PIP is delivering 'Pearls in the Classroom' to primary schools close to the rivers in the PIP project.

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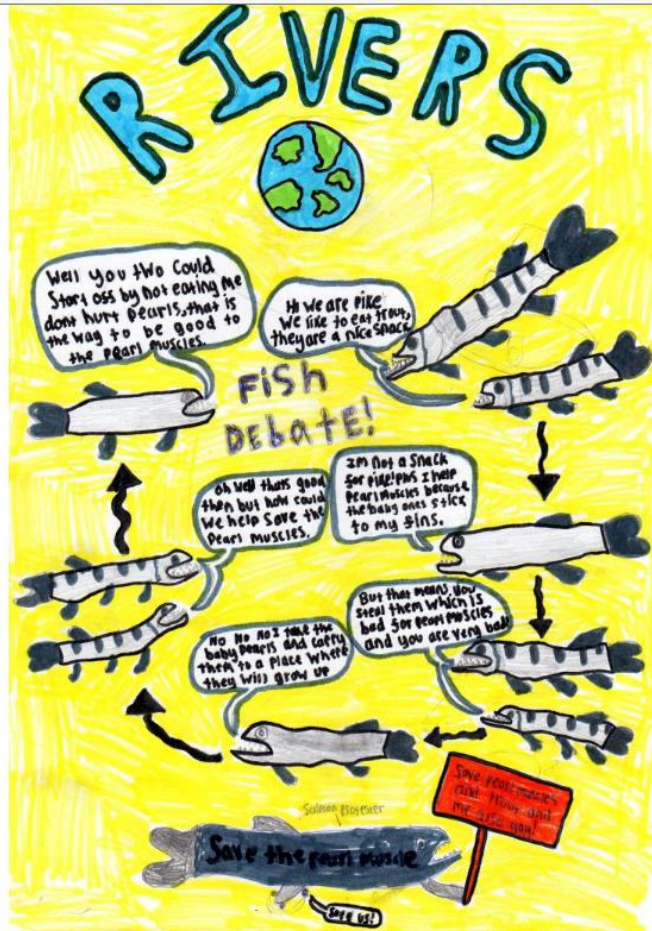
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Poster made by schoolchildren as part of the Pearls in the Classroom project. Image: Ness and Beaulieu Fisheries Trust

It seems that outreach and engagement with local communities is an important part of the Pearls in Peril project, through your Riverwatch and Pearls in the Classroom initiatives. Could you tell us a little more about these initiatives? Is it easy to engage people with a rare creature that many people won't have seen?

The majority of people we speak to are usually fascinated to hear about the freshwater pearl mussel and are often quite amazed that such an important species has been living in the river on their doorstep. For those who already know about the mussel, memories are often re-awakened and we hear stories about the antics of the old pearl fishers or the thousands of shells washed into fields after large floods and the best places to look for mussel beds. People often talk about the mussels as though there are old friends that have always been there.

We are very pleased to engage with local communities. Our project partners are delivering Pearls in the Classroom (PIC), visiting local primary schools and looking at the species' unusual lifecycle and that of its host species (salmon and trout). We discuss why the pearl mussel, salmon and trout are such an important part of the local river ecosystem. The children are given worksheets, activities and where possible, they visit the river bank with River Trust biologists.



Poster made by schoolchildren as part of the Pearls in the Classroom project. Image: Ness and Beaulieu Fisheries Trust

The PiC programme also looks at how mussels can be conserved. This message is being delivered to a wider audience through Riverwatch, which aims to raise awareness of the problems pearl mussels face from criminal activity. Riverwatch Schemes are currently being established and will be promoted in the local media and with relevant stakeholders including fishery boards, fishery trusts, local communities, the police, conservation groups and others. PIP has employed a seasonal Riverwatcher who has so located evidence of illegal pearl fishing, unauthorised river engineering, pollution and gained important intelligence that has been passed to the National Wildlife Crime Unit and Police Scotland.

#### Is illegal pearl fishing still an issue?

Illegal pearl fishing is still an issue, seriously threatening the survival of freshwater pearl mussels – there simply are not enough mussels to sustain this exploitation which is why it was made illegal in 1998 and the species given full protection. There are other serious threats to the survival of mussels that can be addressed through practical conservation measures. We have had a mixed response across the UK from land managers and are pleased to say that in the majority of sites we have achieved very positive results.



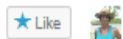
Measuring juvenile freshwater mussels. Image: J Webley / SNH

#### If all goes to plan with the Pearls in Peril project, how will UK populations of freshwater mussels be faring in 2016? How about in another 50 years?

It will take many years to measure the effects of the conservation work happening now on freshwater pearl mussels given their reproduction rate (maturing between 10 – 15yrs old) and long life span 100yrs. Conservation work is aimed at improving habitat based on information provided by a range of research on the habitat requirements of this species. Water quality and fish populations are being monitored to allow us to see more immediate changes in conditions.

In another 50 years... we have to look positively at this species future, they are integral to a healthy river ecosystem and form a significant part of our culture and history. We would expect to see more populations successfully reproducing and a halt in the decline of the freshwater pearl mussel. Long may the stories continue...

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