



Association of Rivers Trusts Autumn Seminar
November 18th 2008
Agricultural Business Centre, Bakewell.

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Big Catchment ?

Deliver Bite Sized Chunks

THE PROCESS



From whole catchment to Delivery plans

- 1) Very brief overview of the monitoring and research that led to our resource targeting
- 2) Which areas we have concentrated on and why
- 3) Development of Conservation Plans
- 4) Resources
- 5) Monitoring

Targeting



- 1) We've undertaken catchment-wide monitoring of salmonids

Fisheries research



Catchment-wide electrofishing (~250 sites)
Juvenile 0+ fry surveys (Crozier & Kennedy)



Salmon and trout are used as ecological indicator of the health of the river system

Results 2002-2004



Salmon fry
(Below barriers)



Trout fry



Results – What?



Salmon fry – below impassable barriers



Wider streams where diffuse pollution risks and land management are more important

Trout fry

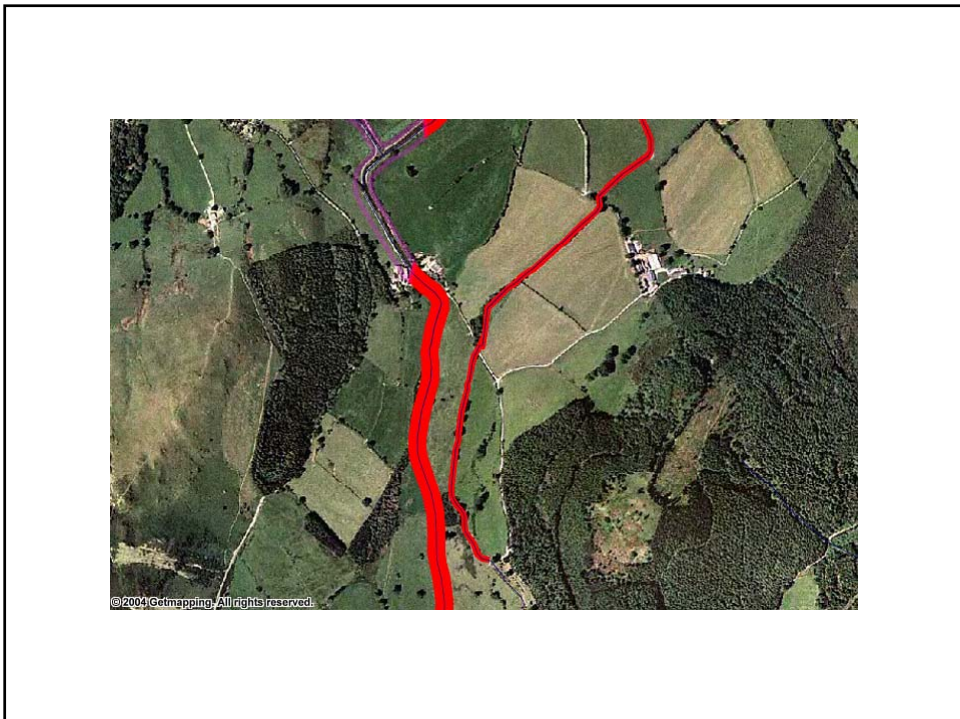
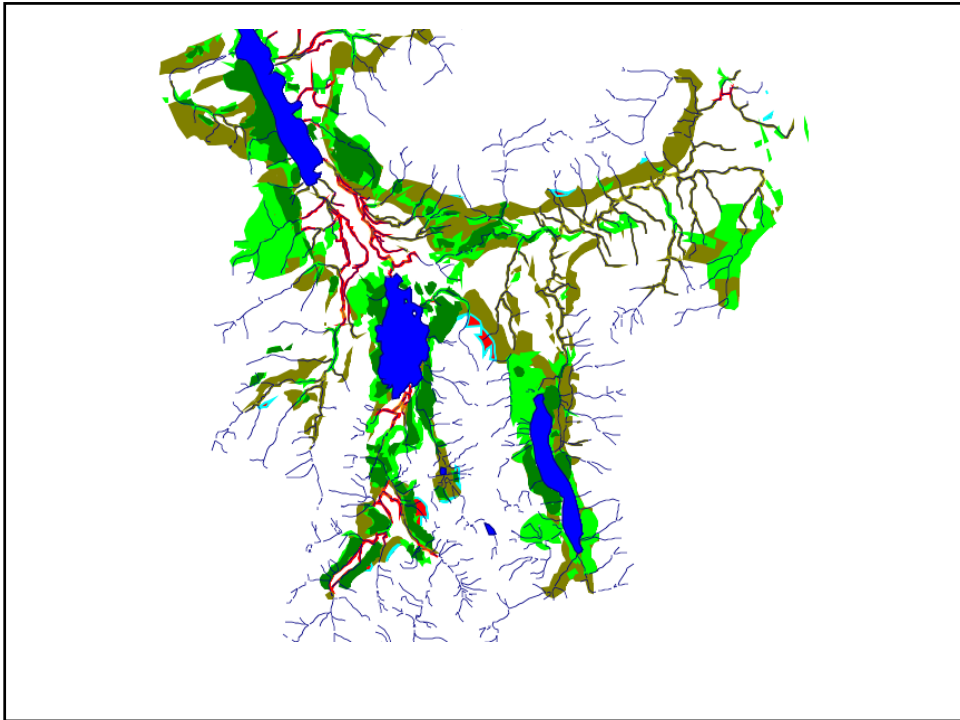
Narrow streams where lack of cover and bank erosion issues are important

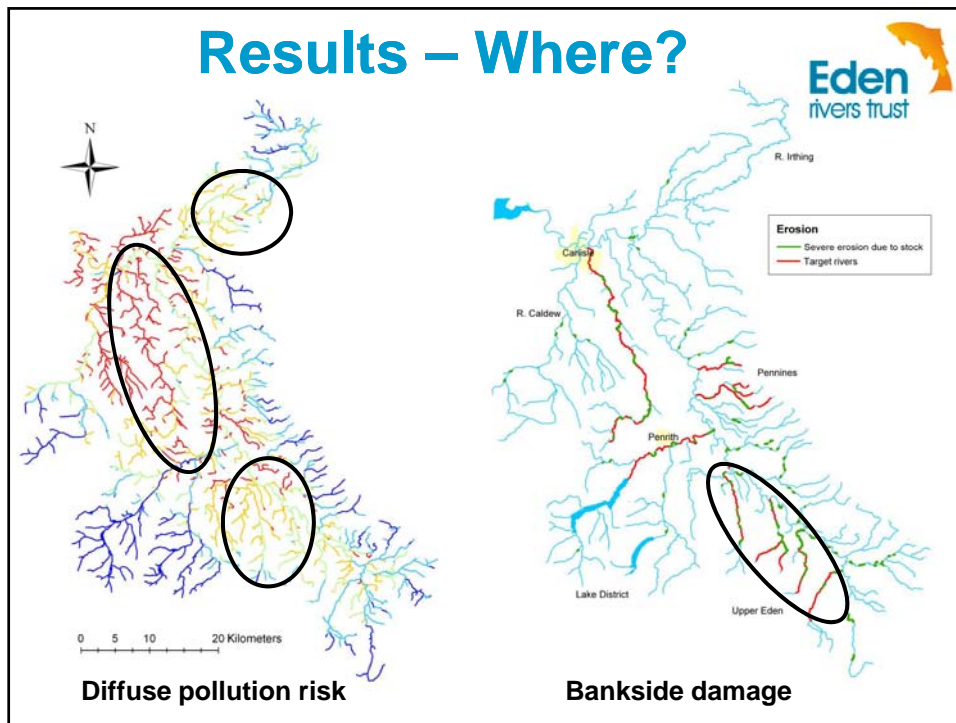


Targeting



- 1) We've undertaken catchment-wide monitoring of salmonids
- 2) We've undertaken catchment-wide research into the impacts we can address
- 3) Identified the extent of problems
- 4) Identified where the impacts are most acute



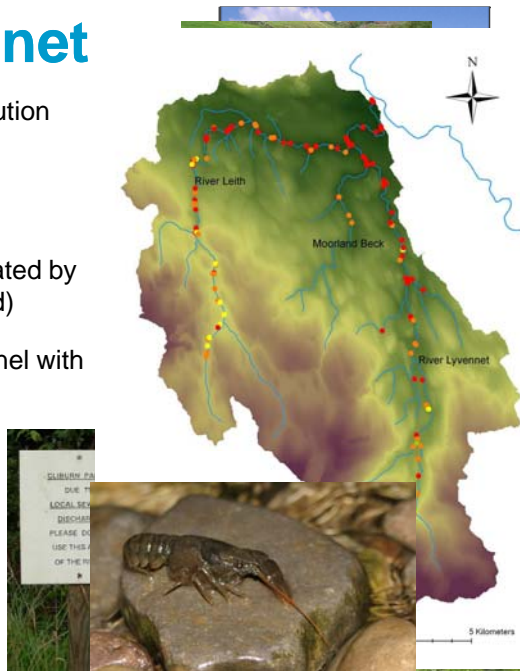


River Petteril

- High to very high risk of diffuse pollution
 - Groundwater nitrogen ($\text{NO}_3\text{-N}$) levels up to 30mg l^{-1}
 - Invertebrate sampling
- Severe bank erosion accelerated by stock (19.5km of banks affected)
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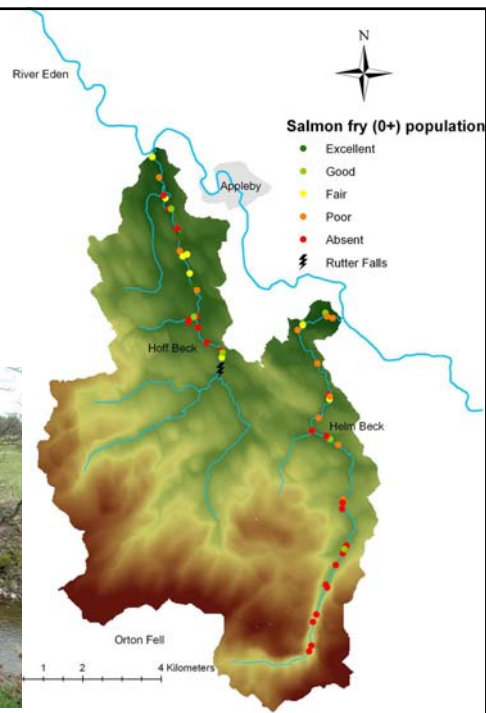
Leith & Lyvennet

- High risk of diffuse water pollution from agriculture but also:
 - Shap WWTs
 - Motorway runoff
- Severe bank erosion accelerated by stock (17km of banks affected)
- Lack of cover (12 km of channel with <25% cover from trees)
- Low flows
- Artificial channels
- Very poor juvenile salmonid numbers
- White-clawed crayfish



Hoff & Helm

- Highest concentration of bankside damage (30-40% of total)
- Lack of cover (15 km of channel with <25% cover from trees)
- Moderate to high risk of diffuse pollution



Trout Beck

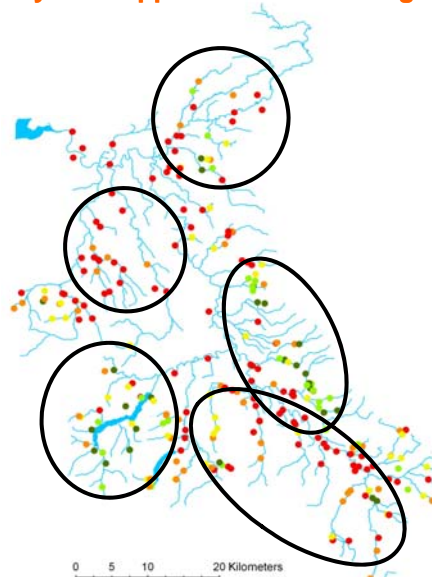
- One of the most productive streams for both trout and salmon
 - Generally low risk of diffuse pollution
 - High levels of cover
 - Good bankside habitat
- Considerable habitat work has been undertaken here
- Localised pressures due still exist
- Balanced approach



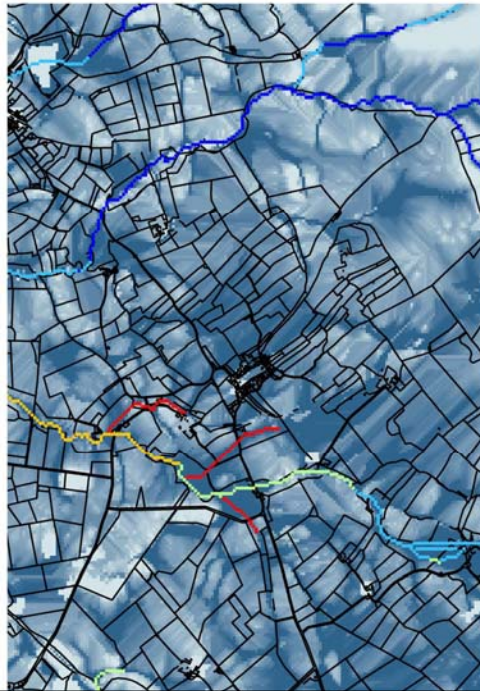
STREAM

Sustainable Trout Restoration, Ecosystem Approach & Monitoring

- Generally poor trout stocks across catchment
- 2006 survey “searching for trout fry”
- Tributaries less than 2m wide
- Often neglected but their size makes them particularly vulnerable
- Lack of cover, low dilution potential, barriers
- Little information on population dynamics and ecology of Eden’s trout
 - Age structure, run timings and spawning stock biomass



Results at a field –
scale level for
targeting



**Sub-catchment Conservation Plan
River Leith and River Lyvennet
May 2007**

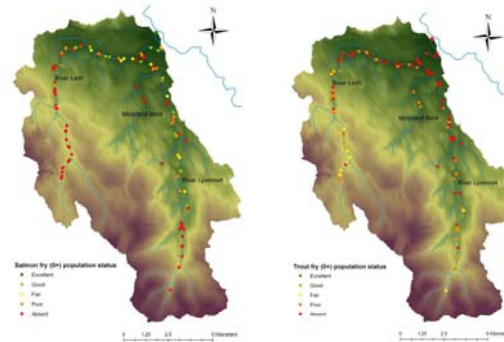


Conservation Plans



Salmonids: Atlantic salmon (Salmo salar) and brown trout (Salmo trutta)

The Atlantic salmon is listed in the EU Habitats Directive as a species of European importance. It is also a UK Biodiversity Action Plan (BAP) species of conservation concern. Brown trout are a streamlined species which spend their entire lives in the river system. Both species require good water quality including high dissolved oxygen levels and clean gravels in which to spawn. They are a critical component of the ecosystem and their conservation is vital to maintain ecosystem function and enable the fisheries that exploit them to continue in a sustainable manner.



Fisheries surveys from 2002-2006 indicate low numbers of both juvenile salmon and trout within the Leith/Lyvennet sub-catchment. Trout populations in particular are very low within both rivers.

Generic Solutions



1. River corridor restoration
2. Engineered solutions
3. Diffuse pollution prevention

Resources




1. How much needs doing?
2. How much can you do currently?
3. What resources do you require?

Generic Costs/Time and Specific Costs

Costs and Bids




Leith-Lyvannet sub-catchment conservation plan budget				
Activity	Staffing and time*	Year 1	Year 2†	Year 3
	Staff costs £200 per day	(£)	(£)	(£)
Community engagement				
Awareness raising leaflet includes costs for production and dissemination		800		
Demonstration days to landowners, river walks etc...	2 staff members (conservation team) for 3 days. (6 man days per year - 2 man days planning and 4 man days delivery).	13,200	13,596	14,004
Sub-total		14,000	13,596	14,004
Habitat improvement costs				
Specific site planning and identification. To include walkover survey, liaison with farmers and landowners, site meetings, obtaining necessary consents etc...	1 staff member (conservation team) for 1 day per week (46 man days)	9,400	9,682	9,972
In-stream habitat creation e.g. ranunculus transplanting and willow stake planting	2 staff members (conservation team) for 4 days per year (8 man days)	1,600	1,648	1,697
Habitat project maintenance e.g. tree maintenance	3 days per year at £150 per man day (Contractor time - 3 man days)	450	464	477
Capital costs of riparian fencing @ £7.50 per metre including water/gates etc. 2000m per year. (Contractor costs)		15,000	15,450	15,914
Capital costs of tree planting @ £3 per tree. 500 trees per year. (Contractor costs)		1,500	1,545	1,591
Sub-total		27,950	28,789	29,652



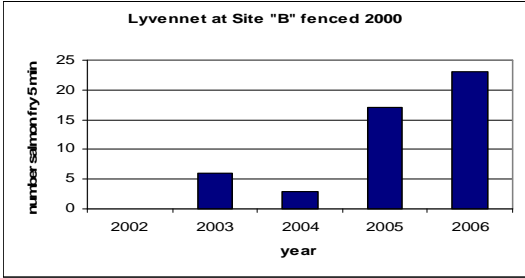
Resources

Table 1: Summary of sub-catchment targeting in the River Eden catchment

Sub-catchment	Area	Reason	Proposed actions	Estimated cost of 3 year plan
The Rivers Leith and Lyvennet	129km ²	<ul style="list-style-type: none"> -Predicted by SCIMAP to have a high risk of receiving diffuse pollution. (Shap WwTw & road runoff from M6 are other contributing factors to poor water quality) -High levels of riparian damage due to intensive grazing. 17km of bankside are eroding due to stock trampling and 12km of channel have less than 25% cover -Prone to extreme low flows which exacerbates the problems of diffuse pollution and stock trampling by reducing refuges and dilution potential -The River Leith in particular has reaches of artificially modified geomorphology associated with the west-coast mainline and quarrying activity -Highly variable juvenile salmonid populations where habitat is fragmented by degradation. This area is also critical for supporting white-clawed crayfish due to extensive limestone geology in the headwaters 	<ul style="list-style-type: none"> -6km of riparian fencing -2 willow spiling projects -12 days of in-stream habitat enhancement -1500 trees planted -Whole farm environmental plans to be delivered by CSF. ERT to support associated capital improvement works -Monitoring ecological (salmonid, lamprey, bullhead and crayfish surveys) and habitat improvements following restoration, together with socio-economic benefits -Engaging the local community through demonstration days, farm walks and an awareness raising leaflet -Awareness raising about the dangers of introducing non-native American Signal crayfish and crayfish plague 	£206,000



Does it work?



Lyvennet at Site "B" fenced 2000

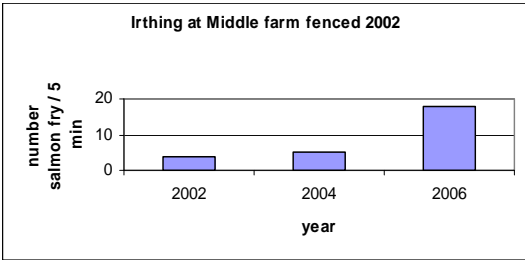
YES: Habitat restoration sites are showing increased fry numbers

Monitoring needed

Salmonids

Geomorphology

Crayfish:

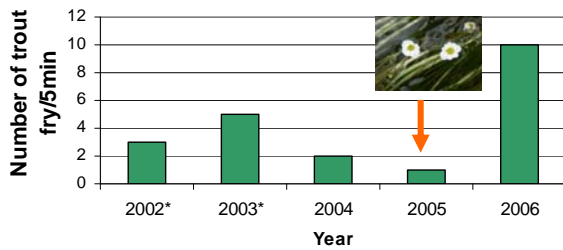


Irthing at Middle farm fenced 2002

Creating refuges



Ranunculus transplanted 2005



Breaking down barriers



Leith at
Sheriff Park



Lyvennet
at Maulds
Meaburn



Reporting Back

