



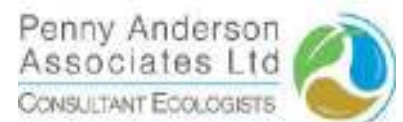
Name:

Organisation:

# River Restoration Centre 18th Annual Network Conference

## *River Restoration: Addressing Uncertainty*

Kindly sponsored by:



# Restoration Specialists for Freshwater & Coastal Environments

## River and Floodplain Restoration

- Process-based restoration approach
- Catchment-scale restoration & NFM prioritisation
- Detailed restoration design
- Construction supervision

## Natural Flood Management (NFM)

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- Upland landuse management
- Flood hydrographic attenuation and desynchronisation

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# Welcome

...from the RRC Managing Director

Welcome to the 18th River Restoration Centre Annual Network Conference at the Hilton Metropole in Brighton. Last year in Blackpool, the RRC Conference (as well as the sun) continued to shine with nearly 300 delegates and over 40 high quality presentations. Since then we have seen the largest political shift in recent memory, resulting in uncertainty across our sector. It is now

more important than ever for us to be able to clearly demonstrate benefits, learn from our experiences and promote the work that we do. I have no doubt that you, as a passionate and knowledgeable audience, will deliver excellent talks, ask challenging questions and partake in engaging conversations to determine how we will go forward and 'address uncertainty'.

RRC has welcomed three new members of staff over the last year. Marc Naura has joined as our Science and Technical Manager; Rosie Steadman is delivering RRC's Esmée Fairbairn grant as the Community Engagement Officer; and Alexandra Bryden is our Information Assistant. Please take a moment to read the Meet the Staff section on page 31 to familiarise yourself with our staff.

This year's programme has been designed to promote thought and discussion on the impact of the UK's exit from the EU and the issues around funding and environmental standards. However, we cannot lose sight of the planning, technical delivery and evaluation of projects. It's important that we continue to share and learn from innovative and ambitious projects from across the UK. We hope that the programme this year will give you some new ideas that you can integrate into your own work.

Over the last 5 years we have seen community groups and partnerships become far more integral to the delivery of river restoration across the UK. These groups are multiplying the benefits of funding through the use of volunteers and delivering work that agencies don't have the remit or capacity to carry out. RRC has been providing training, advice and guidance with funding from the Esmée Fairbairn Foundation and working with CaBA to support and build this essential capacity.

The UK River Prize is now in its third year and we're proud to say that it will once again feature on the first night of this year's conference. The Nigel Holmes Trophy has been travelling widely in Cumbria for the last year after the Rivers Eden, Derwent and Kent won last year's prize. This time around we have four excellent finalists that would all be deserving winners; we can't wait to showcase their projects. New to the awards dinner this year is the River Champions, where we will be recognising the work that individuals are doing by volunteering their own time, enthusiasm and love of rivers. It promises to be an inspiring and exciting evening, we hope you enjoy it.

Finally, I would like to acknowledge and thank all of those who support and partner the RRC. I hope, over the next two days, that you will make the most of this opportunity to generate new ideas and contacts to follow up.

**Martin Janes, Managing Director**



## River Restoration Solutions

### Our approach

Royal HaskoningDHV's river restoration team has an established track record of successfully delivering river restoration schemes from inception and stakeholder engagement through to detailed design and delivery for rivers trusts, riparian landowners, private developers, local authorities and regulators.

Our Nature Driven Design philosophy means that we recognise the importance of working with natural river processes to deliver sustainable river improvements as part of a multi-use landscape. We have a strong team of experts in geomorphology, engineering and ecology who have considerable experience of working across the UK and Europe, and an excellent understanding of relevant drivers such as the Water Framework Directive.

### Contact

For further information about our work, come and visit our stand or contact Dr Ian Dennis, Water Environment Sector Lead, on [ian.dennis@rhdhv.com](mailto:ian.dennis@rhdhv.com) or 01444 476632.

### Recent project examples

#### **River Nith Restoration, Dumfriesshire:**

Our team have recently completed a feasibility study to identify options to restore natural river processes in a dynamic and flood-prone reach of the River Nith near Thornhill. We are currently working with SEPA and the landowner to design a sustainable solution for the reach.

#### **Ugbrooke Restoration, Devon:**

Our geomorphologists are currently leading an innovative approach to the design of a new naturally functioning river channel adjacent to a major quarry near Newton Abbot that is being realigned to allow valuable mineral resources to be accessed.

#### **Powick Weir Removal, Worcestershire:**

Our experts are working with the Environment Agency and Severn Rivers Trust to develop a solution to remove a significant barrier to fish passage on the River Teme near Worcester, whilst retaining flow and habitat quality in an important mill leat.



# *the River Restoration Centre*

*Working to restore and enhance our rivers*

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# Natural Flood Management

Working with natural processes in catchments to slow down and store flood waters whilst delivering other environmental and social benefits.

## Strategic NFM opportunity mapping

We recently produced the first nationally consistent, set of strategic NFM opportunity maps for the Environment Agency. These include over 4,500 interactive maps showing different NFM opportunities and potential benefits, that help identify where NFM could potentially supplement Flood Risk Management (FRM) schemes.

To find out more:

Visit: [www.jbaconsulting.com](http://www.jbaconsulting.com)

E: [steve.rose@jbaconsulting.com](mailto:steve.rose@jbaconsulting.com) or [barry.hankin@jbaconsulting.com](mailto:barry.hankin@jbaconsulting.com)

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**PROGRAMME OF EVENTS**

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## DAY 1:

**--- TUESDAY 4<sup>TH</sup> APRIL ---**

## REGISTRATION at Reception

09:00

NETWORKING & EARLY VIEWING POSTER SESSION  
in the Durham Suite

60 mins

**Session 1**  
**Oxford Suite**

**CHAIR:** *Martin Janes (RRC)*

10:00

## River Restoration Centre introduction & welcome

Martin Janes (*the River Restoration Centre*)

15 mins

10:15

# Lessons for river restoration from understanding natural channel adjustment: 30 years of examples from the UK and Denmark

Andrew Brookes (*Jacobs*)

15 mins

10:30

## 10 years of restoring English rivers with special designations for wildlife

Jenny Wheeldon (*Natural England*)

15 mins

10:45

## Discussion

15 mins

11:00

SHORT BREAK *with coffee and tea*

35 mins

11:35

## 5 years' achievement in unstable political times

Peter Barham (*Welland Rivers Trust*)

15 mins

11:50

**Multi-objective floodplain management (aka natural flood management):  
practitioner's perspective parsed by the pond**  
Chris Bowles (*cbec eco-engineering Ltd.*)

15 mins

12:05

## Restoration beyond the wall – delivering success

Charles Perfect (*SEPA*)

15 mins

12:20

## Discussion

15 mins

12:35

## LUNCH in the Durham Suite

60 mins

Session 2				
<u>Oxford Suite</u>		<u>Stamner</u>	<u>Hall 4</u>	
Hard engineering removal		Healthy rivers, healthy habitats	Geomorphological design	
CHAIR: Kevin Skinner (Atkins)		CHAIR: Judy England (Environment Agency)	CHAIR: David Hetherington (Arup)	
13:35	<b>Wandle weir removal</b> Jayne Hornsby & James Maclean <i>(Land &amp; Water Services Ltd.)</i>	<b>Restoring an agricultural river: experience of the Pow Burn</b> Charles Perfect <i>(SEPA)</i>	<b>Applications of geomorphology in engineering design: delivering substantial economic and environmental benefits</b> Helena Parsons <i>(Jacobs)</i>	15 mins
13:50	<b>Avon Water Barriers: supporting the return of Salmon to the Upper Clyde System</b> Alan McCulloch <i>(SEPA)</i>	<b>Restoration &amp; future management of the River Ems</b> Seeseana Wright <i>(Arun &amp; Rother Rivers Trust)</i>	<b>How much “design” is required for a successful river restoration scheme?</b> Ian Dennis <i>(Royal HaskoningDHV)</i>	15 mins
14:05	<b>Discussion.</b>	<b>Discussion.</b>	<b>Discussion.</b>	10 mins



## Session 2 – continued...

14:15	<b>How have Pearls in Peril physical restoration measures performed?</b> Kenneth MacDougall (EnviroCentre Ltd.)	<b>River Sleat, working with a dry river</b> Marie Jane Taylor (Lincolnshire Rivers Trust)	<b>The importance of in-channel feature creation when naturalising active river channels</b> George Heritage (AECOM)	15 mins
14:30	<b>Porter Brook de-culverting and Pocket Park creation</b> Paul Gaskell (Wild Trout Trust)	<b>The use of indigenous aquatic plants &amp; floating ecosystems in river restoration</b> Bill Gush (Land & Water Services Ltd.) & Galen Fulford (Biomatrix Water)	<b>Flexibility in design &amp; construction – success and challenges at Norton Bavant Mill</b> James Maddison (CH2M) & Alasdair Maxwell (Environment Agency)	15 mins
14:45	<b>Discussion.</b>	<b>Discussion.</b>	<b>Discussion.</b>	10 mins
14:55	<b>POSTER SESSION in the Durham Suite</b> <i>with tea and coffee</i>			45 mins

Session 3				
<u>Oxford Suite</u> Geomorphic surveying & modelling		<u>Stamner</u> Urban restoration	<u>Hall 4</u> Natural flood management	
<b>CHAIR:</b> <i>Charles Perfect (SEPA)</i>		<b>CHAIR:</b> <i>Oliver Lowe (Natural Resources Wales)</i>	<b>CHAIR:</b> <i>Fiona Bowles (RRC Board)</i>	
15:40	<b>Mobile data collection for geomorphological survey work</b> Katie Atkinson ( <i>Arup</i> )	<b>Clean streams and community teams</b> Bonnie Boulton ( <i>Atkins &amp; Manchester City Council</i> ) & Pamela Bradley ( <i>Manchester City Council</i> )	<b>Letting nature innovate – can natural processes manage flood risk?</b> Steve Rose ( <i>JBA Consulting</i> )	15 mins
15:55	<b>Integrated riparian survey – a holistic survey technique</b> Kieran Sheehan ( <i>JBA Consulting</i> )	<b>Outfall safari: a way of working with volunteers to map and record the impact of polluted surface water outfalls in a river</b> Joe Pecorelli ( <i>Zoological Society of London</i> )	<b>Upland drainage network extension: a prime target for NFRM</b> Neil Entwistle ( <i>University of Salford</i> )	15 mins
16:10	<b>Discussion.</b>	<b>Discussion.</b>	<b>Discussion.</b>	10 mins

### Session 3 – continued...

16:20	<b>Putting the pieces together: dynamic modelling of river restoration measures</b> Samantha Jane Hughes ( <i>University of Trás-os-Montes e Alto Douro</i> )	<b>Multifunctional benefits of urban restoration – Stanmore Marsh</b> Kevin Skinner ( <i>Atkins</i> ) & Mick Bradshaw ( <i>London Borough of Harrow</i> )	<b>Modelling, mapping and engaging with NFM in Cumbria</b> Barry Hankin ( <i>JBA Consulting</i> )	15 mins
16:35	<b>Is morphodynamic sediment transport modelling a useful tool for piecewise restoration design?</b> Eric Gillies ( <i>cbec eco-engineering Ltd.</i> )	<b>The River Alt Restoration Project – a catalyst for change</b> Helen Rawlinson ( <i>The Cass Foundation</i> )	<b>Local authorities working with communities and landowners to restore streams and reduce flood risk using natural flood management</b> Chris Uttley ( <i>Stroud District Council</i> )	15 mins
16:50	<b>Discussion</b>	<b>Discussion</b>	<b>Discussion</b>	10 mins
17:00	SHORT BREAK TO MOVE TO FINAL SESSION			10 mins



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**Session 4**  
**Oxford Suite**

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**CHAIR:** *Will Bond (Alaska)*

<b>Keynote Address</b>		
17:10	<b>Putting the 'geo' in hydro(geo)morphology</b> <i>Angela Gurnell (Queen Mary University of London)</i>	25 mins
17:35	<b>Discussion</b> (Keynote and General)	20 mins
17:55	<b>Poster competition prizes, final announcements and close</b> <i>Martin Janes (the River Restoration Centre)</i>	5 mins
18:00	<b>END OF DAY 1</b>	

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**19:30 – PRE-DINNER DRINKS RECEPTION**

Durham Suite

**&**

**20:00 – UK RIVER PRIZE AWARDS DINNER**

Oxford Suite

**2017 UK RIVER PRIZE FINALISTS**

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PEARLS IN PERIL	RIVER FROME, STROUD	RIVER AVON, HAMPSHIRE	HEALTHY RIVERS, WALES
<i>PAGE 25</i>	<i>PAGE 26</i>	<i>PAGE 27</i>	<i>PAGE 28</i>

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AND

**'RIVER CHAMPIONS'**

*PAGE 30*

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# Free project support and advice drop-in session

**Where:** Office opposite the Durham Suite

**When:** 13.05-13.35 4th & 5th April (second half of lunch break)

**What:** Through our Esmée Fairbairn Foundation funded community engagement programme the RRC can provide free project support to UK trusts, partnerships and community groups - come along to chat to a member of RRC staff about whether you are eligible and to find out more about what resources we have available.

**Supporting community-led projects to improve our rivers for wildlife and people**



Esmée  
Fairbairn  
FOUNDATION





# The WaterLIFE DECLARATION\*

## PARTNERSHIP

Support and investment in the Catchment Based Approach, recognising catchment partnerships are an essential basis for collaborative action and impact at all scales.

## EQUITY

Through its new abstraction and agricultural policies, the government must create a level playing field and ensure environmental protection across England and Wales.

## COLLABORATION

All players working together openly, honestly and without blame, to develop shared, evidence-based and deliverable solutions.

Please sign on: [waterlife.org.uk/declaration](https://waterlife.org.uk/declaration)



\*This declaration reflects learnings from WaterLIFE about the measures needed to improve the health of rivers.



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**DAY 2:****--- WEDNESDAY 5<sup>TH</sup> APRIL ---****Registration  
opens at 8:30am**

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**Session 5**

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9:00

PRE-BOOKED SITE VISIT OR WORKSHOP

3 h 30 min

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**Oxford Suite****Workshop A:****How to implement adaptive management  
effectively***Facilitator: Judy England (Environment Agency)*

The response of natural systems to restoration can be uncertain because of the complexity of the systems and our imperfect knowledge of how they operate. Adaptive management provides a structured but flexible process for making decisions and solving problems in the face of this uncertainty. It is an iterative process which includes a series of steps: planning, monitoring, implementing measures, further monitoring and evaluation of effectiveness, followed by adjustments to measures or additional measures as needed.

**Durleigh reservoir adaptive management trial***Chris Tattersall & Andy House (Wessex Water)***Geomorphic change detection: constraining uncertainty in restoration monitoring***Richard Williams (University of Glasgow)**SEE PAGE 62***Stamner****Workshop B:****Managing silt: Muddy Waters or  
Clearwater Revival?***Facilitators: S. Whitton & D. Hammond (Affinity Water)*

Increased rates of river sedimentation, caused not least by inappropriate land management practices in recent decades, has reduced channel capacities, affected navigation and brought about environmental degradation. The mobilisation of fine sediment in the water column is particularly difficult to manage, with water quality impacts affecting riverine fauna and incurring additional costs for drinking water purification.

Ever tightening waste regulations mean that it is becoming harder to beneficially re-use dredged material on riparian land or coastal sites, but the cost of remediating the arisings or taking it to landfill, especially if it is considered as contaminated, makes some projects financially unviable.

**Managing sedimentation, ingenuity driven by challenges to navigation** - William Coulet (*Exo Environmental Ltd.*)**Silt control: Application of Water Lynx***Richard Haine (frog environmental)***Dealing with inland dredged sediments for wetland habitat creation and for alternative disposal through land spreading** - David Holland & Peter Barlow (*Salix*)**Bubble Curtains: a silt control solution***Leela O'Dea (frog environmental)**SEE PAGE 64*

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12:30

LUNCH

65 mins

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## Session 5

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9:00	PRE-BOOKED SITE VISIT OR WORKSHOP continued...	3 h 30 min
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**Hall 4**  
**Workshop C:**  
 Green measures  
 in river engineering

**Queens**  
**Workshop D:**  
 Community delivery and capacity –  
 messages for policy makers

*Facilitator: Marta Roca (HR Wallingford)*

*Facilitator: Martin Janes (RRC)*

Green infrastructure (GI) approaches are fundamental to improving the quality, morphology and ecology of our waterbodies and as part of an overall strategy to help people and communities to adapt to the negative effects of climate change. However, there are procedural and technical barriers which prevent and obstruct the implementation of green solutions as part of river engineering protection schemes.

This workshop will explore different elements to consider in the decision-making process to implement green solutions and will discuss some recent examples exploring their main challenges and success factors.

**How to select green measures to protect rivers from erosion?**

Marta Roca (*HR Wallingford*)

**Engineering river naturalisation for the Brent Cross Cricklewood Urban Regeneration: challenges and geomorphological solutions**

Neil Williams (*AECOM*)

*SEE PAGE 66*

River restoration in the UK is undertaken by organisations at a wide range of scales, from large government agencies to small trusts, local interest groups and community volunteers. The varying scales of these organisations mean they have different resources and requirements in terms of funding and support. The catchment-based river restoration movement is growing, and government policies may not necessarily align with the evolving needs of these grassroots organisations.

This workshop, funded by the Esmée Fairbairn Foundation and delivered by the RRC, aims to identify these misalignments and provide opportunities to consolidate ideas and views from a range of small organisations around the country. Participants will have an opportunity to suggest and discuss potential improvements to the policy framework that would better support small organisations to conduct efficient and effective river restoration planning, delivery and reporting. The outcomes from this workshop will include briefings which will be delivered to key policy makers with recommendations.

*SEE PAGE 68*

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12:30	LUNCH	65 mins
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Session 5		
9:00	PRE-BOOKED SITE VISIT OR WORKSHOP continued...	3 h 30 min
<div> <div> <b><u>Preston</u></b>  <b>Workshop E:</b>  The cost of river restoration </div> <div> <b>Site Visit 1:</b>  <b>Woodsmill Stream</b> </div> </div>		
<div> <div> <i>Facilitators: J. Webley, I. Sime &amp; A. Tree (SNH)</i> </div> <div> <i>With Kevin Skinner (Atkins)</i> </div> </div>		
<div> <div> <p>Implementing in-stream restoration in our changing economic climate is a challenging prospect. It is essential that, from the outset, funders, practitioners, stakeholders and partners have a realistic understanding of the risks and costs in order to complete successful projects.</p> <p>This workshop will share experiences from the Pearls in Peril (PIP) LIFE+ project. PIP has completed over ten river restoration projects, of varying sizes, applying a range of techniques on four rivers in Scotland, England and Wales.</p> <p>Using project examples we shall:</p> <ul style="list-style-type: none"> <li>• discuss risk management;</li> <li>• investigate the full costs to restore river reaches; and</li> <li>• consider the opportunities and approaches that can be developed to make efficiencies and thereby achieve greater value.</li> </ul> <p>In addition to risks and the economic costs, we shall also consider and discuss how to demonstrate the non-monetary value and wider benefits that can be achieved as part of river restoration.</p> <p>SEE PAGE 70</p> </div> <div> <p>This project was delivered by the Environment Agency and Sussex Wildlife Trust in 2010. The old stream had been previously channelised and slightly embanked on either side. A new meandering course was established which created a significantly wider flood corridor as well as a low flow channel in the lowest part of the floodplain. The stream was designed to freely adjust following construction. Features that were installed as part of the scheme included riffles, deeper bends, meander cut-offs, a ford and woody material features.</p> <p>SEE PAGE 71</p> </div> </div>		
<div> <div> </div> <div> <b>Site Visit 2:</b>  <b>Twineham</b> </div> </div>		
<div> <div> </div> <div> <i>With Peter King (Ouse and Adur Rivers Trust)</i> </div> </div>		
<div> <div> </div> <div> <p>This project on the River Adur has removed four weirs, created five backwaters, planted 5,000 trees and used the creation of berms to introduce sinuosity into the channel. With the use of volunteers and local groups it has been a great example of cost saving whilst still delivering a successful project. In 2016 the project was a finalist in the Wild Trout Trust Conservation Awards.</p> <p>SEE PAGE 72</p> </div> </div>		
12:30	LUNCH	65 mins



Session 6				
<u>Oxford Suite</u>		<u>Stammer</u>	<u>Hall 4</u>	
Restoring rivers with trees and wood		Floodplain reconnection	Community & partnership delivery	
CHAIR: <i>Ann Skinner</i>		CHAIR: <i>Jo Cullis (CH2M)</i>	CHAIR: <i>Geraldine Wharton (Queen Mary University of London)</i>	
13:35	<b>Trees, roots and how to use them</b> James Holloway <i>(Queen Mary University of London)</i>	<b>EcoCo Life: “Joining up nature” in the Glazert water catchment</b> Clare Rodgers <i>(Royal HaskoningDHV)</i> & Roberto Martinez <i>(SEPA)</i>	<b>Working in partnership to deliver multiple benefits: integrated sub-catchment mapping in the River Ouse, Sussex</b> Peter King <i>(Ouse &amp; Adur Rivers Trust)</i> & Sandra Manning-Jones <i>(Sussex Flow Initiative)</i>	15 mins
	<b>Making use of dead wood</b> Joe Huddart <i>(Imperial College London)</i>	<b>Rewilding in a managed landscape: a case study from the Lake District</b> Lee Schofield <i>(RSPB)</i>	<b>Planning and delivery of a multi-landowner river restoration project on the River Avon in Wiltshire</b> A. Martijn Antheunisse <i>(Wiltshire Wildlife Trust)</i>	15 mins
14.05	<b>Discussion.</b>	<b>Discussion.</b>	<b>Discussion.</b>	10 mins

### Session 6 – continued...

14:15	<b>Ystrad Mynach: tree revetment</b> David Penny ( <i>Natural Resources Wales</i> )	<b>Improving habitat along a small headwater stream</b> Lev Dahl ( <i>Wiltshire Wildlife Trust</i> )	<b>Letting the Dove flow – river restoration in a much loved landscape</b> Julie Wozniczka ( <i>Trent Rivers Trust</i> )	15 mins
14:30	<b>Could beavers have a role in river restoration?</b> Martin Gaywood & Angus Tree ( <i>Scottish Natural Heritage</i> )	<b>Changing minds on the River Test</b> Heb Leman ( <i>Environment Agency</i> )	<b>Community mapping of the lost streams of London</b> Adam Broadhead ( <i>Arup</i> )	15 mins
14:45	<b>Discussion</b>	<b>Discussion</b>	<b>Discussion</b>	10 mins
14:55	SHORT BREAK TO MOVE TO FINAL SESSION			10 mins

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***NOTES***



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**Session 7**  
**Oxford Suite**

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**CHAIR:** *Rob Mitchell (SEPA)*

15:05	<b>River restoration in Europe: a hobby or a planned action? (A Polish Perspective)</b> <i>Ewelina Szałkiewicz (Poznań University of Life Sciences)</i>	15 mins
15:20	<b>Bringing business into catchment management</b> <i>Kathy Hughes (WWF-UK)</i>	15 mins
15:35	<b>Sharing good practice and building capacity</b> <i>Marc Naura (the River Restoration Centre)</i>	15 mins
15:50	<b>Discussion and close</b>	30 mins

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16:20	<b>END OF CONFERENCE</b> <i>with tea and coffee</i>	
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# Can this river be fully restored?

Arup's advanced understanding of catchment and river processes is being used to both inform and deliver holistic solutions throughout the UK and Europe.



River Restoration - WFD Assessment and Mitigation Design - Fish Pass Design  
Fluvial Geomorphology - Fluvial Audit - Specialist Site Supervision - Freshwater Ecology  
Natural Flood Management - Monitoring - Environmental Flows and Hydropower

For further information please contact:  
[sally.german@arup.com](mailto:sally.german@arup.com)  
[www.arup.com/water](http://www.arup.com/water)

# ARUP

## UK RIVER PRIZE & NIGEL HOLMES TROPHY

*"Rewarding the best in river restoration and catchment management"*

**On the 4<sup>th</sup> of April, one of the four shortlisted finalists will be announced as the winner of the UK River Prize and Nigel Holmes Trophy 2017**

After much deliberation the judges selected the four category winners for the 2017 UK River Prize. The overall winner will be presented with the Nigel Holmes Trophy, named after the hugely influential and passionate river restoration and conservation advocate.



**The finalists for the UK River Prize are:**

Finalist	Category	Lead applicant
<b>Pearls in Peril, Scotland, England and Wales</b>	Multiple benefit and partnership project <i>Demonstrating significant contributions to catchment ecology and working with natural processes delivered by a large partner network</i>	Scottish Natural Heritage
<b>Stroud River Frome, Gloucestershire</b>	Innovative project <i>Demonstrating cost-effective achievements, innovation and novel approaches</i>	Stroud District Council
<b>River Avon, Hampshire, Wiltshire &amp; Dorset</b>	Catchment project <i>Demonstrating a whole river approach to restoration</i>	Environment Agency
<b>Healthy Rivers Project, South East Wales Valleys</b>	Urban communities project <i>Working on highly constrained and modified watercourses to restore a healthy river for people and wildlife</i>	Groundwork Wales

*"The 2017 UK River Prize has attracted an exceptional and diverse group of projects from far afield and demonstrates how much passion, commitment and effort goes into restoring the health and quality of our rivers.*

*The standard of work carried out by local partnerships, charities, volunteers and agencies, in managing their river for people and wildlife, is exceptionally high.*

*Each of the four finalists had to really justify their place as a category winner. I would like to thank all of the applicants who submitted their projects for consideration."*

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

### 2017 Partners





## 2017 UK River Prize Finalist

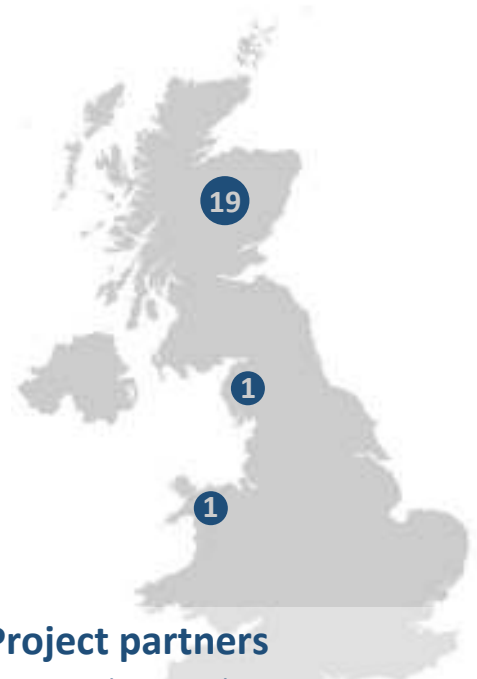
### Pearls in Peril Project - Rivers across England, Scotland & Wales *Partnership & multiple benefit project*

Pearls in Peril (PIP) is a large and complex LIFE+ Nature project with 22 partners working together throughout Great Britain to restore river habitats for freshwater pearl mussels and their host salmonids. The UK holds many of the largest remaining pearl mussel populations in Europe. The project began in 2012 and finished in March 2017. Work extended across 21 rivers designated as Special Areas of Conservation (SACs) for pearl mussels.

The project is led by Scottish Natural Heritage, who began planning the project in 2010 with other partners. The catalyst for the project was a desire to undertake coordinated and carefully planned actions in several key catchments to restore the species habitats and, thereby, improve the conservation of pearl mussels.

Key to this aim has been an ethos of restoring natural river processes, co-ordinated at the catchment scale, and targeted at prioritised locations. This has included planting landscape-scale riparian woodlands, completing extensive in-stream restoration works, reducing diffuse pollution and creating and restoring riparian wetlands.

As well as restoration works, the project has communicated the importance of river and pearl mussel conservation with a range of audiences, particularly via our 'Pearls in the Classroom' initiative that has been attended by over 4,000 school children. In the long term, agreements and plans are in place to maintain, and build upon the achievements of PIP and to further improve the conservation of freshwater pearl mussels.



#### Project partners

- Scottish Natural Heritage
- Forest Enterprise Scotland
- Environment Agency
- Natural Resources Wales
- West Cumbria Rivers Trust
- Rivers and Fishery Trusts of Scotland
- Kyle of Sutherland District Salmon Fisheries Board
- Esk District Salmon Fisheries Board
- Forestry Commission Scotland
- Lake District National Park
- Dee Catchment Partnership
- Cairngorms National Park Authority
- Argyll Fisheries Trust
- Ness & Beaulieu Fisheries Trust
- North & Mid Wales Trunk Road Agency
- Dee District Salmon Fishery Board
- Scottish Environment Protection Agency
- The Spey Fishery Board
- Snowdonia National Park Authority



## 2017 UK River Prize Finalist

### Stroud River Frome - Gloucestershire

#### *Innovation project*

The Stroud RsuDs project is located in the catchment of the Stroud River Frome, which rises from the Cotswold escarpment in Gloucestershire. The project arose primarily out of a concerted effort by community flood action groups to reduce flood risk using natural flood management techniques.

The vision is “To create a river catchment where water management is fully integrated into land management practices. Where public bodies, private companies and local communities work together to manage water within the landscape, creating valuable habitat for wildlife and people, and limiting flood risk downstream”.

The majority of headwaters in the catchment have been impacted by incision and bank erosion, straightening and removal of woody debris, siltation and soil pollution. To help achieve the project's vision and aims over 280 measures have been installed over 18km of stream/river. Key activities undertaken include introducing large quantities of Large Woody Debris, reducing the speed of flow in erosion gullies by filling with logs and brash and much more.

The long term vision is to link with partners working to improve fish migration from the sea to the restored headwaters and to create an enduring and sustainable system for adding new projects and maintaining river improvement works.

#### Project partners

- Stroud District Council
- Environment Agency
- Gloucestershire Wildlife Trust



## 2017 UK River Prize Finalist

### River Avon - Hampshire, Wiltshire, Dorset *Catchment project*

The River Avon Restoration Programme (RARP) was set up to restore the River Avon Special Area of Conservation (SAC) to a naturally functioning river system to meet the government's obligations under the Water Framework and Habitats Directives.

The implementation of RARP is an ambitious project as it aims to restore the River Avon to a naturally functioning river that supports characteristic chalk stream habitats and wildlife. The objective is to strategically deliver natural-process based schemes that restore reaches of river that have been most damaged by past physical modifications.

In many places the channel has been straightened or moved to the edge of the floodplain to work mills or water meadows and there are now some 150 weirs and sluices on the river. It has also more recently been dredged for land drainage resulting in an over-wide and deepened channel and has been embanked in places.

A range of restoration methods have been used to restore the rivers natural geomorphology and processes. These include the removal, modification and bypassing of structures; re-alignment of the river through the centre of the floodplain; re-meandering the channel within its existing plan-form and much more.

The completion of Phase 1 is not the end point but a springboard for the next phases of restoration using the knowledge, experience and goodwill built up over the past ten years. A further programme of work is needed on the remaining 185km of river to fully realise a more naturally functioning river catchment, able to respond and adapt to climate change.

#### Project partners

- Environment Agency
- Natural England
- Wiltshire Wildlife Trust
- Wessex Chalk Stream and Rivers Trust
- Wessex Water
- Wiltshire Fishery Association
- National Farmer Union
- Hampshire & Isle of Wight Wildlife Trust



*Photo: Martijn  
Antheunisse,  
WWT*



## 2017 UK River Prize Finalist

### Healthy Rivers Project - South East Wales Valleys

#### *Urban communities project*

The Healthy Rivers programme at Groundwork Wales carries out work on the rivers of South East Wales with the aim of improving the river habitats so that they can support greater populations of native fish such as salmon, trout, eels and bull heads.

The work that Healthy Rivers carries out has a direct positive impact upon the river habitats of South East Wales by making the rivers more accessible to migrating fish by removing barriers to fish migration. A total of 28 barriers have been removed or modified. Healthy Rivers has also helped to remove 30 tonnes of rubbish and engage local people by offering volunteering opportunities, community river care days and training opportunities. This instils a long term appreciation of the river habitats. Engaging local communities is essential for the conservation of the rivers. If they are engaged, local people will appreciate the rivers and look after them in the future.

Healthy Rivers also works with local primary schools to deliver salmon and eels in the classroom. This type of engagement with children is essential in ensuring that they understand the river habitats and look after them in the future.

Healthy Rivers will continue forging new partnerships and maintaining strong relationships with existing partners who place a high value on the work Healthy Rivers does and the high value that Healthy Rivers contributes to partnerships.

#### **Project partners**

- Groundwork Wales
- Natural Resources Wales
- Welsh Water
- South East Wales Rivers Trust
- Keep Wales Tidy
- Caerphilly County Borough Council
- Blaenau Gwent County Borough Council





Esmée  
Fairbairn  
FOUNDATION

## RRC PROJECT SUPPORT FOR UK TRUSTS, PARTNERSHIPS & LOCAL GROUPS

The River Restoration Centre is able to provide **FREE** project advice to charitable groups delivering local river restoration and catchment management projects. We can provide support in the following areas:

### Project scoping

- Identifying opportunities for restoration
- Sharing case studies of similar projects (success stories, or what to avoid), informed from a database of 4400 UK projects
- View case studies of previous RRC project scoping support on the RRC website

### Design & implementation

- Independent review of project designs
- On hand advice during project delivery
- Over 320 previous project reports since 1996, covering a variety of techniques
- View examples of previous RRC project design & implementation support on the website

### Monitoring & evaluation

- Monitoring strategies and techniques
- How to demonstrate success through evaluation
- Advised CRF and CPAF project monitoring
- View examples of previous RRC monitoring and evaluation support on our website

### Volunteer training support

- Course design, including objectives, contents, and suggested trainers
- Technical handouts
- Expertise drawn from delivering 45 training courses over the last 5 years

Project support is available **on a first come first served basis** and can be booked in advance.

### Guidance resources



Also under our Esmée Fairbairn funded programme, RRC are producing introductory **factsheets** and **videos** and running **training courses** to provide guidance on all aspects of river restoration. These resources are freely available and can be found on our **Community Engagement** webpage.



# 2017 River Champions

'River Champions' seeks to celebrate the outstanding efforts of individuals contributing to river restoration. Below is a brief introduction to the 2017 River Champions, more information about each will be showcased by the RRC over the next year.



Esmée  
Fairbairn  
FOUNDATION



## **Euan Bull**

Euan regularly volunteers with the Crane Valley Project, enhancing rivers in the Crane Catchment, London. He trains new volunteers in river improvement techniques and has built a committed team of volunteers.

## **Nick Fysh**

Nick has been an integral part in protecting, enhancing and restoring the River Stour in Kent with the Kentish Stour Countryside Partnership since 1999. He makes daily visits to the river and engages with the public and businesses.

## **Vaughan Lewis**

Vaughan works voluntarily and tirelessly with river trusts and local community groups to plan and deliver river restoration projects at the catchment scale, secure funding and liaise with regulatory authorities.

## **Patrick McNeill**

Patrick spends 13 days a month monitoring sites along the River Lea for the Hertfordshire and Middlesex Wildlife Trust. He develops projects and has brought the community together to embrace the catchment based approach.

## **Martin Moore**

Martin has increased the capacity of the Loddon Fisheries & Conservation Consultative and Catchment Partnership, establishing projects such as the Loddon Rivers Week and regularly inspires groups of volunteers in the catchment.

## **Richard Stadelmann**

WWF volunteer Richard designed and delivered a 640m river restoration of the 'Aabach' in Switzerland aiming to improve the longitudinal connectivity. He personally engaged with all stakeholders to make the project possible.

## **Chris Stafford**

Chris has volunteered with Thames21 for 10 years, working to improve rivers in south east London. He is involved with the ThamesWatch project and was instrumental in installing fish/eel passage along the River Ravensbourne.

## **Sam St Pierre**

Sam is Chairman of the Ouse & Adur Rivers Trust and regularly undertakes biological and chemical analyses across the catchments which he distributes to the Environment Agency. He also supports students at the Uni. of Brighton.

## **Paul Wicks**

Paul volunteers whenever needed and is key to the success of Friends of the Blue Loop in Sheffield. He supports the River Stewardship Company on practical projects and educational school visits.





## *Meet the RRC Team*

### **Martin Janes – Managing Director**

As Managing Director, Martin's role combines technical river restoration expertise, business management and water sector liaison. He works closely with our core funders to ensure that RRC provides the advice and information they need. Martin enjoys the technical side of the business, using his substantial experience to support the technical team on a variety of river restoration projects. He also routinely represents practitioners and the wider river restoration community on steering groups and larger projects, as well as overseeing management of the RRC.

### **Emma Turner – Business and Finance Manager**

A big part of Emma's role is overseeing the organisation of this annual network conference each year. She also undertakes the management and accounting functions of the business, and works alongside the Managing Director with business planning, staff management, project management and support to the RRC Board.

### **Jasmine Errey – River Restoration Adviser**

Jasmine provides technical river restoration advice in response to enquiries and for advisory projects. This involves assisting with all stages of projects, from early scoping/ideas stage through to post-project monitoring. Jasmine also manages the RRC's annual program of events including training courses and member site visits. This will be Jasmine's second and final RRC conference, as she is almost at the end of her very worthwhile stint working in the UK, and will be heading down under after April.

### **Joshua Robins – River Restoration Information Adviser**

Josh's role is to collect, manage and disseminate information on river restoration. He manages the substantial National River Restoration Inventory database through adding new projects and improving existing information. This involves helping to manage the RiverWiki and updating our UK Projects Map. Josh will be taking on a more advisory role at RRC in the coming months.

### **Nicola Mackley – Centre Administrator**

Nicola runs the bookings process for the Annual Network Conference and Training days. She also acts as the RRC's Membership administrator and manages the contacts database and distribution lists along with helping to maintain the National River Restoration Inventory. Nicola supports Emma's role by undertaking financial tasks such as invoicing and purchasing. Like all the best administrators, Nicola assists the team with everything that happens in the office and manages incoming calls and emails for the whole organisation.

### **Marc Naura – Science and Technical Manager**

Marc provides technical advice and expertise on river restoration, geomorphology and ecology as well as helping the team develop research bids and manage the online river restoration database and project map. He will also be developing decision support tools and training courses for river restoration. Marc is a geomorphologist and ecologist with a keen interest in decision support and software development. He is particularly interested in what technology and science can do to help practitioners and environmental managers in their decision-making.

### **Rosie Steadman – Community Engagement Officer**

Rosie's main responsibility is to coordinate the RRC's support of small UK trusts, partnerships and local groups who deliver restoration projects. This is a new development for the RRC, made possible through funding from the Esmée Fairbairn Foundation. Her work includes coordinating desk based and on-site project support, organising training courses, and developing new guidance resources.

### **Alexandra Bryden – Information Assistant**

Alex's role is to support Josh in managing the RiverWiki, National River Restoration Inventory (NRRI) and UK Projects Map. This involves updating existing information and approving new projects. She also works on the monthly bulletin and updates the website with exciting news and events information. When required, Alex often steps up to undertake coordination of events or support projects and site visits.

### **Chiara Magliozzi – Marie Curie Researcher in River Processes**

Chiara is a Marine Scientist and PhD researcher of the European Marie Skłodowska-Curie ITN HypoTRAIN program. Combining a mix of field expertise on ecology and river hydrology, she is currently working on the hyporheic zone, a "hidden area" below and beyond the river bed, to link its functioning to river ecology and river restoration practices. Though Chiara is not technically an RRC staff member, she sits with the team and regularly provides valuable input and support in their work, including the planning for this conference.



*Back row, left to right:*

Alexandra Bryden, Emma Turner, Marc Naura, Jasmine Errey, Joshua Robins

*Front row, left to right:*

Nicola Mackley, Martin Janes, Rosie Steadman





# the River Restoration Centre

*Working to restore and enhance our rivers*

## RRC Membership Benefits

**INDEPENDENT  
TECHNICAL ADVICE**



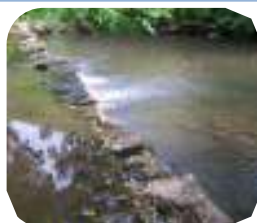
**TECHNICAL TRAINING,  
TAILORED TO YOUR NEEDS**



**SITE VISITS TO BEST PRACTICE &  
INNOVATIVE RIVER RESTORATION  
PROJECTS**



**PROMOTE YOUR BUSINESS OR  
INDIVIDUAL EXPERTISE TO OUR  
NETWORKS**



**DISCOUNTED ANNUAL  
CONFERENCE  
REGISTRATION**

**CONNECTING YOU TO A WIDER NETWORK OF  
RIVER RESTORATION AND ENVIRONMENTAL  
PROFESSIONALS**

**FACILITATED WORKSHOPS  
FOR YOUR ORGANISATION  
OR PROJECT**

### Package Options & Annual Prices

**Corporate Membership**—covers ALL offices/entire staff of an organisation  
£1200 plus VAT

**Business Plus Membership**—Covers ONE office/7 individuals  
£520 plus VAT

**Business Membership**—Covers ONE office/4 individuals  
£260 plus VAT

**Sole Trader Membership**—Covers a ONE person organisation  
£120 plus VAT

**Trust Membership**—Coves ONE office  
£210 including VAT

**Individual Membership**—Covers ONE office  
£74.40 including VAT

**Student Membership**—Covers ONE person, not for business use  
£37.20 including VAT





# the River Restoration Centre

*Working to restore and enhance our rivers*

## Corporate Members

Arup is the inspirational force behind many of the world's most innovative and sustainable planning, building and infrastructure projects. Since 1946, our designers, planners, engineers, consultants and technical specialists, have provided a diverse range of professional services to shape a better world.

# ARUP

# ATKINS

Atkins is a global design, engineering and project management consultancy. We are fortunate to have our own group (Sustainable River Management (SRM) team) who are focused on ensuring our projects deliver sustainable river management where at all possible. We have a range of specialists within our widely experienced team.

As the UK's only exclusively postgraduate university, Cranfield University works closely with industry and government to provide tailored research, technical development and professional education and training. Water is one of the core themes of the university, and our Cranfield Water Science Institute has been delivering robust, innovative solutions for the water sector for over 40 years.

# Cranfield UNIVERSITY



Royal HaskoningDHV is an independent international engineering, environmental and project management consultancy that has been working with clients to manage the water environment and help improve living standards around the world for over 135 years.

Salix have been involved with river and wetland restoration for over 12 years, working on a full range of river types from chalk streams to intertidal and mobile gravel bed systems. River restoration is the core part of our business and our knowledge gained on working on over 50 restoration projects has built a strong knowledge reputation within the industry.

# Salix



South East Water abstracts and treats more than 565 million litres of water a day and supplies around 2.1 million customers. Most of this comes from underground aquifers, but also from

ivers and surface water reservoirs. The company has embarked upon a Catchment Management programme to develop new and innovative ways of tackling complex water quality problems upstream of their treatment works.





# the River Restoration Centre

*Working to restore and enhance our rivers*

## Update on Advice and Information

### Best Practice Advice and Support

We provide support and information to anyone interested in river restoration, and those looking to restore or enhance a river environment. We can advise you on best possible options for restoration, habitat enhancement and natural flood management, and help you develop your project through advisory site visits and design reviews.



### Information and Guidance

Our website provides a range of advice and tips for project development, planning and monitoring, to help you reach your restoration goals. We offer best practice examples through our Manual of Techniques, and manage over 4600 projects on our NRRI database, and the RiverWiki.

We provide updates through our monthly bulletins, social media platforms, and Science Digests offering easy-to-read literature reviews; the first on the use of 2D hydrodynamic modelling in restoration.

### Training Courses and Workshops

We offer a range of training courses to allow attendees to improve their knowledge and capabilities in certain aspects of river restoration.

Contact us for more information or for any advice on how to start, develop or improve your own restoration project.



Website: [therrc.co.uk](http://therrc.co.uk)

Email: [rrc@therrc.co.uk](mailto:rrc@therrc.co.uk)

Telephone: 01234 752979





# National River Restoration Inventory (NRRI)

## NRRI

The NRRI holds over 20 years of project information, including costs, locations, site information, techniques and much more. This information is sourced from agencies, trusts and other river restoration practitioners.

Total Projects  
**4,648**



**3,749**



**467**



**290**

N. Ireland

**90**

**1,858**  
in high  
energy rivers

**2,493**  
Projects with  
costs



**290**  
Re-meandering  
projects

**950**  
Urban  
projects

**719**  
in chalk  
rivers

**700+**  
NFM  
projects

## NRRI Update

RRC has transferred the NRRI into Microsoft Access so that it can be searched with more ease. Objective and contextual keywords have been added to over 3,900 projects to create better links within the database.

This greater functionality will enable RRC to better use, advertise and report the benefits of the data that it has collected over many years and show how it can be better applied to produce evidence in support of projects, programmes and strategy.

This is an example of the sort of search we can now do:

## Looking for flood storage examples in suburban areas

### Technique Keywords



### Site Context



### Outputs

Keywords (Top 10)	No. of projects
Fencing	1006
Longitudinal connectivity	976
Fish pass	804
Barrier modification	640
Pollution source control	620
Barrier removal	561
Species habitat creation	578
<b>Flood storage area</b>	<b>527</b>
Bank protection	515
Marginal planting	500

River type (Top 5)	No. of projects
Lowland High Energy	155
Lowland Low Energy	111
Upland Low Energy	68
Coastal High Energy	28
Upland High Energy	27

Land use (Top 5)	No. of projects
Arable and horticulture	102
<b>Suburban</b>	<b>126</b>
Improved grassland	120
Urban	26
Broadleaved woodland	12

Geology (Top 5)	No. of projects
Clay, silt, sand and gravel	126
Mudstone, siltstone, sandstone	84
Chalk	65
Sandstone and conglomerate	30
Mudstone, siltstone, limestone	18

Projects
Ait Rehabilitation (Phase 1), in Lincoln
Ash (Swales), Sussex Channel Encouragements
Ardenham Lake Bank Flood Storage Basin
Ardenham High River Flood Storage Basin
<b>Elm Elm Wetland Centre, South West London</b>
Forbes Channel
Full Green Gap Works, Systonham
Levenham Park

Library
<b>Enhancing the Environment - 25 Case Studies from the Thames Region</b>

Images
<b>Digital Images - England/Bank_Elms</b>



## RRC Advisory projects

**Did you know** that as well as addressing short technical enquiries for river restoration projects, the RRC undertakes in-depth advisory projects too? We provide targeted technical support at any stage of projects, at any scale from site to whole catchment.

This could include:

- Analysing your river and catchment system and **identifying opportunities** for restoration, habitat enhancement and natural flood management
- Providing an **independent perspective** on existing ideas, plans, design documents, consultant briefs or funding applications
- Delivering **technical support and assistance** with project monitoring and evaluation
- **Connecting you** with relevant organisations and people to maximise your outcomes, and help you to best promote your work to a wider audience

Recent and current RRC advisory projects include:

- River Don, Tyne and Wear – whole river assessment of condition and pressures to identify priority locations and opportunities for river restoration
- River Laroach, Highland – advice on the likely cause of, and appropriate remediation actions for, an eroding bank on a high-energy river in the Scottish Highlands
- River Lark, Suffolk – detailed options assessment for a large aging sluice structure to improve fish passage, hydromorphological connectivity and flood risk
- River Crane, Greater London – high-level feasibility support for a catchment partnership looking to improve this urban river that is currently constrained to a concrete channel, including advice that will be used for funding applications
- River Machno, North Wales – Site visit, technical advice and input to project board relating to a large scale river restoration opportunity
- Loughton Brook tributary, Buckinghamshire – A report to advise on river restoration and natural flood management measures, including indicative cross sections and a management plan.



[Investigations on the River Lark](#)

***Why not ask us how we can support your project too?***



# Case study: River Don Advisory project

The RRC recently completed a large advisory project for the Environment Agency on the River Don in Newcastle upon Tyne.

The project involved a detailed desktop and field assessment of the whole river from source to tidal reach, pulling together a range of information sources and specialist experience to identify the major pressures as well as opportunities for restoration projects along the river.



The River Don at Jarrow



The River Restoration Centre's interactive map showing previous and current planform of the River Don, as well as findings and opportunities

To assist with communicating the findings and opportunities to a range of stakeholders, the RRC developed an interactive mapping tool using the *Google Maps* interface. This allows users to easily see

- the current river alignment
- previous flow paths of the river prior to historical modifications
- localised and large-scale pressures on the river such as fish barriers, major sediment sources and land management practices
- photographs of key features
- identified opportunities for river restoration

The map is supported by a project report which explains the main findings and opportunities and provides recommendations for next steps for four priority projects.

The Environment Agency has already used the recommendations from this project to feed into planning for a new industrial development bordering the river. The results of RRC's assessment were used to take advantage of opportunities provided by the development, recommending targeted restoration that would have benefits for the entire river.





# Delivering value where land meets water



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River Restoration

Revetments

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# *the River Restoration Centre*

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## ABSTRACTS

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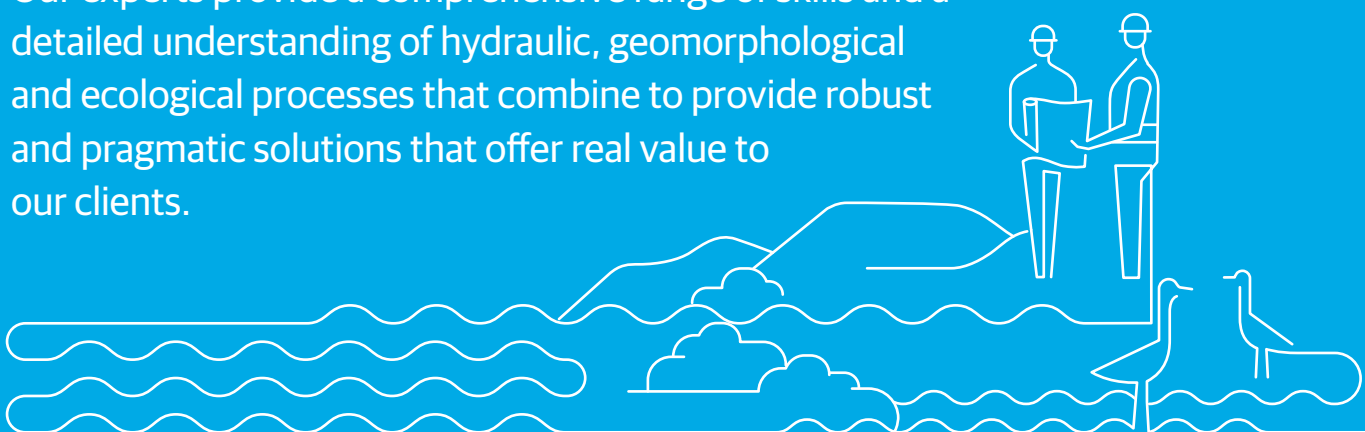
# Delivering robust and pragmatic solutions



**Local understanding, combined with CH2M's global network of industry specialists has made us the consultancy of choice for clients around the world.**

With dedicated teams in all aspects of river and wetland management and restoration, we have an enviable breadth of skills and expertise at our fingertips. Our integrated teams deliver designs which allow for flexibility during construction, so that we work with nature, rather than against it. This approach is critical to the success of habitat restoration and natural flood management schemes.

Our experts provide a comprehensive range of skills and a detailed understanding of hydraulic, geomorphological and ecological processes that combine to provide robust and pragmatic solutions that offer real value to our clients.



To find out how we're solving some of our clients' greatest challenges and how we're helping to make the world a better place, contact Jo Cullis on +44 1793 815 587 or email [jo.cullis@ch2m.com](mailto:jo.cullis@ch2m.com)

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## **Session 1:**

### **Oxford Suite**

#### **LESSONS FOR RIVER RESTORATION FROM UNDERSTANDING NATURAL CHANNEL ADJUSTMENT: 30 YEARS OF EXAMPLES FROM THE UK AND DENMARK**

A. BROOKES<sup>1</sup>

*1 Jacobs*

Understanding the potential for natural adjustment of the bed and banks of a channel is essential in developing sustainable river restoration projects. This can become evident through the choice of river channel type expected naturally and/or desired at a location – for example an active gravel bed river with the potential to move across its floodplain compared to a channel with a winding tree-lined sinuous course which does not readily move. Using examples from the past 30 years in the UK and Denmark this paper demonstrates the challenges and opportunities that more active channels present when considered for restoration. For example:

- ‘Playing it safe’ and choosing an option with relatively static bed and banks
- Shying away from a solution founded on adaptive channel management
- Opting for intervention and not choosing to allow a river channel to recover naturally
- Compromising on a more artificially ‘created’ solution to pacify social and political drivers

#### **10 YEARS OF RESTORING ENGLISH RIVERS WITH SPECIAL DESIGNATIONS FOR WILDLIFE**

J. WHEELDON<sup>1</sup> & C. MAINSTONE<sup>2</sup>

*1 Natural England/Environment Agency, 2 Natural England*

Natural England and the Environment Agency have an established strategic programme of physical restoration on a series of English rivers with special protection status. The programme has been successful in developing strategic plans for most specially protected rivers in England, and practical implementation of measures is well underway and increasing each year. Over time, more local resources are becoming available as the benefits of restored natural ecosystem function are becoming more apparent. The lessons learnt from this programme over the past 10 years will be of use to those working on river restoration elsewhere in England, the UK, Europe and further afield.

#### **5 YEARS’ ACHIEVEMENTS IN UNSTABLE POLICAL TIMES**

P. J. BARHAM<sup>1</sup> & C. STOATE<sup>2</sup>

*1 Welland Rivers Trust, Peter Barham Associates, 2 Welland Rivers Trust, Game & Wildlife Conservation Trust*

The Welland Rivers Trust was formed in 2010 and, as well as being one of the newest, is one of the smallest Trusts. Nevertheless, It has catalysed a very effective series of restorations throughout the catchment, from headwaters to Fenland lower reaches. It led on one of the 10 Pilot Catchments, which evolved into today’s wide support by DEFRA for catchment partnerships. The main thrust of our work has been through the Welland Valley partnership, which was formed jointly with the Environment Agency and which we provide the chair and secretariat. Partners consist of representatives of all interest groups in the Welland. This presentation will be a discussion of the key points in the evolution of Welland catchment restoration, seeking to critically share our experiences and learn from similar experiences from Trusts in other parts of the country.

## **MULTI-OBJECTIVE FLOODPLAIN MANAGEMENT (AKA NATURAL FLOOD MANAGEMENT): PRACTITIONER'S PERSPECTIVE PARSED BY THE POND**

C. BOWLES<sup>1</sup> L. CAMELO<sup>1</sup>, H. MOIR<sup>1</sup>

*1 cbec eco-engineering Ltd.*

Multi-objective floodplain management (or floodplain management), as it is referred to in the USA, otherwise known as Natural Flood Management (NFM) in the UK, is an approach that has progressed rapidly over recent years and we have learned much through practice and experience. As a philosophy, floodplain management aims to remove barriers to a river's natural physical and ecological processes that help to promote healthy riverine ecosystems, as well as providing opportunities for flood risk reduction through attenuation of flood pulses on the floodplain. Floodplain management as an approach and philosophy has been practiced in the USA for over 30 years. In comparison, NFM presents a development and extension of a SUDS type of approach that is more holistic, importantly considering 'out of floodplain' options, such as renaturalisation of land use/ land cover (especially reforestation) and upland drain blocking. This approach has been increasingly practiced in the UK for over the last 5 to 10 years, with interest in the approach increasing in recent months, particularly as result of the Environment, Food and Rural Affairs Select Committee (EFRA) report on Future Flood Prevention and subsequent UK government follow up.

## **RESTORATION BEYOND THE WALL – DELIVERING SUCCESS**

C. PERFECT<sup>1</sup> & S. MCCONNELL<sup>1</sup>

*1 SEPA*

High ambition characterises Scotland's approach to tackling the degraded physical condition of rivers and barriers to fish migration - healthy, functioning river corridors being the goal.

This presentation will expand on the following:

- SEPA and partners are working hard on an approach to restoration that ensures meaningful improvements are made to the physical condition of Scotland's water bodies, implementing restoration measures targeted at the physical pressures present and delivered at an appropriate scale and level of intervention.
- Priorities for RBMP Cycle 2 have been developed following careful consideration of the balance between the ambition to deliver meaningful ecological improvements, the scale of the task both within individual sites and across Scotland, and constraints both in terms of funding and space (e.g. in an urban setting)
- SEPA has put significant effort into evolving the way we work with project partners and contractors to ensure a robust delivery process.
- Scotland now has many examples of successful restoration projects that can serve as case studies offering lessons on the delivery of ecological improvements together with wider 'multiple benefits'.

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## **NOTES**

## **Session 2:**

### **Oxford Suite**

#### **Hard engineering removal**

##### **WANDLE WEIR REMOVAL**

**J. HORNSBY<sup>1</sup> & N. PICKFORD<sup>1</sup>**

*1 Land & Water Services Ltd.*

Land & Water have been contract by Wandsworth Council to remove the tidal weir, layers of contaminated sediments and other debris at the mouth of the River Wandle in Wandsworth. The area has not been cleared for 25 years. The project will allow the area to be restored to a thriving environment for plants, wildlife and the community. This presentation will take the audience through each aspect of the project, looking at practical and environmental aspects of an operational site. Due to complete in March 2017 the content of the presentation will develop alongside the project. The content will include visual illustrations of the works and processes used. It will also include some interesting challenges including, community engagement and mitigation measures. The aim is to take the audience through the lifecycle of a complex and sometimes challenging project. Demonstrating how vital the concept stage is to a successful outcome for all stakeholders.

##### **AVON WATER BARRIERS: SUPPORTING THE RETURN OF SALMON TO THE UPPER CLYDE SYSTEM**

**A. MCCULLOCH<sup>1</sup>**

*1 SEPA*

The Avon Water and its tributaries flow from the southern uplands to the River Clyde in Scotland. In recent decades significant work has been undertaken to restore the Clyde and limit the impact of historic pollution on the river. The success of this work has resulted in the return of Atlantic Salmon. The Avon Water Barriers project was designed to remove two of the final blocks to their migration by easing fish passage across two large redundant weirs on the Avon Water. By doing so, approximately 150km of river habitat has been opened up to migratory fish. Three years ago SEPA and its partners began work to identify how to achieve fish passage at Fernegair and Millheugh Weirs. Led by the Rivers and Fisheries Trust for Scotland and supported by the Water Environment Fund this work has culminated in the installation of natural fish passes to these structures. This talk will discuss the process that was followed from initial identification and scoping through to the final construction of both fish passes.

##### **HOW HAVE PEARLS IN PERIL PHYSICAL RESTORATION MEASURES PERFORMED?**

**K. A. MACDOUGALL & E. CLEMENTS<sup>1</sup>**

*1 EnviroCentre Ltd.*

The EU LIFE funded Pearls in Peril project undertook a number of river restoration projects during 2015-16 and here the performance of these measures within the Rivers Dee and South Esk in north eastern Scotland are reviewed. The projects removed over 1.1km of hard bank armouring, 28 flow deflectors and 0.5km of embankments, along with reconnecting relict channels. These works were exposed to extreme river flows through the winter of 2015-16 which were the highest recorded since at least the Muckle Spate of 1829. The changes observed at these sites are reviewed in terms of what was expected during the design phase, which were broadly similar although the timescales for change were faster. In addition to the physical changes, the views of the landowners on how they now view the works has been captured which will help inform future projects during the planning stages.

## PORTER BROOK DE-CULVERTING AND POCKET PARK CREATION

P. N. GASKELL<sup>1</sup> & S. THORN<sup>2</sup>

*1 Wild Trout Trust, 2 Sheffield City Council*

Buried for 160 years, a section of the Porter Brook in Sheffield has been de-culverted and the surrounding land transformed into an urban “Pocket Park”. The site now contributes to flood risk management while creating valuable urban green-space, increased biodiversity and puts the local community in direct contact with this previously buried stream. This project demonstrates that multiple benefits – including enhanced geomorphological and ecological process – can be achieved through innovative partnership work with relevant expert consultation. Incorporating this advice at an early stage and identifying the most appropriate partners enabled gains to be delivered with minimal additional cost to the existing plans for deculverting and park creation. This process was greatly facilitated by the existence of the Sheffield Waterways Strategy Group and its attendant network of practitioners, governmental bodies and stakeholders and made possible by funding through Interreg North Sea Region, SCC Breathing Spaces, EA and further funding by partners.

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### **NOTES**



## **Session 2:**

### **Stamner**

Healthy rivers, healthy habitat

#### **RESTORING AN AGRICULTURAL RIVER: EXPERIENCE OF THE POW BURN**

C. PERFECT<sup>1</sup>

*1 SEPA*

There is no one-size-fits-all approach to restoring our freshwater environments. This can be a challenge for the design and implementation of river restoration projects and for achieving desired outcomes. The phased implementation of restoration measures along the Pow Burn (nr Montrose, Scotland) allowed lessons to be learned and implemented as the project progressed. The 'Pow Burn (Farnell to Powmouth) River Restoration Project' is being delivered through a partnership between the SEPA Water Environment Fund and the Esk Rivers and Fisheries Trust. It aims to improve the physical and ecological condition of an SAC river through the renaturalisation of channel morphology and the reinstatement of riverine processes. Improvements to the design of instream structures, two stage channels and river corridor features will be presented. This case study demonstrates that the critical review of designs, as projects progress through works, has the potential to significantly improve delivery of key objectives.

#### **RESTORATION & FUTURE MANAGEMENT OF THE RIVER EMS**

S. WRIGHT<sup>1</sup> & A. THOMAS<sup>2</sup>

*1 Arun & Rother Rivers Trust, 2 Wild Trout Trust*

The Ems is a chalk stream with ephemeral headwaters that currently has 'Poor' ecological status under the EU Water Framework Directive (WFD) and fails for fish, dynamics of flow and water resource (abstraction) pressures. The Arun & Western Streams Catchment Partnership enabled different organisations with a joint interest in the River Ems to come together to deliver a river restoration project that in total aims to deliver more than the sum of its individual parts. The project has involved linking up with the water industry (Portsmouth Water), Natural England, the Environment Agency and importantly the local community to deliver a suite of projects aimed at turning around the Ems such that it can support a healthy and diverse ecology. The Ems comprises a single WFD waterbody such that once all of the restoration works are delivered this should turn a failing watercourse into a high quality waterbody.

#### **RIVER SLEA, WORKING WITH A DRY RIVER**

M. J. TAYLOR<sup>1</sup>, L. H. VICKERS<sup>1</sup> & T. JACKLIN<sup>2</sup>

*1 Lincolnshire Rivers Trust, 2 Wild Trout Trust*

The River Slea is an 18 mile long tributary of the River Witham, in Lincolnshire. Historically the River Slea flowed all year round, but in the early 60s the flow of the river began to slow and ceased in 1962. After a public campaign in 1992, a pump was installed to keep the River Slea flowing all year round. The Lincolnshire Rivers Trust (LRT) commissioned Clear Environmental to deliver the Sleaford Urban Opportunities Study. This study highlighted how the river would benefit from various rehabilitation techniques to enable wildlife to be more resilient during periods of low flow. The LRT worked with the Wild Trout Trust to create a low flow, two staged channel to retain water for longer in dry periods. Pools were excavated and brushwood bundles were installed with the help of the community. Brown trout and water voles have been seen in the sections of restored channel.

## THE USE OF INDIGENOUS AQUATIC PLANTS & FLOATING ECOSYSTEMS IN RIVER RESTORATION

B. GUSH<sup>1</sup> & G. FULFORD<sup>2</sup>

*1 Land & Water Services Ltd, 2 Biomatrix Water*

We will explore and demonstrate the innovative use of aquatic plants of local provenance in river restoration projects and look at using them in conjunction with floating eco systems.

The benefits we will be demonstrating are:

- Improved water quality
- Enhanced habitat for aquatic species
- Aesthetic cover to hard engineering
- Environmental resilience
- Community involvement – pride/understanding

We will discuss and illustrate:

- Choosing the best plants
- Life cycle of the plants from seed to first establish through grown-on to planting
- The use and benefits of the plants in the floating habitat

Several live project examples will be provided with pictures of their installation and their successful development.

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### NOTES

## **Session 2:**

### **Hall 4**

#### **Geomorphological design**

##### **APPLICATIONS OF GEOMORPHOLOGY IN ENGINEERING DESIGN: DELIVERING SUBSTANTIAL ECONOMIC AND ENVIRONMENTAL BENEFITS**

H. PARSONS<sup>1</sup>

*1 Jacobs*

The Water Framework Directive (WFD) provides geomorphologists with the legislative driver for playing an influential role in engineering design. Applications of the WFD and its influence in engineering design in turn provides us with a compelling evidence base for securing our future in the changing political and economic environment. Geomorphology delivers considerable added value in the whole asset management life cycle and delivers both substantial economic and environmental benefits. This presentation draws on recent applications, which include the use of WFD and geomorphology in a major slope stabilisation scheme, feasibility studies for locating water utility assets, erosion risk assessments and delivering geomorphological enhancements through environmental impact assessments.

##### **HOW MUCH “DESIGN” IS REQUIRED FOR A SUCCESSFUL RIVER RESTORATION SCHEME?**

I. DENNIS<sup>1</sup>

*1 Royal HaskoningDHV*

The term “detailed design” is often used in the river restoration community. However, it is not necessarily used to mean the same thing, and can refer to a spectrum of different outputs. At one end of the spectrum, all aspects of the scheme are specified, and detailed hydraulic and geomorphological calculations are used to support the design. At the other end of the spectrum, a much “looser” approach can be adopted to inform the creation of initial conditions that will adapt naturally in the future. This presentation will draw upon recent examples in England and Scotland that Royal HaskoningDHV’s river restoration team have delivered to compare the results of different approaches to “detailed design”. The advantages and disadvantages of different approaches will be discussed, and lessons learned for their applicability to future schemes will be highlighted.

##### **THE IMPORTANCE OF IN-CHANNEL FEATURE CREATION WHEN NATURALISING ACTIVE RIVER CHANNELS**

G. L. HERITAGE<sup>1</sup> & S. BENTLEY<sup>1</sup>

*1 AECOM*

River naturalisation is an increasingly popular branch of restoration that applies a softer touch approach to channel alteration, allowing river processes to develop a natural functional morphology. Often an expected planform template is created with river features then allowed to self-form over time. Here we review short and medium term river response from several such schemes and argue that such an approach often leads to the rapid development of a set of disequilibrium flood controlled landforms that are inherently unstable. Localised bank erosion is also often associated with these features, dramatically altering the planform of the watercourse from the imposed template. This type of response is contrasted with schemes that impose both planform and embryonic features on the new river. Here anticipated fluvial processes appear to operate in line with the morphology and active erosion and deposition processes act to integrate the imposed features into a dynamic morphology.

## **FLEXIBILITY IN DESIGN & CONSTRUCTION – SUCCESSES AND CHALLENGES AT NORTON BAVANT MILL**

A. MAXWELL<sup>1</sup> & J. CULLIS<sup>2</sup>

*1 Environment Agency, 2 CH2M*

In 2014 a major embankment breach at some hatches on the River Wylye, instigated a project to create a more dynamic, naturally functioning channel, with a lowered more ecologically diverse floodplain. The straightened channel at Norton Bavant had been perched above the natural floodplain and impounded by mill hatches, resulting in a sluggish, uniform channel with few of the habitat features expected of a chalk stream. An integrated team of ecologists, geomorphologists and engineers produced a design which allowed for flexibility during construction, an approach that proved critical to the success of the scheme. The flexible design enabled the construction support team to make the most of opportunities on-site and make expert judgement decisions to tweak channel alignment, in-line with what river processes demanded. The former channel was infilled and raised embankments were lowered as part of a wider landscaping to create a functional floodplain and associated wetland habitats.

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### **NOTES**



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### ✱ Management Plans and Hydrological Studies

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## Session 3:

### Oxford Suite

#### Geomorphic surveying & modelling

##### **MOBILE DATA COLLECTION FOR GEOMORPHOLOGICAL SURVEY WORK**

K. ATKINSON<sup>1</sup>

*1 Arup*

Geomorphological surveys often require large amounts of detailed information to be collected for long distances of river channel. Previously, most of these surveys were completed using paper maps, requiring digitizing of the data post survey and having to manage multiple pieces of paper under all weather conditions. Arup have developed a methodology to collect data digitally and sent it directly to a database. The application on ArcGIS Collector guides surveyors through the data entry process, therefore increasing accuracy. Arup are using the application for nearly 5500km of MImAS surveys as well as fluvial audits and targeted geomorphological walkovers. This application has created efficiencies avoiding the need for digitization afterwards. This approach also has environmental benefits from a reduction in paper as well as practical and health and safety advantages. This presentation explores the challenges of geomorphological data collection, the techniques adopted to increase efficiencies and future opportunities to develop this further.

##### **INTEGRATED RIPARIAN SURVEY - A HOLISTIC SURVEY TECHNIQUE**

K. A. SHEEHAN<sup>1</sup> & S. BENTLEY<sup>2</sup>

*1 JBA Consulting, 2 AECOM*

The Integrated Riparian Survey (IRiS) is a new holistic survey technique that we have been developing since 2012, based on our experience of surveying, for example, the Rivers Teme, Ribble, Wharfe and Stour. The deficiencies in the current system of Fluvial Audit and River Corridor Survey plus Phase 1 mapping became obvious on the River Wharfe where the river was surveyed separately by ecologists and geomorphologists with consequent separate although linked reporting. The focus at the time from Natural England and the Environment Agency was for in principle a more joined-up survey approach, however, with separate visits and survey methodologies, this proved difficult to implement in practice. The solution was to employ a fully integrated survey whereby all features of interest within the river corridor are recorded together. This methodology was first employed on the River Teme in 2012 and has since been refined into a formal interdisciplinary survey method.

##### **PUTTING THE PIECES TOGETHER: DYNAMIC MODELLING OF RIVER RESTORATION MEASURES**

S. J. HUGHES<sup>1</sup>, M. SANTOS<sup>1</sup>, R. CORTES<sup>1</sup>, J. CABRAL<sup>1</sup>, C. GARDNER<sup>2</sup> & B. DAVIES<sup>2</sup>

*1 University of Trás-os-Montes e Alto Douro, Vila Real, Portugal, 2 South East Rivers Trust*

We outline how Stochastic Dynamic Methodology (StDM) can be used to anticipate the efficacy and outcome of river restoration measures. We explain the StDM protocol application, a sequential modelling process which has been applied to assess scenarios of change across a range of altered ecosystems. StDM can embrace system complexity and stochasticity (e.g. flood or wildfire events) in scenario development and integrate different types of explanatory data and target indicators. We suggest that relevant data gathered from diverse sources such as online open access databases, RiverWiki contributors, Statutory environmental agencies, student research projects and citizen science projects, can be used to build accurate StDM models that allow end users to identify the best management procedures, the most suitable restoration measures and how combinations of measures can benefit target species or specific objectives, such as improved WFD status of waterbodies.

## IS MORPHODYNAMIC SEDIMENT TRANSPORT MODELLING A USEFUL TOOL FOR PIECEWISE RESTORATION DESIGN?

E. GILLIES<sup>1</sup>

*1 cbec eco-engineering Ltd.*

When a restored river reach is tied into a previously perched channel, the initial 'break-out' slope into the lower floodplain is high, potentially causing head cut and instability. Similarly, if grade control structures are removed, channel bed sediment is unlikely to be static during moderate flows. While restoration designers have basic guidelines regarding channel geometry and sediment size in their toolbox, sediment transport modelling is a powerful additional tool to investigate the design and the only technique that might predict future conditions. However, sediment transport modelling is expensive: models are time consuming, have to be based on detailed topographic data, mapped sediment distribution and upstream sediment supply. Such modelling is a significant effort for results that are sometimes only accurate within a factor of two or three. What can be learned from such models and are they useful? We present a number of case studies to illustrate these issues.

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### **NOTES**

## **Session 3:**

### **Stamner**

#### **Urban restoration**

##### **CLEAN STREAMS AND COMMUNITY TEAMS**

**B. BOULTON<sup>1</sup> & P. BRADLEY<sup>1</sup>**

*1 Manchester City Council*

Manchester City Council is currently working to restore its urban watercourses through activities that also support community revitalisation. A number of ordinary watercourses in Manchester suffer poor water quality and increased flood risk as a result of fly-tipping, overgrown vegetation, blocked and undersized culverts and historic modification. Working alongside local schools, resident groups and businesses, a suite of measures have been implemented to reduce flood risk, increase habitat diversity and make the neighbourhood a more appealing place to live. It is hoped that working with the community will help deter future fly-tipping, promote an improved understanding of the local environment and instil a sense of ownership and pride. In addition to the benefits of community engagement the project will reduce flood risk whilst also offering habitat and morphological benefits, thereby taking steps towards fulfilling the WFD and the Council's responsibilities as Lead Local Flood Authority.

##### **OUTFALL SAFARI: A WAY OF WORKING WITH VOLUNTEERS TO MAP AND RECORD THE IMPACT OF POLLUTED SURFACE WATER OUTFALLS IN A RIVER**

**J. PECORELLI<sup>1</sup> & R. GRAY<sup>2</sup>**

*1 The Zoological Society of London (ZSL), 2 Friends of River Crane Environment (FORCE)*

Water quality in many urban areas is degraded by the chronic problem of misconnected and cross-connected sewers sending pollution into rivers via surface water outfalls. Yet often there is an ad hoc approach to reporting polluted outfalls and, in the Thames region, there is a lack of evidence to confirm if the current work to remediate the problem is of an appropriate scale to effectively tackle it. As part of the Citizen Crane project, ZSL worked with FORCE, Frog Environmental, The Environment Agency, Thames Water and Green Corridor, the catchment partnership host, to devise a citizen science approach to systematically, map and record the impact of surface water outfalls in the catchment with the help of a mobile app and a team of dedicated volunteers. This presentation will be a practical guide to running an Outfall Safari and lessons learned from the Citizen Crane experience.

##### **MULTIFUNCTIONAL BENEFITS OF URBAN RESTORATION – STANMORE MARSH**

**K. S. SKINNER<sup>1</sup> & M. BRADSHAW<sup>2</sup>**

*1 Atkins, 2 London Borough of Harrow*

London Borough of Harrow Infrastructure Team, in their role as Lead Flood Local Authority, identified Stanmore Marsh as an opportunity to develop a scheme that could meet the s.106 and local plan requirements whilst improving amenity and social value of the park and incorporating environmental improvements. Atkins was commissioned to undertake detailed design using a multidisciplinary team followed by construction supervision. The marsh was split into two sections, the northern and southern marsh. In the northern section, work concentrated on improving recreational amenity value with a new children's play area, a rain garden, access paths as well as a new SUDs scheme being created. In the Southern Marsh, Edgware Brook was restored with a new channel cut over much of the length. The whole project was managed using a catchment and partnership based approach so that the community, habitat and education benefits could be realised in the longer term.



## THE RIVER ALT RESTORATION PROJECT – A CATALYST FOR CHANGE

H. A. RAWLINSON<sup>1</sup> & P. D. PUTWAIN<sup>2</sup>

*1 The Cass Foundation, 2 Ecological Restoration Consultants*

Against a backdrop of cuts to Local Authority funding, challenging delivery of non-statutory services, and city wide campaigns to save local greenspaces from possible development. The River Alt Restoration Project posed social, political and technical challenges. The case study centres on the reclamation of 8.2 ha of brownfield land, 'daylighting' the River Alt into a newly engineered 900m section of river, mosaic of habitats and publically accessible greenspace. This presentation sets the scene in terms of the projects economic and environmental drivers, the importance of genuine collaboration between project partners, contractors, Liverpool University and the local community and the creation of an enhanced environment providing a catalyst for positive change. To highlight the technical challenges, multiple benefits and local impact of the scheme, examples are provided relating to fluvial geomorphological performance, ecological development, local regeneration and investment, local pride and engagement and a GIS based economic valuation of Green Infrastructure.

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### NOTES

## Session 3:

### Hall 4

#### Natural flood management

##### **LETTING NATURE INNOVATE – CAN NATURAL PROCESSES MANAGE FLOOD RISK?**

L. BURGESS-GAMBLE<sup>1</sup>, STEVE ROSE<sup>2</sup>, STEVE MASLEN<sup>2</sup>, RACHELLE NGAI<sup>2</sup>

*1 Environment Agency, 2 JBA Consulting*

Working with Natural Processes (WWNP) involves restoring more naturally functioning catchments and coasts. Interest in this greener approach to flood risk management has soared in recent years because, if properly planned and executed, it can not only further help to reduce the risk of flooding to people and property but also achieve win-wins for the environment and society. However, to date the application of this innovative component of the flood risk management toolbox has yet to become fully mainstream because the evidence to support WWNP has been hard to obtain and limited tools are available to help interested parties make strong business cases for funding. This presentation will showcase early outcomes from the new WWNP Evidence Directory - a resource that will describe 'what we know' and 'what we don't know' about the effectiveness of different WWNP measures at reducing flood risk whilst delivering other benefits. We will also discuss the development of a WWNP mapping toolbox, which will help practitioners identify key locations in a catchment where WWNP measures could be most effective.

##### **UPLAND DRAINAGE NETWORK EXTENSION: A PRIME TARGET FOR NFRM?**

N. S. ENTWISTLE<sup>1</sup> & G. L. HERITAGE<sup>2</sup>

*1 University of Salford, 2 AECOM*

Historic alterations to the land use and hydrology in the upper catchments of many UK watercourses could be exacerbating the severity of downstream flooding. This study compares historic first epoch (1880-1890) Ordnance Survey mapping of several upland catchments in the north of England with the current mapped river network. Channel extension was seen to be widespread with new headwater streams extending up to several hundred metres into areas previously exhibiting no overland drainage. Environment Agency open data LiDAR were also used to map smaller grips connecting into the main channel network calibrating the simulated network against aerial imagery of known grips and drains. The increase in flow path density was dramatic. Coarse empirical relationships exist between drainage density and flow measures such as mean annual discharge and the impact of altered drainage density is shown to be significant on flood generation. Given the link between increased drainage and flood discharge and the general severity of modification revealed by the study, it is suggested that reducing this upland network to something approaching more natural densities is a priority and that Natural Flood Risk Management measures should be strongly targeted towards this over smaller more scattered measures which may not be effective during large floods.

##### **MODELLING, MAPPING AND ENGAGING WITH NFM IN CUMBRIA**

B. G. HANKIN<sup>1</sup> & D. JOHNSON<sup>2</sup>

*1 JBA Consulting, 2 Rivers Trust*

This paper brings together advances in modelling and mapping opportunities for better working with natural processes (WWNP) in three Cumbrian catchments terribly impacted in 2015. The paper seeks to put in context the relative contribution that can be made through WWNP, alongside other risk management measures from defences to flood warning. Taking a whole-catchment approach, with a distributed 2d overland flow model plus ReFH-losses model, we look at the relative difference in hydrograph peaks and timing with and without measures at different locations around the Derwent,

Eden and Kent. Opportunities for distributed storage are taken from new techniques for data-mining the updated surface water flood map, and from the 'woodlands for water' dataset. The results are then demonstrated using a set of interactive PDFs, allowing catchment users to appreciate the location of the opportunities at the small scale, but also the relative benefits at the sub catchment scale. Following catchment engagement workshops facilitated by the Rivers Trust, these opportunities are modified using local knowledge as constraints, given for example land ownership issues. The consultation results in the distributed opportunities being modified and re-modelled to reflect catchment knowledge, and the realistic benefits then being re-computed. The re-modelling includes outputs from a new Dynamic Topmodel with Routing developed at LEC, that has been specifically adapted to model NFRM features.

## **LOCAL AUTHORITIES WORKING WITH COMMUNITIES AND LANDOWNERS TO RESTORE STREAMS AND REDUCE FLOOD RISK USING NATURAL FLOOD MANAGEMENT**

C. UTTLEY<sup>1</sup>

*1 Stroud District Council*

Stroud District Council is working with communities and landowners to implement natural flood management and restore Cotswold streams for people and wildlife in the Stroud Valleys. I will discuss the potential role of local authorities in delivering NFM and in particular, how they are uniquely placed to work in the right locations (Ordinary water courses), involve the right people (local communities, landowners and local contractors) and gain local political support to ensure projects move from theory to implementation. I will also discuss why it is important to ensure community benefits are built into projects from the start and why projects need to be flexible enough to deliver a wide range of objectives.

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### **NOTES**



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Desk based analysis and field studies to identify or diagnose geomorphological processes and systems. Sediment provenance and tracing studies, and hillslope-channel coupling investigations. Audits and surveys, including fluvial, River Habitat Survey (RHS) and more.

### Ecology and fisheries

Preliminary Ecological Assessments (PEA), Phase I habitat surveys, River Corridor Surveys (RCS), aquatic ecology, hydro-ecological assessment, fisheries monitoring, fish barrier evaluation, water quality monitoring, protected species surveys and mitigation. Habitats Regulations and WFD assessments.

### Environmental impact assessment (EIA)

EIA coordination from inception through to approval and performance management; including screening and scoping, baseline studies, preparing planning applications and environmental statements, monitoring, and support in the discharge of planning conditions.

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# River Restoration and Biodiversity

Nature-Based Solutions for Restoring the Rivers  
of the UK and Republic of Ireland

Stephen Addy, Susan Cooksley, Nikki Dodd, Kerry Waylen,  
Jenni Stockan, Anja Byg and Kirsty Holstead



## Session 4:

### Oxford Suite

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## Keynote Address

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### PUTTING THE 'GEO' IN HYDRO(GEO)MORPHOLOGY

A. GURNELL<sup>1</sup>

*1 Queen Mary University of London*

For over 4 decades, I have conducted research on the way hydrology, sediment and vegetation processes interact to drive the (hydrogeomorphological) form of river channels and their floodplains and the way these continually adjust over time. At a time when Working with Natural Processes (WwNP) and Natural Flood Management (NFM) implicitly promote the incorporation of natural catchment-floodplain-river processes and related forms into river management, it is crucial to recognise that even the lowest energy lowland rivers continually adjust their form in response to flow, sediment and plant-driven processes and human interventions. Therefore, I will explore how rivers adjust naturally, and how understanding of these continual natural adjustments in processes and forms need to underpin the sustainable design of river restoration and flood management strategies.

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### **NOTES**





ENVIRONMENTAL  
E  
P  
C  
CONTRACT

## Session 5:

### Oxford Suite

#### **Workshop A:**

#### How to implement adaptive management effectively

*Facilitator: **Judy England (Environment Agency)***

*RRC Lead: **Marc Naura***

The response of natural systems to restoration can be uncertain because of the complexity of the systems. Adaptive management provides a structured but flexible process for making decisions and solving problems in the face of this uncertainty. It is an iterative process which includes a series of steps; planning, monitoring, implementing measures, further monitoring and evaluation of effectiveness, followed by adjustments to measures or additional measures as needed.

Within this workshop we will explore peoples understanding of what adaptive management is, the tools which are available to help and examples of implementing adaptive management and the lessons learnt. We will have a chance to discuss what is needed to help the process and an opportunity to discuss what evidence is needed to make adaptive management decisions and how to assess success. The workshop will include:

**WHAT IS ADAPTIVE MANAGEMENT?** – Mike Summers, Environment Agency

**ADAPTIVE MANAGEMENT TOOLS** – Judy England, Environment Agency.

#### **DURLEIGH RESERVOIR ADAPTIVE MANAGEMENT TRIAL**

C. TATTERSALL<sup>1</sup> & A. HOUSE<sup>1</sup>

*1 Wessex Water*

Between 2010 and 2015, Wessex Water investigated the impact of Durleigh Reservoir (Somerset), on the Water Framework Directive status of Durleigh Brook downstream. Macroinvertebrate indices indicated a significant impact of the impoundment on flow, silt and water quality. Macroinvertebrate biomass immediately downstream was found to be higher than at upstream and downstream monitoring sites and dominated by detritivores and predators. The imbalance in the macroinvertebrate community appeared to be linked to the rapid settlement of phytoplankton present in the compensation flow in the downstream watercourse. Adaptive Management is being trialled to improve the ecological status of the brook from the current Moderate Ecological Potential. Spate flows using different flow regimes and water sources (including pumping from a nearby canal) have been reintroduced to simulate summer rain storms and successfully flush sediment from the watercourse. The sediment flux, water quality and ecological response are being monitored.

#### **GEOMORPHIC CHANGE DETECTION: CONSTRAINING UNCERTAINTY IN RESTORATION MONITORING**

R. D. WILLIAMS<sup>1</sup>

*1 University of Glasgow*

River restoration schemes are typically sensitive to morphological adjustment during the first set of high-flow events that they are subjected to. Quantifying elevation change associated with morphological adjustment can contribute to improved adaptive decision making if interventions are necessary to ensure scheme objectives are achieved. This presentation provides an overview of the different survey data that can be used to map restoration scheme topography, the approaches that can be used to constrain uncertainty when mapping geomorphic change, and how different temporal frequencies of analysis can yield different insights into morphological dynamism. These themes are



illustrated using data from six topographic surveys of the Whit Beck restoration scheme, Cumbria, which were acquired between August 2013 and September 2016, using a variety of geomatics technologies. Maps of geomorphic change quantify adjustment: (i) in the immediate aftermath of realignment; (ii) due to the 2015 flood event; and (iii) after in-channel works.

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***NOTES***

## Session 5:

### Stamner

#### Workshop B:

#### Managing silt: Muddy Waters or Clearwater Revival?

*Facilitators: Simon Whitton & Di Hammond (Affinity Water)*

*RRC Lead: Alexandra Bryden*

This workshop will focus on two key areas of sediment management: 1) managing silt generated from our own activities, and 2) removing silt from watercourses to improve habitats and to facilitate the removal of barriers such as weirs which cause sediment to build-up. We aim to share delegate experiences of dealing with silt, and assess different approaches to this issue. For example, we will discuss the approach for deciding whether the silt needs to be sampled for contaminants before it can be removed and, if so, how you decide which contaminants to test for. We will also discuss waste exemptions and participant experiences of this process, explore how participants have used silt for landscaping purposes and determine the best ways to get advice.

#### **MANAGING SEDIMENTATION, INGENUITY DRIVEN BY CHALLENGES TO NAVIGATION**

W. COULET<sup>1</sup>, W. MANNING<sup>1</sup>

*1 Exo Environmental Ltd.*

Estuaries are the complex interface of terrestrial, freshwater and marine environments. A marina within the River Colne estuary, Essex, required the removal of 11,000m<sup>3</sup> of accumulated sediment that threatened the safe and navigable operation. An adaptive management approach to dredging and the dispersal of the sediments, proved economically and environmentally a successful solution. To minimise environmental impact, a baseline monitoring survey was conducted. The results of the survey were utilised to create hydro- and geomorphological models that would predict the sediment behaviour. Based on this study, the dredging and dispersal activity was further optimised. A verification monitoring survey was conducted during the works to assess and regulate the dispersal process. Measured and visual observation of the sediment plume during dispersal was found to correlate well with that predicted, thereby validating the model and supporting their use as a tool for the management of dredging projects within complex and uncertain environments.

#### **SILT CONTROL: APPLICATION OF WATER LYNX**

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

*1 frog environmental*

Sediment is the main pollutant generated on construction sites and arises from the erosion of exposed soils and pumping excavations. Traditional interventions such as settlement ponds do not have a capability of removing fine silt and clay particles, however the addition of Water Lynx can significantly improve their efficacy. Water Lynx is an environmentally safe flocculant. It enables the smallest of silt particles to stick together so that they can be more easily captured to prevent their release into the environment and complete the treatment process. Water Lynx application is varied and several techniques have been developed including the pipe reactor to support dewatering excavations where it is possible to consistently reduce total suspended solids from 880mg/l to 9mg/l. The use of treated silt net to increase sedimentation in settlement ponds and silt mats placed in areas of natural deposition to prevent resuspension of silts in high flow conditions.

## **BUBBLE CURTAINS: A SILT CONTROL SOLUTION**

L. O'DEA<sup>1</sup> & D. PENNY<sup>2</sup>

*1 frog environmental, 2 Natural Resources Wales*

Sediment released through essential flood maintenance and restoration activities on rivers may have a number of deleterious water quality and habitat effects. Controlling silt suspended during in channel operations in often deep, high flow velocity environments is extremely difficult. Bubble Tubing® was deployed on the River Rhymney at Ystrad Mynach to create a curtain of sub-surface air bubbles. Two lines of ½" self-sinking Bubble Tubing were positioned downstream of the work activities in an area of natural deposition with a depth of 1m. The intention is that the air barrier would reduce silt transfer downstream and encourage sedimentation. There was an observed reduction in turbidity even in the faster flow velocities of 0.4m/s and high dissolved oxygen levels were maintained. Further trials to determine the optimal air pressure, tubing dimensions, position and number of lines in a variety of river flow types are planned to continue through winter 2016/17.

## **DEALING WITH INLAND DREDGED SEDIMENTS FOR WETLAND HABITAT CREATION AND FOR ALTERNATIVE DISPOSAL THROUGH LAND SPREADING**

D. HOLLAND<sup>1</sup> & P. BARLOW<sup>1</sup>

*1 Salix*

The presentation will focus on two project-based examples of how dredged sediments can be disposed of by different means, firstly by re-using sediments to create wetland habitat features within the waterbody and secondly by land spreading on agricultural land. The presentation will draw on practical experience of handling sediments, the challenges faced and the wider statutory implications of such works.

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### **NOTES**

## Session 5:

### Hall 4

#### Workshop C:

#### Green measures in river engineering

Facilitators: **Marta Roca & Jonathan Simm (HR Wallingford), Neil Williams (AECOM)**

RRC Leads: **Jasmine Errey & Chiara Magliozzi**

Working with rather than against natural systems provides a range of benefits to society. This includes reduction of climate change impacts and protection against floods and environmental disasters, carbon storage, clean water and air, and greater amenity value and community ownership of natural assets. This idea has led to the concept of Green Infrastructure (GI): a network of natural and semi-natural features that connects villages, towns and cities. In the context of river engineering, GI approaches are those that promote the conservation and restoration of the natural character of our rivers and are fundamental to improving the morphology and ecology of our waterbodies.

However, there are procedural and technical barriers which can obstruct the implementation of Green solutions as part of river engineering protection schemes. We are still in a phase of cultural shift from traditional hard engineering to more environmentally led designs. For example, Green solutions can be perceived as having a higher risk of failure than Grey measures, or can be insufficiently supported by proven successes or design and maintenance guidance and procedures. Additionally, the demonstration and communication of their multiple benefits is sometimes unclear and ineffective.

This workshop will explore the different elements to consider in the decision-making process for implementing green solutions for river restoration and bank protection such as vegetation, willow spiling and woody material among others. Strategic assessments to identify the potential for a GI approach, as well as technical knowledge to identify suitable Green or Green-Grey measures, will be discussed. Recent examples, including the Brent Cross Cricklewood regeneration scheme in London, will be presented and used to support the discussion of the main challenges and success factors of GI in river restoration.

The workshop aims to support professionals from all areas of river management including planners, engineers, ecologists, landscape architects, decision-makers and other end-users, to identify the critical success factors that will permit the selection and application of Green engineering approaches. Participants will come away with a clearer understanding of the theory and practice of GI, the different opportunities and constraints to consider when planning Green techniques, and the tools that are available to support decision-making.

The workshop will be structured along a series of short presentations interspersed with project case studies, discussion and interactive activities.

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### **NOTES**





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## Session 5:

### Queens

#### Workshop D:

#### Community delivery and capacity – messages for policy makers

Facilitator: ***Martin Janes (RRC)***

*RRC Lead: Rosie Steadman*

River restoration in the UK is undertaken by organisations at a wide range of scales, from large government agencies to small trusts, local interest groups and community volunteers. The varying scales of these organisations mean they have different resources and requirements in terms of funding and support. The catchment-based river restoration movement is growing, and government policies may not necessarily align with the evolving needs of these grassroots organisations.

This workshop, funded by the Esmée Fairbairn Foundation and delivered by the RRC, aims to identify these misalignments and provide opportunities to consolidate ideas and views from a range of organisations around the country. Participants will have an opportunity to suggest and discuss potential improvements to the policy framework that would better support small organisations to conduct efficient and effective river restoration planning, delivery and reporting. The outcomes from this workshop will include briefings which will be delivered to key policy makers with recommendations.

Discussions will focus on:

- What are the expectations of catchment partnerships and trusts in delivering catchment based outcomes locally?
- Can all of these expectations be met by small as well as large partnership host organisations?
- What are the critical roles that sit squarely with partnerships and trusts?
- How and should partnerships develop other aspects of catchment management delivery?
- What is the capacity and priorities for growth of partnerships and how can this be supported?
- What policy mechanisms, recognition and resourcing is required to maintain these 'delivery partners' involvement?

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### **NOTES**

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***NOTES***

## Session 5:

### Preston

#### Workshop E:

#### The costs of river restoration

*Facilitator: Jackie Webley, Iain Sime & Angus Tree (Scottish Natural Heritage)*

*RRC Lead: Josh Robins*

Implementing in-stream restoration in our changing economic climate is a challenging prospect. It is essential that, from the outset, funders, practitioners, stakeholders and partners have a realistic understanding of the risks and costs in order to complete successful projects.

This workshop will share experiences from the Pearls in Peril (PIP) LIFE+ project. PIP has completed over ten river restoration projects, of varying sizes, applying a range of techniques on four rivers in Scotland, England and Wales. This workshop will also include talks from Jason Winslow (Alaska Ecological Contracting) and Conor Price (CPE Consultancy) to provide a contractor's and consultant's perspective on costing projects and accounting for risks.

The morning's presentations will provide context and information to help delegates complete the group tasks. These tasks will include analysing and discussing the costings of real project examples and having a go at costing up a generic project.

During the workshop we shall:

- Discuss risk management.
- Investigate the full costs to restore river reaches.
- Consider the opportunities and approaches that can be developed to make efficiencies and thereby achieve greater value.

In addition to risks and the economic costs, we shall also consider and discuss how to demonstrate the non-monetary value and wider benefits that can be achieved as part of river restoration.

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### **NOTES**



## Session 5:

### Site Visit 1 - Woodsmill Stream

*Site visit lead: Kevin Skinner (Atkins)*

Woodsmill Stream is a tributary of the River Adur in Sussex. The stream at the Sussex Wildlife Trust Headquarters was previously channelised to go from one side of the valley to the other and had been slightly embanked on either side.



A project to provide fish passage to the headwaters of the system past the mill stream as well as restoration of a 360m section of watercourse was led by the Environment Agency. The restoration works were undertaken in conjunction with the Sussex Wildlife Trust. Restoration took place between October and November 2010. The total cost of the restoration project was around £100,000.

A new meandering course was established which created a significantly wider flood corridor as well as a low flow channel in the lowest part of the floodplain. The stream was designed to freely adjust following construction. Features that were installed as part of the scheme included riffles, deeper bends, meander cut-offs, ford and woody debris features. Much of the old course was left to form a ribbon backwater feature. The fish pass was also constructed on private land further upstream to provide free passage for sea trout to the headwaters of the system.

A significant number of sea trout have been recorded spawning in the headwaters since the overall project was constructed. The restored river also forms an integral part of the Sussex Wildlife Trust's education and schools programme. They regularly visit the Woodsmill Stream to learn about natural river features and wildlife.

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#### **NOTES**

## Session 5:

### Site Visit 2 - Twineham

*Site visit lead: Peter King (Ouse and Adur Rivers Trust)*

The Herring Stream and the River Adur were previously impounded by four weirs at Twineham which made 4.8km of river habitat inaccessible for fish species. In 2014 the Ouse and Adur Rivers Trust (OART) led a project in collaboration with the Environment Agency to remove these weirs.



Following the removal of the weirs, monitoring revealed that some in-channel work would be required to provide habitat for invertebrates and fish at all life stages. Using funding obtained from Rampion Offshore Wind Limited and in collaboration with the Environment Agency, OART looked to address this.

A series of berms were constructed in the immediate upstream section which has provided multiple benefits to the river and to those who use it for recreation. These berms have been built on alternate sides of the channel and are designed to create sinuosity and flow diversity as well as slightly increasing the water level. In addition to the benefits to the river and its associated wildlife, these berms also provide access to the river for the angling clubs who can now be close to the water at any time of year by using them as fishing platforms. In addition, five backwater/refuge habitats have been created by volunteers from OART, the Environment Agency and Sussex Piscatorial Society.

This is a great example of landowner engagement as the landowner got involved and undertook some of the work, resulting in a large cost saving for the project.

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#### **NOTES**







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## Session 6:

### Oxford Suite

#### Restoring rivers with trees and wood

##### **TREES, ROOTS AND HOW TO USE THEM**

J. V. HOLLOWAY<sup>1</sup>, A. M. GURNELL<sup>1</sup>

*1 Queen Mary University of London*

Perhaps the most cost-effective and sustainable restoration measure, where space allows, is to encourage the re-establishment of natural riparian tree cover. River specialists such as willows and poplars are ecosystem engineers, actively generating and maintaining a suite of physical habitats, and could be used in a variety of ways at both large and small scales to help rehabilitate rivers. For such approaches to succeed and become mainstream, however, knowledge is required of the specific mechanisms by which trees engineer rivers 'in the wild'. After a brief practitioner-focused 'digest' of research in the area, this presentation explores the novel topic of underground riparian wood. Original research is presented which identifies some of the key predictors of root distributions in riverbanks, and reveals the massive, complex buried structures which develop when resilient, re-sprouting trees are subjected to floodwaters. Lessons for geotechnical bioengineering and the management of riparian trees are discussed.

##### **MAKING USE OF DEAD WOOD**

J. HUDDART<sup>1</sup>, G. WOODWARD<sup>1</sup>

*1 Imperial College London*

The urgent need to halt biodiversity declines has seen restoration theory put directly into practice, with funds earmarked for actions, rather than biomonitoring. As such, our understanding of how restoration measures operate to restore biodiversity remains limited and more rigorous testing is required. We used a highly resolved, standardised and replicated approach to monitor the effect of reach-scale restoration using large woody debris (LWD) on a lowland river. As biodiversity is a multi-level concept, we wanted to use an ecosystem approach and monitored fish, invertebrates, diatoms and algal standing stock. Not only has this increased our depth of vision for assessing change, but these components make up the food web, which provides a mechanistic understanding of how LWD habitat restoration operates to shape the stream community structure.

##### **YSTRAD MYNACH: TREE REVETMENT**

D. PENNY<sup>1</sup>

*1 Natural Resources Wales*

Natural Resources Wales's purpose is to pursue sustainable management of natural resources in all of its work, including the undertaking of its Flood Risk Management duties. This paper provides an example of some essential maintenance work undertaken on a flood risk asset employing these values using alternative innovative solutions and 'green engineering' techniques. Approximately 900-ton shoal consisting of pebble gravel accumulated on the River Rhymney at Ystrad Mynach, causing narrowing and deepening of the river channel parallel to a flood bank. This resulted in erosion and the exposure of the root systems of trees. To improve access and the health of the river, large riverside trees were felled. These tree trunks were used to create a natural timber revetment to protect the flood bank and deflect and refract energy within the river to prevent further erosion. It also helped to stabilise and nurture the existing trees, protecting their root system and hopefully extending their longevity. Shoal material from within the river was used as fill, with care taken around tree roots to avoid root compaction. Bank re-profiling, redistribution of topsoil and placement of V-max erosion

matting established the final ground levels. Increased natural light onto the bank should also encourage diverse ground cover, helping to bind the soil and reduce future erosion from rain and flood events.

### **COULD BEAVERS HAVE A ROLE IN RIVER RESTORATION?**

M. GAYWOOD<sup>1</sup> & A. TREE<sup>1</sup>

*1 Scottish Natural Heritage*

With the recent Scottish Government decision to reintroduce the Eurasian beaver, *Castor fiber* to Scotland, a new, potential agent of restoration has officially arrived. The propensity of beaver to modify river hydraulics and so function, form and habitat is well documented, but what exactly should we expect, will it fit in with contemporary ways of managing land, to what extent could it be directed and how might it be managed?

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### **NOTES**

## **Session 6:**

### **Stamner**

#### **Floodplain reconnection**

##### **ECOCO LIFE: "JOINING UP NATURE" IN THE GLAZERT WATER CATCHMENT**

**C. RODGERS<sup>1</sup> & C. WARD<sup>2</sup>**

*1 Royal HaskoningDHV, 2 SEPA*

The EcoCo Life+ project is about joining up nature across central Scotland, delivering improvements so that the freshwater habitats are 'bigger, better quality, and better connected'. In the Glazert Water pilot catchment, river restoration experts from Royal HaskoningDHV have been working with SEPA to apply these principles to develop options that will improve lateral connectivity between the river and the floodplain, mitigate barriers to fish and create the conditions for instream habitats to thrive. A combination of site surveys, landowner meetings and desk-based assessments have been undertaken to date to verify and develop solutions to river habitat fragmentation and degradation across the catchment. Through the Glazert Water case study, our presentation will discuss the mutual benefits of river restoration for biodiversity and ecological connectivity, alongside the more widely appreciated benefits for geomorphology and natural flood risk management.

##### **REWILDING IN A MANAGED LANDSCAPE: A CASE STUDY FROM THE LAKE DISTRICT**

**L. SCHOFIELD<sup>1</sup> & G. HERITAGE<sup>2</sup>**

*1 RSPB, 2 AECOM*

The view that our rivers are largely static systems continues to pervade the restoration environment with the desire to minimise change expressed by regulators and practitioners alike. Such an attitude probably stems from the 'successful' engineering and management of our watercourses over historic time that has created a perception of stability. Great environmental benefit can, however, be achieved by considering rivers as dynamic systems, restoring erosional and depositional processes and re-establishing floodplain links. This philosophy underpins the naturalisation of Swindale Beck in the Lake District where the historically constrained watercourse has been restored to create the planform and morphology encouraging active meandering across the upland SSSI floodplain. The early success of the works has been due to the resolve of the project partners and the courage and far sightedness of regulatory staff who have balanced the environmental gains against any short term potentially negative effects of the works downstream.

##### **IMPROVING HABITAT ALONG A SMALL HEADWATER STREAM**

**L. DAHL<sup>1</sup>, G. COLLEY<sup>1</sup>, P. WELLER<sup>1</sup> & A. M. ANTHEUNISSE<sup>1</sup>**

*1 Wiltshire Wildlife Trust*

In 2016, Wiltshire Wildlife Trust's Water Team instigated a river restoration scheme on one of the county's most northerly chalk streams. Using current and historical ecological and morphological data, a range of techniques were used to rewet an extensive area of native woodland and reconnect the river channel to the floodplain. By installing a number of in-channel log jams and large trees, as well as lowering sections of the riverbank, the Trust has increased the amount of floodplain meadow and wet woodland habitat within the county as well as restoring the morphology of one of the county's chalk streams. These BAP priority habitats are able to support a wide range of plants and animals and at the same time increase floodplain storage upstream of a large urban area, reducing the potential impacts of high rainfall events on the downstream inhabitants.



## CHANGING MINDS ON THE RIVER TEST

H. LEMAN<sup>1</sup>

*1 Environment Agency*

The presentation will look at how river restoration is taking place on this iconic river against a background of over 100 years of tradition where 'neat and tidy' has been the norm. With pressures on the riverine SSSI environment and the needs of anglers, the many owners, estates and fishery managers have to balance the need for improvements while still appreciating that these are commercial fisheries and they have to keep their customers happy. The presentation will provide examples of how this is being achieved, while also appreciating that 'Rome wasn't built in day'. While the presentation will focus on the issues of river restoration against a backdrop of traditional management, it will also show examples of reconnecting the river with the flood plain for the benefit of local communities.

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### **NOTES**

## Session 6:

### Hall 4

#### Community & partnership delivery

##### **WORKING IN PARTNERSHIP TO DELIVER MULTIPLE BENEFITS: INTEGRATED SUB-CATCHMENT MAPPING IN THE RIVER OUSE, SUSSEX**

P. KING<sup>1</sup> & S. MANNING-JONES<sup>2</sup>

*1 Ouse & Adur Rivers Trust, 2 Sussex Flow Initiative*

Working in partnership in the River Ouse catchment, East Sussex, the Ouse and Adur Rivers Trust and Sussex Flow Initiative are collecting and combining landscape and river data on a sub-catchment level, assessing how and where landscape enhancements could help mitigate against flooding, improve river health, enhance Ecosystem Services and build resilience to future climate change. The final output maps highlight the best locations for natural additions and changes based on ground truthed information, and identify problem areas and opportunities for enhancement, enabling funding to be focused on locations providing multiple benefits.

##### **PLANNING AND DELIVERY OF A MULTI-LANDOWNER RIVER RESTORATION PROJECT ON THE RIVER AVON IN WILTSHIRE**

A. M. ANTHEUNISSE<sup>1</sup>, G. COLLEY<sup>1</sup>, P. WELLER<sup>1</sup> & L. DAHL<sup>1</sup>

*1 Wiltshire Wildlife Trust*

The River Avon in Wiltshire has recently been identified as the most diverse and healthy chalk stream in England, but it is still failing WFD and SAC/SSSI favourable condition targets. This project focussed on restoring the Upper Avon in and around the village of Durrington. During 2015, the Wessex Chalk Streams Project initiated a scheme to improve the ecological quality of the river. Over the course of the year, more than 40 individual riparian owners were approached and meetings and site visits were undertaken. An improvement plan was agreed with stakeholders and landowners by June 2016; 75% of the landowners gave consent to carry out habitat improvement on their stretch of river. The first phase of the works was carried out in October 2016. The project is funded by the Environment Agency, with cash contributions from the riparian owners as well as donations resulting from fund-raising activities organised by the local community.

##### **LETTING THE DOVE FLOW - RIVER RESTORATION IN A MUCH LOVED LANDSCAPE**

J. WOZNICZKA<sup>1</sup> & J. WHEELDON<sup>2</sup>

*1 Trent Rivers Trust, 2 Natural England/Environment Agency*

The River Dove in Dovedale runs through a unique landscape of high built and cultural heritage value, and received around a million visitors per year. The Dove is part of the Peak District National Park and is a Site of Scientific Interest and required river restoration and rehabilitation. This presents a fantastic opportunity to engage the wider public in river rehabilitation but requires specific consideration of heritage, landscape and the emotional connection people have to the river in Dovedale.

## COMMUNITY MAPPING OF THE LOST STREAMS OF LONDON

A. T. BROADHEAD<sup>1</sup> & M. CHENDORAIN<sup>1</sup>

*<sup>1</sup> Arup*

In many UK towns and cities, watercourses and springs were historically culverted or have been completely “lost” into sewer and drainage systems. This can exacerbate local flood risk and damage aquatic ecosystems and catchments, as well as disconnecting neighbourhoods from the socio-cultural heritage of watercourses that once flowed through them. Arup was engaged by a Neighbourhood Forum to map the lost streams and natural springs of an area in London. We developed a way for the community to co-create and maintain a live online map, based on a range of desk-based technical analyses undertaken by Arup with local community sourced knowledge collected by the Forum. Under the Localism Act, this is being used to influence neighbourhood planning policies that explore opportunities for river restoration through physical deculverting or through “cultural” daylighting, such as by marking the route of the lost watercourses to reconnect local people with water heritage.

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### **NOTES**





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Installing rock pre-barrages for fish passage in a chalk stream.  
EA / BBOWT partnership project. River Lambourn, Berkshire



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Picture: The Tagliamento River in Italy is one of our research sites and the location for this programme's field trip.

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## **Session 7:**

### **Oxford Suite**

#### **RIVER RESTORATION IN EUROPE: A HOBBY OR A PLANNED ACTION? (A POLISH PERSPECTIVE)**

**E. SZAŁKIEWICZ<sup>1</sup> & M. GRYGORUK<sup>2</sup>**

*1 Poznań University of Life Sciences, 2 Warsaw University of Life Sciences*

The main purpose of presented research was analysis of management conditions of river restoration projects. We hypothesized that wishing to make river restoration successful in a scale larger than the river stretch, the projects have to be induced and implemented as a planned and scheduled process. To test that hypothesis we conducted an international survey in order to verify the involvement of the authorities in river restoration projects in the EU. We examined most of the European projects aimed at restoring rivers with taking into account total budget spent on river restoration projects in each country. Our study revealed that the vast majority of European projects of river restoration are implemented by dedicated organisations and stakeholders. We also revealed that in most of the European countries there are no integrated plans for river restoration, which makes the finalized, ongoing or planned river restoration projects activities of dedicated people.

#### **BRINGING BUSINESS INTO CATCHMENT MANAGEMENT**

**K. HUGHES<sup>1</sup>**

*1 WWF-UK*

In these times of political and economic uncertainty, the future sustainability of catchment management governance and resourcing is unknown. However there are things we can be certain about; there is a need for wider engagement within catchment management. The private sector including brands, retailers and their entire supply chains have been previously less engaged but are highly influential politically and also potential sources of sustained funding. Through our project WaterLIFE we have investigated the enabling conditions required to bring private sector actors on board within catchment management. This presentation will set out our work to date including on the ground delivery in our two WaterLIFE Water Stewardship catchments – the Cam and Ely Ouse and the Broadland Rivers catchments, and our work to develop a mechanism whereby we can increase these partnerships across all catchments in England.

#### **LINKING SCIENCE AND EVIDENCE IN RIVER RESTORATION PRACTICE**

**M. NAURA<sup>1</sup>**

*1 the River Restoration Centre*

In the past 6 months, RRC has been planning strategies, tools and products for better integrating science and decision making in river restoration practice. We have been developing 'Science Digests' to review existing scientific and grey literature on specific issues such as 'the use of 2D modelling for river restoration' or 'the impact and effectiveness of deflectors on fluvial forms, processes and habitats'. We have also revamped and improved our database of river restoration case studies, the NRRI (National River Restoration Inventory) and indexed each of the near 5000 records with keywords on techniques and contextual information (e.g. geology, river type). We have also started designing training courses on general and specific river restoration and hydromorphological issues that we wish to combine into a wider accreditation scheme. As well as this we are also planning the development of simple tools and software for river assessment and river restoration design. RRC welcomes your contributions, suggestions and ideas so that we can deliver tools, training and approaches that will be useful to the wider community of practitioners.





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# POSTER PRESENTATIONS

## DURHAM SUITE

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**1**

**Environment Agency's Evidence and Learning Project.**

K. ASPRAY<sup>1</sup>, I. MARSHALL<sup>1</sup>

*1 Environment Agency*

**2**

**Environment Agency's Environment Programme.**

K. ASPRAY<sup>1</sup>, R. MARTIN<sup>1</sup>

*1 Environment Agency*

**3**

**Obsessive Modelling Disorder!**

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

*1 AECOM*

**4**

**Community Mapping of the Lost Streams of London.**

A. BROADHEAD<sup>1</sup>, M. CHENDORAIN<sup>1</sup>

*1 Arup*

**5**

**Trade-Offs Between River Restoration and Wetland Conservation: Insights from Hydrological Monitoring in a French Valley Mire.**

A. DURANEL<sup>1</sup>

*1 Thomson Ecology*

**6**

**A Natural Response to Flooding in York.**

A. GEE<sup>1</sup>, A. HEATH-BROWN<sup>1</sup>

*1 AECOM*

**7**

**Identifying hotspots of habitat diversity in English rivers using river network structure**

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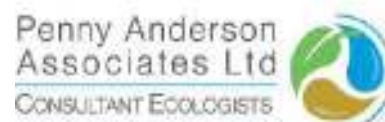
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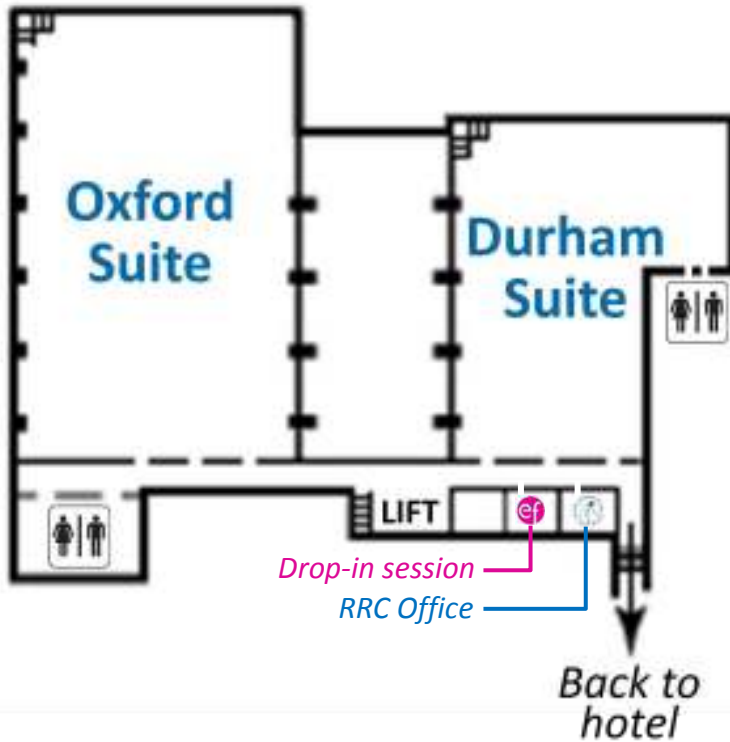


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## Ground Floor



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