

Restoring Freshwater Mussel Rivers



- FPM facts and figures
- Development of FBA Ark
- River requirements
- Rapid assimilation of data for short project delivery
- Specific river restoration - practicalities
- Reintroduction

Restoration for biodiversity?

- Wider ecosystem benefits
 - salmonids
- Challenges in validation
 - Geographical scale
 - Time scale
- Keystone species

Vital Statistics

M. margaritifera (Linnaeus, 1758)

- Bivalve mollusc Order Unionoida
 - Larval stage is temporarily parasitic
- Reliance on host fish
 - Application to wider river restoration
- Require pristine habitat (pH 6.2 - 7.3)
- Long-lived (100-220 years)
- Slow growing (17cm)



FBA Ark timeline

2006

- Concept of an **Ark** at FBA

2007

- Ark installed at Mitchell Wyke
- First adult mussels arrive on 18th April

2008

- First successful excystment

2009

- Filters required to manage water supply efficiently
- Funded by Natural England & Environment Agency

...

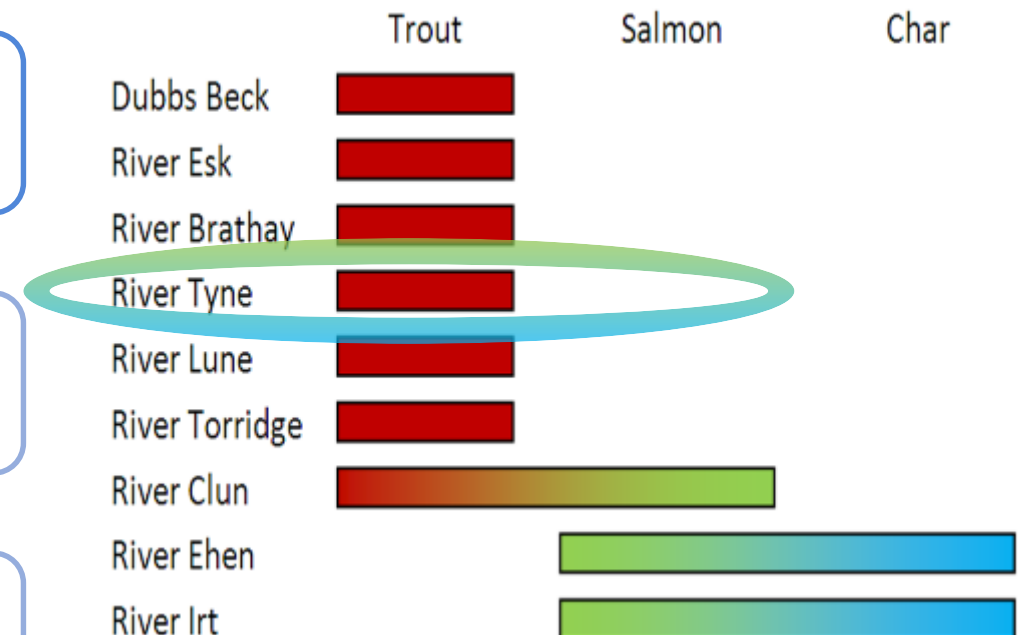
- More adult mussels received
- Varying conditions / improved understanding

2015

- Biffa Award grant secured

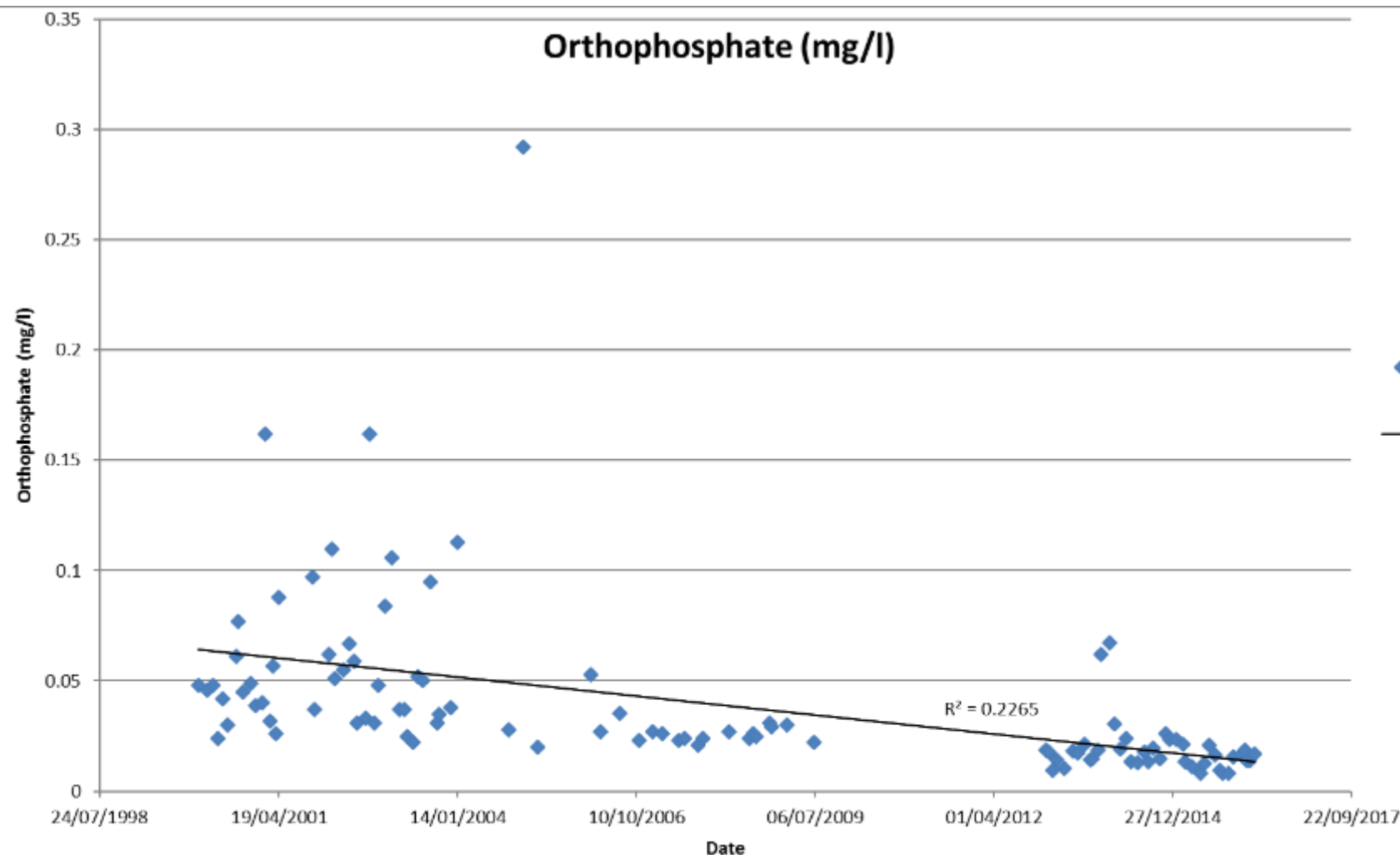
2017

- Captive-bred juveniles reintroduced



River Requirements

- WFD not ambitious enough for FPM
 - Habitats Directive (92/43/EEC) / SAC designation for some FPM rivers
- CEN standard
 - first species standard for monitoring population and environment
- Practitioner confidence
 - Availability of suitable information / reliable equipment



Project design / start point

- ... capital delivery in year 1
- Local knowledge / partners



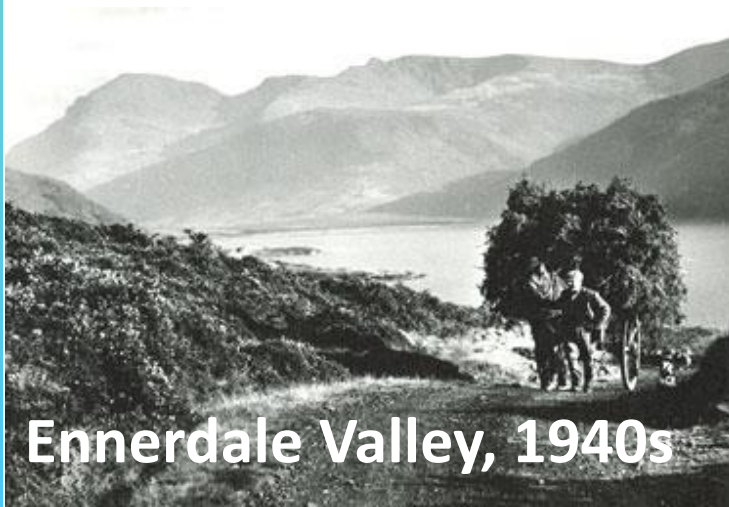
South
Cumbria
Rivers
Trust



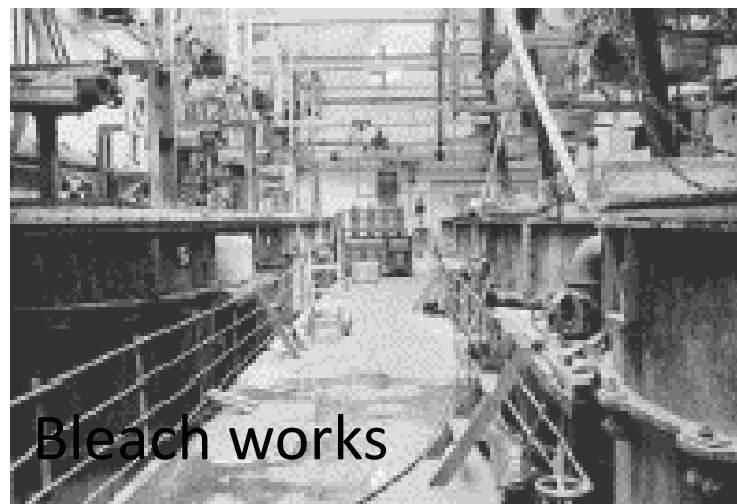
Devon
Wildlife Trust



- Historic FPM survey records
- State of the catchment
 - ‘Historic changes in the Upper River Ehen Catchment’ 1690-2015



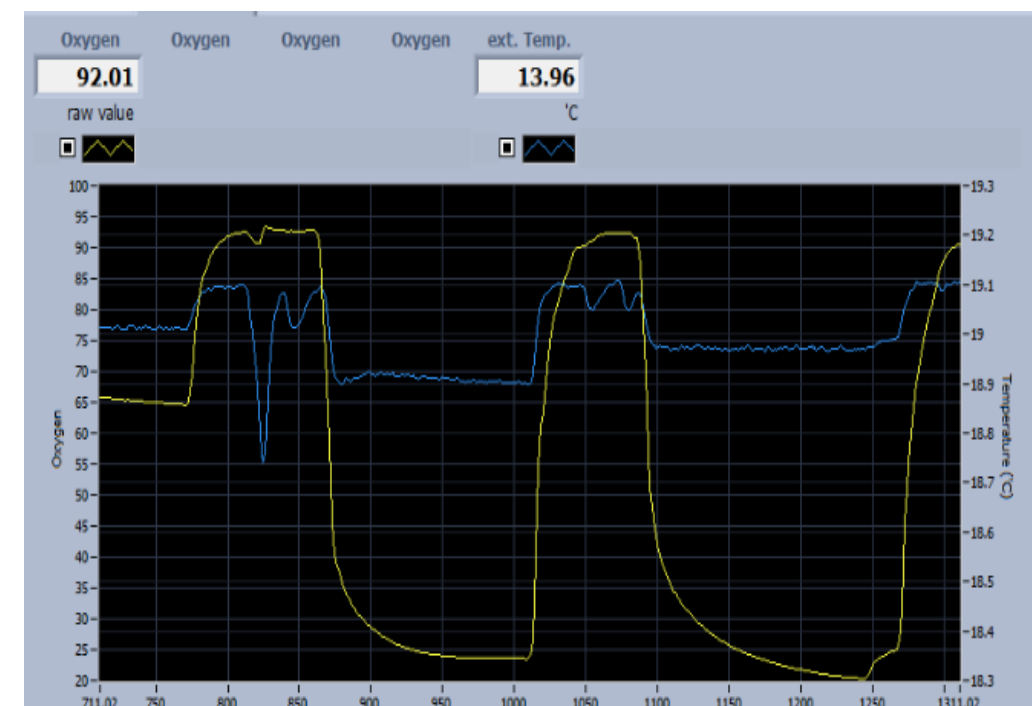
Ennerdale Valley, 1940s



Bleach works

River Restoration

- Intuitive river improvements
 - Green engineering
 - Water quality improvement and fish habitat
- Interstitial sites for juveniles
 - DO
 - geomorphology



Revetment removal

- 🌱 FPM translocated
- 🌱 Work by hand
- 🌱 Silt trigger



River Restoration

0+ Salmon densities 1994

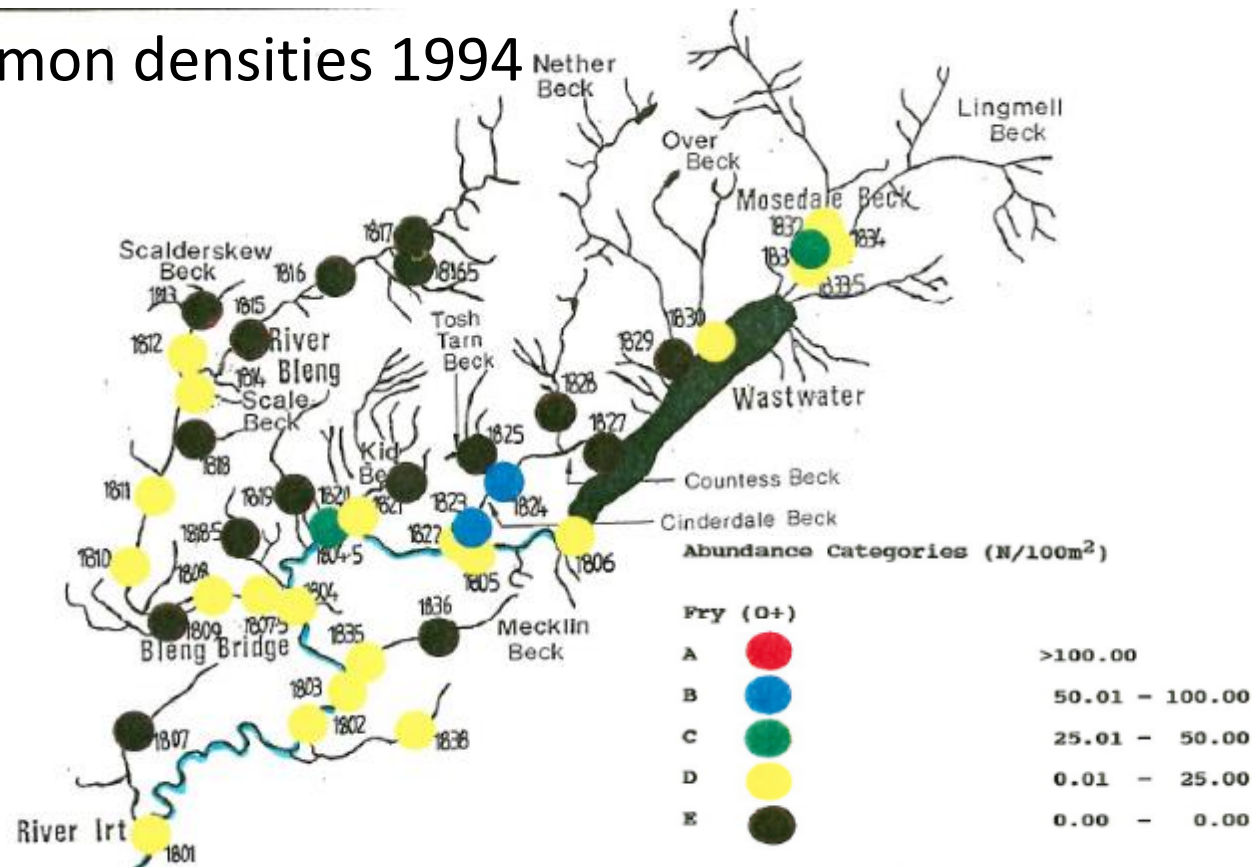
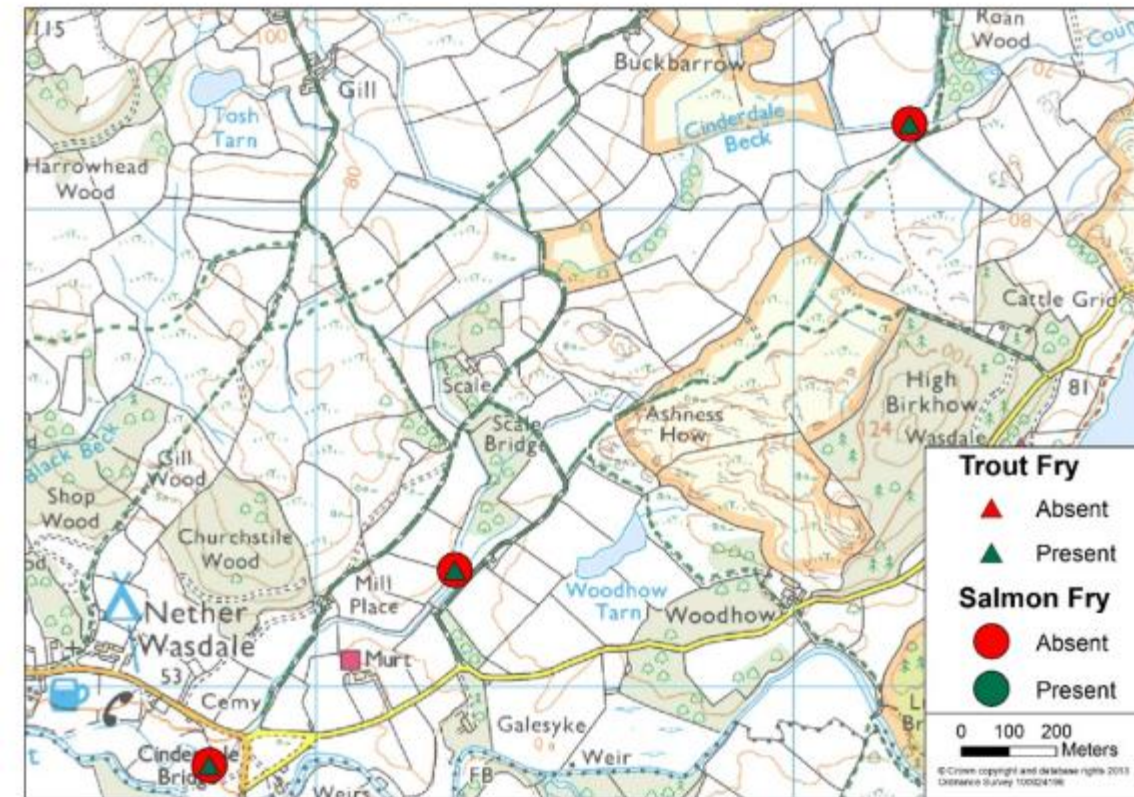
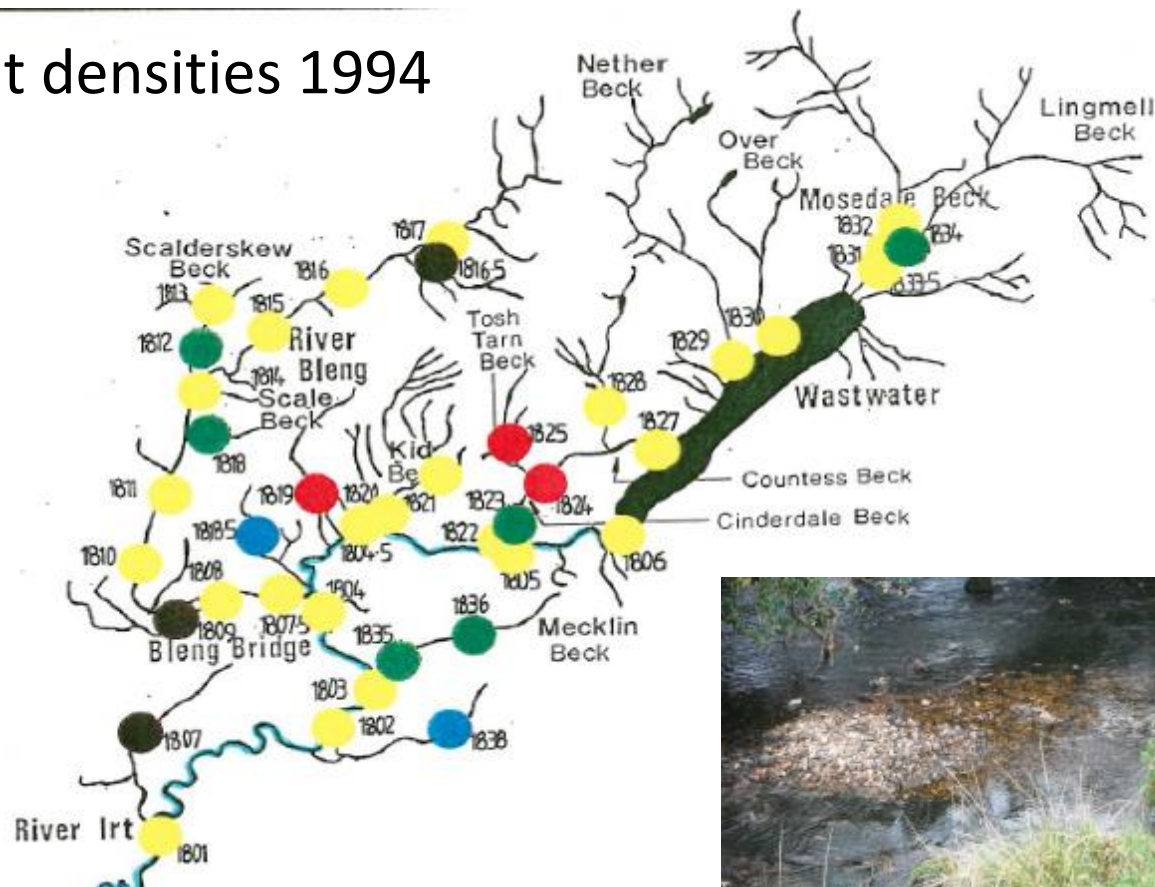


Figure 6. Salmon and Trout fry observed in Cinderdale Beck



0+ Trout densities 1994



Reintroduction

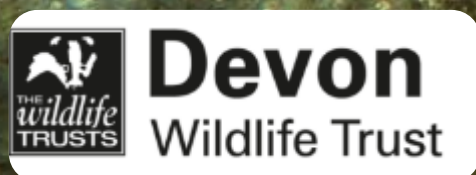
- NE protocol to follow
- Shear stress of gravel
- Humans in the ecosystem
- Speed of FPM reaction



Thank you for listening



Discussion?

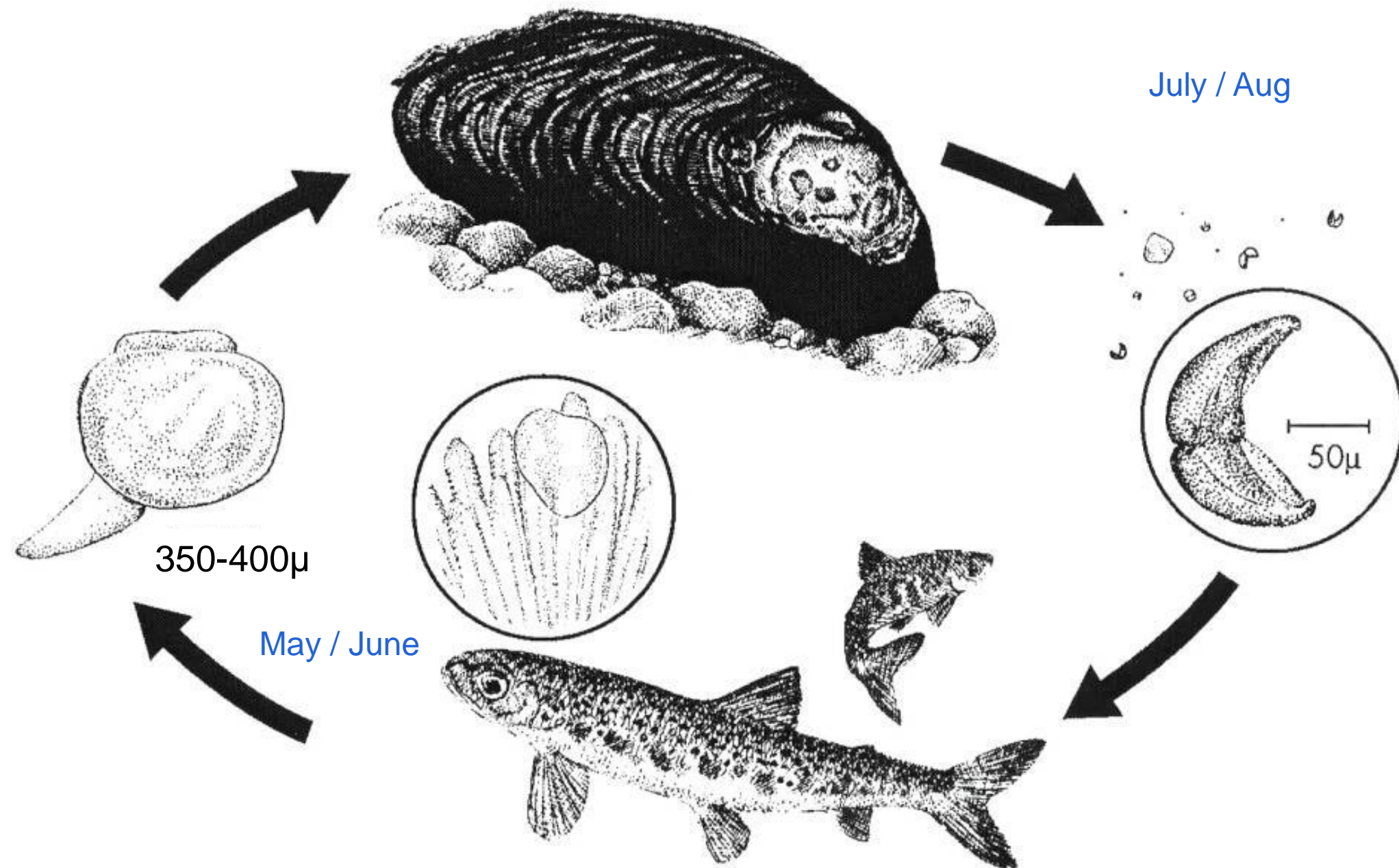


www.fba.org.uk



Complex life cycle

Margaritifera margaritifera (Linnaeus, 1758)



Reintroduction



 Conditioning of juveniles

Short-term breeding



🌱 No evidence available within project delivery

Early Farm improvements

