

Last chance for the Freshwater Pearl Mussel?

What are they?

Freshwater pearl mussels are large mussels that can grow to over 15cm long and live for more than a century. They live in clean, fast-flowing rivers, partially buried in coarse sand or fine gravel. They feed by filtering fine organic particles carried by the river. Able to filter about 50 litres of water a day, pearl mussels help to clean the river when occurring in large numbers.

Freshwater pearl mussels have been a feature of the River Esk since the end of the last Ice Age. Formerly widespread in the UK, they are now very rare and the River Esk is the only river in Yorkshire which supports the species.

Why are they rare?

Freshwater pearl mussels have declined because they were killed for the pearls they sometimes contain. This decline has continued due to increasing amounts of sediment and nutrients carried in our rivers. Sediments clog the voids between the sand and gravel substrate, and nutrients encourage algal growth which can prevent the establishment of young mussels.

The lottery of life

During summer, a female pearl mussel produces between one and four million larvae known as glochidia. Almost all are swept away, but a few are inhaled by juvenile brown trout or Atlantic salmon. Glochidia attach to the fishes' gills and grow in this oxygen-rich environment until the following spring, when they detach. To have a chance of survival they have to establish in gravels that are silt free and in waters low in nutrients. A clean, silt and pollution free river with a healthy salmon and trout population will not only increase the fishing value of the river but will also be good for pearl mussels.



What is being done?

The North York Moors National Park Authority, the Environment Agency, Yorkshire Esk Rivers Trust and the Catchment Sensitive Farming Initiative are working together to help conserve freshwater pearl mussels in the River Esk. Supported by a wide range of funding, farmers and land managers are working to restore pearl mussel habitat. It is likely that a slow recovery may take place if the threats are removed. Other projects include soil and watercourse workshops, awareness raising with schools, river restoration work, and a captive pearl mussel breeding programme.



Riverbank Tree Management – Light Means Life

Traditionally riverbank trees were managed by coppicing and pollarding. The timber produced provided a range of useful products including clogs, firewood, charcoal, gunpowder and fencing materials. With declining markets, coppicing has largely ceased, resulting in over-mature and uniformly aged trees which deprive rivers and banks of sunlight. However, promoted by agri-environment schemes, coppicing is slowly making a comeback, along with the wildlife encouraged by these restored habitats.

The Benefits of Coppicing and Pollarding

- Creates a mosaic of light and shade beneficial to a wide range of plants and animals.
- Rejuvenates diseased and over-mature trees to help bind riverbanks.
- Encourages bank-side grasses and shrubby growth to help stabilise banks.
- Prevents erosion and over-widening by limiting the formation of 'erosion bays' and undercut banks.
- Re-vegetated banks help narrow the river channel, increasing flow velocity to 'scour' silted riverbeds.
- Coppicing is the only known control for alder disease.

Coppicing and Pollarding – Good Practice

- Coppicing is best undertaken during winter months – October to March.
- Check for the presence of protected species before starting work – consult relevant authorities.
- Strike a balance between light and shade – aim for more light over shallows and more shade over pools.
- Avoid cutting back to old growth.
- Dispose of brush carefully – do not burn near to the river and remove ash from the site.
- Retain old and veteran trees for wildlife and landscape value.
- Do not use heavy machinery on riverbanks and in river.
- Use vegetable-based chain oil in chainsaws.

What's in it for the farm?

- Increased capital value of holding.
- Significant improvements in water quality - reduced risk of pollution and prosecution.
- Savings in reduced fertiliser applications and losses to the river.
- Cleaner animals, reduced lameness and infection.
- Improved stock handling.
- Improved fisheries benefit the local economy.
- Promotes good relationships with neighbours.
- Tree management can produce a sustainable timber/firewood crop.
- Improved wildlife and recreational value.

Help and Advice

There is lots of support to help manage our rivers and streams. Help to gain consents, capital grants, deal with the paperwork and provide advice. It's all out there and often free.

North York Moors National Park Authority 01439 772700

Catchment Sensitive Farming Initiative 0300 060 1901

Environment Agency 03708 506 506

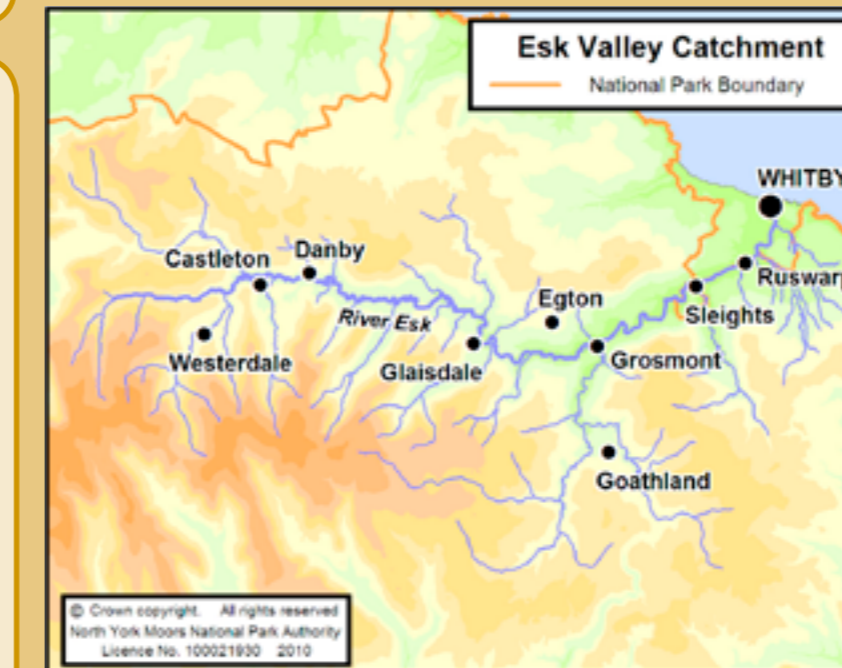
Yorkshire Esk Rivers Trust 01430 423647

Natural England 0300 060 3900

Forestry Commission 01904 448778

Who to Contact: Keeping it legal

- Work on, or affecting a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) or Special Protection areas (SPA) will require Natural England consent.
- Any work that will affect protected species may require a licence from Natural England.
- Work that will affect a scheduled ancient monument will need advice from English Heritage.
- Consult the Environment Agency before undertaking work on or in a main river. On non main rivers consult your Local Authority.
- An Environment Agency licence is required if spraying herbicides near to or on any watercourse.
- A felling licence may be required from the Forestry Commission if more than 5m³ of timber is coppiced in a calendar quarter.



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River Esk WATER FRIENDLY FARMING Good Practice Guide



WATER FRIENDLY FARMING

Water Friendly Farming can help protect our rivers and streams, and can help make farm businesses more effective and efficient. Good land management and farm practice will improve soil protection, reduce fertiliser and pesticide use and can also improve animal health. This can result in both cost savings and environmental improvements.

Livestock and Rivers

Where stock have free access to the river, water quality can be poor.

Poached soil leads to erosion, over-wide channels and shallow watercourses. This is compounded by compaction of soil, in turn leading to greater runoff and the deposition of fine silt on the riverbed. Silt robs the riverbed of oxygen by blocking the spaces between the gravels, significantly reducing the number of invertebrates, pearl mussels and fish eggs. Uncontrolled stock access also adds animal wastes to the rivers which causes pollution..

Fencing watercourses can help reverse this decline

- River bank vegetation is re-established, helping to reduce erosion.
- Establishes a buffer strip between rivers and fields that intercepts soil run off.
- Reducing soil run-off helps to keep important nutrients on the land, often reducing the need and cost of using fertiliser.
- Keeping livestock out of rivers may help reduce the spread of waterborne disease.
- Failing to address soil erosion or complete a 'Soil Protection Review' can affect single farm payments.
- Allowing polluting material to enter a river or stream is also an offence which can attract large fines.

Fencing and Stock Watering Good Practice

- Set fencing at an appropriate distance from the river (banktop height or greater).
- Align fencing parallel to flow and build in weak points at areas of risk.
- Temporary electric fencing or three lines of wire may be more appropriate than stock netting in areas of high flood risk.
- Make provision for gated access, to allow control of invasive vegetation by topping or occasional grazing by livestock.
- Access ramps should be sited on slope no more than 1:6 and should be surfaced with local stone held in place at the toe of the bank with untreated timber or similar.
- Locate water troughs away from watercourses.
- Provide hard base around the trough to minimise poaching.
- Troughs should be used in preference to drinking bays.

Alder Disease

Alder is vital to the health of our rivers, helping to stabilise riverbanks and to provide food and cover for a host of aquatic and riverbank wildlife.

During the early 1990s, riverside alders throughout Europe started to die. Symptoms included crown dieback, abnormally small, sparse and yellowing leaves and tarry exudates from the base of the tree. The culprit was found to be an entirely new species of *Phytophthora*, a fungus related to potato blight. Spread by free-swimming spores, it is now a serious problem throughout the Esk catchment.

Eradication of the disease is not possible as the spores survive in the soil and root system of infected trees. Coppicing is the only method of control as this encourages regeneration of new growth and prevents the tree from becoming unstable. Even severely affected trees respond well to coppicing.

Ditch Management

Ditches often form a direct route between the farmyard and the river and can be a path by which fertilisers or chemicals enter a river. Ditches can act as a buffer to filter silt and pollutants before they reach the river. Frequent clearing can disturb this filter.

Good Practice

- To reduce the need for frequent dredging, fence ditches to prevent bank erosion. Bank side vegetation will help intercept run-off.
- At field corners consider creating small ponds or filter beds to encourage settlement of silt.
- Phase dredging operations over several years rather than clearing the entire length.
- Avoid spreading fertiliser and pesticides near to ditches.

Issues

1. Poorly maintained yard and buildings – no rainwater goods, uncovered stock gathering areas resulting in clean and dirty water mixing.
2. Silage clamp located next to ditch increases potential for leachate to drain to river.
3. Poorly maintained farm/cattle tracks and gateways encourage runoff to ditches and river.
4. Neglected, over-mature riverbank trees – heavy shade suppresses vegetation and encourages erosion.
5. Poorly sited livestock feeder – poached and prone to runoff to river.
6. Uncontrolled stock access resulting in trampled and eroded riverbanks.
7. Arable field on steep slope – no buffer between field and river, no in-field grass or shrub buffer to help intercept runoff.
8. Collapsed willow - identify willows at risk and pollard.

Large Woody Debris

Large woody debris - the branches and root boles that collect in a watercourse are often removed because they are unsightly or thought to cause erosion and flooding.

Whilst this is sometimes true, large woody debris is in fact a valuable asset to the river and can if managed correctly help to reduce erosion and benefit wildlife.

- It can be difficult and costly to remove woody debris from the river. Instead, if it is pinned to the bank it will help to reduce erosion - by stabilising riverbanks.
- LWD Creates diverse flow conditions that can improve water quality and encourage natural flows that enable the river to self clean.
- It creates niche habitats and cover valuable to fish.
- Woody debris provides valuable resting sites for otter, grey wagtail and dipper.

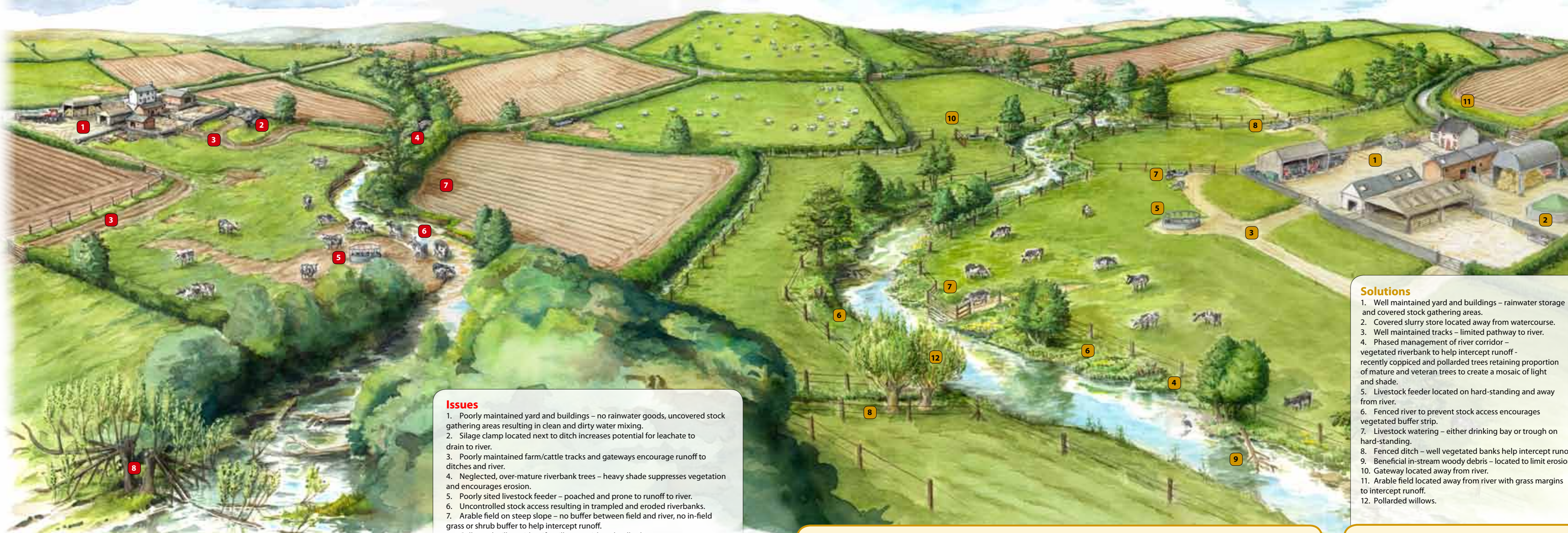
Controlling Riverbank Erosion

Riverbank erosion is largely a natural process. However in recent times erosion has accelerated through the loss of riverbank alder (diseased and over-mature) and uncontrolled stock access.

Eliminating the cause of erosion is essential before embarking on riverbank protection works. Where erosion is sustained it may be necessary to consider revetment.

Revetment – Good Practice

- Environment Agency consent may be required before working within or near the watercourse.
- Use soft revetment eg willow spilling, brush, coir matting, pinned conifer tops.
- Hard revetment should be avoided.
- Revetment should follow the natural line of the river.
- Opportunity to incorporate wildlife features eg pipes buried into banks to encourage water voles.



Good Practice Guide

Controlling Runoff at Source

Clean and Dirty Water Separation

- Ensure guttering, downspouts and underground pipe work are in good order – consider storage of this clean water as an alternative to more expensive sources.
- Ensure that rainwater from rooftops is kept away from stock gathering areas trackways and manure stores.
- Consider roofing stock gathering areas to minimise the production of dirty water.

Livestock and Vehicle Movement

- Minimise poaching through the provision of 'cow tracks'.
- Site feeders on hard-standing areas on higher ground away from watercourses and move regularly to avoid poaching.
- Identify erosion pinch points to reduce poaching – install cross drains in tracks, move or resurface erosion prone gateways, resurface farm tracks, install watercourse crossings.

Managing Soils

- Implement soil, crop and nutrient plans for the farm – identifying areas of erosion and runoff risk will help safeguard the most valuable resource on the farm.
- Consider regular soil nutrient testing to help reduce fertiliser costs.
- Capping and compaction encourage rapid runoff - check soils regularly.
- Avoid cultivation when soil is too moist.
- Avoid vehicle movements/wheel ruts on wet soil.
- Utilise a cropping sequence to ensure ground coverage throughout the year.
- Where erosion is severe consider alternative uses for the land.
- Consider permanent vegetation (hedges, woodland, grass buffers) on steep slopes, natural drainage-ways at risk from gully erosion, long unbroken slopes, wet soils in difficult corners and alongside watercourses.

Solutions

1. Well maintained yard and buildings – rainwater storage and covered stock gathering areas.
2. Covered slurry store located away from watercourse.
3. Well maintained tracks – limited pathway to river.
4. Phased management of river corridor – vegetated riverbank to help intercept runoff - recently coppiced and pollarded trees retaining proportion of mature and veteran trees to create a mosaic of light and shade.
5. Livestock feeder located on hard-standing and away from river.
6. Fenced river to prevent stock access encourages vegetated buffer strip.
7. Livestock watering – either drinking bay or trough on hard-standing.
8. Fenced ditch – well vegetated banks help intercept runoff.
9. Beneficial in-stream woody debris – located to limit erosion.
10. Gateway located away from river.
11. Arable field located away from river with grass margins to intercept runoff.
12. Pollarded willows.

