



Working to restore & enhance our rivers

# River Restoration Centre 15th Annual Network Conference

*River Restoration:  
Delivering Multiple Benefits*



## Delegate Pack

Including programme, abstracts, workshop  
and site visit information, and notepaper

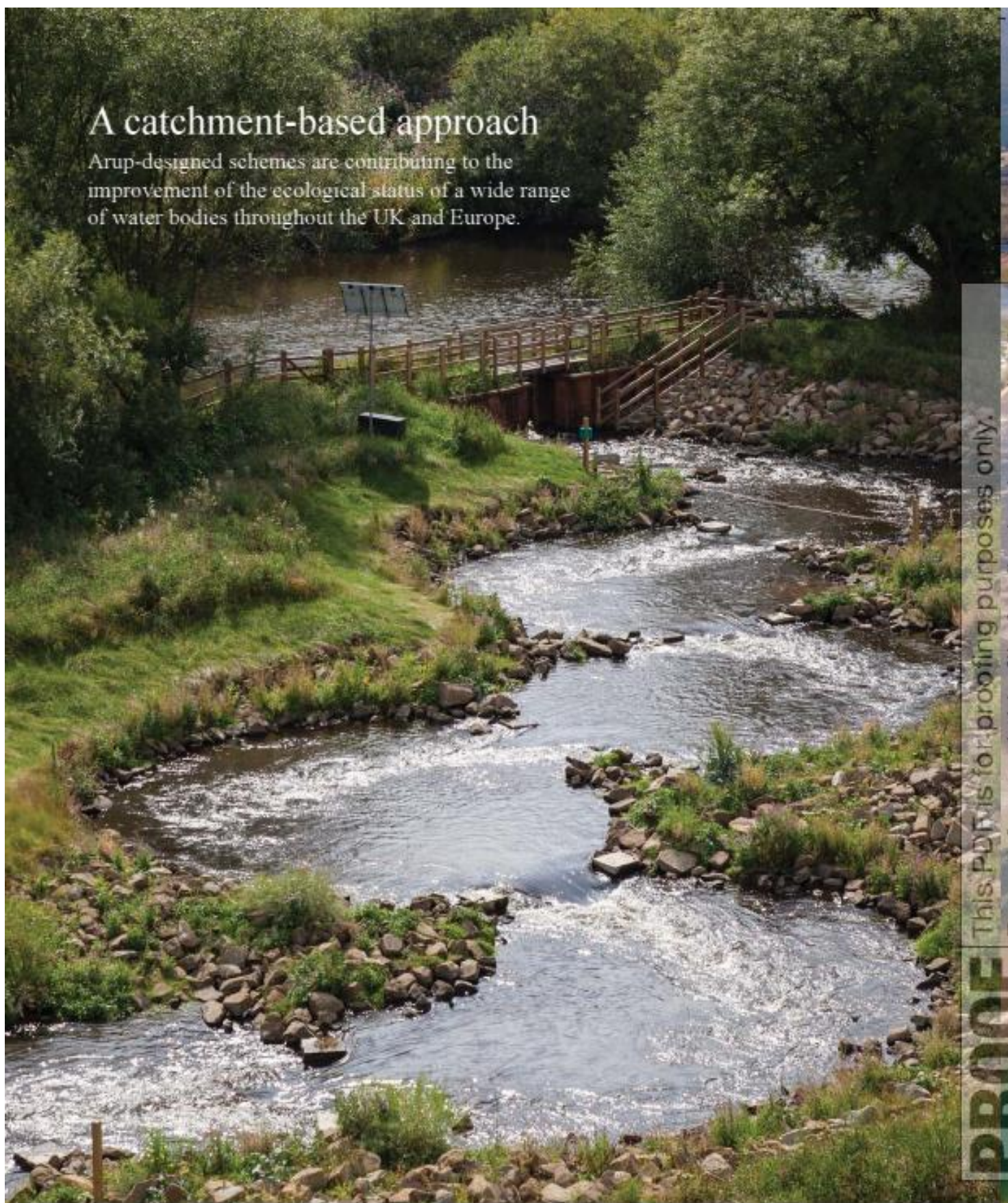
**7th & 8th May 2014**

*Sheffield Hallam University, Sheffield, England*



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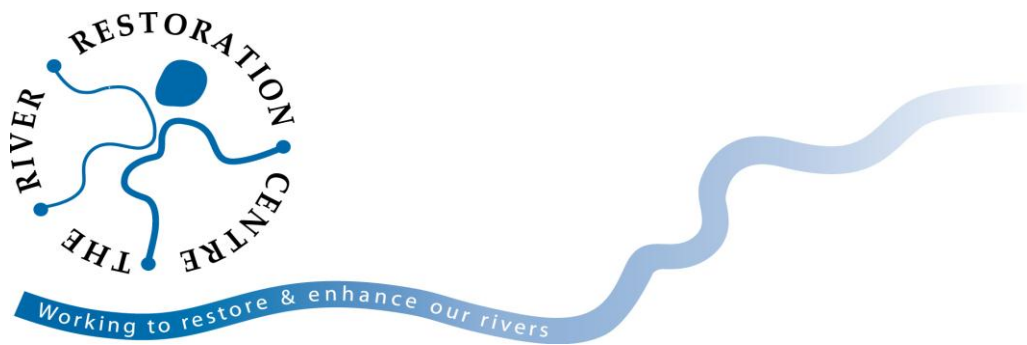
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# River Restoration Centre 15th Annual Network Conference

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## *River Restoration: Delivering Multiple Benefits*

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# Welcome!

...from the Managing Director

I would like to welcome you to this year's River Restoration Centre Annual Network Conference at Sheffield Hallam University. Now in its 15<sup>th</sup> year, the continued success of this event owes much to the enthusiastic contributions of presenters and attendees both past and present, without whose participation by speaking, questioning and sharing, this conference would not be such a success.

April 2014 sees the RRC enter its 20<sup>th</sup> year having started life as the River Restoration Project. In 1994 EU and UK funding enabled two river restoration demonstration projects on the Rivers Skerne and Cole. The work carried out on these rivers proved the need to promote this 'new' concept of river restoration across the UK, and to share information on completed river restoration and habitat enhancement projects. As a result the RRC was born and our inventory now holds information on more than 2,000 UK projects.

20 years on and we are continuing to build on the outputs from these early schemes, this past year adding a further 17 new projects to the Manual of River Restoration Techniques. This year also saw us support the newly formed Natural Resources Wales, establish closer working links with rivers trusts and other catchment host organisations by supporting the catchment based approach and continuing as the independent advisor to the Environment Agency and DEFRA as part of the £24M Catchment Restoration Fund programme.

December 2013 saw the RESTORE EU Life+ project draw to an end. Its legacy continues by streamlining data collection. The RiverWIKI is regarded as the premier repository of river restoration information in Europe and RRC and the European Centre for River Restoration (ECRR) will now be responsible for its management.

Looking to the future, we have received a fantastic response to the launch of this year's programme of workshops, site visits and technical training courses and look forward to seeing many of you at these throughout the year.

We are delighted to be working with the Environment Agency and WWF on the Inaugural England River Prize which celebrates local involvement in river, estuary and wetland catchment projects. The standard of entries was exceptionally high and we look forward to recognizing the achievements of the finalists at the prize giving which is taking place at the conference dinner.

Finally, my sincere thanks go out to all of those who have supported the RRC over the past 20 years. I hope, over the next two days, that you unashamedly exploit this opportunity to fill your mind with another year's worth of ideas and contacts.

**Martin Janes,  
Managing Director**





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# Penny Anderson Associates Ltd

## CONSULTANT ECOLOGISTS

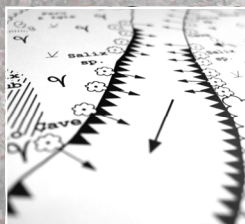
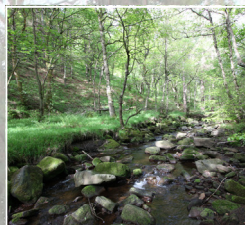
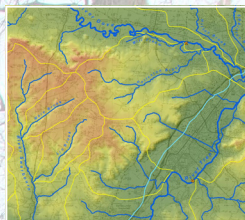
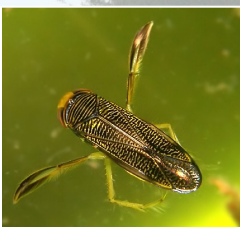
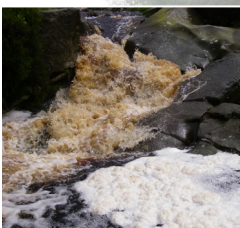


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- Ecological Survey & Evaluation
- Habitat Creation & Restoration
- Soils/Geology/Geomorphology





# PROGRAMME OF EVENTS

**DAY 1:**

**--- WEDNESDAY 7<sup>TH</sup> MAY ---**

09:00	REGISTRATION @ REFRESHMENTS in the Heartspace	60 mins
<hr/>		
<p style="text-align: center;"><b>Session 1: DAY 1</b> <b><u>Pennine Theatre</u></b></p>		
10:00	<p><b>Welcome and Introduction</b> Andrew Gill (<i>RRC Chairman</i>)</p>	25 mins
<hr/>		
<p style="text-align: center;"><b>CHAIR:</b> Mark Everard (<i>Associate Professor of Ecosystem Services, UWE, Bristol</i>)</p>		
<p><b>National Panel Discussion</b></p>		
10:25	<p>This session provides an important opportunity to discuss the UK's aspirations for the coming year. It will also provide a platform for outlining what are seen as the key challenges. After each representative has addressed the floor, there will be time for responses and questions.</p>	45 mins
<p style="text-align: center;"><b>CHAIR:</b> Peter Worrall (<i>Penny Anderson Consultants</i>)</p>		
11:10	<p><b>Keynote Address</b> Dr. Mark Everard (<i>Associate Professor of Ecosystem Services, UWE, Bristol</i>)</p>	25 mins
11:35	<b>Discussion</b>	15 mins
<p><b>RRC Corporate Member Panel</b></p>		
11:50	<p>Some of RRC's corporate members will outline key work they have been involved with during the last year, highlight areas where they have worked with RRC and express what they see as the main focus for the forthcoming year. There will be time for questions and comments from the floor.</p>	25 mins
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12:15	LUNCH in the Heartspace	60 mins
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**Session 2: DAY 1**

	<b><u>Pennine Theatre</u></b> Natural Flood Management	<b><u>Peak Theatre</u></b> Monitoring Pollution and Innovative Solutions	<b><u>Owen Theatre</u></b> Monitoring and Evaluation	
	<b>CHAIR: Lydia Burgess-Gamble</b> <i>(Environment Agency)</i>	<b>CHAIR: Sacha Rogers</b> <i>(Penny Anderson Associates Ltd)</i>	<b>CHAIR: Laurence Couldrick</b> <i>(Westcountry Rivers Trust)</i>	
13:15	<b>Scale, timeframes and funding - making natural flood management work for whole catchments.</b> Peter Worrall <i>(Penny Anderson Associates Ltd)</i>	<b>Assessing levels of sediment-bound contaminants from road runoff in the River Wandle to inform river restoration.</b> Geraldene Wharton <i>(Queen Mary, University of London)</i>	<b>Monitoring River Irwell weir removals.</b> Kevin Nash <i>(Environment Agency)</i>	15 mins
13:30	<b>Quantifying and simulating the impact of flood mitigation features in a small rural catchment.</b> Alex Nicholson <i>(Arup)</i>	<b>Ecological impacts of sewer misconnections.</b> Dave Chandler <i>(University of Sheffield)</i>	<b>Practical lessons from monitoring a large scale river rehabilitation on the River Trent.</b> Julie Wozniczka <i>(Staffordshire Wildlife Trust)</i>	15 mins
13:45	<b>Discussion.</b>	<b>Discussion.</b>	<b>Discussion.</b>	15 mins

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14:00	<b>Using a natural flood management approach to mitigate flooding, water quality and sediment problems.</b> Mark Wilkinson ( <i>The James Hutton Institute</i> )	<b>BioHaven floating islands deliver wide-ranging ecosystem services.</b> Leela O'Dea ( <i>Frog Environmental</i> )	<b>Braid Burn post project appraisal.</b> Adrian Hill ( <i>AECOM</i> )	15 mins
14:15	<b>'Slowing the flow' - a hydrological analysis of natural management measures in the Pickering beck catchment, North Yorkshire.</b> Huw Thomas ( <i>Centre for Ecosystems, Society and Biosecurity, Forest Research</i> )	<b>From hard edged water channel to soft edged waterway: floating ecosystem technology to restore urban waterways.</b> Galen Fulford ( <i>Biomatrix Water Solutions</i> )	<b>The zoological society of London's European eel citizen science programme.</b> Joe Pecorelli ( <i>The Zoological Society of London</i> )	15 mins
14:30	<b>Discussion.</b>	<b>Discussion.</b>	<b>Discussion.</b>	15 mins
14:45	POSTER SESSION in Owen 223 <i>With tea and coffee</i>			45 mins

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### Session 3: DAY 1

	<b><u>Pennine Theatre</u></b> River Restoration and Biodiversity	<b><u>Peak Theatre</u></b> Delivering Restoration Through Public Consultation	<b><u>Owen Theatre</u></b> Urban Regeneration in Sheffield	
	<b>CHAIR: Phil Boon</b> <i>(Scottish Natural Heritage)</i>	<b>CHAIR: Jenny Wheeldon</b> <i>(Natural England/Environment Agency)</i>	<b>CHAIR: Kathryn Hardcastle</b> <i>(River Nene Regional Park CIC)</i>	
15:30	<b>River restoration and biodiversity – a study of the UK and Ireland</b> Ian Griffin ( <i>ECUS ltd</i> )	<b>Reconciling unconstrained visions and disparate consultation responses: lessons learned from the rivers Wharfe and Teme.</b> Kieran Sheehan ( <i>JBA consulting</i> )	<b>Restoring the River Don - from open sewer to artery of urban regeneration.</b> Ian Rotherham ( <i>Sheffield Hallam University</i> )	15 mins
15:45	<b>Monitoring a river restoration project for conservation objectives.</b> Melanie Fletcher ( <i>FBA</i> )	<b>River Dee/Afon Dyfrdwy SSSI Restoration – Balancing geomorphological and ecological enhancement with public expectation.</b> Elinor Phillips/Alison Flynn ( <i>Jacobs</i> )	<b>Reflections on the planning of river restoration through the lens of two deculverting projects in Sheffield.</b> Ed Shaw ( <i>University of Sheffield</i> )	15 mins

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16:00	<b>Letting the river build habitat: the sustainable ecological benefits of applying the process restoration philosophy in ideal and practice.</b> Hamish Moir ( <i>cbec Eco-Engineering/The Rivers and Lochs Institute</i> )	<b>River Swilgate restoration.</b> Gareth Bradbury ( <i>Wildfowl &amp; Wetlands Trust (Consulting)</i> )	<b>Daylighting Lost Urban Rivers: joining up multiple benefits for the water industry and river restoration.</b> Adam Broadhead ( <i>University of Sheffield</i> )	15 mins
16:15	<b>Discussion.</b>	<b>Discussion.</b>	<b>Discussion.</b>	15 mins
16:30	SHORT BREAK TO MOVE TO FINAL JOINT SESSION			15 mins

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**Session 4: DAY 1**

**Pennine Theatre**

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**CHAIR: Alastair Driver**  
(*Environment Agency*)

16:45	<b>Development and application of a multiscale process-based framework for the hydromorphological assessment of European rivers.</b> <i>Angela Gurnell (Queen Mary, University of London)</i>	15 mins
17:00	<b>Visioning catchment futures: a case study on the river Stiffkey, Norfolk UK.</b> <i>Sarah Taigel (University of East Anglia)</i>	15 mins
17:15	<b>Restoring the Eddleston Water - the science evidence-base for the delivery of multiple benefits from a heavily degraded water course.</b> <i>Chris Spray (University of Dundee)</i>	15 mins
17:30	<b>Discussion.</b>	15 mins
17:45	<b>Poster Competition Prizes and Close (RRC)</b> Sponsored by Wiley	15 mins

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18:00	END OF DAY 1
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**19:30 – DRINKS RECEPTION**

**&**

**20:00 – CONFERENCE DINNER**

To Be Held At:

Sheffield City Hall, Barkers Pool, Sheffield, S1 2JA

**First England River Prize Winner Announcement**

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**DAY 2:****--- THURSDAY 8<sup>TH</sup> MAY ---****Registration  
Opens at 8:30am**

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**Session 5: DAY 2**

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9:00

CHOICE OF SITE VISIT OR WORKSHOP

3 hours  
30 mins

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**Harmer 2210****Workshop A:**Applying Cutting Edge Science to River  
Restoration**Harmer 2230****Workshop B:**Restoration Techniques and Methods:  
Application, Transferability and Problem  
Solving.

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The workshop will explore the science knowledge base used by practitioners, determine additional information currently under-utilised and define better ways to exchange information, bringing academic advances into restoration practice.

**Innovation in consultancy: experiences of incorporating new science into practice.**Sebastian Bentley (*JBA Consulting*)**The use of conceptual models to help understand the relationship between hydromorphological change and ecosystem response.**Judy England (*Environment Agency*)**Working with natural processes to reduce flood risk - developing and R&D framework.**Jo Barlow (*Black & Veatch*) & Lydia Burgess-Gamble (*Environment Agency*)**Developing approaches for assessing the effects of river restoration in terms of multiple benefits and ecosystem services.**Dave Gilvear (*University of Plymouth*)

This session will discuss the common approaches to restoration and habitat enhancement. From practical demonstration, latest guidance and the experience of the group, we will discuss how to decide “what to use” application and common problems.

**20 years of “what works and why”: applying the common UK techniques.**Martin Janes (*RRC*)**River Habitat Workshops: practical insight for delivery and design**Mike Blackmore (*Wild Trout Trust*)**Restoration on a grand scale: the River Avon restoration project.**Jane Moon (*Black & Veatch*)**Healthy catchments - Environmental improvements: mitigation guidance for FCRM activities and WFD.**Philip Williamson (*Royal HaskoningDHV*)

12:30

LUNCH

65 mins

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## Session 5: DAY 2

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9:00

CHOICE OF SITE VISIT OR WORKSHOP Continued

3 hours  
30 mins

### Harmer 2202

#### **Workshop C:**

Prioritising River Restoration for Multiple Benefits

### Owen 1031

#### **Workshop D:**

Catchment Management and River Restoration: Linking Outcomes to the Next Round of River Basin Planning

Methods that help to prioritise multi-objective river restoration projects are becoming ever more essential as financial resources continue to be squeezed. The aim of this workshop is to share experiences of successful prioritising methods and identify gaps in our understanding that could make such methods more robust.

#### **The river at the end of the Universe**

Richard Jeffries/Shona McConnell (*SEPA*)

#### **A practitioner's perspective on consideration of WFD within multi-objective projects**

Sacha Rogers (*Penny Anderson*)

#### **Prioritising WFD implementation at a water body scale.**

Ian Dennis (*Royal HaskoningDHV*)

#### **Prioritising river improvement in infrastructure projects: WFD – status quo or legacy?**

Katy Kemble (*Jacobs*)

Catchment scale management is now recognised as an essential element to achieving best practice river restoration. This workshop will discuss how current approaches and future outcomes from catchment management projects can feed into the 2<sup>nd</sup> round of river basin management plans. Mechanisms to ensure information and data is effectively captured to achieve this goal, will be discussed.

#### **WFD and the catchment based approach - going from data to evidence.**

Laurence Couldrick (*Westcountry Rivers Trust*)

#### **The catchment change management hub - engaging communities and sharing best practice.**

David Corbelli & David Kingsley-Rowe (*Cascade Consulting*)

#### **Improving water quality with the community.**

Tim Longstaff (*Wandle Trust*)

#### **Catchment restoration delivery.**

Jerry Gallop (*Environment Agency*)

12:30

LUNCH

65 mins

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## Session 5: DAY 2

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9:00	CHOICE OF SITE VISIT OR WORKSHOP Continued	3 hours 30 mins
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### **Owen 1037**

#### **Workshop E:**

Can River Restoration Help Achieve  
Synergies Between Flood Risk Mitigation,  
Urban Development, Renewable Energy and  
Climate Change?

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REFORM (Restoring rivers FOR effective catchment management) is a European-funded 4 year project that addresses the challenges of reaching the ecological objectives for rivers require under WFD. This workshop will enable participants to hear first-hand about the latest results from the REFORM project in terms of the development of tools and procedures for determining the most effective restoration measures and defining success. The workshop will then explore the synergies between delivery of flood mitigation, renewable energy, urban development and climate change in the context of river restoration. Participants will then be able to discuss and provide feedback on the validity and benefits of these new ideas and identify any gaps. For further information about REFORM visit [www.reformrivers.eu](http://www.reformrivers.eu)

This workshop will be led by Ian Cowx  
(*University of Hull*) and Angela Gurnell  
(*Queen Mary University, London*)

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12:30	LUNCH	65 mins
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## Session 5: DAY 2

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9:00	CHOICE OF SITE VISIT OR WORKSHOP Continued	3 hours 30 mins
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**Site Visit 1:**  
Porter Brook Regeneration Scheme

**Site Visit 2:**  
The Five Weirs Walk, River Don

This combined workshop and site visit will include an introductory talk & opportunities to discuss issues surrounding deculverting in a heavily modified urban river system. Delegates will be asked to contribute using their creativity, knowledge and passion, whilst taking the opportunity to learn and consider what constitutes good practice in 'river regeneration'. After the workshop element we will go out to see some deculverting work in action which includes benefits for local people, flood risk management and ecology.

Site visit lead:  
Tom Wild (*South Yorkshire Forest*)  
Simon Ogden (*Sheffield City Council*)

This site is a 10 minute walk from the University.

Come along on part of the famous Five Weirs Walk to see combined natural flood risk management and habitat creation in action. Hear how a combination of local authority, statutory bodies, charities and hundreds of volunteers have worked together to improve the River Don through Sheffield. Find out the future plans for the Don and its urban tributaries. For more information: [Five Weirs Walk](#)

Site visit lead:  
Simon Hinkins (*Environment Agency*)  
Adam Rollitt (*The River Stewardship Company*)

This site is a 15 minute walk from the University with a 3 mile walk around the site.

12:30	LUNCH	65 mins
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Session 6: DAY 2				
<u>Pennine Theatre</u>		<u>Norfolk Theatre</u>	<u>Owen Theatre</u>	
WFD: Planning to Delivery		Engaging Society in River Restoration	Partnerships to Deliver River Restoration	
CHAIR: Shaun Leonard (Wild Trout Trust)		CHAIR: Fiona Bowles (Wessex Water)	CHAIR: Kevin Skinner (Atkins)	
13:35	<b>The challenges of achieving WFD compliance on large engineering scheme: a consultant's perspective.</b> Sally German ( <i>Arup</i> )	<b>Living Waterways.</b> Rachael McFarlane ( <i>Environment Agency</i> )	<b>Dynamic rivers in small spaces: making room for river restoration in Cumbria.</b> Duncan Wishart ( <i>Environment Agency</i> )	15 mins
13:50	<b>Implementation of the WFD: resolving engineering and hydromorphological river restoration difficulties.</b> Matthew Hemsworth ( <i>JBA consulting</i> )	<b>MURCI WATERS - Protecting and enhancing urban rivers.</b> John Brewington ( <i>Environment Agency</i> )	<b>River of Life: A multi-benefit, landscape scale habitat enhancement project.</b> Lizzie Rhymes ( <i>Environment Agency</i> )	15 mins
14:05	<b>At a local level: joint delivery of the WFD.</b> Claire Gray ( <i>London Borough of Lewisham</i> )	<b>Restoring a multitude of processes on the Connswater.</b> David Hetherington ( <i>Arup</i> )	<b>Partnership delivery of the River Avon restoration plan.</b> Martijn Antheunisse ( <i>Wiltshire Wildlife Trust</i> )	15 mins
14.20	<b>Discussion.</b>	<b>Discussion.</b>	<b>Discussion.</b>	15 mins
14.35	BREAK With tea and coffee			40 mins

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**Session 7: DAY 2**

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**Pennine Theatre**

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**CHAIR: Will Bond**

*(Alaska Environmental Contracting Ltd)*

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15:15	<b>Urban channel enhancement for fisheries and ecology: balancing flood risk and channel stability with fisheries and habitat enhancement.</b> <i>Jack Spees (Ribble Rivers Trust)</i>	15 mins
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15:30	<b>An institutional analysis of water management and spatial planning in England.</b> <i>Karen Potter (University of Liverpool)</i>	15 mins
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15:45	<b>Conference Finale</b> <i>Martin Janes (RRC)</i>	15 mins
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16:00	<b>Discussion and close.</b>	15 mins
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16:15	END OF CONFERENCE	
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# Update on Support & Advice from RRC

## Best practice advice

Call us to find out how we can best support you. We can, for example:

- Identify opportunities for restoration, habitat enhancement and natural flood management;
- Provide an independent perspective on existing ideas, plans or design documents;
- Offer technical support and assistance with monitoring and project evaluation;
- Help you to best promote your work to a wider audience.

## Available information

Through the Centre's involvement in projects, initiatives and strategy, we:

- Share information and understanding within the UK and across Europe;
- Build the UK evidence base through collating, updating and reporting trends;
- Provide a forum for the exchange of knowledge and developments (the RRC annual network conference and the RiverWIKI online projects database);
- Update through a monthly e-bulletin, a bi-annual newsletter and social media (Facebook, Twitter, Linked In & YouTube).



## Guidance and training

Develop your capabilities through our series of training courses, technical workshops and site visits:

- Topics include natural flood management, project monitoring, best practice river restoration design and ecosystem services;
- This year our site visits cover projects in England and Scotland;
- We also publish high quality best practice technical guidance on our website.



Email: [rrc@therrc.co.uk](mailto:rrc@therrc.co.uk) Telephone: 01234 752979 Or speak to a member of staff.



# Aquatic Science & Ecology Experts



Water is one of our most important resources and yet we face a crisis in our waterways. frog environmental are aquatic science and ecology experts with several decades experience of solving manmade problems in our surface waters. We offer a comprehensive range of consulting services:

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- River habitat and urban river surveys
- Fish habitat and obstruction assessments, fish passage design
- Invasive plant and macrophyte surveys
- Protected species and habitat surveys
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- Sediment management
- Design, management and installation of BioHaven® floating treatment wetlands, a versatile, reliable and unique approach to water quality management, erosion control, biodiversity enhancement and flood mitigation.

We provide cost effective, innovative approaches inspired by nature to protect and enhance our aquatic environments.

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# ENGLAND RIVER PRIZE

*“Celebrating local involvement in river, estuary and wetland catchment projects”*

**On the 7<sup>th</sup> May, one of the four shortlisted finalists will be announced as winner of the inaugural England River Prize**

The finalists of England’s first ever River Prize for river restoration were announced in April. After much deliberation, the judges selected finalists across four different categories. Administered by the River Restoration Centre (RRC) and judged by a panel of experts, the overall winner will be announced at RRC’s 15<sup>th</sup> annual network conference dinner.

Category	River Prize Finalist	Lead applicant
Large catchment project, demonstrating a whole river approach to restoration.	Wensum, Norfolk	Environment Agency
Value for money project, demonstrating cost effective achievements.	Bow Brook, Worcestershire	Worcestershire Wildlife Trust
Multi-partnership project, demonstrating wide ranging involvement in the planning and delivery of restoration.	Haltwhistle Burn, Northumberland	Tyne Rivers Trust
Multi-benefit project, demonstrating substantial contribution to catchment ecology, the economy and local communities.	Wye, Herefordshire	Wye and Usk Foundation

“The inaugural England River Prize attracted an exceptional and diverse group of restoration schemes from across England and demonstrated how much rivers mean to local people. The number of entrants, and the standard of work being done by agencies, charities and volunteers in restoring their cherished local waterways was exceptionally high, and much greater than we expected given it is an inaugural event. We would like to thank all applicants who submitted their projects for consideration.”

**Martin Janes, Managing Director of the River Restoration Centre.**

*Sponsored by:*





## *Meet the RRC Staff*

Tracy Burton

I coordinate the day to day administration of the Centre, and I am the first point of contact for enquiries. I support the planning and delivery of the Conference, help to maintain the National River Restoration Inventory and distribute the RRC Bulletin and Newsletter. I am the main point of contact for our Individual, Organisation and Corporate Members.

Nick Elbourne

My role is to provide technical advice and guidance for a variety of audiences. I am editor of RRC's monthly Bulletin, manager of the RiverWiki projects database and recently I have been involved in the 'Catchment Based Approach' programme to help improve access to data for end users. I am looking to develop stronger links with water professionals and the planning sector so come and find me if you have any bright ideas!

Martin Janes

My role combines technical advice on river restoration, representing practitioners and the wider restoration community on steering groups and managing the business. I work with our core funder representatives (Environment Agency, Natural Resources Wales, the Scottish Environmental Protection Agency, the Northern Ireland Environment Agency, Natural England, Scottish Natural Heritage and the Rivers Agency) to ensure that RRC provides the expertise they need.

Ivo Kohn

I am a visiting ERASMUS student from the Czech Republic and will be working with the RRC for approximately three months. I am currently studying Landscape Engineering at Mendel University in Brno. The course covers a broad range of subjects and we are encouraged to think about the 'bigger picture' to create natural constructions at the landscape-scale. The ERASMUS work placement at the RRC will be a great opportunity to learn some practical skills in river restoration. In my free time, I enjoy going cycling, cross-country skiing, foraging and most of all - rock climbing!

Jenny Mant

I manage the advisory work, associated budgets and technical team. I support business development activities by forging closer links with science institutions and practitioners. In addition I provide technical advice to practitioners and policy makers through advisory visits, training courses and events. I have a background in fluvial geomorphology.

Emma Turner

I previously worked on Regional Development Agency activities as a Business Co-ordinator and Accounts Technician before joining the RRC. I undertake the RRC's accounts, management accounting and financial reporting and support the RRC Board.

Vicky West

In my role as projects officer at the RRC I support the rest of the technical team in providing best practice advice and guidance on river restoration. This has included our work with the 42 Catchment Restoration Fund projects. I also help to deliver RRC events, such as site visits and training courses as



well as updating the RRC website and the River WIKI resource. I have been working with Simon Whitton (below) to complete habitat walkover surveys for the Nene Valley Nature Improvement Area project.

Simon Whitton

In my current role as the River Restoration Adviser to the Nene Valley Nature Improvement Area (<http://nenevalleynia.org/>), I am investigating the geomorphology and physical habitats of the 69 waterbodies that comprise the River Nene catchment to identify reasons for Water Framework Directive failure whilst working up restoration projects to remedy some of the issues found.

Ulrika Åberg

I support a range of advisory visits, assess river restoration works and provide technical advice. Over the last year this has also included evaluation of the 42 Catchment Restoration Fund projects. I am the editor of RRC's bi-annual Newsletter and I also compile case studies and support the RiverWiki database. I am involved in planning and coordinating our technical training courses, workshops and site visits. My main area of expertise lies within the field of eco-hydromorphology, and I am working on bridging the gaps between science and practice.



**From top to Bottom, left to right:**

Ivo Kohn – Visiting Researcher (ERASMUS)  
Simon Whitton – River Restoration Adviser to the Nene Valley NIA  
Nick Elbourne – Restoration Adviser and Communications  
Ulrika Åberg – Restoration Adviser and Information  
Vicky West – Projects Officer  
Emma Turner – Accounts Technician  
Martin Janes – Managing Director  
Tracy Burton – Centre Administrator  
Jenny Mant – Science and Technical Manager



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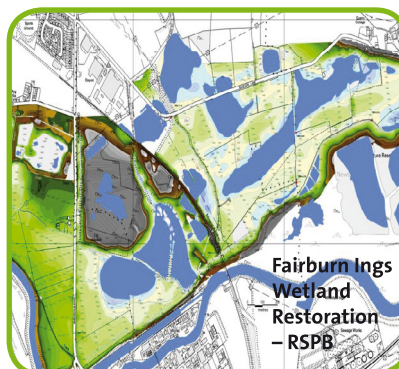
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**NOTES**

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## ABSTRACTS

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## **Session 1:**

### **Pennine Theatre**

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## **KEYNOTE ADDRESS**

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### **EXPLAINING THE VALUE OF NATURE**

M. EVERARD

*Associate Professor of Ecosystem Services – University of the West of England*

The ways we talk about nature, its importance and what it does for us, can seem technical and remote. A key element of effective communication is connecting with the value systems and priorities of those we want to engage, as a conversation and not just one-way traffic. This is vital to engender action, particularly helping people recognise their dependencies and vulnerabilities and hence a rationale for payment to secure or enhance service provision. Raising awareness about systemic connections between ecosystem services and their multiple beneficiaries is also vital. Various case studies will be highlighted to illustrate these principles in action.

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### **NOTES**





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## Session 2:

### **Pennine Theatre** Natural Flood Management

#### **SCALE, TIMEFRAMES AND FUNDING – MAKING NATURAL FLOOD MANAGEMENT WORK FOR WHOLE CATCHMENTS**

P. WORRALL<sup>1</sup>, S. ROSE<sup>2</sup>, N. HESTER<sup>3</sup>, G. HAMMOND<sup>4</sup>

*1 Technical Director – Penny Anderson Associates, 2 Technical Director – JBA Consulting, 3 Projects & Grants Manager – National Trust, 4 GIS Manager – Penny Anderson Associates*

Using the Defra sponsored Holnicote Multi-Objective Flood Management Demonstration Project as the key case study example, the presentation will illustrate some of the inherent challenges of embarking on land management change across a whole catchment in order to achieve viable flood risk benefits. Determining not only the nature of land management changes but their scale requires at first an agreed objective for the contribution that might be made to the flood regulating service – often reliant on expert opinion. The next challenge is determining realistic timeframes. The process of community engagement and consultation with individual farm units is neither rapid nor necessarily immediately successful. Scale and timeframes for land management change in catchments will always be constrained by the processes and vagaries of funding streams. Frustratingly, opportunities such as environmental stewardship schemes do not always lie comfortably with land management change for flood risk benefits.

#### **QUANTIFYING AND SIMULATING THE IMPACT OF FLOOD MITIGATION FEATURES IN A SMALL RURAL CATCHMENT**

A. NICHOLSON<sup>1</sup>, P. QUINN<sup>2</sup>, G. O'DONNELL<sup>3</sup>, M. WILKINSON<sup>4</sup>

*1 Graduate Engineer – Arup, 2 Senior Lecturer – Newcastle University, 3 Senior Researcher – Newcastle University, 4 Catchment Hydrologist – The James Hutton Institute*

Management of fluvial flood risk in the UK is undergoing a paradigm shift, with a change in emphasis from structural defences to working with natural processes. The village of Belford failed to satisfy a risk-based cost-benefit criterion for structural defences, despite a number of floods occurring in recent years. The alternative low cost Natural Flood Management approach involves the use of soft-engineered Runoff Attenuation Features (RAFs) that intercept or modify hydrological flow pathways. This research has quantified the impacts of individual RAFs in the Belford Burn catchment, Northumberland. Analyses reveal that a network of RAFs has the potential to significantly reduce peak flow (up to 30%). However, for larger storms it is demonstrated that a certain threshold of RAFs are required before the aggregate effects cause reduction in peak flow. The potential transferability of the approach and the methods used could have benefits for similar small catchments.

#### **USING A NATURAL FLOOD MANAGEMENT APPROACH TO MITIGATE FLOODING, WATER QUALITY AND SEDIMENT PROBLEMS**

M. WILKINSON<sup>1</sup>, P. QUINN<sup>2</sup>, S. ADDY<sup>3</sup>, H. WATSON<sup>3</sup>, N. BARBER<sup>4</sup>, J. JONCZYK<sup>4</sup>, A. NICHOLSON<sup>5</sup>

*1 Catchment Hydrologist – The James Hutton Institute, 2 Senior Lecturer – Newcastle University, 3 Hydromorphologist – The James Hutton Institute, 4 Catchment Scientist – Newcastle University, 5 Graduate Engineer – Arup*

The hazard of flooding is increasing owing to impacts of changing climatic patterns, intensification of agriculture and continued pressure to build on floodplains. Concurrently, the cost of constructing and maintaining traditional flood defences in small communities outweigh the potential benefits. Here we demonstrate the potential to manage and attenuate runoff using Natural Flood Management by targeting flow pathways and exploiting floodplains and riparian zones in low order river channels.

Study catchments include the Bowmont headwaters, Scottish Borders, Netherton, Northumberland and Belford, Northumberland. These catchments have contrasting land uses, are known for their rapid runoff generation and have downstream communities at risk of flooding and sediment problems. The evidence gathered is helping to inform optimal design and location of measures to accrue multiple benefits. Findings show that the management of surface runoff and ditch flow is a cost-effective method for managing flood risk and sediment discharge of rapidly responding catchments.

### **“SLOWING THE FLOW” – A HYDROLOGICAL ANALYSIS OF NATURAL FLOOD MANAGEMENT MEASURES IN THE PICKERING BECK CATCHMENT, NORTH YORKSHIRE**

H. THOMAS<sup>1</sup>, D. LINDSAY<sup>2</sup>, T. R. NISBET<sup>3</sup>

*1 Project Manager – Centre for Ecosystems, Society and Biosecurity, Forest Research, 2 Technical Specialist, Hydrology – Environment Agency, 3 Programme Group Manager – Centre for Ecosystems, Society and Biosecurity, Forest Research*

The hazard of flooding is increasing owing to impacts of changing climatic patterns, intensification of agriculture and continued pressure to build on floodplains. Concurrently, the cost of constructing and maintaining traditional flood defences in small communities outweigh the potential benefits. Here we demonstrate the potential to manage and attenuate runoff using Natural Flood Management by targeting flow pathways and exploiting floodplains and riparian zones in low order river channels. Study catchments include the Bowmont headwaters, Scottish Borders, Netherton, Northumberland and Belford, Northumberland. These catchments have contrasting land uses, are known for their rapid runoff generation and have downstream communities at risk of flooding and sediment problems. The evidence gathered is helping to inform optimal design and location of measures to accrue multiple benefits. Findings show that the management of surface runoff and ditch flow is a cost-effective method for managing flood risk and sediment discharge of rapidly responding catchments.

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#### **NOTES**



## Session 2:

### Peak Theatre

#### Monitoring Pollution and Innovative Solutions

##### **ASSESSING LEVELS OF SEDIMENT-BOUND CONTAMINANTS FROM ROAD RUNOFF IN THE RIVER WANDLE TO INFORM RIVER RESTORATION**

G. WHARTON<sup>1</sup>, M. BRIERLEY<sup>2</sup>, B. DAVIES<sup>3</sup>, T. HULL<sup>4</sup>

*1 Reader in Physical Geography - School of Geography, Queen Mary, University of London, 2 MSc student, School of Geography, Queen Mary, University of London, 3 Trust Director, The Wandle Trust/South East Rivers Trust, 4 Catchment Project Officer, The Wandle Trust*

Inputs of fine sediments and sediment-bound contaminants from deposits on roads and runoff through stormwater drains have detrimental effects on the aquatic health of urban rivers. Specific concerns over the sustainability of trout populations in the Carshalton Arm of the River Wandle prompted this study. Heavy metal and Polycyclic Aromatic Hydrocarbon concentrations were compared to Environmental Quality Guidelines and concentrations in the sediments were referenced against Canadian Sediment Quality Guidelines. Baseline water and sediment quality data were collected prior to the installation of three Hydrodynamic Separators. This presentation will detail the water and sediment quality results and discuss the implications of this for further monitoring, management and restoration.

##### **ECOLOGICAL IMPACTS OF SEWER MISCONNECTIONS**

D.M. CHANDLER<sup>1</sup>, D.N. LERNER<sup>2</sup>, L.L. MALTBY<sup>2</sup>, P.H. WARREN<sup>2</sup>

*1 Researcher – University of Sheffield, 2 Professor – University of Sheffield*

Sewer misconnections of domestic appliances to surface water sewers, which discharge directly to rivers, are causing urban diffuse pollution. The impact of these small but frequent discharges is a potential threat to water and ecological quality. Diatoms have been sampled at sewer outfalls suffering from a range of intensities of misconnections in Sheffield. Measures of community diversity and structure have been used to investigate the impacts within those communities. This work demonstrates that misconnection effluents show potential to cause notable impacts, though at lower intensities the impact is non-significant. Sewer misconnections may therefore pose a threat to the success of river restoration.

##### **BIOHAVEN FLOATING ISLANDS DELIVER WIDE-RANGING ECOSYSTEM SERVICES**

L. O'DEA<sup>1</sup>, R. HAINE<sup>2</sup>

*1 Partner – Frog Environmental, 2 Partner – Frog Environmental*

BioHaven technology is based on bio-mimicry, designed to emulate the function and strength of pristine floating peat wetlands, providing a wide range of ecosystem services. The deep, high surface area of the recycled polymer matrix promotes the development of a natural, complex, microscopic ecosystem which kicks off the treatment process and kick starts the food chain. BioHaven floating wetlands have been shown to deliver water quality improvements equal to that of a constructed wetland in less than 5 times the space. Current research into the removal of oestrogen and heavy metals is also having positive outcomes. BioHavens adjustable and integral buoyancy provides a freeform platform for innovation and creativity to delivering multiple benefits through a range of applications within the catchment.

## **FROM HARD EDGED WATER CHANNEL TO SOFT EDGED WATERWAY: FLOATING ECOSYSTEM TECHNOLOGY TO RESTORE URBAN WATERWAYS**

G. FULFORD

*Managing Director – Biomatrix Water Solutions Ltd*

In 2012 The Canal and River Trust (CRT) was seeking a restoration solution for a vertical edged section of the River Brent in Henwell. Permission to remove the edging or carry out in stream civil works had been declined due to the inherent flood risk in the area. As a solution CRT selected a series of Floating Edge Ecosystem modules to provide bank protection and restore the river's edge without obstructing flow or navigability. Sections were fitted together using a quick connect system, matching the curvature of the river. A sliding guidepost anchoring system allowed the system to move with changing water levels. In September 2013 184 Floating Ecosystem models, providing 634 linear meters of riparian habitat, were installed along steel sheet pile walls in the Aviles and Sampoloc canals, Manila. The system has already experienced and effectively withstood typhoons, highly variable water levels and flows exceeding 3m/s.

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### **NOTES**

## Session 2:

### Owen Theatre

#### Monitoring and Evaluation

##### **MONITORING RIVER IRWELL WEIR REMOVALS**

K. NASH<sup>1</sup>, M. SCHOFIELD<sup>2</sup>, G. MORRIS<sup>3</sup>, A. MORRISE<sup>3</sup>, O. SOUTHGATE<sup>4</sup>

*1 Fisheries Technical Specialist – Environment Agency, 2 Trust Director – Irwell Rivers Trust, 3 Biodiversity Officer – Environment Agency, 4 Project Manager – Environment Agency*

The River Irwell Restoration project was initiated in 2009. Its main aim is to deliver Good Ecological Potential to the many heavily modified waterbodies of North Manchester. Over recent years, the project has focussed on weir removal as the most efficient way of delivering ecological benefits on a modest budget. To date, 16 weirs have been removed. Our monitoring programme aims to be SMART and is influenced by the River Restoration Centre's monitoring guidance manual (PRAGMO). We identified principle reasons for monitoring and matched them to preferred methods, before assigning specific monitoring aims to individual weir removal sites. Methods include expert opinion, simple flow mapping and fixed point photography. Several case studies are presented that illustrate the delivery of key WFD mitigation measures.

##### **PRACTICAL LESSONS FROM MONITORING A LARGE SCALE RIVER REHABILITATION ON THE RIVER TRENT**

J.C. WOZNICZKA<sup>1</sup>, S. BENTLEY<sup>2</sup>, N.S. ENTWISTLE<sup>3</sup>, N.MOTT<sup>4</sup>

*1 Project Manager – Central Rivers Initiative, 2 Senior Hydromorphologist – JBA Consulting, 3 Lecturer in Geography – University of Salford, 4 Senior Ecologist – Staffordshire Wildlife Trust*

The ongoing rehabilitation of a 4km reach of the River Trent will be evaluated in the context of a continuing programme of reach rehabilitation in the Central Rivers Initiative. Catton is a valuable demonstration site which has encouraged other landowners to see their river as a valuable resource for their business, enabling restoration and business aims to be aligned. Initially project objectives were set, using the River Restoration Centre's monitoring guidance (PRAGMO), and a baseline report undertaken. Works included extensive bank reprofiling, introducing large woody debris, creation of islands and side bars and introduction of several thousand cubic metres of gravel. The project is monitored and evaluated against success criteria, and inform design and development of future schemes. The results of monitoring up to one year will be presented.

##### **BRAID BURN POST PROJECT APPRAISAL**

A. HILL<sup>1</sup>, M. BRIGNELL<sup>2</sup>

*Senior Engineer – AECOM*

The AECOM designed Braid Burn Flood Alleviation Scheme successfully balances several drivers whilst delivering multiple benefits to a wide range of users. The scheme is working with natural processes to reduce flood risk by utilising park areas for natural flood storage, and incorporating river restoration measures. The scheme was featured in the 2013 update of the River Restoration Centre Manual of River Restoration Techniques, and awarded a commendation by the Saltire Society in association with the Institution of Civil Engineers. A series of routine site visits have demonstrated the importance of implementing a post project plan to ensure that the ecological improvements achieved to date can be sustained. This presentation will provide a background to the scheme, discuss the benefits and issues encountered, outline the importance of ongoing involvement following construction and highlight lessons learned to inform future practices.

## THE ZOOLOGICAL SOCIETY OF LONDON'S EUROPEAN EEL CITIZEN SCIENCE PROGRAMME

J. PECORELLI

*Citizen Science Programme Leader – The Zoological Society of London*

The European eel (*Anguilla anguilla*) is an iconic species with a life cycle that encompasses a 10,000 km round trip migration from the Sargasso Sea. Since 2008 the eel has been listed as Critically Endangered. Zoological Society of London field staff have been monitoring the upstream elver migration in four of London's rivers for the last eight years. In 2011 we started to engage the help of volunteer citizen scientists in this research, and we are now moving from monitoring to adding eel passes over barriers. Well-designed citizen science programmes can be very cost-effective and produce valid data that can be used to guide conservation management decisions. The presentation will include an introduction to the biology of the European eel and why we need to monitor them, a description of the monitoring methodology, and an explanation of how we recruit and work with our citizen scientists.

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### NOTES

## Session 3:

### Pennine Theatre

#### River Restoration and Biodiversity

##### **RIVER RESTORATION AND BIODIVERSITY - A STUDY OF THE UK AND IRELAND**

I. GRIFFIN

*Hydroecology Team Leader – ECUS environmental consultants*

The work presented covers findings from Phase 1 of a proposed three-phase project, reviewing the present status of river restoration in the UK and Ireland with particular focus on river corridors, and the restoration of upstream and lateral connectivity between channels, banks, riparian areas and floodplains. The key objectives are: (a) To describe the main causes and extent of physical habitat damage in rivers in the UK and Ireland and to review the need for restoration in the light of this information. (b) To review the link between river processes and biodiversity, by gathering evidence of the benefits of restoring natural processes for river, riparian and floodplain biodiversity. (c) To assess the current status of river restoration in the UK and Ireland, including a comparison of each of the five countries.

##### **MONITORING A RIVER RESTORATION PROJECT FOR CONSERVATION OBJECTIVES**

M.S. FLETCHER<sup>1</sup>, A.M. POWELL<sup>2</sup>

*1 Science, Publications and Training – Freshwater Biological Association, 2 Consultant Fellow – Freshwater Biological Association*

While the importance of monitoring river restoration projects is increasingly recognised, project reviews often omit mention of it and funding is often difficult to obtain. Monitoring of a restoration project on the River Gowan, Cumbria, will be presented. As well as a designated SSSI due to the presence of white-clawed crayfish and freshwater pearl mussel, it is also designated as a SAC, and as such, a Natura Protected Area under the WFD. Conservation Objectives are therefore required to be met rather than Good Ecological Status. The restoration strategy aimed to implement physical interventions to return the River Gowan to Unfavourable Recovering or Favourable Condition. The talk examines the difficulties of selecting a suitable and cost-effective monitoring method, and making use of the PRAGMO approach. Pre- and post-restoration monitoring results will be discussed in the context of the original aims and the conservation drivers under which it was initiated.

##### **LETTING THE RIVER BUILD HABITAT: THE SUSTAINABLE ECOLOGICAL BENEFITS OF APPLYING THE PROCESS RESTORATION PHILOSOPHY IN IDEAL AND PRACTICE**

H. MOIR<sup>1</sup>, T. MCDERMOTT<sup>2</sup>

*1 Managing Director – cbec eco-engineering, 2 Senior Project Manager – cbec eco-engineering*

The process restoration philosophy promotes the reinstatement of natural process at the catchment scale and is based on the concept that river biological communities will respond positively to the reinstatement of natural physical function. The application of this 'let-the-river-do-the-work' approach is regarded as providing a sustainable alternative to traditional intrusive approaches. However, often the reality is that full restoration of the controlling physical processes at the catchment scale is not feasible due to a variety of constraints and less ambitious objectives have to be set, typically with more intrusive designs. Thus, under these typical constrained circumstances, can process restoration still be applied and, given the fundamental assumption of biophysical linkage, can ecology still be expected to respond positively? To elucidate these issues, we present a pair of contrasting case studies; one a 'process river restoration' almost without limitations contrasted with one that was subjected to typical necessary constraints.





## Session 3:

### Peak Theatre

#### Delivering Restoration Through Public Consultation

#### **RECONCILING UNCONSTRAINED VISIONS AND DISPARATE CONSULTATION RESPONSES: LESSONS LEARNED FROM THE RIVERS WHARFE AND TEME**

K. SHEEHAN<sup>1</sup>, G. HERITAGE<sup>2</sup>, S. BENTLEY<sup>3</sup>

*1 Head of Ecology – JBA Consulting, 2 Technical Director (Geomorphology) – AECOM, 3 Senior Hydromorphologist – JBA Consulting*

Naturalisation of river systems in the UK will involve releasing lateral migratory potential for many dynamic rivers. Restoration plans were developed for the River Wharfe and River Teme advocating whole river restoration, rather than ad-hoc localised schemes, encouraging assisted natural fluvial processes to enable recovery of the habitat types for which these SSSIs were designated. User group views were then sought on the restoration plans. A wide range of perceptions were noted on the state of the rivers, often influenced by the users' relationships with the river. However, it was widely agreed that the rivers and their surrounding environment should be improved. Nevertheless, opinions were mixed on how this could be achieved. Perceptions of stability need to be confronted to ensure future restoration objectives are not unnecessarily restricted, as this will ultimately limit naturalisation gains and waterbody recovery.

#### **RIVER DEE/ AFON DYFRDWY SSSI RESTORATION – BALANCING GEOMORPHOLOGICAL AND ECOLOGICAL ENHANCEMENT WITH PUBLIC EXPECTATION**

E.L. PHILLIPS<sup>1</sup>, A.E. FLYNN<sup>2</sup>

*1 Senior Geomorphologist, Jacobs, 2 Geomorphologist, Jacobs*

The River Dee/ Afon Dyfrdwy is a heavily regulated river for public water supply. The river and its tributaries are designated as SSSI and a SAC, and the driver behind the project was principally the Habitats Directive and secondly the WFD. After a comprehensive desk study and targeted fieldwork, technical and management reports were produced for critique via public consultation. The consultation event provided a platform to exchange scientific knowledge and practices with local knowledge and concerns. The perception of river restoration varied amongst stakeholders resulting in the plan being received with mixed opinion. It is hoped this initiation of discussion will help balance public expectation and needs with the legislative requirement for ecological enhancement. For river restoration to be successful in any river, catchment-wide support is needed.

#### **RIVER SWILGATE RESTORATION**

G. BRADBURY

*Senior Consultant – WWT Consulting*

The Swilgate River at Tewkesbury has been classified as only being of moderate ecological status under the WFD, due to morphological alterations, surface water drainage and agricultural inputs. The overall aim of this work was to improve the 'ecological status' through improvements to the quality and quantity of surface water runoff and the physical form and function of the channel, riparian zone, floodplain and catchment. WWT Consulting carried out extensive consultation with the Environment Agency, Tewkesbury Borough Council, farmers, industry and in particular local community groups to understand their requirements. Site surveys informed an option assessment which was undertaken in consultation with community groups to determine the most appropriate habitat enhancements and their desired locations. Options with concept designs were produced and presented at stakeholder workshops to engage with local community groups.



## **Session 3:**

### **Owen Theatre**

#### **Urban Regeneration in Sheffield**

##### **RESTORING THE RIVER DON - FROM OPEN SEWER TO ARTERY OF URBAN REGENERATION**

I.D. ROTHERHAM

*Professor of Environmental Geography – Department of Natural and Built Environments, Sheffield Hallam University*

At the heart of Sheffield's twenty-first century regeneration is the historic River Don, which provided a focus for the first coordinated actions to renew and recover the Don Valley from industrial and post-industrial dereliction. In 2007, the consequences of centuries of human impacts on the watercourse and its wider catchment became obvious as the region was subjected to the worst floods ever records here. However, today the river is ecologically renewed and the River Don has re-emerged as a vital living artery for the City linking people, nature and place. The paper describes the processes of decline over several centuries, the abrupt abandonment in the 1970s and 1980s, and then the road to recovery, in part, into the twenty-first century.

##### **REFLECTIONS ON THE PLANNING OF RIVER RESTORATION THROUGH THE LENS OF TWO DECULVERTING PROJECTS IN SHEFFIELD**

T. WILD<sup>1</sup>, E. SHAW<sup>2</sup>

1 Director – South Yorkshire Forest, 2 Researcher – Catchment Science Centre, The University of Sheffield

Efforts to regenerate and restore degraded river corridors have long involved complex and sometimes difficult interactions between water managers and spatial planners, amongst a plethora of other stakeholders. Good examples illustrating best practice - both in terms of substance and process - are urgently required, not least due to the pressure on public sector resources. The paper investigates the potential opportunities and limitations of two very different approaches, one firmly linked with the ecological and water resources perspective, the other drawing heavily on spatial planning theory and practice. These concepts and case studies are used to explore how decision makers might move forwards faster and with more confidence in their attempts to realise the multiple benefits that can be derived through efforts to achieve good ecological status/potential by working together in partnership.

##### **DAYLIGHTING LOST URBAN RIVERS: JOINING UP MULTIPLE BENEFITS FOR THE WATER INDUSTRY AND RIVER RESTORATION**

A.T. BROADHEAD<sup>1</sup>, R. HORN<sup>2</sup>, D. N. LERNER<sup>3</sup>

1 PhD Student – Catchment Science Centre, University of Sheffield, 2 Senior University Teacher – Department of Civil and Structural Engineering, University of Sheffield, 3 Professor of Environmental Engineering – Catchment Science Centre, University of Sheffield

Countless streams are buried under towns and cities. They became "lost" in pipes and culverts due to the processes of urban expansion and sewerage development. Daylighting is a key measure to target Heavily Modified Water Bodies under the WFD, and the diverse environmental, social and economic benefits it brings could be far more viable if joined up with the additional benefits to stakeholders in the private sector. Water companies could stand to gain considerably from investing and collaborating with the Environment Agency, local authorities and environmental organisations in this. We conclude that there is a need for a strategic and ambitious plan to daylight lost urban rivers in the UK, with a delivery framework that recognises all the multiple benefits and joins up the support and investment from the multiple stakeholders.





## Session 4:

### Pennine Theatre

#### **DEVELOPMENT AND APPLICATION OF A MULTISCALE PROCESS-BASED FRAMEWORK FOR THE HYDROMORPHOLOGICAL ASSESSMENT OF EUROPEAN RIVERS**

A.M. GURNELL

*Professor – School of Geography, Queen Mary, University of London*

Many current river assessment methods employed within EU member states emphasise the river reach scale, where the ‘reach’ often coincides with a fixed length in the order of a few hundred meters. This paper reports on the initial development and some preliminary applications of a European wide multiscale, process-based and ecologically relevant river framework aimed to better understand hydromorphological and ecological processes and their interactions within European rivers and their margins. This topic is part of the EU project REFORM (REstoring rivers FOR effective catchment Management) which has the overall aim to provide a framework for improving the success of hydromorphological restoration measures in a cost-effective manner, targeting the ecological status or potential of rivers.

#### **VISIONING CATCHMENT FUTURES: A CASE STUDY ON THE RIVER STIFFKEY, NORFOLK UK**

S. TAIGEL<sup>1</sup>, J. TOSNEY<sup>2</sup>, A. LOVETT<sup>3</sup>,

*1 ESRC PhD Researcher – University of East Anglia, 2 Nine Chalk Rivers Project Officer – Norfolk Rivers Trust, 3 Professor of Environmental Sciences – University of East Anglia*

Visualisations can be valuable tools in the development of a multifunctional and sustainable catchment by providing a common focus for discussion between various groups. The ability to explore issues within a ‘What If?’ visualisation framework encourages communities in directing their own future and so assists in shaping longer term management goals. An engagement project in the Stiffkey catchment, Norfolk, successfully increased awareness of its issues by using cutting edge visualisation tools and workshops which brought together a representative sample of catchment stakeholders. Feedback from the workshops indicated unanimous agreement that priority should be given to the reduction and mitigation of silt runoff. Improving habitat along the river and reducing damaging flooding were considered equally important as secondary objectives.

#### **RESTORING THE EDDLESTON WATER - THE SCIENCE EVIDENCE-BASE FOR THE DELIVERY OF MULTIPLE BENEFITS FROM A HEAVILY DEGRADED WATER COURSE**

C.J. SPRAY<sup>1</sup>, L. COMINS<sup>2</sup>, D. GARFT<sup>3</sup>, R. RICHARDSON<sup>4</sup>

*1 Chair of Water Science and Policy – UNESCO Centre for Water Law, Policy & Science, University of Dundee, 2 Director – Tweed Forum, 3 Flood Unit – Scottish Government, 4 Flood Strategy Manager – Scottish Environment Protection Agency*

Within UK, the main causes of failure to achieve good ecological status are historical morphological changes to river courses, diffuse agricultural pollution and invasive non-native species. This paper reports on progress of the on-going restoration of the Eddleston Water, a typical ‘failing’ water body in Scotland. We report on the detailed initial characterisation of the catchment; the identification of potential key locations and types of intervention to improve ecological status and flood risk reduction; the setting up of the monitoring networks; the engagement with local communities and land managers; the first sets of habitat modifications and the early results of the study. We situate this within the wider context of priorities for restoration and delivery of ecosystem services and the work of Tweed Forum within the UNESCO IHP-HELP basin.



## Session 5:

### Harmer 2210

#### Workshop A:

#### Applying Cutting-edge Science to River Restoration

#### **INNOVATION IN CONSULTANCY: EXPERIENCES OF INCORPORATING NEW SCIENCE INTO PRACTICE**

S. BENTLEY<sup>1</sup>, G. HERITAGE<sup>2</sup>

*1 Senior Hydromorphologist – JBA Consulting, 2 Technical Director (Geomorphology) – AECOM*

River restoration practice in the UK has evolved from the engineer led methodologies of the 70s and 80s through to the process based naturalisation projects increasingly being conducted today. This development has, however, been slow and in many cases achieved through risk taking with little guidance available. Part of the problem is linked to a failure of academics to interact, influence and be influenced by practitioners and with practitioners relying on a limited knowledge base with which to formulate restoration plans. There is a general lack of cognizance paid to understanding system form and function during restoration, with emphasis being on moving a system back to a former state or recreating channel form with little reference to current process. This requires challenging and this talk looks at a number of schemes that are trying to do this, employing science driven, process based approaches that anticipates and accommodates change due to natural process.

#### **THE USE OF CONCEPTUAL MODELS TO HELP UNDERSTAND THE RELATIONSHIP BETWEEN HYDROMORPHOLOGICAL CHANGE AND ECOSYSTEM RESPONSE**

J. ENGLAND<sup>1</sup>, M. NAURA<sup>2</sup>, J. HARKNESS<sup>3</sup>, R. SHARP<sup>3</sup>

*1 Hydromorphology Research Scientist – Environment Agency, 2 Research Fellow – University of Southampton, 3 Technical Advisor – Environment Agency*

A conceptual model is a diagram that defines theoretical entities, objects or conditions of a system and the relationships between them. The models can be used to visualise and understand the complex relationships between hydromorphological change and ecological response. As part of the EU funded WISER project conceptual models were developed to present a framework to summarize and structure the current knowledge on the effectiveness of three common river restoration measures. The REFORM project is expanding upon this work to develop further models. Within the Environment Agency we are using available information to develop conceptual models (e.g. ToolHab) to help in our decision making processes and guidance. We wish to raise the awareness of these projects to ensure that the restoration projects are based upon scientific understanding and how effective monitoring and appraisal of restoration schemes can contribute to this knowledge base.

#### **WORKING WITH NATURAL PROCESSES TO REDUCE FLOOD RISK - DEVELOPING AN R&D FRAMEWORK**

L. BURGESS-GAMBLE<sup>1</sup>, J. BARLOW<sup>2</sup>

*1 Research Scientist – Environment Agency, 2 Principal Geomorphologist – Black & Veatch*

Flood and Coastal Erosion Risk Management (FCERM) has to be delivered sustainably. Using a range of approaches to reduce flood risk can greatly improve the environmental condition of rivers, wetlands and coastal areas, whilst also benefiting local communities and the wider economy. The Pitt Review highlighted that flood risk cannot be managed by simply building ever bigger hard defences. Softer approaches, working with natural processes (WwNP) and rural land-use options can contribute to a more sustainable approach. In many cases it is the only way we can reduce risk without compromising the requirements of environmental legislation. As part of the joint EA/Defra FCERM R&D Programme, we are developing a 5 year WwNP research framework. This presentation will outline the findings of

the project, identifying the gaps in evidence and research priorities which need to be met to help deliver FCERM sustainably.

## **DEVELOPING APPROACHES FOR ASSESSING THE EFFECTS OF RIVER RESTORATION IN TERMS OF MULTIPLE BENEFITS AND ECOSYSTEM SERVICES**

D.J. GILVEAR<sup>1</sup>, A.R.G LARGE<sup>2</sup>, P.W. DOWNS<sup>3</sup>, C.J. SPRAY<sup>4</sup>

1 Professor of River Science – University of Plymouth, 2 Reader – Newcastle University, 3 Associate Professor – University of Plymouth,  
4 Professor – University of Dundee

This paper will present our recent attempts to develop a framework to quantify and map the benefits that river restoration can bring in terms of a range of ecosystem services. Our framework and expert judgement based scores can be used to assess the multiple benefits of a range of river restoration techniques across the whole river network. One innovative aspect of the framework is acceptance that the benefits of river restoration will vary according to the timescale over which they are measured. The mapping work links 18 river attributes/land covers, measurable on Google-earth, to fluvial processes and hence ecosystem services. The approach can highlight key areas of the river network for delivery of ecosystem services and areas devoid of delivery. Examples of the approach are drawn from Central and Southern Scotland, North East England and South West England.

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### **NOTES**

## **Session 5:**

### **Harmer 2230**

#### **Workshop B:**

#### **Restoration Techniques and Methods: Application Transferability and Problem Solving**

### **20 YEARS OF**

#### **WHAT WORKS AND WHY: APPLYING THE COMMON UK TECHNIQUES**

M. JANES

*Managing Director – The River Restoration Centre*

As our ideas, our understanding, the science and the practical trial and error application of river restoration have evolved, we have a better idea about what works and why. Initial techniques were often small scale, in-channel features and discrete points. But through these trials, points became reaches and catchments, in-channel became riparian corridor and floodplain, and feature focus shifted towards habitat and processes. A recent review of UK information shows the most commonly applied groupings of techniques. These all address the UK and EU's most frequently reported WFD pressure; physical modification. Of course, the challenge prior to selecting any suite of restoration techniques is to understand the problem and what you are trying to achieve!

#### **RIVER HABITAT WORKSHOPS: PRACTICAL INSIGHTS FOR DELIVERY AND DESIGN**

M. BLACKMORE<sup>1</sup>, S. LEONARD<sup>2</sup>

*1 Conservation Officer (South and West) – Wild Trout Trust, 2 Director – Wild Trout Trust*

Within the river restoration sector as a whole, there is ample information sharing via scientific publications, manuals and conferences. There is however, comparatively little training available to individuals and organisations for the specific skills and techniques required to physically deliver river habitat improvements. Funded through a national partnership for delivery of WFD improvements, the Wild Trout Trust and the Environment Agency have hosted a number of free-to-participate 'Habitat Workshops'. The goal of the programme is to engage with people and organisations involved in river management and deliver in-river training in assessing habitat, identifying opportunities and physically delivering enhancements. This paper reflects on the role of Habitat Workshops as both a means of training individuals in river habitat enhancement and delivering outcomes toward WFD targets.

#### **RESTORATION ON A GRAND SCALE: THE RIVER AVON RESTORATION PROJECT**

J.A. MOON<sup>1</sup>, A. MAXWELL<sup>2</sup>, M. PORTER<sup>2</sup>

*1 Principal Geomorphologist – Black & Veatch, 2 Project Manager, Environment Programme Delivery – Environment Agency*

The River Avon Restoration Project is one of the largest catchment scale restoration projects in the UK, involving the restoration of over 200 km of river. The River Avon System SSSI/SAC currently fails to meet the standards required for SSSIs and for the WFD. Key to the delivery of such an ambitious programme of restoration work has been the prioritisation of reaches during planning and the early consultation with stakeholders during appraisal and outline design. Consultants Black & Veatch worked with Cain Bio-Engineering to create designs to restore the physical structure of the river, removing barriers to fish passage and delivering conditions capable of supporting more diverse ecology. The ultimate goal is to move towards a more naturally functioning and un-constrained system that is able to adjust and respond to changes without constant management.



## HEALTHY CATCHMENTS - ENVIRONMENTAL IMPROVEMENTS: MITIGATION GUIDANCE FOR FCRM ACTIVITIES AND WFD

L. BURGESS-GAMBLE<sup>1</sup>, P. WILLIAMSON<sup>2</sup>, I. DENNIS<sup>3</sup>

*1 Research Scientist – Environment Agency, 2 Senior Environmental Consultant – Royal HaskoningDHV, 3 Principal Geomorphologist – Royal HaskoningDHV*

Flood and Coastal Erosion Risk Management (FCERM) activities can have a big impact (both positive and negative) on the water environment, by changing flow patterns and sediment movement and physically altering habitats. The aim of this presentation is to demonstrate the new 'Healthy Catchments' web-based resource which provides everybody involved in managing the water environment with a selection of case studies. These are intended to give ideas of how to implement environmental improvements when undertaking FCERM activities. We will demonstrate how to use this webpage and highlight the important information that is included in the case studies. The presentation will also use selected case studies to show that implementing the WFD need not be complicated, and that we can achieve exciting integrated solutions to improve the environment for communities and wildlife.

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### NOTES

## **Session 5:**

### **Harmer 2202**

#### **Workshop C:**

#### **Prioritising River Restoration for Multiple Benefits**

##### **THE RIVER AT THE END OF THE UNIVERSE**

R. JEFFRIES<sup>1</sup>, S. MCCONNELL<sup>2</sup>

*1 Water Environment Fund Restoration Specialist – Scottish Environment Protection Agency, 2 Scottish Environment Protection Agency*

For many of us, the universe of restoration could halt in 2027, because by then we will have restored most of our rivers. Or will we? Might the costs and difficulties of restoration far outstrip funding... and our capability? And with progress within the first river basin plan having been pretty modest, how might we speed things up over the next few years? In this lecture we'll discuss what can be learned from old ways – and gained from new ways – of prioritising the limited resources we have available to restore our rivers. We'll also outline how restoration might look in some of the second river basin plans. Although we can't guarantee where we'll be by 2027, that won't stop us thinking – and planning – how we should get there.

##### **A PRACTITIONER'S PERSPECTIVE ON CONSIDERATION OF WFD WITHIN MULTI-OBJECTIVE PROJECTS**

S. ROGERS

*Managing Director – Penny Anderson Associates Ltd*

The Holnicote Defra Multi-Objective Flood Demonstration Project aims to demonstrate how land use changes at a catchment scale can positively influence flood risk. This presentation will consider the implications of one of these land use changes - flood meadow creation in the floodplain of the River Aller - for WFD objectives. Currently, whilst the river channel has 'good' ecological status, the adjacent land uses of arable or permanent pasture are ecologically depauperate and flood meadow creation could deliver improved floodplain habitat, improved water quality and reduced flood risk. However, the in-channel works required to achieve flood meadow creation have the potential for conflict with WFD objectives. The presentation will encourage participants to consider some of the practical and regulatory challenges associated with catchment scale land use change for projects with a multi-objective focus, without compromising WFD objectives.

##### **PRIORITISING WFD IMPLEMENTATION AT A WATER BODY SCALE**

I. DENNIS<sup>1</sup>, P. WILLIAMSON<sup>2</sup>, T. FENN<sup>3</sup>, D. HUGGETT<sup>4</sup>

*1 Principal Geomorphologist – Royal HaskoningDHV, 2 Senior Environmental Consultant – Royal HaskoningDHV, 3 Technical Director – Risk and Policy Analysts Ltd., 4 Senior Team Leader, WFD – Environment Agency*

Royal HaskoningDHV has developed a spreadsheet tool which produces estimates of the costs and benefits associated with the Environment Agency's requirements under the WFD. The spreadsheet can be used by catchment and River Basin District managers to understand which mitigation measures can be implemented for the least cost whilst delivering the greatest benefits, and prioritise expenditure in the next River Basin Planning Cycle accordingly. The tool provides costs estimates based on editable assumptions of construction cost, the extent to which a measure is applied, and the techniques which are used to implement each measure. The tool also uses an ecosystem services approach to value the benefits associated with each mitigation measure. The model suggests that overall expenditure required to achieve compliance with the WFD is greater than the ecosystem services benefits that this expenditure will deliver.

## **PRIORITISING RIVER IMPROVEMENT IN INFRASTRUCTURE PROJECTS: WFD – STATUS QUO OR LEGACY?**

K. KEMBLE<sup>1</sup>, A. BROOKES<sup>2</sup>, E. PHILLIPS<sup>3</sup>

*1 Geomorphologist – Jacobs, 2 Head of Geomorphology and River Restoration – Jacobs, 3 Senior Geomorphologist – Jacobs*

As the WFD becomes more embedded as a part of statutory requirements for activities in and around riverine environments, the requirement for WFD assessments is becoming common practice in land-use planning and flood defence consenting for all development types. This includes key developments like the recent re-emergence of highway improvements and new roads funded by central and local Government. In response to this, Jacobs have developed a specific approach to WFD assessment founded on a geomorphological approach that considers the wider catchment and leads to suggested mitigation appropriate/ proportional to the local area/ water body. We include examples of mitigation measures (some considered as innovative) from current road projects.

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### **NOTES**

## Session 5:

### Owen 1031

#### Workshop D:

#### Catchment Restoration: An Opportunity to Inform River Basin Planning

##### **WFD AND THE CATCHMENT BASED APPROACH - GOING FROM DATA TO EVIDENCE**

L.B. COULDRICK<sup>1</sup>, S. GRANGER<sup>2</sup>, W. BLAKE<sup>3</sup>, A. COLLINS<sup>4</sup>, S. BROWNING<sup>5</sup>

*1 Head of Catchment Management – Westcountry Rivers Trust, 2 Rothamsted Research, North Wyke, 3 Plymouth University, 4 Rothamsted Research, North Wyke, 5 RS Hydro Ltd*

The Westcountry Rivers Trust has coordinated a research partnership, under the Taw River Improvement Project (funded by the Catchment Restoration Fund), to build upon the data used to classify WFD status in order to understand the pressures and impacts to generate effective catchment management solutions. The WFD Reasons For Failure database is adequate for feeding upwards for regional and national reporting but does not have the accuracy needed for local management. This presentation overviews the historic information available for the catchment and what is used to report upwards for delivery of WFD 2nd Cycle plans as well as the current investigatory work being done to improve targeting of measures and future project work.

##### **THE CATCHMENT CHANGE MANAGEMENT HUB - ENGAGING COMMUNITIES AND SHARING BEST PRACTICE**

C.L. BLACK<sup>1</sup>, D. CORBELL<sup>2</sup>, K. CONLAN<sup>3</sup>

*1 Environmental Scientist – Cascade Consulting, 2 Principal Environmental Scientist – Cascade Consulting, 3 Managing Director – Cascade Consulting*

Cascade Consulting in association with Lancaster University and the Rivers Trust have been working with Defra, UKWIR, EA, FBA, RRC and others to develop an online interactive resource to support knowledge exchange for planners and practitioners in Catchment Management. This presentation covers progress made to date in developing the Catchment Change Management Hub (CCM Hub) (<http://ccmhub.net/>) and sets out the lessons learnt in terms of effective ways to engage with a wide range of audiences, encourage interaction and share best practice for delivery of the WFD. Central to this is the importance of monitoring and adapting the CCM Hub by gathering regular feedback. To meet the needs of its users we are now developing the CCM Hub through a second phase, which includes a practitioner-orientated database on catchment solutions and greater alignment with other knowledge exchange hubs such as the RESTORE website.

##### **IMPROVING WATER QUALITY WITH THE COMMUNITY**

T. LONGSTAFF<sup>1</sup>, B. DAVIES<sup>2</sup>, R. MAILE<sup>3</sup>, K. MCDERMOTT<sup>4</sup>

*1 Catchment Project Officer – Wandle Trust, 2 Trust Director – Wandle Trust/South East Rivers Trust, 3 Environment Officer – Environment Agency, 4 Senior Environment Officer – Environment Agency*

Urban Rivers suffer from poor water quality due to pollution incidents and misconnections. In response, a successful pilot Urban Pollution Assessment Volunteer Scheme has been trialled on the River Wandle in south London. Local volunteers are trained in pollution monitoring and undertake assessment of minor incidents to feed information into the Environment Agency's pollution assessment process. The scheme has proved successful in: empowering the community to take ownership of their local river, creating effective and skilled volunteers, gathering of quality information allowing the Environment Agency to have a faster, more efficient and focused response to incidents. The scheme has resulted in a number of pollutions being prevented and pollution sources being removed and it is hoped that the scheme will now be rolled out to other urban rivers.

## **CATCHMENT RESTORATION DELIVERY**

J. GALLOP

*Technical Manager – Environment Agency*

In 2012 Defra created the Catchment Restoration Fund (CRF) to support third sector groups to bring forward projects that will at a catchment level I) restore natural features in and around watercourses; II) reduce the impact of man-made structures on wildlife; and III) reduce the impact of diffuse pollution that arises from rural and urban land use. Forty-two bids, with a total value of just over £24m, were approved using River Basin Liaison Panels and technically assessed by Environment Agency experts and partners in Natural England and the RRC. These projects will make significant steps towards good status as well as providing wider benefits. As we enter the third and final year of CRF, the presentation will provide an update on the current fund status and a summary of key project delivery.

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### **NOTES**

## Session 5:

### Owen 1037

#### **Workshop E:**

### **Can River Restoration Help Achieve Synergies Between Flood Risk Mitigation, Urban Development, Renewable Energy and Climate Change?**

I. COWX<sup>1</sup>, N. ANGELOPOULOS<sup>1</sup>, T. BUIJSE<sup>2</sup>

*1 Professor of Applied Fisheries Science & Director of Hull International Fisheries Institute – University of Hull, 2 Deltares, The Netherlands*

The REFORM Stakeholder Workshop on River Restoration to Support Effective Catchment Management will be introduced by an overview of the EU FP7 project on REstoring rivers FOR effective catchment Management (see <http://www.reformrivers.eu/>). The main objectives, outcomes and deliverables will be described, in particular the REFORM WIKI that allows access to detailed European restoration projects that can be used to support management frameworks. The presentation will then open up the debate on developing synergies for restoration between river user groups such as flood mitigation, renewable energy and urban development. The Drivers-Pressures-State of the Environment-Impacts-Responses DPSIR approach will be used to explore the motives and drivers of the different users and how they can work together to maximise the benefits to ecosystem restoration. Participants will be challenged with a series of questions to help identify the best approaches to integrate the activities of different user groups to meet WFD objectives.

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#### **NOTES**



## Site Visit 1 – Porter Brook

Under the auspices of the EU project 'SEEDS' (Stimulating Enterprising Environments for Development and Sustainability), South Yorkshire Forest Partnership, Sheffield City Council and the Environment Agency have been working together to deliver deculverting and river restoration on the heavily modified Porter Brook. This historically important urban river was harnessed for water power and has been used in many other ways over the centuries. All of these activities have left their mark, from different perspectives, some 'good', and some 'bad'.

How should we, collectively, decide what is good and bad now and for the future? And, if we can agree on how best to proceed, how can we secure the resources to deliver this work, to maximise the full range of social, economic and environmental benefits for citizens today and generations to come? What should the role of communities, businesses and public sector be in this process? And how should we support people in coming together to make it happen?

This workshop and site visit will involve group work to review progress to date, reflect on opportunities and constraints and consider next steps. Delegates will be asked to contribute their creativity, knowledge and passion, whilst taking the opportunity to learn and consider what constitutes good practice in 'river regeneration'. After these initial discussions we will walk down to Porter Brook at Matilda Street (c. 10min walk).

Porter Brook is a tributary of the River Sheaf, and like many urban streams it has been confined and largely hidden from the urban landscape. The river rises in the Peak District, but as it enters the city historical modifications for water mills become apparent. At present, the last stretch of open water is bordered to the east by the soon-to-be-open UTC technical college and to the west by a council-owned piece of land currently being leased by a private company for use as a car park (Figure 1).

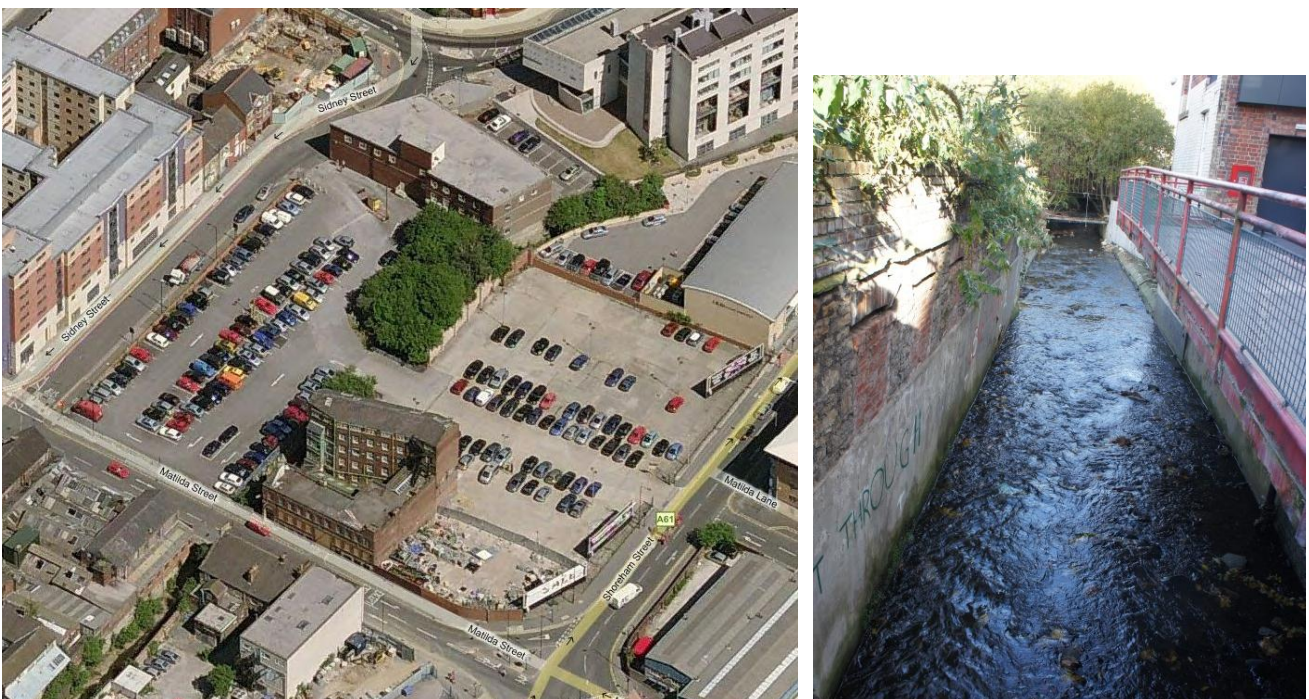


Figure 1 Left – aerial photo showing the car park and UTC technical college building site between which Porter Brook is flowing. Right – Porter Brook at Matilda Street.

At this site an opportunity exists to create a new park within the city centre and reconnect with the often forgotten Porter Brook. As part of the feasibility study, it was negotiated with the UTC development to include for the removal of a culvert as part of their works.

It is highly desirable to revitalise the watercourse to enhance its amenity and environmental value for the surrounding area, while unlocking the river as an asset for future developments on the upper side of the site.

Sheffield City Council's City Centre Breathing Space Strategy has identified the lower Porter Brook as an opportunity to provide valuable public open-space for the rapidly developing residential population, as well the location for a possible cycle/footpath link along the full length of the lower Porter to the nearby train station. The site is shown within the Strategy document as being a larger green-space pocket park, helping bring the river back to prominence and providing the public with an opportunity to spend time relaxing near to the watercourse (Figure 2).



Figure 2 Design for Porter Brook Pocket including green lawns for relaxation and sitting walls for lunchtime breaks.

In remodelling the existing bank to create the park and provide a more accessible riverside view, the site would become subject to a greater frequency of flooding. At the lowest accessible area, this could be 2-3 times a year on average. This increase in volume will provide additional river storage capacity during peak-flow events, so helping offset any naturalised interventions within the river as part of this project. The preferred design for the proposed park utilises many of the materials and construction details developed for similar projects across Sheffield's regenerated open spaces, specifically focussed on riverside restoration. Another key element to the project is the use of green infrastructure to help soften the setting and provide a more interesting changing landscape throughout the seasons.

The SEEDS project is funded by Interreg IVB North Sea Region Programme. SYFP/SCC are together the lead partners for SEEDS and the Porter Brook restoration programme (phase I), with financial support from the Environment Agency.



## Site Visit 2 – 5 Weirs Walk

The 5 Weirs Walk is a public path and cycle route along the River Don from Lady's Bridge near the city centre to Meadowhall shopping centre. The concept was conceived, developed and guided by a group of enthusiasts who set themselves up as the Five Weirs Walk Trust supported by statutory bodies such as the Environment Agency (EA) and the city council, local charities, national funding bodies and many hundreds of volunteers. This site visit will include the upper part of the 5 Weirs Walk starting in the city centre. Some key points of interest are given below and these will be used to stimulate wider discussion amongst the group.

Upstream of the bridge on the left bank is a small flood scheme. The catchment has many reservoirs some of which are compensation reservoirs used to release water to maintain flows for industry. There is currently negotiation under way with Yorkshire Water to allow some of the capacity in the reservoirs to be used for flood storage purposes. New potential storage sites are also being investigated.



New flood scheme upstream of Lady's Bridge

Major channel clearance was carried out after the 2008 floods. The River Stewardship Company subsequently delivered a 3-year maintenance programme in partnership with the EA, delivering outcomes around tree and invasive species management, planting, litter and debris removal and other in-channel habitat improvements.

Large boulders were introduced into the channel. These were set in clusters to create refuge areas for fish and to increase flow diversity. Marginal planting was also carried out and rock groynes were placed on the margins to create more fish refuge areas and flow variability. The mix of marginal plants used was agreed between the Environment Agency and Sheffield City Council.

On the upstream side of Blonk Bridge on the right bank is the exit of the culvert which carries the River Sheaf. The river is culverted from Granville Square to the confluence with the River Don. There are plans to knock down the indoor market which stands on the site of the old castle, expose the old castle walls, de-culvert the River Sheaf leaving the area that urban cavers refer to as the 'megatron', a huge cavernous arch which is part of the original Sheaf culvert.



Upstream side of Blonk Bridge with the River Sheaf culvert entrance – 'megatron' inset

Downstream of Blonk Bridge the left bank has a narrow berm which has been planted with marginal vegetation and large boulders have been placed in the channel to create fish refuge areas and flow variability. This reach has seen the return of kingfishers, dippers and sand martins (who favour the stone revetments on the right bank). Shoals of fish such as grayling have been also been observed in this reach.



Vegetated berm at Blonk Bridge

At Walkmill Weir a fish pass was installed in 2006. The weir itself is a heritage feature and has reportedly been there since the Middle Ages. Before the clearance which was carried out after the 2008 floods there were extensive islands downstream of the weir with mature trees established on them. The large trees were removed as part of the flood prevention works and the islands re-planted using whips, but have largely been washed away during subsequent high water events.



Walkmill Weir fish pass

Also at Burton Weir the post-2008 channel maintenance was somewhat over-enthusiastic. A large island was removed which is now slowly re-establishing itself. A makeshift fish pass was put in on the right bank, but this is not very effective and there are plans to put in a more formal pass. Again sand martins inhabit the stone wall on the right bank.



Islands developing downstream of Burton Weir

Salmon Pastures was the site of an old coke works with huge mountains of coke slag on the left bank. In the 1950s this site was levelled and a steep trapezoidal bank profile created from the coke slag, some of which was transferred to the right bank. Over the years this reach has naturalised with mature trees growing along both banks. The acid soil from the coke slag has created an acid heathland on the left bank which is now a local nature reserve managed by Sheffield Wildlife Trust.



Looking upstream at Salmon Pastures – note mature trees on banks



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## **Session 6:**

### **Pennine Theatre**

#### **WFD: Planning to Delivery**

#### **THE CHALLENGES OF ACHIEVING WFD COMPLIANCE ON LARGE ENGINEERING SCHEME: A CONSULTANT'S PERSPECTIVE**

S.E. GERMAN

*Senior Fluvial Geomorphologist – Arup*

Undertaking a WFD compliance assessment is now a standard part of an EIA and crucial to aid scheme design, but there still seems to be little guidance provided on how to complete them, what is required and more importantly how much degradation of the water body will ultimately result in deterioration of WFD status. Although each scheme and water body is assessed on its own merits, there is no rule of thumb when it comes to proportions of physical changes and the acceptable mitigation. This presentation will discuss these issues within the context of a number of large engineering schemes including Skipton FAS, Leeds FAS, Cheddar Reservoir, The Mill Development and Preston FAS and make a call for the production of official guidance on undertaking WFD compliance assessments.

#### **IMPLEMENTATION OF THE WATER FRAMEWORK DIRECTIVE: RESOLVING ENGINEERING AND HYDROMORPHOLOGICAL RIVER RESTORATION DIFFICULTIES**

M. HEMSWORTH<sup>1</sup>, S. BENTLEY<sup>2</sup>

*1 Hydromorphologist – JBA Consulting, 2 Senior Hydromorphologist – JBA Consulting*

The WFD recognises the role water resources and habitats play in the management of river basins in order to support a healthy environment. The objectives of the WFD require the restoration of river process as well as river form. A 'process based' approach aiming to restore/improve natural geomorphic processes and reinstate the natural form and function of the river environment is crucial. In situations where this has been neglected issues have arisen between the aims of the scheme, environmental regulators, land owners and river/riparian users. This paper uses recent examples from across the UK to discuss the lessons learned to date in trying to achieve WFD objectives and the challenges ahead regarding improving both river and floodplain form and process to satisfy WFD objectives.

#### **AT A LOCAL LEVEL: JOINT DELIVERY OF THE WFD**

P. CHAPMAN<sup>1</sup>, C. GRAY<sup>2</sup>, A. GORMAN<sup>3</sup>

*1 European Projects Manager – London Borough of Lewisham, 2 Principal Planning Policy Officer – London Borough of Lewisham, 3 Catchment Coordinator - South London – Environment Agency*

The WFD is primarily a top down directive with the responsibility for implementation sitting at national level. This immediately creates a problem in terms of engaging EU citizens 'on the ground' - it is a distant imposition rather than the intended dynamic directive. The European River Corridor Improvement Plan project (ERCIP), while not established to deliver the WFD, does so indirectly by promoting the strategic management of a localised river corridor, looking at it from a local perspective and generating a response led by the relevant local authority. A key aim of ERCIP is to share knowledge about jointly produced River Corridor Improvement Plans (RCIP). Simply put, the ERCIP model encourages local authorities to Engage, Agree and Formalise a jointly established RCIP with the relevant environment agency, the rationale being that progress at any of these three stages is better than none at all.





## **Session 6:**

### **Norfolk Theatre**

#### **Engaging Society in River Restoration**

##### **LIVING WATERWAYS**

K. FISHER<sup>1</sup>, R. MCFARLANE<sup>2</sup>

*1 Technical Officer – Environment Agency, 2 Technical Specialist – Environment Agency*

Living Waterways has a formula that works! The project has been running since 2007 and now covers the Tees, Durham, Tyne and Northumberland areas. Annually this project has engaged with 3000 people. It seeks to contribute to flood risk and diffuse pollution management, and promote the importance of these streams as habitats and corridors for wildlife. The key to the success of this project is increase public awareness and enjoyment of urban waterways. This is delivered through a series of local Wildlife Trust led community engagement events including consultation and information sessions, stream clean ups, fun days and education sessions. These events ensure the project is community led and that local people have a say in the use of urban streams in their area.

##### **MURCI WATERS - PROTECTING AND ENHANCING URBAN RIVERS**

J. BREWINGTON

*Programme Manager – Environment Agency*

The Midlands Urban River Community Initiative is a two year Environment Agency programme delivering a range of targeted projects which tackle the causes and consequences of urban diffuse pollution. This presentation will focus on a selection of projects and highlight the opportunities and challenges of working with communities. We will show how we have worked in Birmingham and Nottingham to deliver urban stream restoration schemes which help reconnect brooks with their floodplains and communities with their environment. In Coventry and Stoke education and engagement projects have helped communities know, love and care for their rivers. Finally, we will explain how we are working to secure a strong legacy by helping communities adopt, enhance and protect their local watercourses through the WatersideCare and FIN partnerships across the Midlands.

##### **RESTORING A MULTITUDE OF PROCESSES ON THE CONNSWATER**

D. HETHERINGTON<sup>1</sup>, A. GRIMSHAW<sup>2</sup>

*1 Senior Scientist – Arup, 2 Project Manager – Belfast City Council*

The Connswater Community Greenway is a proposal for an inspirational living landmark in East Belfast, creating a green corridor alongside the Connswater, Knock and Loop rivers, providing a network of open spaces and pathways. The Greenway will connect people and places along the way, making east Belfast a better place for people to live, work, visit and invest. At present much of the Connswater is fenced-off, neglected and in poor condition. A restoration vision has been developed that will focus on restoring natural processes, as far as possible within local constraints, to ensure long-term sustainable ecological benefits. Once revitalised the river will be the heart of the Living Landmark of the Connswater Greenway and will become part of the educational and recreational space that is a key part of the scheme.



## Session 6:

### Owen Theatre

#### Partnerships to Deliver River Restoration

##### **DYNAMIC RIVERS IN SMALL SPACES: MAKING ROOM FOR RIVER RESTORATION IN CUMBRIA**

D. WISHART<sup>1</sup>, M. ROBINSON<sup>2</sup>, G. PEDLEY<sup>3</sup>, I. CREIGHTON<sup>4</sup>, P. EVOY<sup>5</sup>

*1 Principal Geomorphologist – Environment Agency, 2 Lead Advisor, Land Management – Natural England, 3 Project Manager – Eden Rivers Trust, 4 Project Manager – West Cumbria Rivers Trust, 5 Project Manager – South Cumbria Rivers Trust*

The Environment Agency and Natural England are working in partnership with Eden, West Cumbria and South Cumbria Rivers Trusts to deliver WFD and protected area objectives on SSSI/SAC rivers across Cumbria. Restoration is required to 'remedy' historic physical channel modifications and thereby achieve favourable or recovering conservation status. Modified rivers have become part of the cultural landscape with expectations which do not necessarily favour river habitat restoration. Yet modified rivers are unfavourable for ecology and unsustainable as they cannot support natural patterns of bedload transport. This has led to dramatic adverse channel responses to flood events. Our approach is to deliver projects that will act as demonstration sites and become the key engagement tool for the development of further restoration schemes. These projects have developed through careful relationship building with land owners and tenants who were identified as being potentially amenable to restoration.

##### **RIVER OF LIFE: A MULTI-BENEFIT, LANDSCAPE SCALE HABITAT ENHANCEMENT PROJECT**

L.R. RHYMES<sup>1</sup>, G.D. SCHOLEY<sup>2</sup>, C. PARKER<sup>3</sup>, C. LAMBERTH<sup>4</sup>

*1 Fisheries and Biodiversity Projects Officer – Environment Agency, 2 Biodiversity Technical Specialist – Environment Agency, 3 Head of Land Management – Earth Trust, 4 Project Designer – Oxford Environment*

The Earth Trust and Environment Agency are working in partnership on a project to create a large area of new wetland habitat along the iconic River Thames near Wallingford, South Oxfordshire. The project aims to create extensive wild areas, with wet woodland, fen, reed beds, ponds and backwaters to protect threatened wildlife, improve river water quality and help to change the relationship that people have with wetlands and wildlife. The 'River of Life' is expected to take several years to complete. The first phase will see the construction of the new habitat features. Subsequent phases will ensure features are properly established and provide access routes. The project partners aim to encourage other River Thames landowners to undertake similar work. We are utilising the ecosystems services approach to demonstrate the wide range of benefits the project is expected to bring.

##### **PARTNERSHIP DELIVERY OF THE RIVER AVON RESTORATION PLAN**

A.M. ANTHEUNISSE<sup>1</sup>, R. SPENCER<sup>2</sup>

*1 Wessex Chalk Streams Partnership Officer – Wiltshire Wildlife Trust, 2 Project Manager, WFD Planning & Delivery – Environment Agency*

The Hampshire Avon (SSSI/SAC) is renowned for its chalk stream habitat that supports wild brown trout, Atlantic salmon, and water crowfoot. The EA, Natural England, Wessex Water, NFU, local fishing clubs and the Wessex Chalk Streams Project (WCSP) have developed a River Avon Restoration Plan (RARP) in the past, with a prioritised set of actions to restore functionality and connectivity and ensure that favourable conditions and WFD targets are met. Close cooperation between the EA and the WCSP in realisation of RARP results in effective engagement and cost effective project delivery. The three reaches that were selected for delivery in 2013 are key demonstration sites for displaying what can be achieved through partnership working and will raise the profile of RARP, and its partners.





## Session 7:

### Pennine Theatre

#### **URBAN CHANNEL ENHANCEMENT FOR FISHERIES AND ECOLOGY: BALANCING FLOOD RISK AND CHANNEL STABILITY WITH FISHERIES AND HABITAT ENHANCEMENT**

J. SPEES<sup>1</sup>, G. HERITAGE<sup>2</sup>, M. HEMSWORTH<sup>3</sup>, S. BENTLEY<sup>4</sup>

*1 River Trust Director – Ribble Rivers Trust, 2 Technical Director (Geomorphology) – AECOM, 3 Hydromorphologist – JBA Consulting, 4 Senior Hydromorphologist – JBA Consulting*

The River Calder at Burnley is designated as a heavily modified waterbody. At present the WFD defines the overall river status as Moderate with a target of reaching Good Ecological Potential by 2027. The Ribble Rivers Trust has embarked on an ambitious programme of works to improve the morphological and ecological status/potential. The restoration plan developed for the Rivers Calder and Brun aimed to generate a diverse hydromorphology providing many niche habitats whilst having no negative impact on flood risk. Restoration needed to be mindful of impacts locally, upstream and downstream, as well as local community interests. This presentation details the short term response of the rivers to the imposed channel form, reviewing the change to hydraulic habitats, describing the impact on sediment transport and the deposition of gravels and fines, and reporting on the improvement to fisheries.

#### **BATTLE FOR THE FLOODPLAINS: AN INSTITUTIONAL ANALYSIS OF WATER MANAGEMENT AND SPATIAL PLANNING IN ENGLAND**

K.M. POTTER

*Lecturer – Department of Geography and Planning, University of Liverpool*

Despite supportive changes in policy, urban floodplain restoration schemes are not being implemented in mainstream planning practice in England. This paper argues that the English floodplain is a 'battle ground' where the planner is caught in the cross fire of an ideological clash between economic (armed with technology) and environmentalist (allied with nature) arguments and preferred change in land use. It is argued the policy responses to 'work with natural processes where possible and enhance the environment', is based on an overstretched steering optimism, and will continue to prove too radical if the mediating and tempering political-institutional context is not seriously addressed. Closing the current implementation deficit on floodplain restoration will require a change in current government agencies power structures, enabling planners to share responsibility to achieve new ways of working towards sustainable, water sensitive towns and cities.

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# POSTER PRESENTATIONS

Owen 223

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1

**Community engagement in the Monty Rivers Project**

L. BARLOW  
*Severn Rivers Trust*

2

**Assessing weir impacts on WFD targets: experiences on Greenpark Weir**

N. TODD-BURLEY, S. BENTLEY  
*JBA Consulting*

3

**Farnham quarry - river restoration**

R. OAKLEY, L. RHYMES, D. WEBB, D. MARTIN, A. DUNCAN  
*Environment Agency*

4

**The urban river survey: a methodology for monitoring and evaluating river restoration**

A. M. GURNELL, D. GURNELL, G. WHARTON  
*Queen Mary University of London*

5

**Trialing solutions to enhance the ecological condition of impounded waterbodies**

D. NEWTON, S. GERMAN, D. HEATHERINGTON, M. TINSDEALL  
*Arup*

6

**Maintaining good status within a large scheme: Skipton FAS**

I. LEXARTZA, S.E. GERMAN, K. COLLEDGE  
*Arup*

7

**Restoration of the Hampshire Avon at Salisbury - A partnership project with multiple benefits**

L.E. DAHL, A.M. ANTHEUNISSE  
*Wiltshire Wildlife Trust*

8

**The RiverSearch riparian mammal monitoring project**

J. JONES  
*Surrey Wildlife Trust*

9

**Catchment measures to improve the low flow environment in rivers**

J. ENGLAND, S. BENTLEY, D. MOULD, H. REID, C. WALLIS  
*Environment Agency*

10

**Using Infrared technology to monitor fish migration**

M. NIEUWENHUYZEN  
*Aquatic Control Engineering*

11

**Building a better Flapvalve (THE DESIGN AND TESTING OF A FLAPVALVE THAT ALLOWS EEL MIGRATION)**

M. WIDDISON  
*Aquatic Control Engineering*

12

**Tanners brook restoration - deculverting**

J. PEACOCK, A. CHALMERS, M. JOB, M. WARD  
*Environment Agency*

13

**Mill Field stream restoration**

A. INGHAM  
*Hampshire and Isle of Wight Wildlife Trust*

14

**Community involvement in the naturalisation of the River Medlock: turning an urban river into an ecological and amenity asset**

S. BENTLEY, O. SOUTHGATE, G. HERITAGE  
*JBA consulting*

15

**Developing the urban river survey to inform and appraise river projects**

A. M. GURNELL, G. WHARTON, R. MARSHALL, M. ROSS, R. SKINNER, D. GURNELL  
*Queen Mary, University of London*

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**Seven Lochs wetland park**

C. SPENCE  
*AECOM*

17

**Eastrop park pre-feasibility study**

J. POWELL, D. CARDEN, L. RHYMES, R. OAKLEY, D. WEBB  
*Black & Veatch*

18

**Hydraulic habitat and physical biotope mapping**

M. HEMSWORTH, C. BITHELL, S. BENTLEY  
*JBA consulting*

19

**Using a catchment-based approach to address water resource pressures**

M. SUMMERS, S. PEET, J. HOSEASON, J. ENGLAND, A. GILL, D. ROSS  
*Environment Agency*

20

**Monetising the value of ecosystem services provided by river restoration projects**

C. MELLOR  
*Scottish Natural Heritage*

21

**Rivers and wetlands - community days**

D. MARTYN  
*Environment Agency*



**Technical advice given by the River Restoration Centre: A 'taster' of the many and varied enquiries that we have responded to throughout**

*RRC*



**Nene Valley Nature Improvement Area: Habitat improvements in a heavily modified waterbody**

*RRC*



**How we have supported our members in 2013/14: Working with our core funders, corporate members and other members**

*RRC*



**RESTORE: Outcomes and results from a three year European partnership project (2010 to 2013)**

*RRC*



**Creating effective monitoring frameworks: A new tool piloted on 42 Catchment Restoration Fund projects**

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**Blue-Green Cities: Delivering and evaluating multiple flood risk benefits in blue-green cities**

*RRC*

**22**

**The Bow Brook Living Landscape Project: A partnership project to improve water quality and habitat on a catchment scale in Worcestershire**

*L. WOOD, P. CASE  
Worcestershire Wildlife Trust*

**23**

**Haltwhistle Burn; a risky and challenging 'total catchment' approach**

*C. GIBSON, M. NEWSON, G. PARKIN, E. STARKEY  
Tyne Rivers Trust*

**24**

**River Wensum Restoration Strategy**

*A. THURTMAN, R. DRYDEN  
Environment Agency*

**25**

**Managing Riparian Habitat for the benefit of Atlantic Salmon (*Salmo salar*)**

*S. EVANS, S. GOTT, P. GOUGH, S. MARSH-SMITH  
Wye and Usk Foundation*

**26**

**The River Nar - Partnership working on a SSSI**

*H. MANDLEY, E. LONG  
Norfolk Rivers Trust*

**27**

**Re-naturalising an historically modified Lincolnshire chalk stream for brown trout and flood prevention**

*A. THURTMAN, R. DRYDEN  
Environment Agency*

**28**

**Catchment-scale river restoration and WFD implementation: Lessons learned from the Ouse and Adur Pilot Catchment**

*I. DENNIS et al.  
Royal HaskoningDHV,*

**29**

**River Aire - Rodley Weir fish migration channel**

*J. PICKLES et al.  
Arup*







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# DELEGATE LISTS

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Ulrika Åberg	Restoration Adviser and Information

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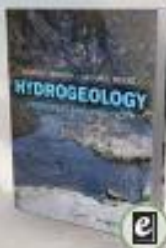
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