



the River Restoration Centre

Working to restore and enhance our rivers

Delivering River Restoration: Recipes for Success

13TH ANNUAL NETWORK CONFERENCE



Restoring Europe's Rivers



ARUP



Penny Anderson Associates Ltd
CONSULTANT ECOLOGISTS



WILLOWBANK
Erosion & Conservation Services



RESTORATION IN TIGHT SPACES! LEGACY ENGINEERING AND RIVER NATURALISATION

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Acknowledgments

- Environment Agency
- Bury Council
- Askams Engineering
- Kirklees Valley Park
- The Rivers Trust (formerly Association of Rivers Trusts)
- DEFRA
- Bury and District Angling Association, Friends of Kirklees Valley, St Johns Church – Tottington, Tottington St Johns Cricket Club, Local residents

Presentation Structure

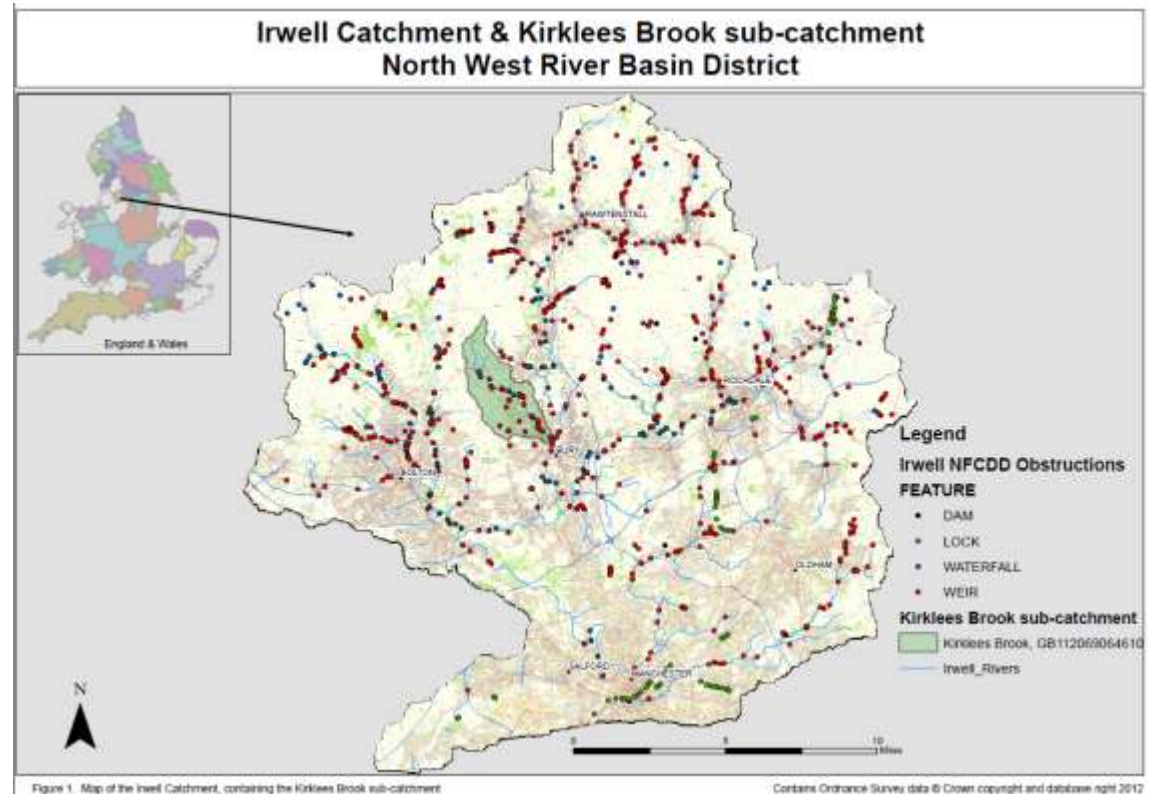
- Identification of Opportunity
- Location & Character of Kirklees Brook
- Issues & Constraints
- Options
- Performance



Restoration Opportunity

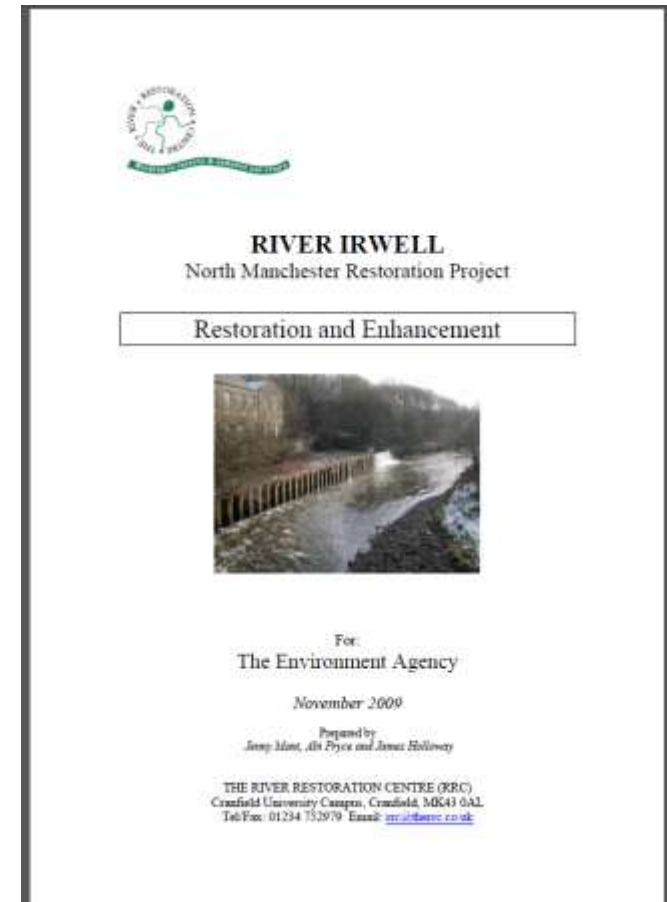
- 75 Waterbodies, 2/3rds classed as artificial/heavily modified.
- All failing to achieve GES/P (Urban Diffuse Pollution, Physical modification and Point Source).

- Kirklees:**
Failing GEP



Restoration Opportunity

- RRC produced a report advising and commenting on possibilities for restoration and enhancement along the course of the Irwell.
- EA and IRT developed a prioritised programme of projects and delivered 10 river restoration projects.
- Represented year 1 for Irwell Rivers Trust in developing expertise and gaining experience in the delivery of projects, increasing technical and managerial resilience of IRT.



Location: Kirklees Brook



River Character

- The valley is a Site of Biological Importance (SBI) and was designated as a Local Nature Reserve in October 2010.
- Woodland, grassland, heathland, ponds, lodges and streams.



River Character

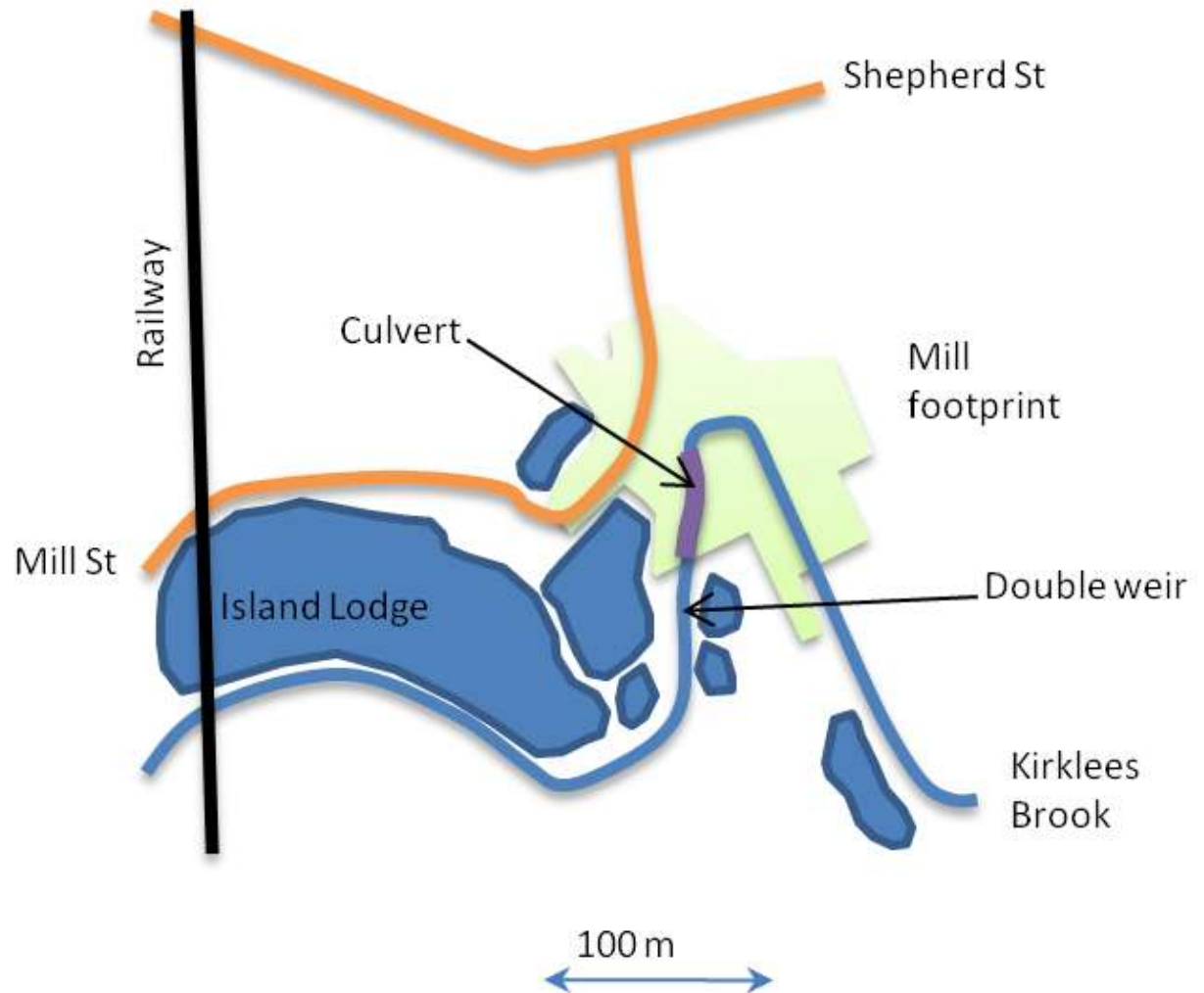


River Character



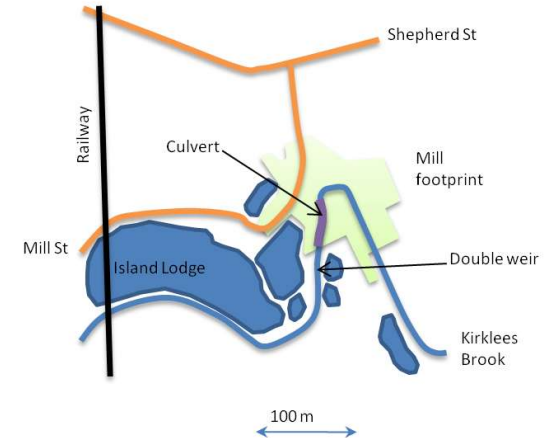
River History

- Industrial legacy: Calico Print Works modified the watercourse



Restoration Opportunity

Two old weirs were preventing fish movement along the watercourse. Easement of these obstructions would open up 6 km of river to migratory fish.



Constraints

Need to maintain the structural integrity of the masonry retaining walls protecting old lodges associated with the historically important former Calico print works.



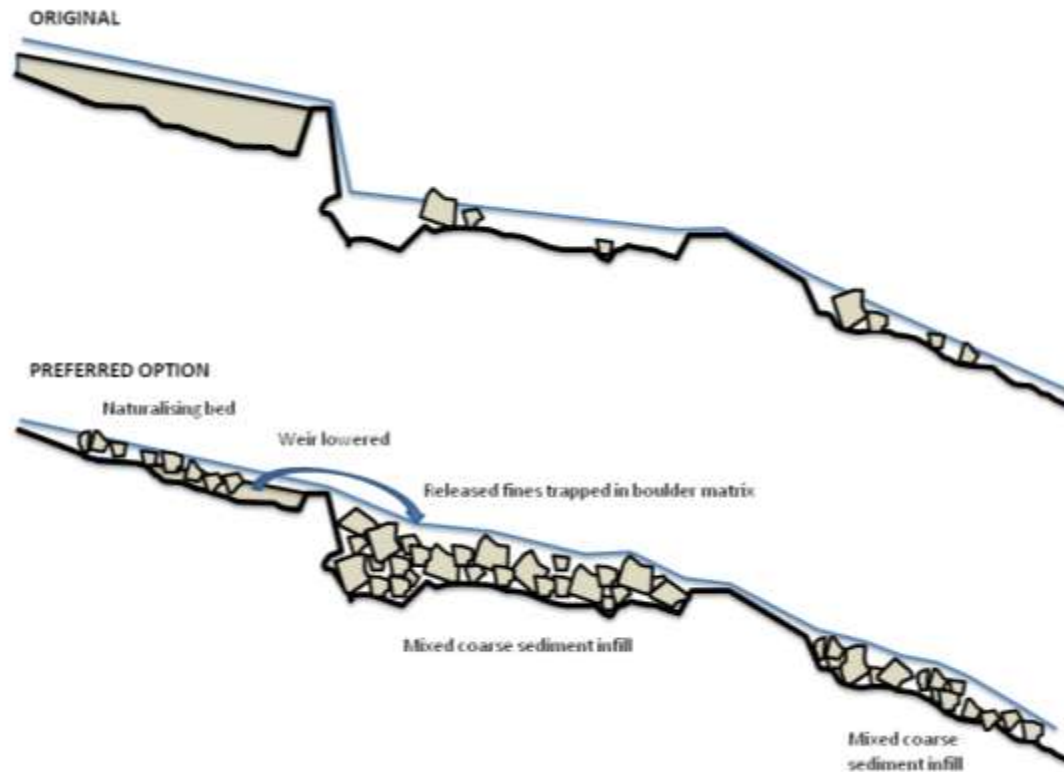
Restoration Options

Option	Description	Advantages	Disadvantages
1	Complete removal of both weirs	Restore original bed gradient and allows river to re-naturalise.	Severe danger of bank collapse as masonry revetment fails. Major and rapid release of sediment stored upstream of weirs. Potential local headcut erosion. Knock on riparian tree fall impacting on structural integrity of Lodges and increased potential for culvert blockage downstream,.
2	Notching of weirs	Partial restoration of original bed gradient. Scour downstream of upper weir reduced. Naturalised morphology upstream.	Some danger of bank collapse between weirs as masonry fails. Some release of sediment stored upstream of weirs.
3	Removal of downstream weir and lowering of upstream weir	Partial restoration of original bed gradient. Scour downstream of upper weir reduced. Naturalised morphology upstream.	Severe danger of bank collapse between weirs as masonry revetment fails. Some release of sediment stored.

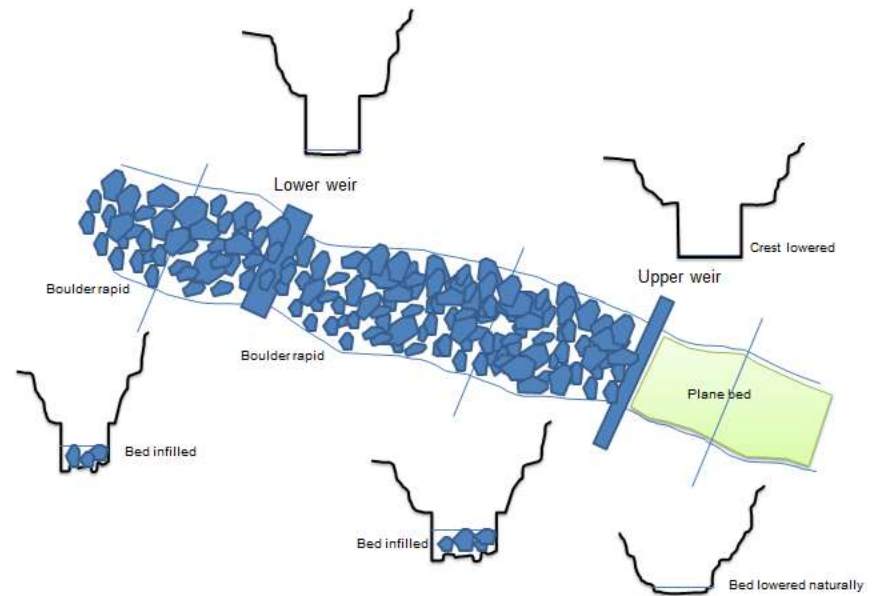
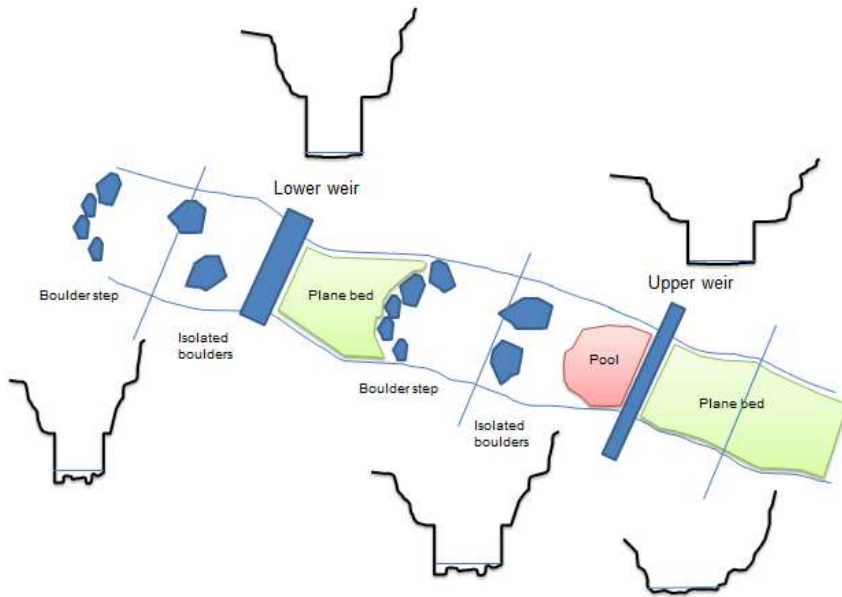
Restoration Options

Option	Description	Advantages	Disadvantages
4	Infilling bed between weirs	<p>Creation of long rapid section characteristic of this river.</p> <p>Reduced risk of masonry revetment failure.</p>	<p>Unnatural fine sediment reach retained upstream.</p> <p>Danger of sub-bed flow unless infill is correctly graded.</p> <p>Minor short-term sediment release downstream from infill.</p>
5	Infilling bed between weirs and lowering of upstream weir	<p>Creation of long rapid section characteristic of this river.</p> <p>Much reduced risk of masonry revetment failure.</p> <p>Restoration of natural steep gradient morphology upstream.</p> <p>Released sediment from upstream will contribute to integrity of bed between the retained buried weirs.</p> <p>Neutral or positive effect on flood conveyance.</p>	<p>Potential local headcut erosion progressing upstream (could be reduced by notching) and local re-profiling upstream.</p>

Preferred Option



Works



Installation



Performance



Performance



Performance



Conclusions

- Project 'constrained' by historic setting
- Options informed by geomorphologic audit
- Functional channel morphology restored
- Generally successful: Infill 'mix' is critical
- Enthusiastic and knowledgeable regulators helped
- Conservative approach led to missed opportunities
- Experienced, willing and able contractor is key
- Gravel accumulated in culvert downstream, not elsewhere
- £41k