



Lesson Plan 3: Nore Freshwater Pearl Mussel

An Chomhairle Oldhreachta
The Heritage Council



This lesson is part of a series of 8 lesson plans based on the “Explore the Nore” poster and River Nore Heritage Audit. It is aimed at 4th, 5th & 6th classes in primary schools. The project is an action of the Kilkenny Heritage Plan, and is funded by the Heritage Office of Kilkenny County Council and the Heritage Council. For further information contact dearbhal.ledwidge@kilkennycoco.ie. Tel: 056-7794925. www.kilkennycoco.ie/eng/Services/Heritage/

■ Learning objectives

SCIENCE

Strand: Living things; Strand unit: Plant and animal life

Strand: Environmental awareness and care;

Strand unit: Environmental awareness

GEOGRAPHY

Strand: Natural environment;

Strand unit: The local natural environment;

Strand unit: Land, rivers and seas of Ireland

Strand: Environmental awareness and care;

Strand unit: Environmental awareness;

Strand unit: Caring for the environment

Content objectives

- explore the environmental repercussions of human actions on physical, natural and human environments
- understand the interdependence of a wide variety of living things and their environments, recognise the importance of conserving habitats and environments, and begin to understand that all life now and in the future depends on the sustainable development of the planet

Skills and concepts to be developed

- questioning
- observing
- investigating and experimenting

■ Learning activities

The Nore freshwater pearl mussel – unique in the world

The Nore freshwater pearl mussel (*Margaritifera durrovensis*) is not known to occur anywhere else in the world; in fact the species name, *durrovensis*, comes from Durrow in Co. Laois. The freshwater pearl mussel *Margaritifera margaritifera* lives in soft (acid) waters in rivers in Ireland, Europe and North America; the Nore mussel is only found in the hard (limestone) waters of the River Nore. Both species are strictly protected under Irish and EU wildlife law. There are about 500 individual adult Nore pearl mussels left alive in the world today and these all live in a short stretch of river between Abbeyleix and

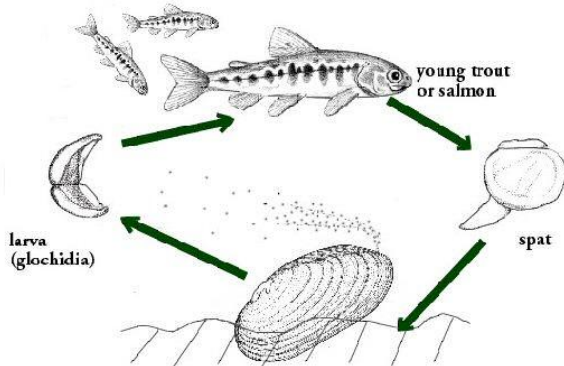
Text by: Mieke Muylaert, Ecologist

Ballyragget.

Life cycle of the freshwater pearl mussel

The freshwater pearl mussel has an amazing life cycle. The tiny baby larvae are released by the adult and have to attach to the gills of a passing trout or salmon, where they stay and grow until they are big enough to drop off as young mussels, attaching themselves to a suitable spot on the river bed, where they grow to adult size. This takes about 10-15 years. They can live to be 100 years old or more. Their scientific name comes from the Latin words **Margarita** meaning pearl, and the verb **Fero** meaning to bear or carry, as the mussels sometimes make pearls.

Freshwater pearl mussel life cycle diagram



The larvae released by the adult mussel attach to the gills of the fish. When they are big enough the baby mussel releases into the water and attaches itself to a suitable spot on the river bed.

Will there still be Nore pearl mussels when this class is grown up?

The Nore pearl mussel is threatened with extinction. This is because there is too much fine sediment floating in the river water. This is caused by the intensive human use of the river catchment, particularly the number of direct drains into the river, including those from the surrounding agriculture, the commercial peat cutting upstream, and the intensive forestry at the top of the catchment. These levels of sediment are unsustainable for a species as sensitive as the pearl mussel. The mussels 'clam up' to avoid getting clogged with this sediment, but then they cannot feed. This is causing the adults to die out much quicker than they should. Too much sediment on the river bed also kills young mussels, so there is no new generation to grow up and replace the old ones when they die. A captive breeding programme is under way in a trout hatchery in Co. Tipperary, which is successfully raising new baby mussels. The question is whether the water quality of the Nore can be improved in time for these mussels to be released successfully.

■ Linkage and Integration

■ Differentiation

- **Investigate local water quality on the internet**

Go to www.epa.ie – EPA maps – the links for the Envision environmental maps. Zoom in on Kilkenny. In the Table of Contents beside the map, click on Water Bodies – Rivers group – then click the box for rivers. This will turn on the Rivers layer on the map. Zoom in on a river near where you live. Then find out how clean the water is by clicking on Surface Water Quality and turning on the River Water Quality layer. Links to Water and Biodiversity themes in Green Schools programme.

- **Investigate local water quality on a field trip**

See what creepy-crawlies are living in your river (or visit the Nore at the Linear Park in Kilkenny). Put some river water in a white bucket or tray. Using a pond net, scoop out some stones and mud and put them in the container. Use the bug dial (<http://www.ipcc.ie/bicbugdial.pdf>) to help identify what creepy-crawlies you have and find out what kind of river they like to live in (polluted or not). (Note: please observe appropriate health and safety precautions and only access land with permission).

- **Get an overview of water quality in Ireland and what causes pollution**

Go to <http://www.epa.ie/environmentinfocus/> and click on Water for background information. Use the Environmental indicators dashboard to see ‘traffic light’ indicators of how Ireland is doing on different aspects of water quality.

■ Resources

Nore Heritage Audit Vol. 1, pages 53-54

External references

<http://fwpm.irish-surge-forecast.ie/> - an Irish freshwater pearl mussel conservation project with photos and information (note this is the soft water species, *Margaritifera margaritifera*). A good resource for further class research on mussel biology and conservation.

www.npws.ie/publications/archive/IWM8.pdf - Irish Wildlife Manuals No. 8 published by National Parks & Wildlife Service – scientific overview of the freshwater pearl mussel in Ireland including diagrams of life cycle. Detailed document useful for interested teachers/pupils and for projects.

<http://www.arkive.org/freshwater-pearl-mussel/margaritifera-margaritifera/> - concise information on freshwater pearl mussel in a global context, including biology and life-cycle and conservation.

www.greenschoolsireland.org/ - Links to “Water” and “Biodiversity” themes in Green Schools programme

Where to see: unfortunately the mussels cannot be seen in the wild and health and safety/insurance issues preclude a visit to the hatchery. The following link shows freshwater pearl mussel conservation in Kentucky, with a similar approach to that being used on the Nore conservation project.

<http://www.youtube.com/watch?v=UaKjXGbgazo&feature=related>

■ **Evaluation**