

The role of River Trusts in the restoration and protection of ecological function at the catchment-scale



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CIEEM Ireland Conference
Athlone

the umbrella body of the rivers trust movement

where there's **water**, there's **life**

A person with long brown hair tied back, wearing glasses and a dark jacket, is sitting on a rocky riverbank. They are looking down at their hands, which are resting on their lap. The background shows a calm river flowing through a landscape with bare trees and dry grass, suggesting an autumn or winter setting. The lighting is warm and golden, indicating it might be late afternoon or early morning.

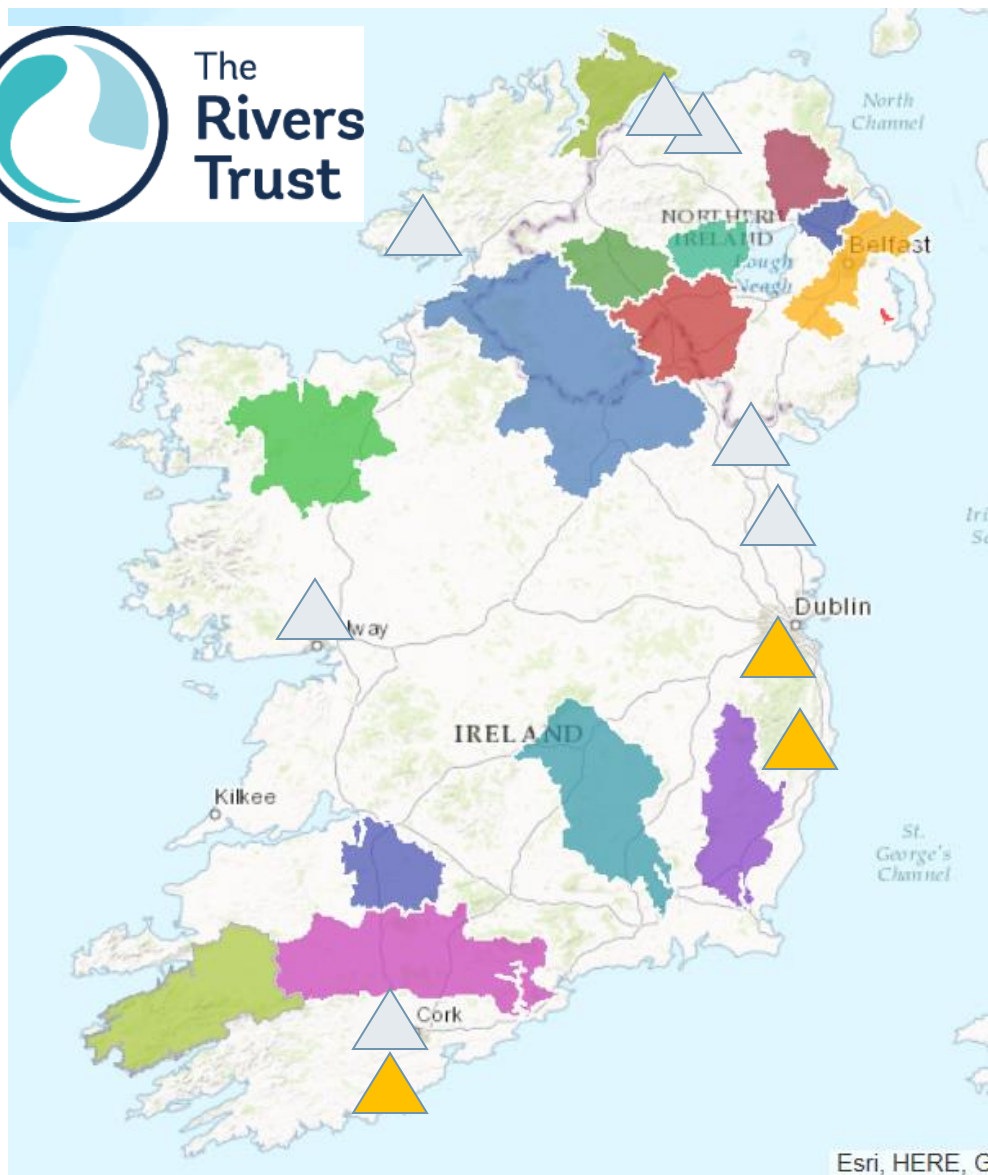
We are the umbrella body of the rivers trust movement, working to protect, promote and enhance our freshwater ecosystems for both people and wildlife

the umbrella body of the rivers trust movement

where there's water, there's life



The
**Rivers
Trust**



Rivers Trusts

- Ballinderry Rivers Trust
- Blackwater Rivers Trust
- Dibney River Conservation Trust
- Erne Rivers Trust
- Inishowen Rivers Trust
- Lagan Rivers Trust
- Maigue Rivers Trust
- Maine Rivers Trust
- Moy Catchment Association
- Nore Rivers Trust
- River Blackwater Catchment Trust
- Six Mile Water Trust
- Slaney Rivers Trust
- Strule Tributaries and Rivers Trust
- Waterville Lakes & Rivers Trust



The
**Rivers
Trust**

Interest in trust development

Fane/Dundalk Bay
Boyne River
Dodder River
East Wicklow River
River Lee
Bandon River
Galway Bay/Area
Owenea/Owentocker Rivers
River Roe
Agivey & Macosquin Rivers

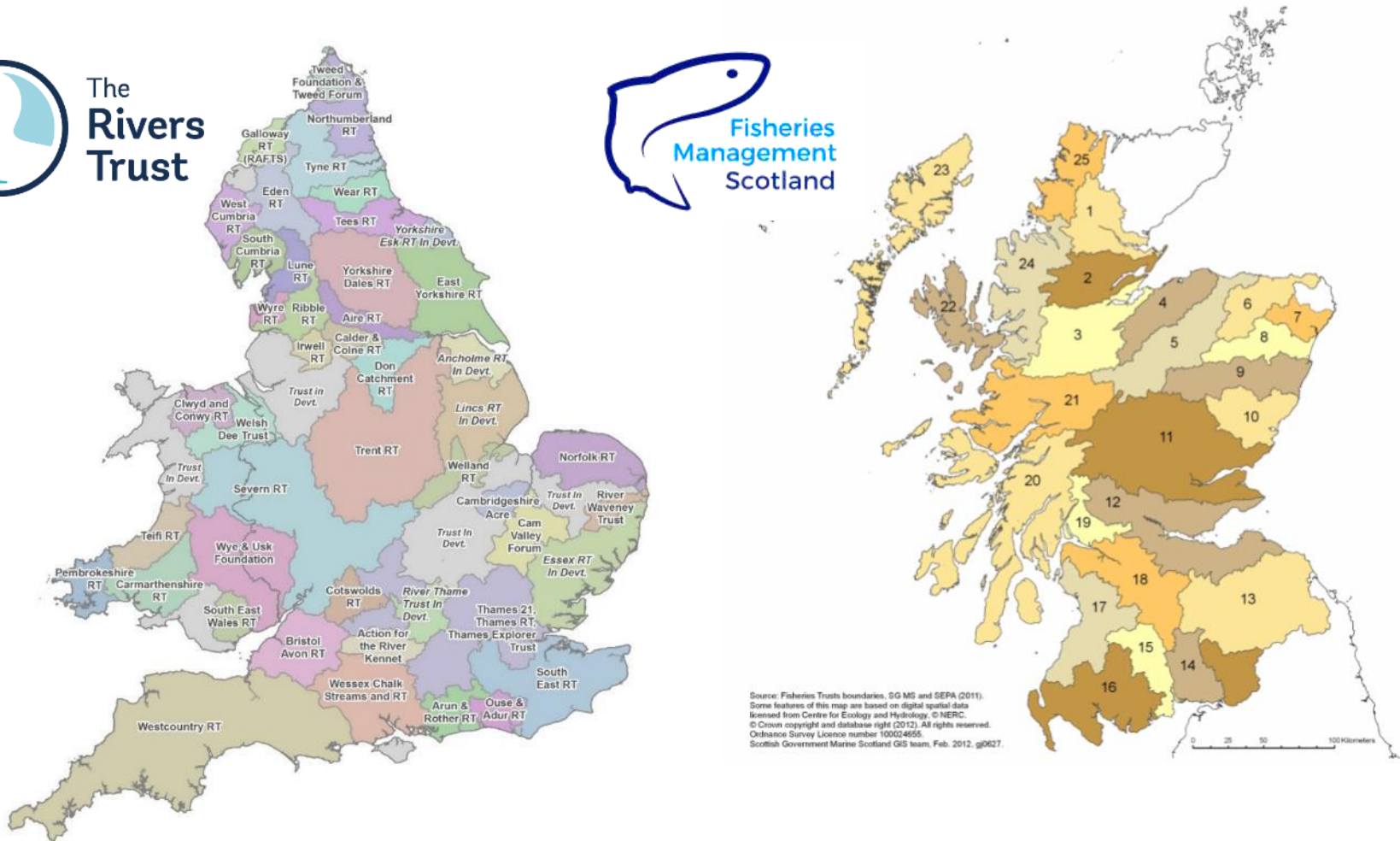
the umbrella body of the rivers trust movement

where there's water, there's life

Purpose

1. To conserve, protect, rehabilitate and improve
2. To advance the education of the public

Local action...national impact



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where there's water, there's life

Charities established to look after a whole river catchment or area with a number of waterbodies

Catchment-based approach

Evidence-based action

Partnership working

Recognised as river basin based deliverers

Contributing to local and EU Objectives

What are Rivers Trusts?

'wet feet' organisations
not lobbying organisations

A grassroots
"bottom up"
movement

Empowering People
Partnership Working

Identifying new funding sources
and redirecting existing funds to
be more effective

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where there's water, there's life

Integrated catchment management

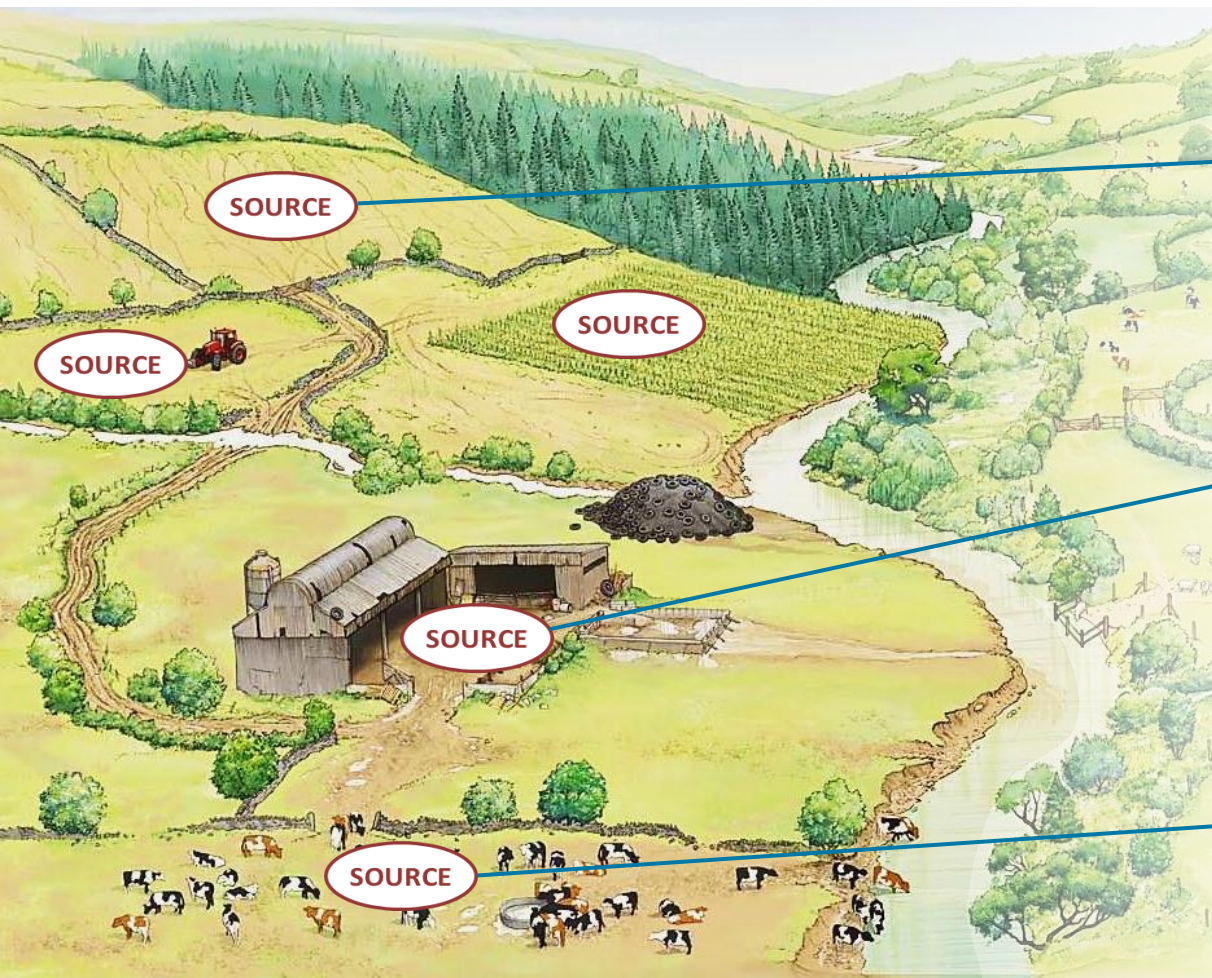


SOURCE

PATHWAY

RECEPTOR

Pollutant Level + Mobilisation + Connectivity = Pollution risk

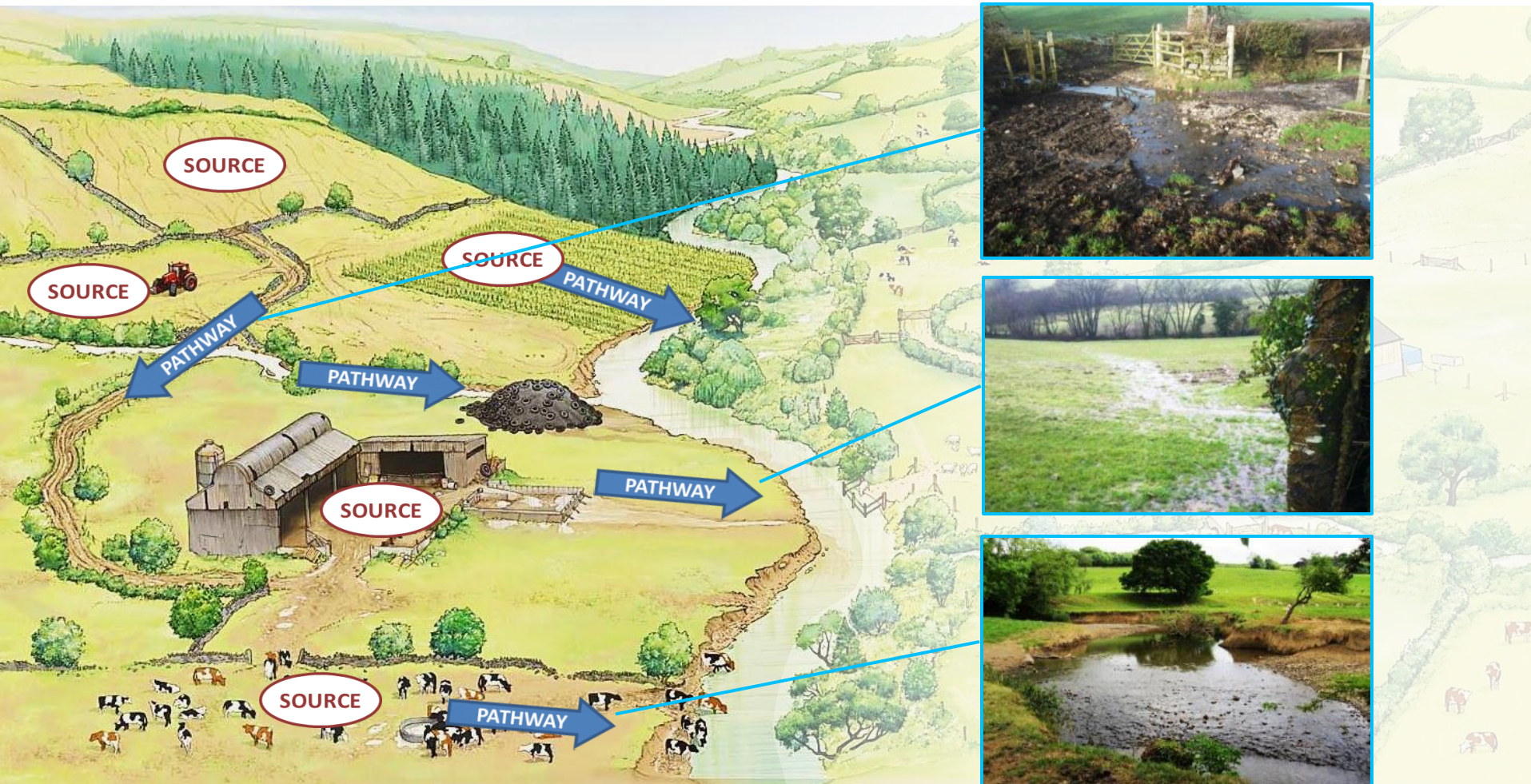


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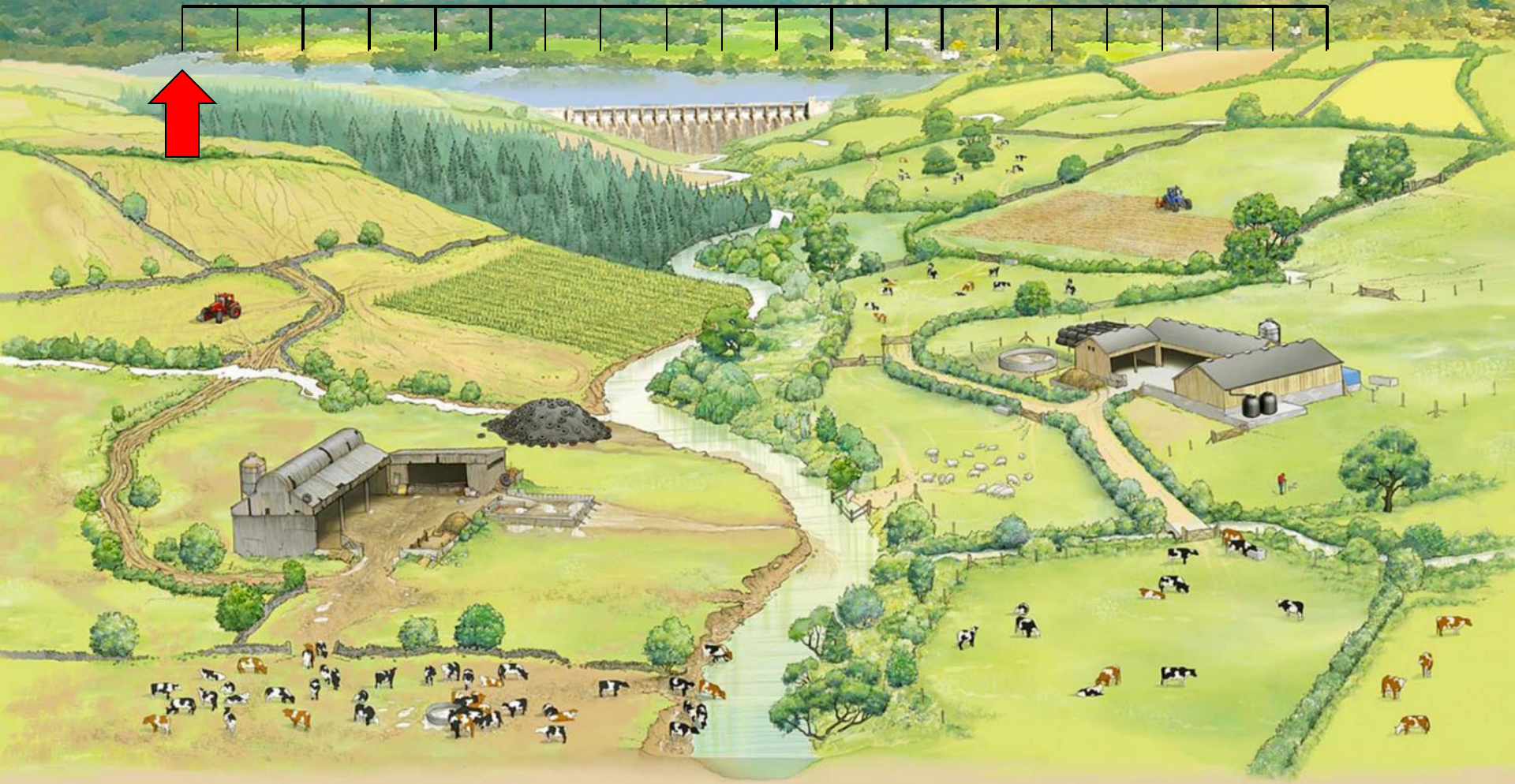
PATHWAY

RECEPTOR

Pollutant Level + Mobilisation + Connectivity = Pollution risk



Environmental Sustainability Meter

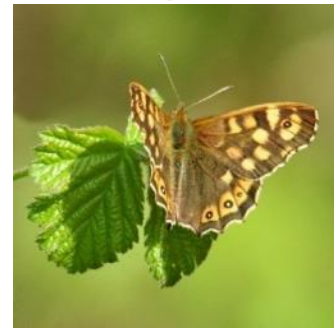


The Ecosystem Approach



Managing the environment is really
about managing people...

Nature can usually manage itself...

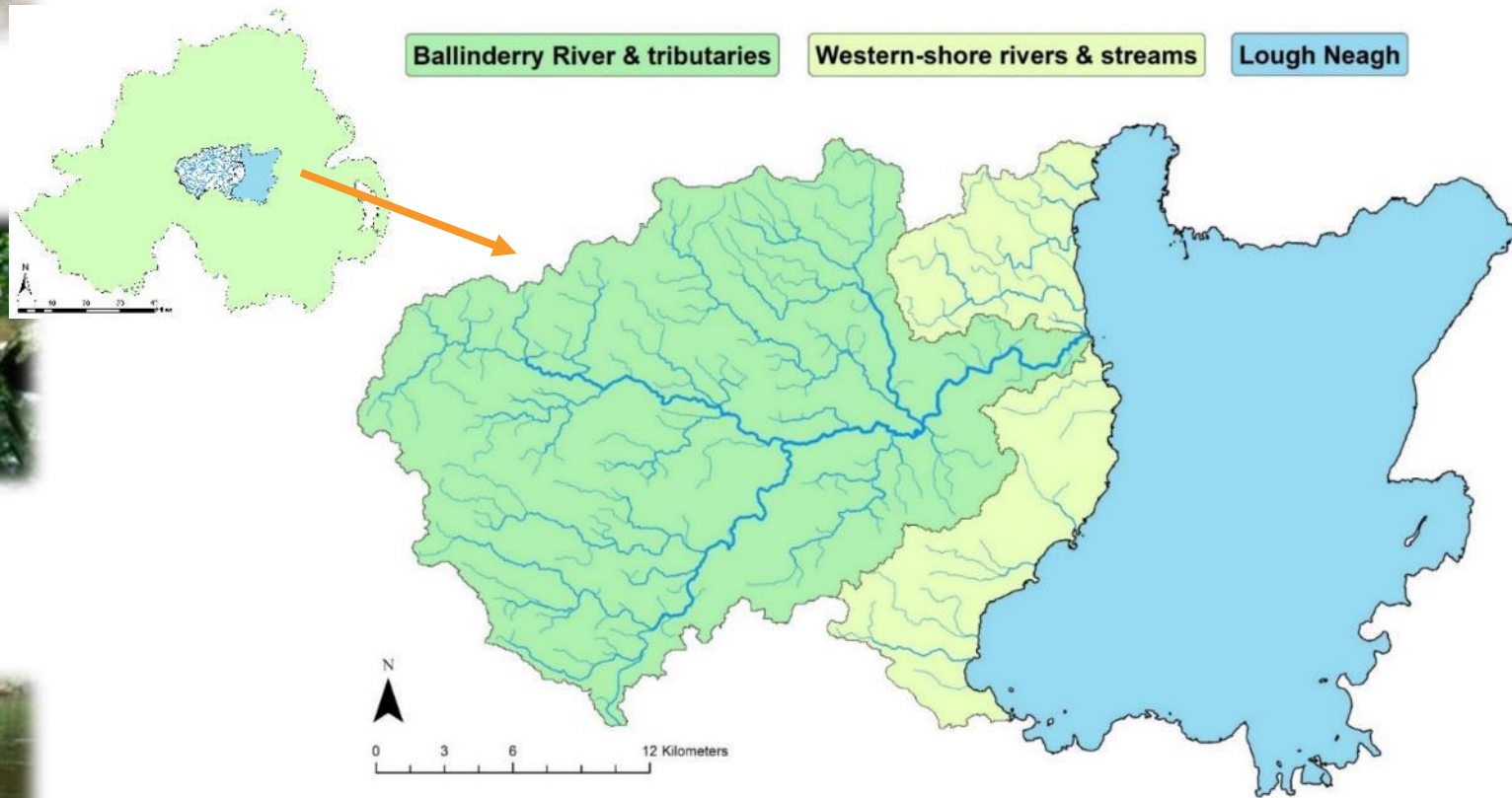


Ballinderry Rivers Trust

Case study

*Restoration of catchment-scale
ecological function for the
freshwater pearl mussel*

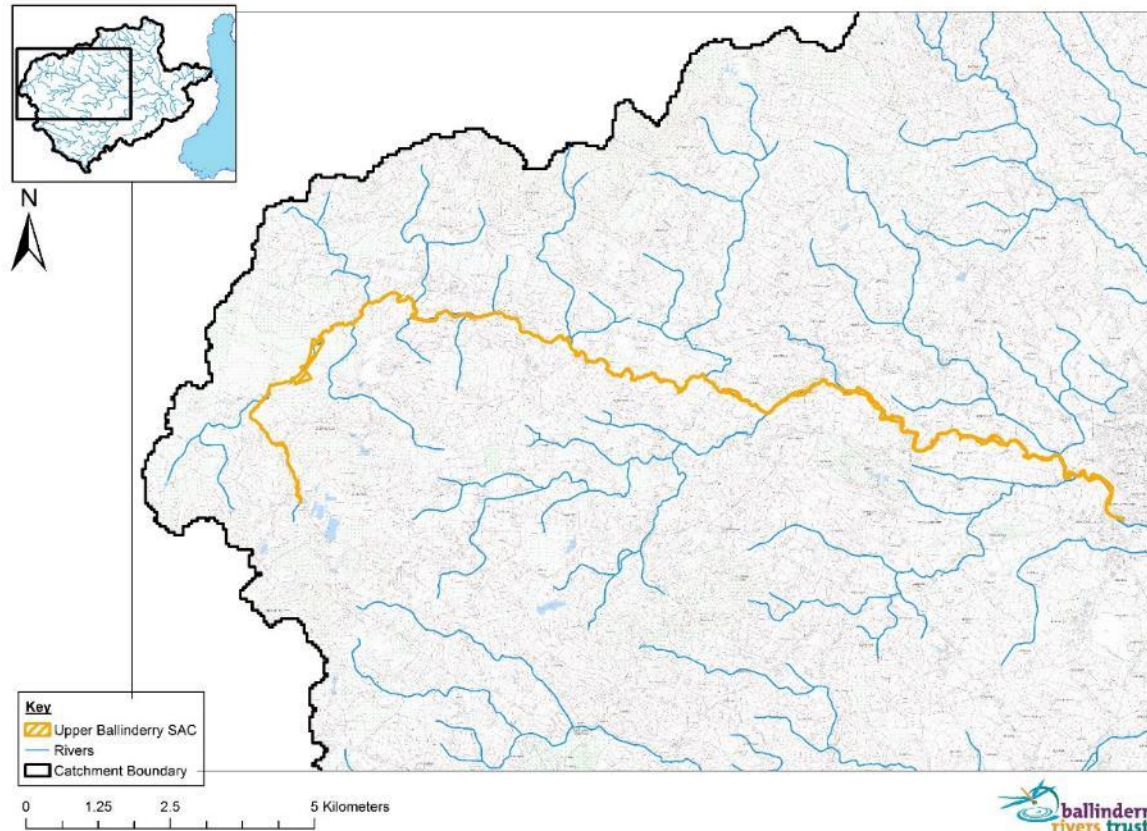
Ballinderry Rivers Trust



Ballinderry Rivers Trust is dedicated to the conservation, protection and improvement of the rivers and loughs of the Ballinderry River catchment, the western-shore streams of Lough Neagh, and Lough Neagh itself.

Local rivers of global importance

- Upper Ballinderry River Area of Special Scientific Interest (ASSI)
- Upper Ballinderry River Special Area of Conservation (SAC)
- Lough Neagh Special Protection Area (SPA) & RAMSAR site



Freshwater Pearl Mussel

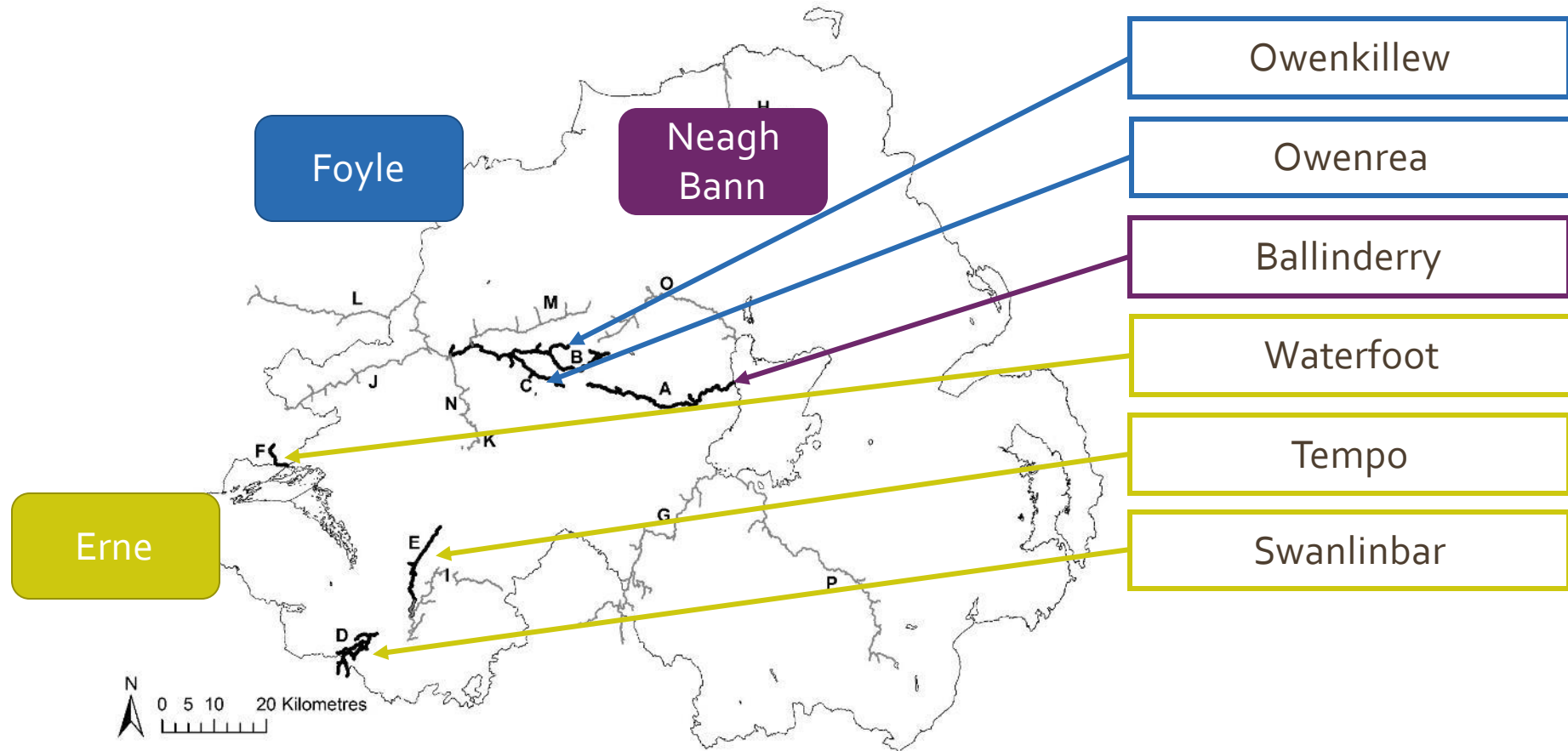


Otter



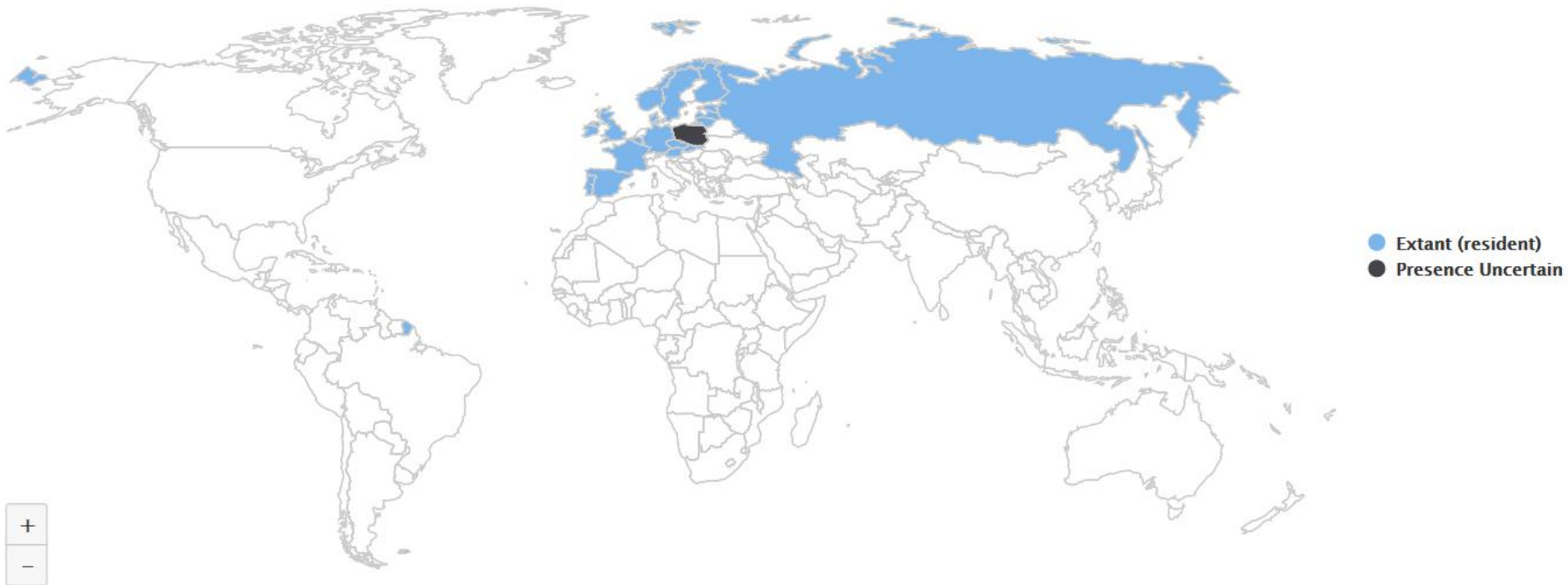
Stream Water-crowfoot

Northern Ireland's last freshwater pearl mussel rivers

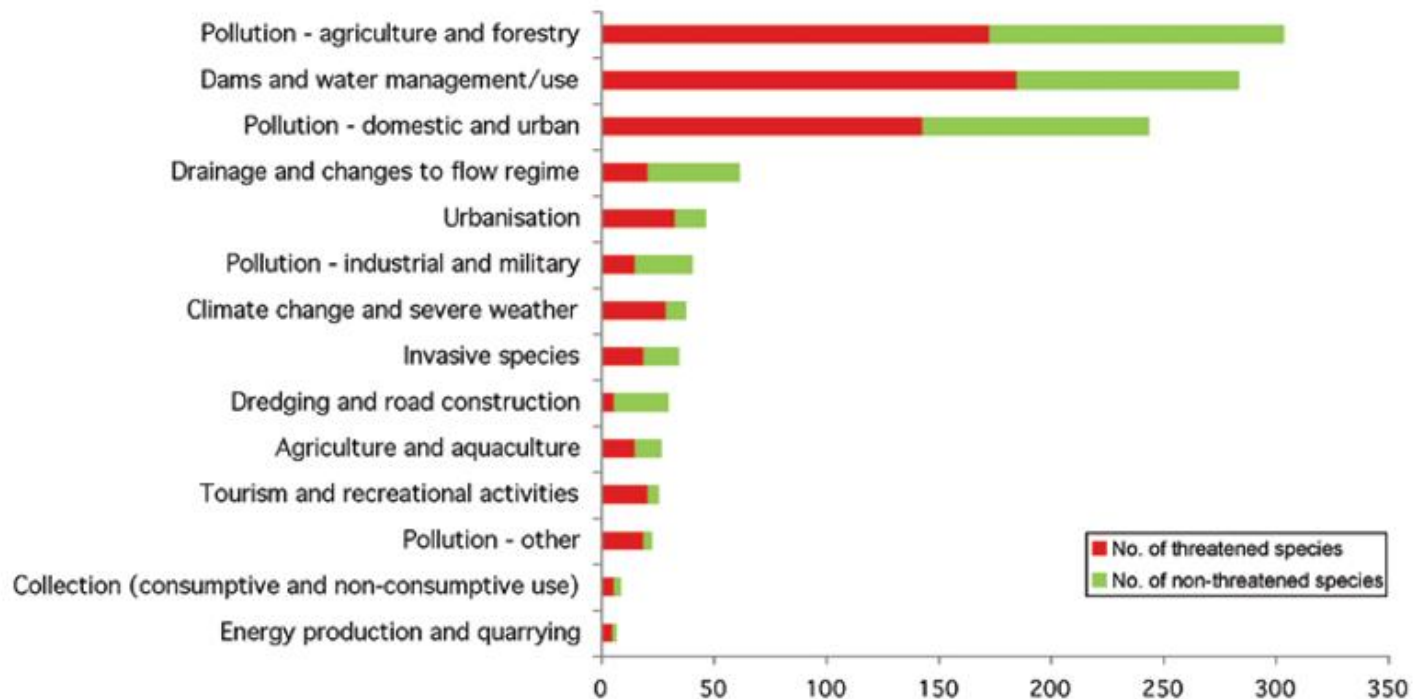


Global (Holarctic) range of *M. margaritifera*

Countries of Occurrence (Country Units only)

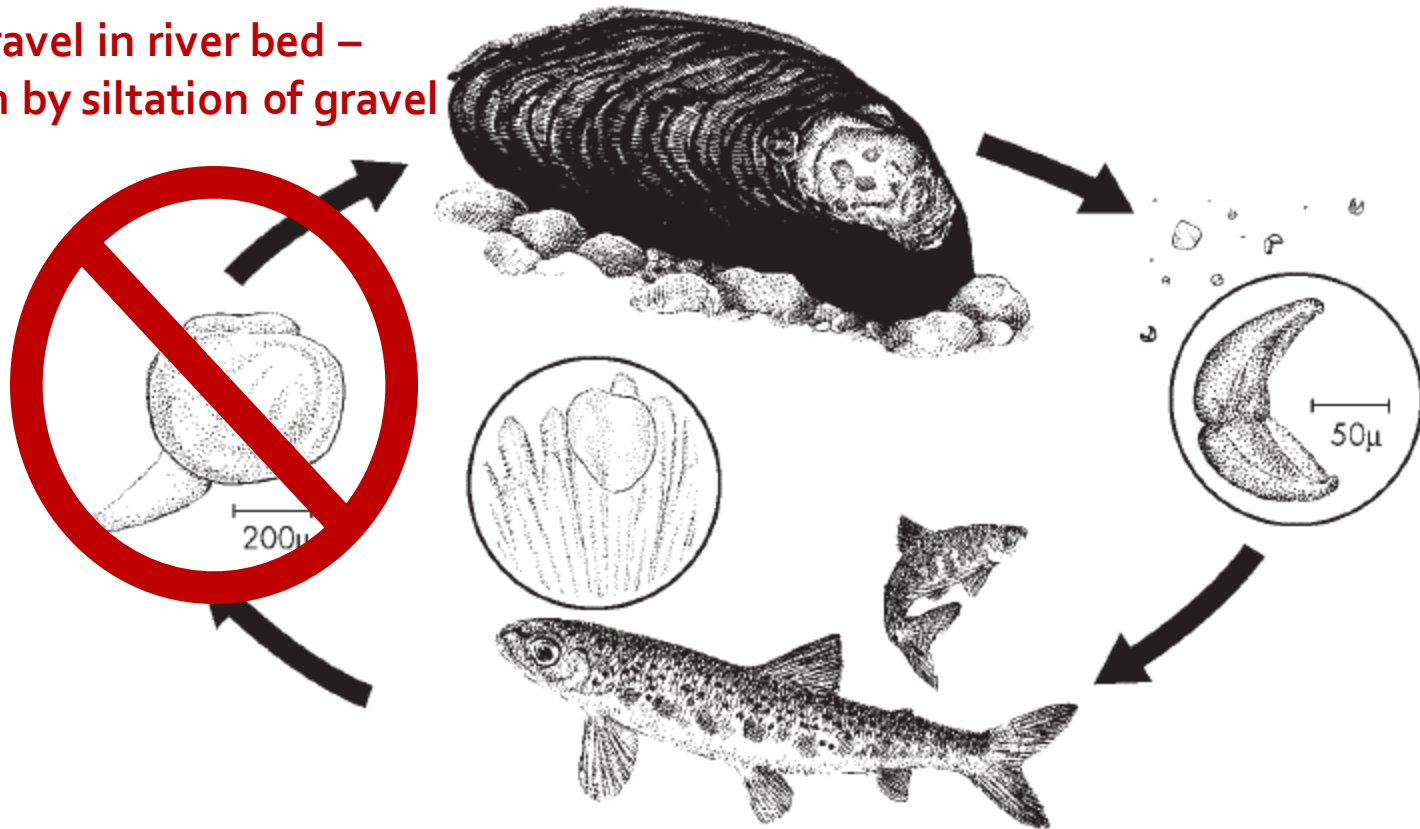


Threats to *M. margaritifera*



The freshwater pearl mussel has a unique lifecycle involving trout and/or salmon

First four years of life buried beneath gravel in river bed – suffocation by siltation of gravel

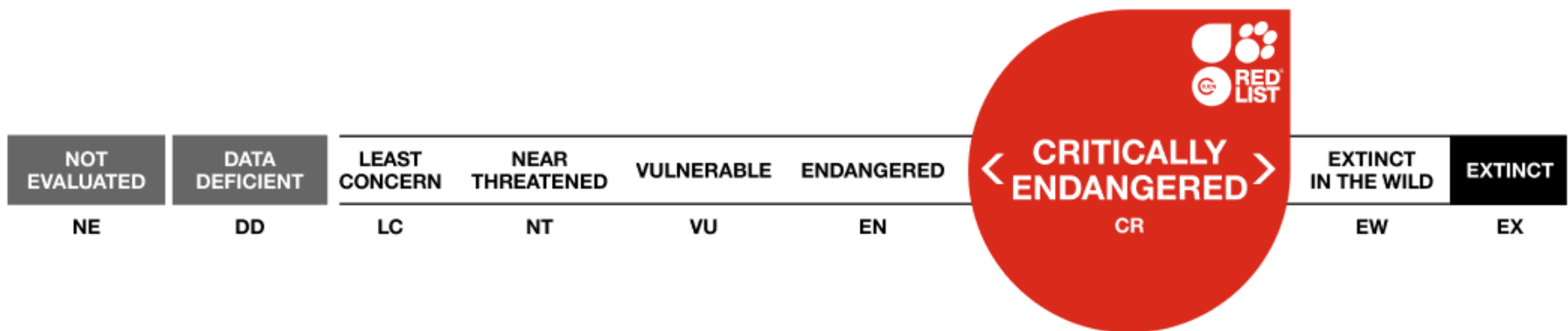


Sarah Wroot

Global Conservation Status

Of the 840 known freshwater mussel species on the planet (Graf & Cummings, 2007), the *M. margaritifera* (L.) is considered to be one of the most endangered (Machedorm *et al.* 2003).

Most populations are extinct or on the verge of extinction (Moorkens)





~1,500

wild freshwater pearl
mussel left in the river





40

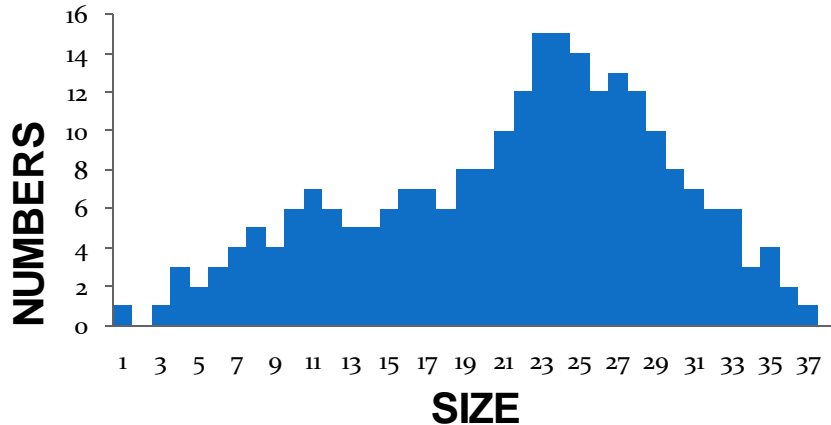
years before the
Ballinderry freshwater
pearl mussel becomes
extinct (without
intervention)

[Wilson, 2010]

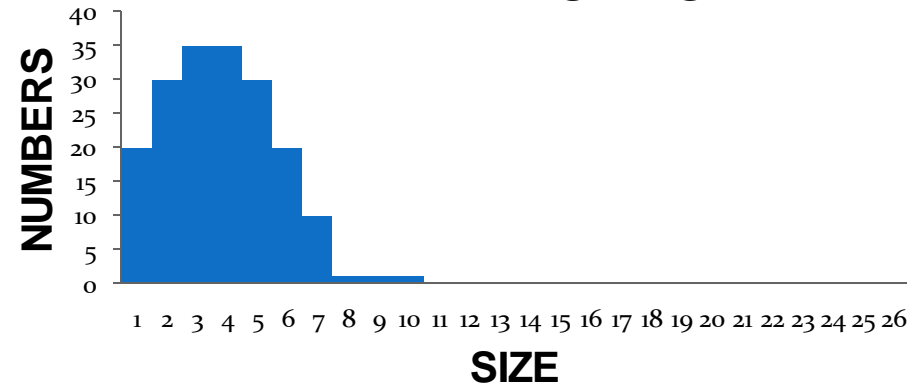
What represents an 'ideal' population profile for *M. margaritifera*?

Young *et al.* 2000

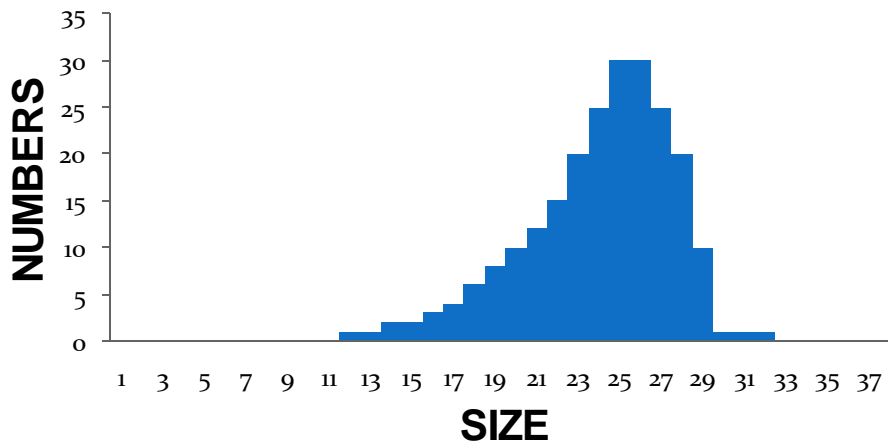
UNIMPACTED POPULATION



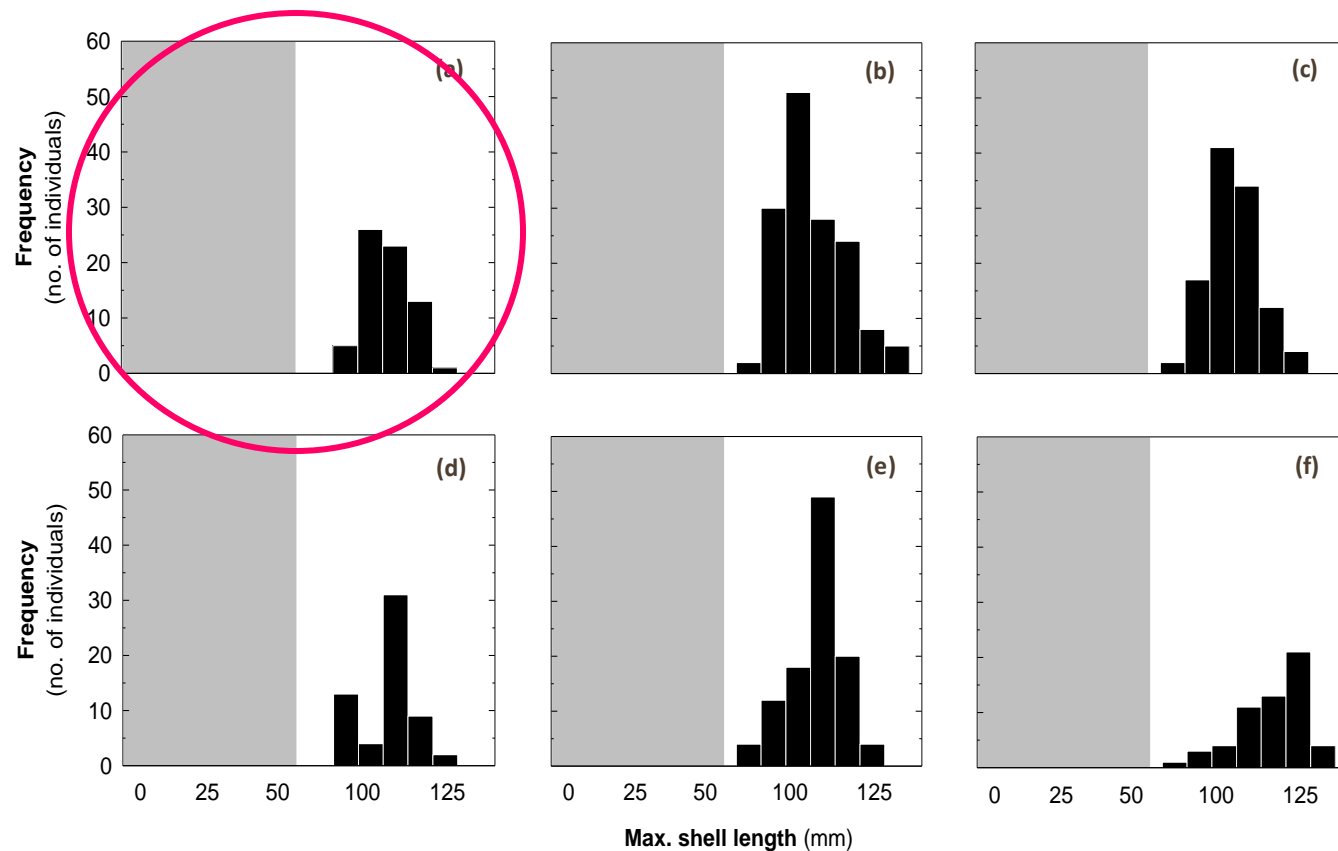
POPULATION IMPACTED BY PEARL FISHING



NON-RECRUITING POPULATION



Periods of low recruitment in long-lived species such as *M. margaritifera* may be offset by years of exceptional recruitment which maintains population densities at high levels.



Pearl mussel population age structure, defined by the frequency distribution of maximum shell length (mm), in three SAC designated rivers, namely the **a) Ballinderry**, **b) Owenkillew**, **c) Swanlinbar** and three ASSI or proposed ASSI rivers, namely the **e) Owenreagh**, **d) Tempo** **f) Waterfoot**.

Favourable conservation status includes a recommendation that >20% of each population should be <65mm in size (indicated by *grey shading*) and at least some individuals should be <30mm indicative of recruitment during the last 20 years

(Young *et al.* 2003).

Chronology of Ballinderry FPM Projects

Freshwater Pearl Mussel Breeding Programme

- 1998 – ongoing
- Conservation breeding programme
- Micro-scale reintroductions (150 individuals)

Ballinderry Freshwater Pearl Mussel Rescue Project

- 2013 – 2016
- Catchment-scale habitat restoration
- Macro-scale reintroductions (500 individuals)

Pearl Mussels Go Wild

- 2016 – 2019
- Further catchment-scale habitat improvements
- Meso-scale reintroduction (~2500 individuals)



20 year Breeding programme – ongoing



Shifting mussel conservation up a gear

- Mussels dispersed in river
- Very few glochidia on wild host fish
- No juveniles mussels found
- Wild mussel population in decline



Address the issues in the catchment which are preventing the mussels from recruiting naturally

Aims

- Identification and resolution of catchment-based issues
- Creation of a sanctuary site for freshwater pearl mussel
- Continuation and improvement of captive-breeding programme
- Education and outreach to the wider community



Northern Ireland
Environment
Agency



An Agency within the Department of the
Environment
www.doeni.gov.uk

Project Partners

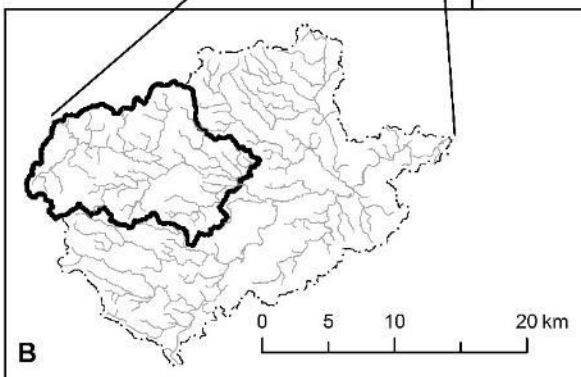
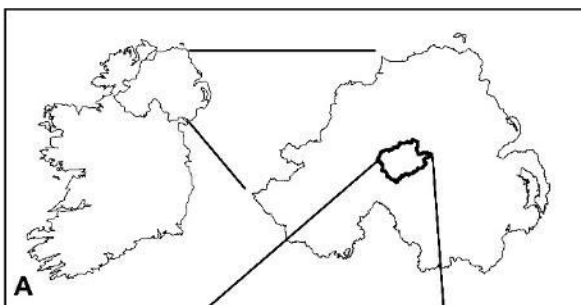


Queen's University
Belfast

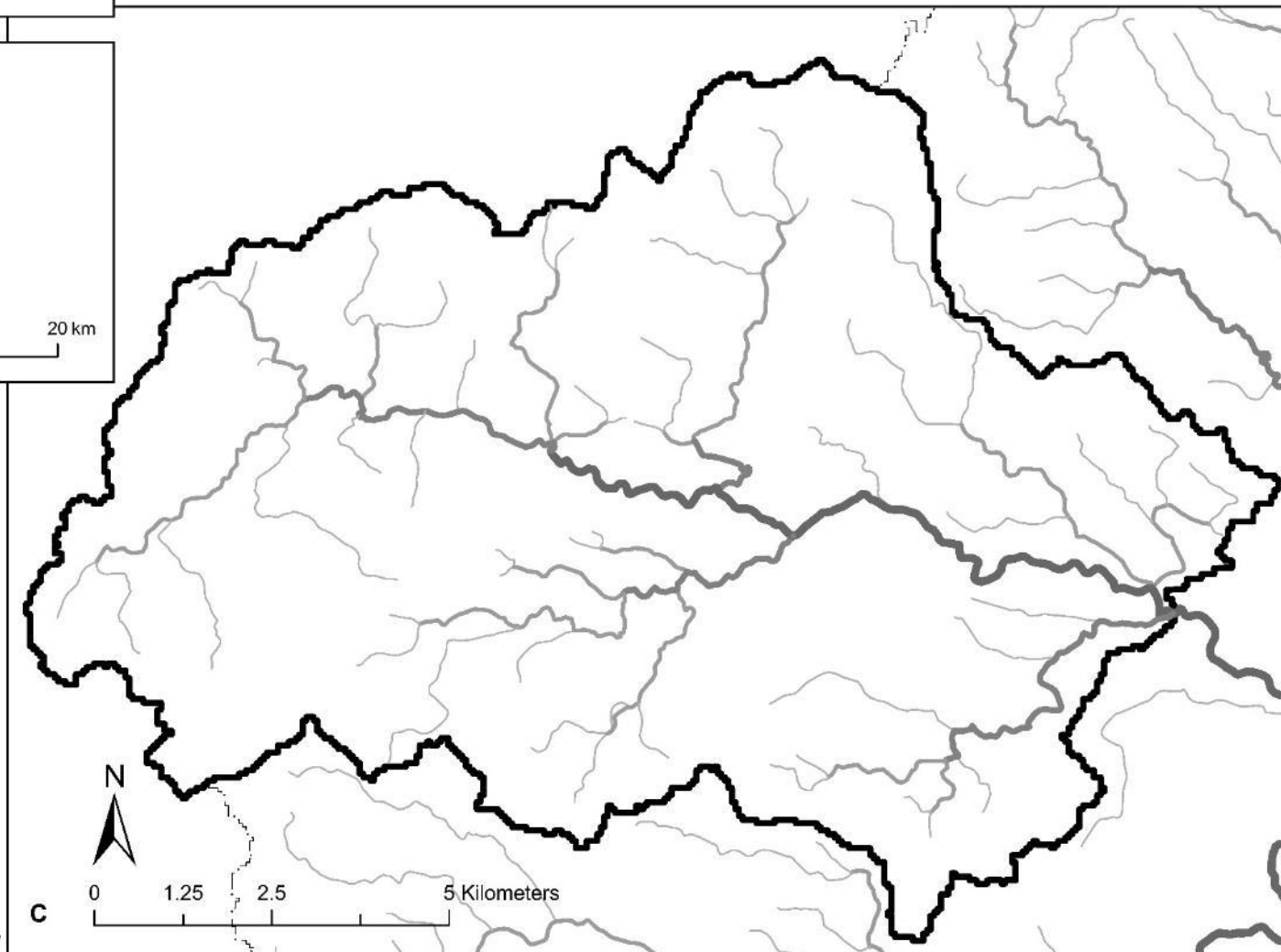


Project Area

Upper Ballinderry SAC/ASSI and its tributaries



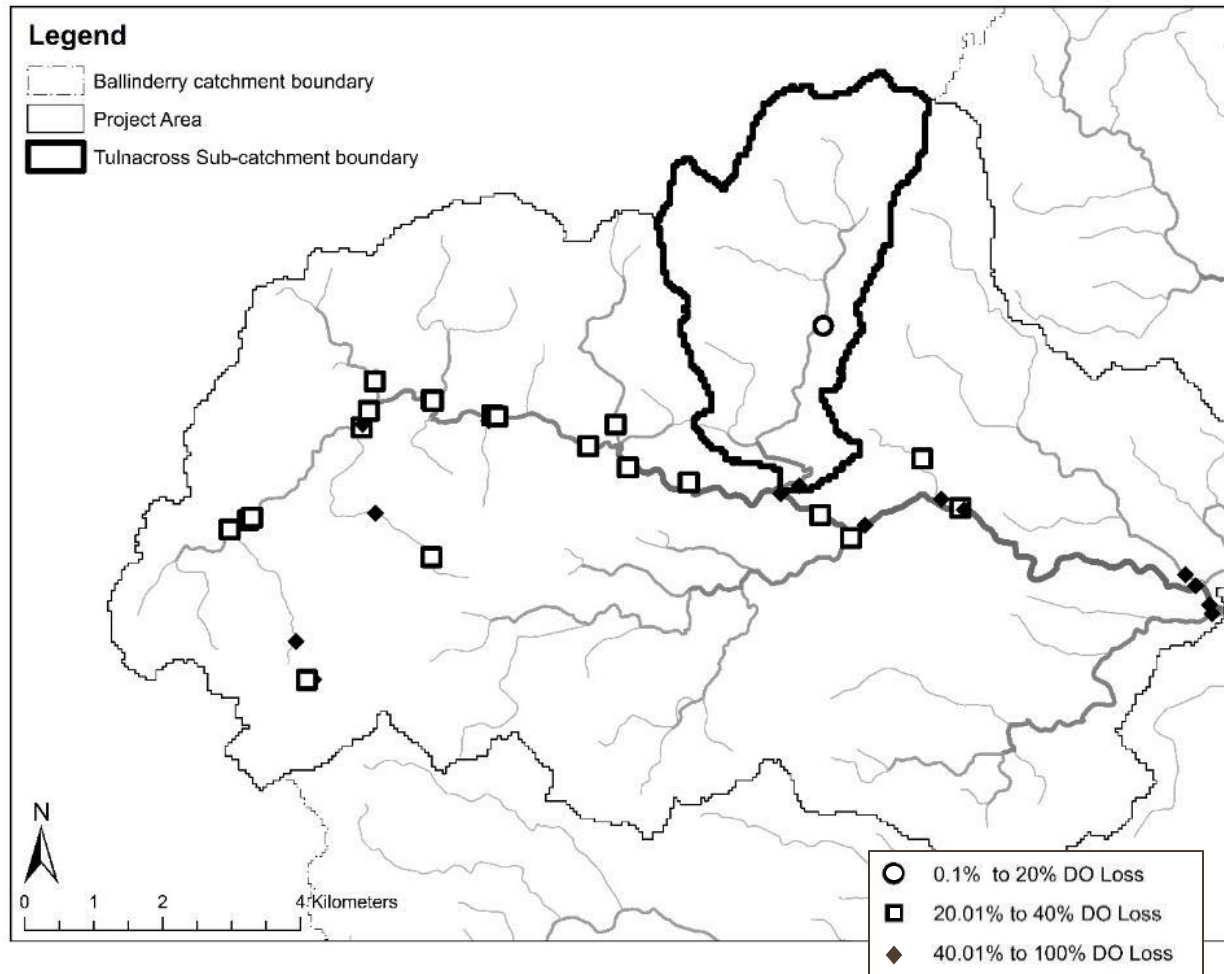
127km²



Legend

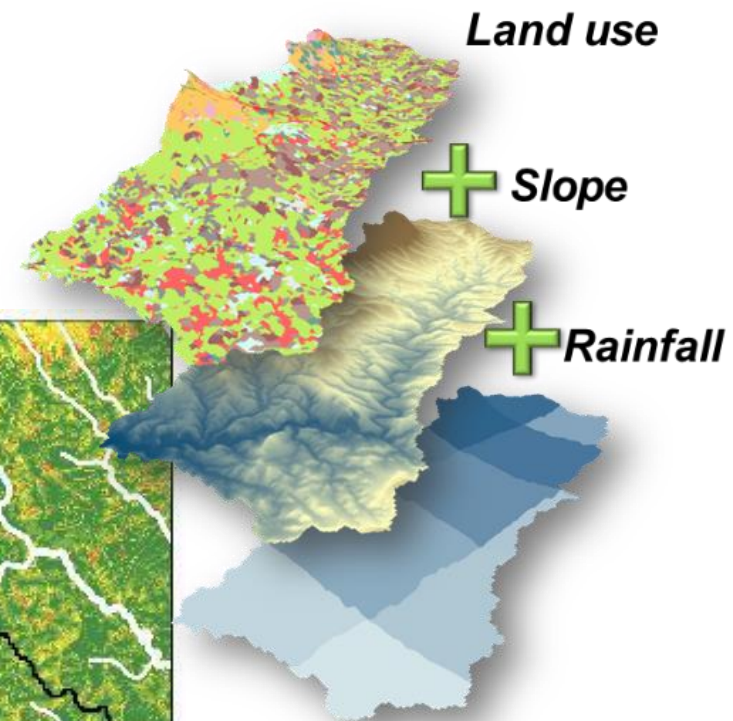
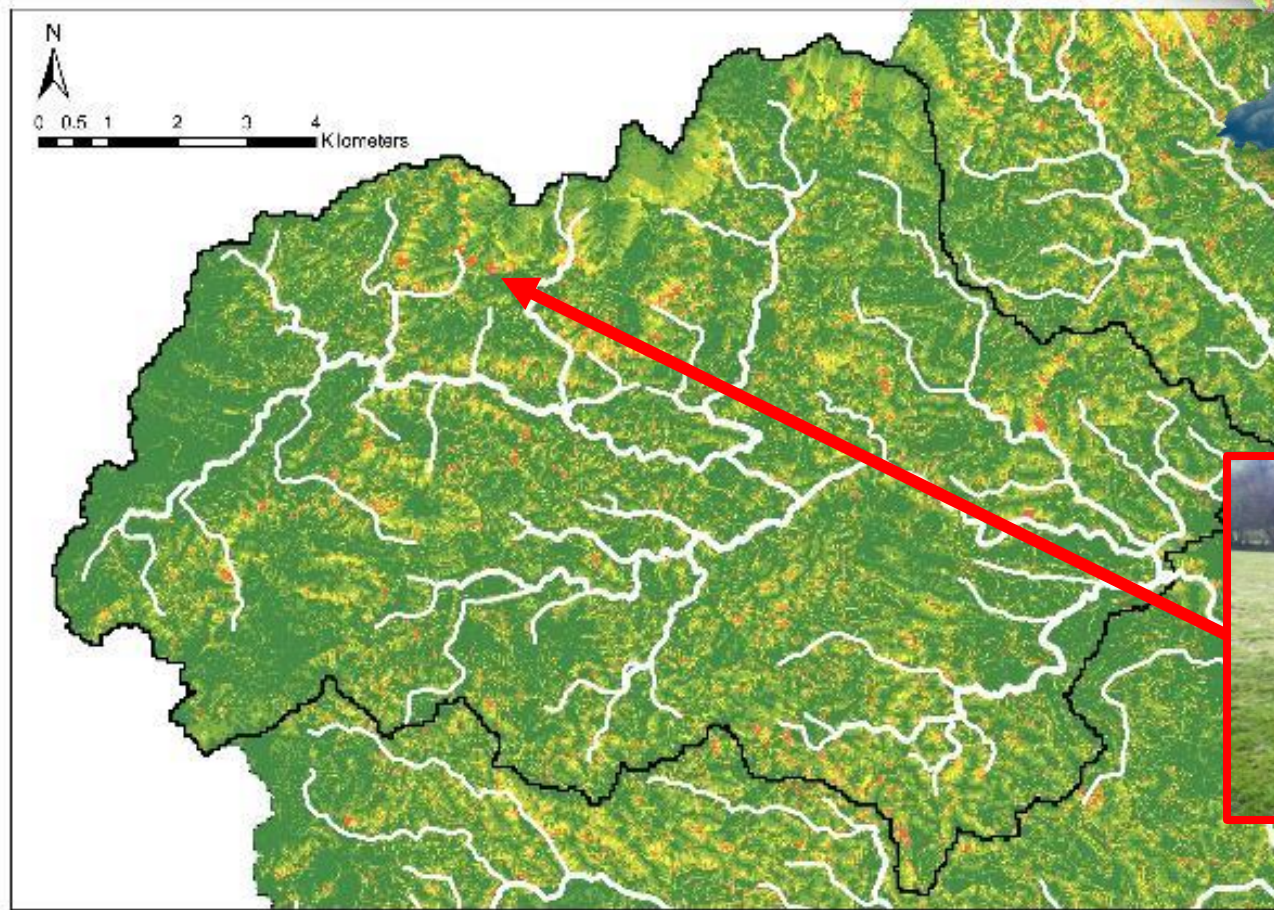
- Rivers
- ▭ Project Area
- - - Ballinderry catchment boundary

Redox Potential Assessment of interstitial habitat quality

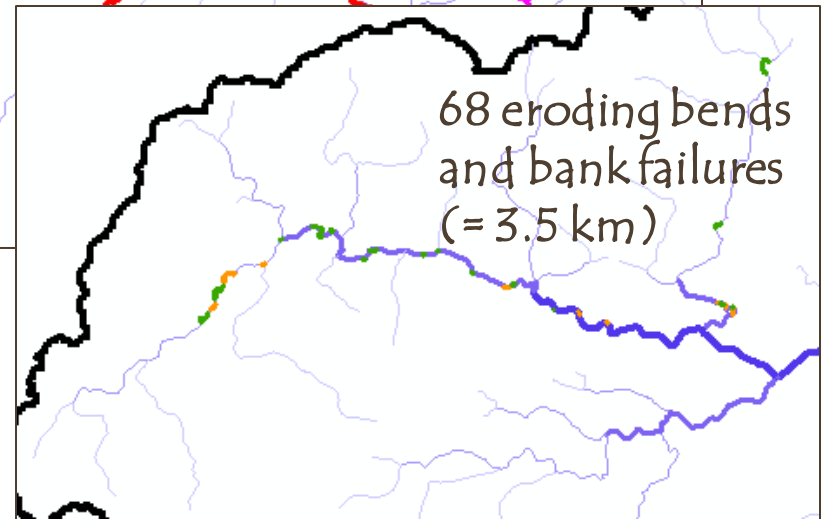
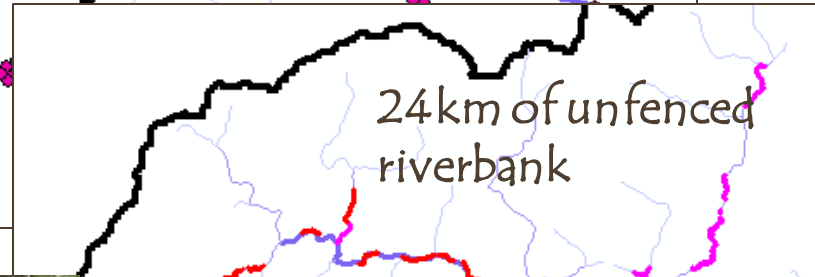
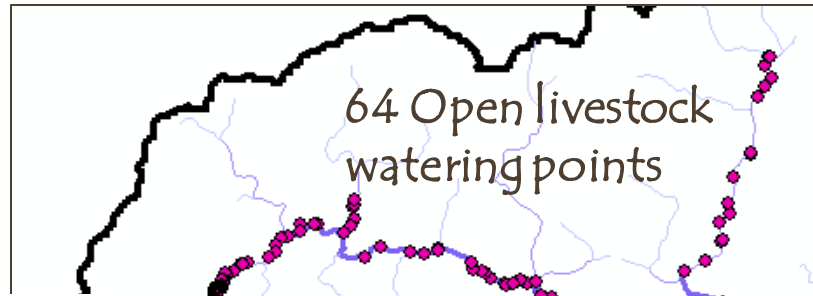


SCIMAP

diffuse pollution risk mapping



Walkover Surveys – point and diffuse sediment source mapping



Catchment-scale restoration

Working with landowners we have been able to reduce silt entering the river and improve the survival rate of juvenile freshwater pearl mussel

- 72 landowners (over £175,000 invested on farms since 2014)
- 24,000m of stock-proof fencing
- 3500m of bank stabilisation works
- 3000 native willow planted
- 60+ pasture pumps installed



Closing livestock watering points



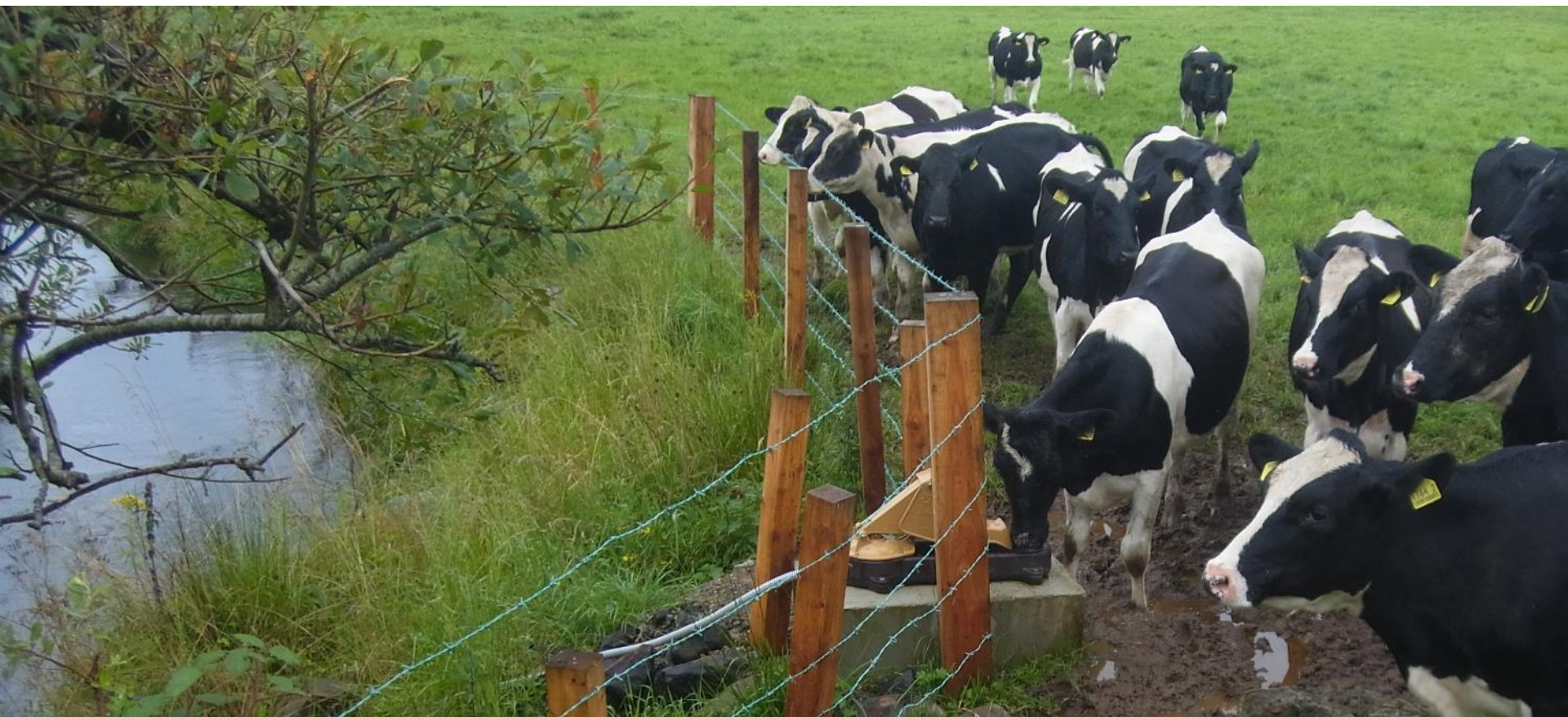
Bank protection – rock revetment



Bank protection – xmas tree revetment



As result of this fencing there were 3000 less livestock in the upper Ballinderry River in 2015 (and 2016...17...18 etc)



Release of mussels

- 210 Hatchery-reared tagged
- 300 Wild mussels tagged
- Planting out into 5 replicate population units – for experimental monitoring purposes



Results in 2016

- **River Restoration**

- Landowners reported visual improvement
- Redox potential assessment showed a 15% improvement in substrate quality after one year (above natural improvement)
- Continued improvement (but not at critical 20%)

- **Mussel Release (to the wild)**

- Limited success – some sites washed out
- July 2015 - 60%-70% visible (for 7 weeks) - until large flood (dropped to 3% at one site)
- 2018 – 2/5 plots empty – remaining three plots only ~10% visible

Pearl Mussels Go Wild 2017-2019

- Detailed population survey
- Large-scale release of mussels
- Further silt remediation work

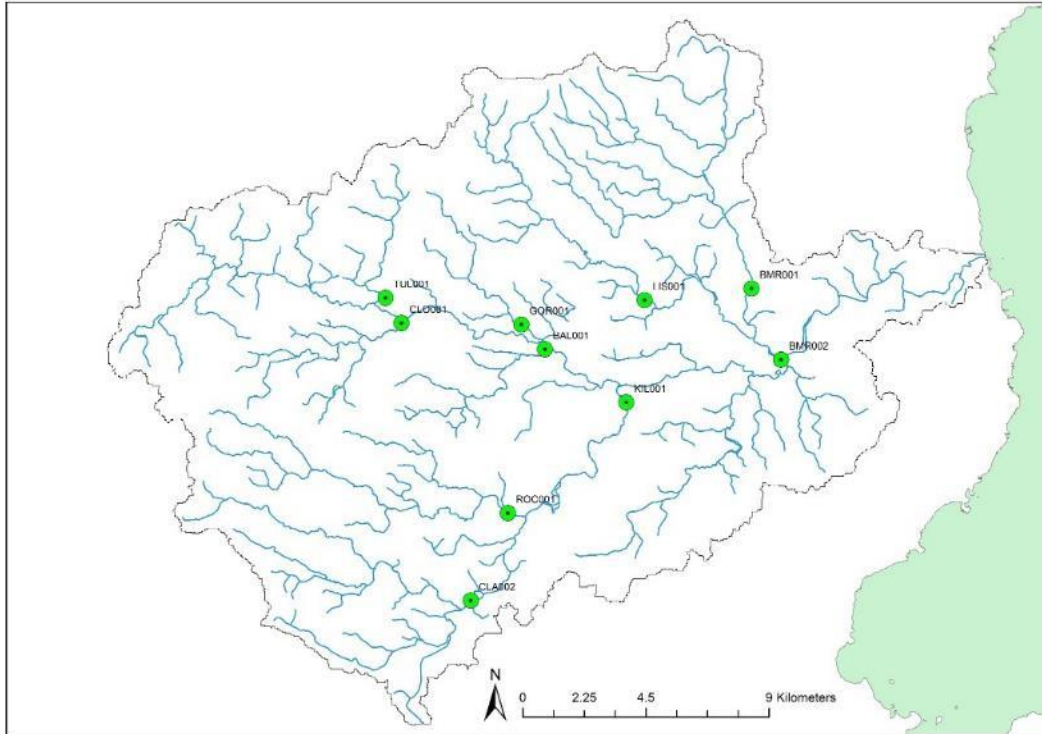


Understand in-river range and density

- Full 47km river survey
- 1456 individuals



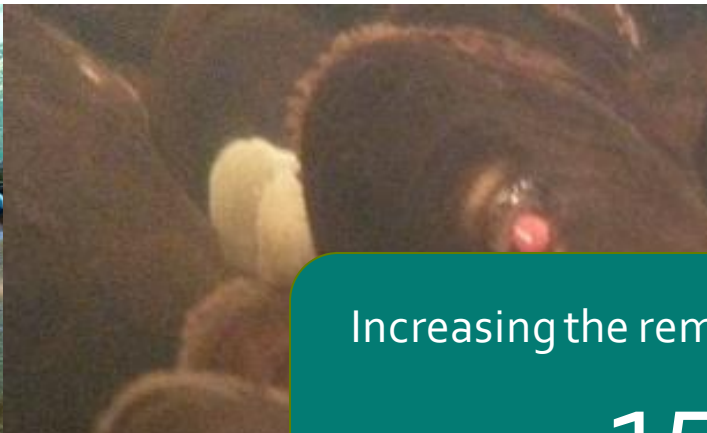
Further data collection ongoing Silt Critical Source Areas



Pearl Mussels Go Wild – Reintroduction Programme

We have undertaken one of the largest reintroductions of
captive-bred freshwater pearl mussel ever –

2500 young mussels released so far



Increasing the remaining population by

153%



Looking ahead

- Release at least 200 mussels/yr
- Monitor remaining wild and newly released mussels
- Monitor condition of the habitat and water quality
- Produce farm-scale management plans for 120 farms in the SAC (focus on nutrient loss, soil loss and slowing the flow to reduce flood peaks) and
- Incentivise changes in land management practices through a bespoke 'Ballinderry River Water-friendly Farming Scheme'
- Continue to educate the public on the importance of the freshwater pearl mussel



This is just one example of the work that rivers trust are undertaking on the restoration and protection of ecological function at the catchment-scale

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has.” Margaret Mead



Thank You

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