

## Freshwater Pearl Mussel SAP



### Objective

To halt the decline of the freshwater pearl mussel population in the River Esk, and to increase the length of watercourse with suitable habitat for this species.

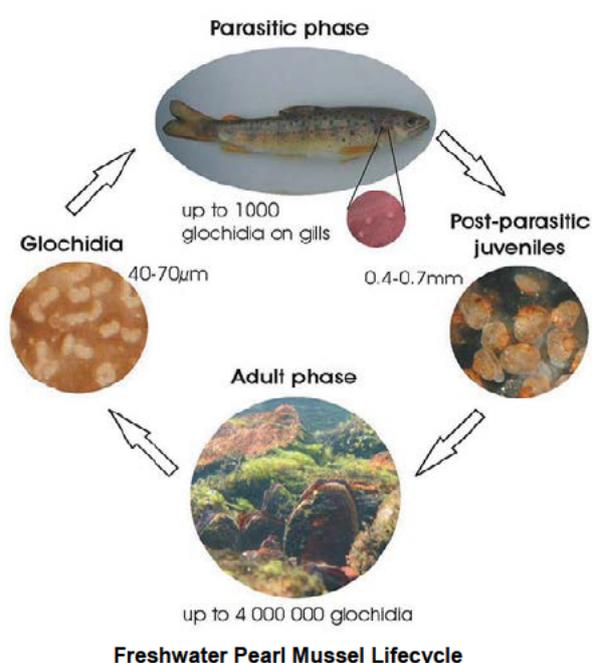
**This objective can be addressed under a number of actions:**

1. Provide advice to riparian landowners and managers with regard to sediment runoff to improve habitat quality within the River Esk catchment
2. Carry out freshwater pearl mussel surveys to determine population distribution, size and structure
3. Set up a captive breeding project
4. Identify suitable re-introduction sites within the River Esk catchment

### Introduction

The freshwater pearl mussel is one of the longest-lived invertebrates and can live for more than 100 years. Freshwater pearl mussels are found in fast running water with a mixture of sand and stones. They require nutrient-poor watercourses with low conductivity and a pH of less than 7.5. Formerly widespread and abundant in England and Wales, its numbers have severely declined due to habitat degradation, the decline in populations of the host fish salmon and trout, historic pearl fishing, pollution and water quality deterioration.

Within the NYMNP the freshwater pearl mussel is only found in the River Esk, in fact these are the last surviving populations within the whole of Yorkshire. The Esk mussels have not produced young for over 30 years, and it is likely that the Esk population will become extinct in the next 25 years unless action is taken to halt this decline.



The lifecycle of the freshwater pearl mussel is very complex and also very unusual. The male pearl mussels release sperm into the water, which is then filtered by the females. The eggs are fertilised, and develop in the female's breeding pouch before being released as larvae (known as glochidia). The glochidia are washed downstream, and if they are lucky they attach themselves to the gills of young salmon or trout. The young mussels develop on the gills of the fish for approximately nine months, before dropping off into the gravels. They then grow in the river bed and develop into juvenile pearl mussels. The juvenile mussels take about 15 years to mature, and during this time they are very sensitive to pollution and sedimentation.

The Esk Pearl Mussel and Salmon Recovery Project was set up in January 2008 to improve the river habitat, restore the pearl mussel population, increase populations of salmon and trout and to promote good land management within the catchment. This project involves a number of partners working together to address a wide range of issues within the Esk catchment. The project partners include the North York Moors National Park Authority, Environment Agency, Catchment Sensitive Farming, Natural England and Durham University.

### **Progress (2008-2012)**

- River restoration work has been carried out with 38 farmers/landowners in the Esk catchment. Work has been carried out to prevent sediment run-off and improve water quality through creation of buffer strips, fencing and tree planting.
- 727 pearl mussel records from new survey data.
- Captive breeding programme. 27 Esk mussels taken to FBA facility in 2007.
- Esk mussels released glochidia in 2008, 2011 and 2012 at the FBA facility, so far we have had no juveniles survive through to maturity.
- Detailed surveys carried out at potential re-introduction areas. Sonde has been installed to measure water quality. All areas require detailed redox surveys to determine interstitial conditions.

When the freshwater pearl mussel SAP was written in 2008 it was estimated that the entire population of the Esk consisted of no more than 200 or so individuals. With new freshwater pearl mussel surveys carried out along most of the River Esk (at the wadable sections) 727 mussels have been recorded between Castleton and Glaisdale. The vast majority of mussels are >100mm showing that they are large, old mussels. Two live mussels measuring ~80mm and 75mm were found but unfortunately the smallest (therefore the youngest) shell to be found measuring 57mm was empty.

The Esk Pearl Mussel and Salmon Recovery Project has been providing advice to many farmers and landowners. River restoration work has been carried out with 38 farmers/landowners in the Esk catchment, to prevent sediment run-off and improve water quality through the creation of buffer strips, fencing and tree planting.

A demonstration farm was set up in the River Esk catchment in 2008. This farm has been invaluable for running events for local farmers and angling clubs in the Esk valley. The farm showcases a range of different river restoration works such as fencing, watering points, pumps, troughs, tracks, wetlands, culverts, tree planting and buffer strips. Further improvement works have been carried out over the last 5 years including improvements to drinking points, gateways, and tracks. The farm is now in Higher Level Stewardship (HLS) (2011) with options to create buffer strips along watercourses, woodland creation and low input grasslands.

The Esk Pearl Mussel and Salmon Recovery Project has been carrying out a great deal of habitat restoration work. Below is a summary of the work carried out in the River Esk catchment.

- The Esk Pearl Mussel and Salmon Recovery Project has been working with Natural England to promote resource protection options in Agri-environment schemes in the Esk valley (6 new HLS agreements have incorporated resource protection options and/or capital works).
- River restoration work has been carried out on a total of 38 farms so far (total of 32 km of riverbank fencing and buffer strips created, and over 1300 trees have been planted).

- Catchment scale invasive plant eradication work is being carried out to remove Japanese knotweed and Himalayan balsam.
- Stonegate Beck, a major tributary of the Esk, is within the Catchment Sensitive Farming target area and a total of four farms received grants in 2010 to prevent diffuse pollution. A total of 5 farms in the Esk catchment received grants in 2011. A range of evening training events and farm walks have been held for local farmers such as nutrient planning, slurry/muck management, water management, soil/manure testing, good grassland management, water friendly farming and river restoration techniques.
- 18 whole farm plans have been carried out on key farms in the Esk catchment to identify on-farm infrastructure improvements, and to help farmers get grants for improvement works and training.
- Durham University have carried out water quality and sediment monitoring work in the Esk catchment since 2008 through PhD and MRes studentships. This has helped us to identify areas with water quality problems and to identify areas for river restoration work.
- An Esk catchment action plan has been drafted with a local steering group, the next stage is to get the actions in the plan included in the EA River Basin Management Plan.

For more information see the Rivers and Streams HAP Review, this is a complete review of work carried out to improve rivers and streams across the NYMNP.

## **Case Study**

### **Captive Breeding Programme**

In September 2007 the Environment Agency moved a number of the River Esk's pearl mussels to a captive breeding facility in the Lake District. In 2008, 2011 and 2012 the Esk mussels released glochidia, unfortunately no juveniles from the Esk have so far survived through to maturity.

Detailed surveys have been carried out at a potential freshwater pearl mussel re-introduction site. A water quality monitoring device has been installed at this site, and redox surveys are required to determine sediment conditions. It is hoped that juvenile pearl mussels from the captive breeding programme will be re-introduced to the River Esk in 5-10 years time.

Although we haven't seen any increase in mussel numbers, freshwater pearl mussels are incredibly slow growing and take about 5-6 years to emerge from the gravels to filter feed. Sampling for juveniles within the river gravels has not been carried out so far as it is a disruptive process and we don't want to damage their important habitat.

Further funding has been obtained from the "WREN - Biodiversity Action Fund," to continue work on the Esk until September 2014. The North York Moors National Park has committed to extend the project for a further year until September 2015.