



Name:

Organisation:

River Restoration Centre 19th Annual Network Conference

River Restoration: Engaging with Rivers

Kindly sponsored by:





Design, Construction
and Maintenance
of Watercourses
and Water features



Bury Gate House,
Bury Gate, West Sussex,
RH20 1HA
01798 831624
info@amenitywater.co.uk
www.amenitywater.co.uk



Nationwide Service



Welcome

...from the RRC Managing Director

Welcome to the 19th River Restoration Centre Annual Network Conference, this year at the De Vere East Midlands Conference Centre in Nottingham. Last year was a huge success down on the south coast in Brighton. We had over 300 passionate and enthused delegates, over 40 engaging and thought provoking presentations, and many a discussion around the conference title: 'Addressing Uncertainty'. This year is looking to be just as successful as we have a great programme of presentations, workshops and networking opportunities. We hope you embody this year's title of 'Engaging with Rivers' by making new contacts, contributing to discussions and taking as much as you can from the packed two days that we have ahead of us!

If you came to the south coast last year you will recognise most of the RRC team. The only new addition is Jackie O'Regan who is our new Accounts Technician. Please take a moment to read the Meet the Team section on page 31 where you can find out more about Alex, Chiara, Jackie, Josh, Marc, Nicola and Me!

This year's programme may just be the best yet, and although we would love to take full credit for this, the truth is that it is driven by the high standard of abstracts we receive. Each year, we put out a title and suggested themes for the conference in the knowledge that you have always delivered a wide range of engaging topics. As you can see from the programme, we were not disappointed. There are sessions on natural flood management, barriers, project planning and natural processes - not to mention the five workshops. These sessions are in the programme because we received a wealth of abstracts on them. Why not bear that in mind over the next two days and start planning a title for next year?

The title 'Engaging with Rivers' can be interpreted in many ways. One interpretation is the need to engage and communicate with all partners during our work. This is important for learning, knowledge sharing and working in partnership to deliver river improvements. It is also essential to engage with local community groups and volunteers who help us achieve the aims and objectives we have for our rivers. RRC has developed a number of resources to help with this, including our River Restoration Factsheets. We are planning more resources and training events in the future, so watch this space. In the meantime, we will be celebrating 'engagement' and the voluntary contribution of individuals to improving our rivers with the eight 2018 River Champions during the UK River Prize Awards Dinner tonight.

The Awards Dinner is now a firm fixture of the conference programme. Over the last year, the Nigel Holmes Trophy has been residing in the south of England after the Hampshire, Wiltshire, Dorset Avon won the 2017 UK River Prize. There are four excellent finalists that are hoping to take the trophy home with them this week. It's going to be a fantastic evening, we hope you enjoy it!

Finally, I would like to acknowledge and thank all of those who support and partner the RRC at this event and throughout the year as members. I hope you will have plenty of new ideas, contacts and freebies to take back with you this week!

Martin Janes, Managing Director



frog
environmental

frog environmental are silt control and water quality specialists.

We provide a unique range of complementary technologies designed to protect, conserve and improve the environment.



Bubble Barriers

- Silt plume containment
- Sound & vibration control
- Floating plastic control
- Micro-bubble aeration



Silt Control

- Silt pollution prevention
- Simple low cost solutions
- Proven in the field
- Expert advice & support



Floating Wetlands

- Habitat creation
- Water treatment
- Versatile solutions
- Easy to retrofit

Contact us:

0345 057 4040

info@frogenvironmental.co.uk

www.frogenvironmental.co.uk

@frogenv





CONTENTS

Programme of events	8
UK River Prize	24
Meet the Staff	31
About the RRC	33
Abstracts	40
Session 1	42
Session 2	44
Session 3	52
Session 4	58
Session 5	60
Site Visit	71
Session 6	76
Session 7	84
Poster presentations	88
Delegate lists	96
Hotel floor plan	105

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)

- Floodplain reconnection
- Upland landuse management
- Flood hydrographic attenuation and Desynchronization

Fisheries and Barriers Management

- Habitat surveys
- Barrier assessment & fish pass screening evaluation
- Mitigative habitat design and construction
- Management of fisheries monitoring programmes

Hydropower Support

- Assessment of geomorphic and hydrological characteristics
- Scoping and design of measures to mitigate impacts to physical form/ process and aquatic ecology
- Planning and review of license applications
- Assessment of the status of local fisheries



designing with nature

PROGRAMME OF EVENTS		
DAY 1: - - - TUESDAY 24 TH APRIL - - -		
	REGISTRATION at Reception Opens at 08:30	
09:00	NETWORKING & EARLY VIEWING POSTER SESSION in the Exhibition Hall	60 mins
<hr/>		
Session 1 <u>Conference Theatre</u>		
<hr/>		
CHAIR: <i>Martin Janes (River Restoration Centre)</i>		
10:00	River Restoration Centre introduction & welcome <i>Martin Janes (River Restoration Centre)</i>	15 mins
10:15	Engaging with rivers – restoration in Scotland and New South Wales – a tale of two Tweeds <i>Chris Spray (University of Dundee)</i>	15 mins
10:30	A partnership approach to misconceptions in London: the ‘outfall safari’ <i>Joe Pecorelli (The Zoological Society of London)</i>	15 mins
10:45	Discussion	15 mins
<hr/>		
11:00	SHORT BREAK <i>with coffee and tea</i>	35 mins
<hr/>		
CHAIR: <i>Kevin Skinner (Atkins)</i>		
11:35	Handing over design of a major flood relief channel and its surrounds to stakeholders – did it make a difference? <i>Jenny Marshall-Evans (Black & Veatch)</i>	15 mins
11:50	Natural Flood Management: shaping success through partnerships <i>Jenny Broomby (JBA Consulting)</i>	15 mins
12:05	Infrastructure development: opportunities and challenges for managing rivers and their catchments <i>Tom Styles & Oana Iacob (Arup)</i>	15 mins
12:20	Discussion	15 mins
<hr/>		
12:35	LUNCH in the Exhibition Hall	60 mins

Session 2

Conference Theatre

Natural Flood Management in Practice

Conference Suite 2

Evidencing Change

Conference Suite 3

Barriers

CHAIR: *Alastair Driver (University of Exeter)*

CHAIR: *David Harper (Welland Rivers Trust)*

CHAIR: *David Bunt (the Sustainable Eel Group)*

13:35	NFM: delivering multiple benefits through Flood Risk Management <i>Alex Fraser (Jacobs) & Sim Reaney (Durham University)</i>	Evaluating river restoration techniques: settlement ponds in the Afon Eden catchment, North Wales <i>Sue Hearn (Natural Resources Wales) & Heather Marples (Bangor University)</i>	Novel design, installation and assessment of coarse fish passage using Low Cost Baffle (LCB) solution at a gauging station <i>Toby Hull (South East Rivers Trust)</i>	15 mins
13:50	Reducing flood risk through Green Infrastructure on the River Soar, Leicester <i>Alex McDonald (Environment Agency)</i>	The Rottal Burn restoration project: collaborative evidence and impact from River Champions, research collaborators (and lots of student projects) <i>Rebecca Wade (Abertay University) & Kelly Ann Dempsey (River South Esk Catchment Partnership)</i>	The impact of weir removal on the foraging and activity of British Bats <i>Sarah Scott (Environment Agency)</i>	15 mins
14:05	Discussion	Discussion	Discussion	10 mins

Session 2 – continued...

14:15	Prioritising restoration and NFM in the River Peffery, Scotland Emma Lewin (<i>Jacobs</i>)	Implementing Flood Risk Management and river restoration to conserve instream habitat for brown trout Natalie Angelopoulos (<i>University of Hull</i>)	New guide to fish passage and screening at Flood Risk Management and land drainage structures based on practical experience Omar Sholi (<i>AECOM</i>)	15 mins
14:30	Do we need an NFM reality check? Eric Gillies (<i>cbec eco-engineering</i>)	Engaging with rivers in four dimensions Lucy Shuker (<i>Thames 21/Cartographer Studios Ltd</i>)	Approaching 10 years on – shedding light on stream daylighting around the world Adam Broadhead (<i>Arup</i>)	15 mins
14:45	Discussion	Discussion	Discussion	10 mins
14:55	POSTER SESSION in the Exhibition Hall <i>with tea and coffee</i> <i>Vote for your top poster (not just your friends!)</i>			45 mins

Session 3				
<u>Conference Theatre</u> Working in Partnership		<u>Conference Suite 2</u> Managing Sediment and Pollutants	<u>Conference Suite 3</u> Novel ways of using Data	
CHAIR: David Hetherington (Arup)		CHAIR: Jo Cullis (Jacobs)	CHAIR: Judy England (Environment Agency)	
15:40	Better together – how working in partnership has achieved so much more in Telford’s urban catchment Guy Pluckwell (<i>Environment Agency</i>)	Contaminated sediment: assessing risks in UK rivers Ian Dennis (<i>Royal HaskoningDHV</i>)	Historical studies for informing sustainable river restoration strategies Jennifer Cox (<i>Ricardo/University of Portsmouth</i>)	15 mins
15:55	Towards a wilder River Crane: benefits of partnership delivery Tom White (<i>London Wildlife Trust/ Groundwork South</i>)	Managing accumulated sediments: Beneficial Use of Dredged Material (BuDM) and Working with Nature (WwN) William Manning (<i>Exo Environmental</i>)	Simple mapping for flood risk and storage Marc Naura (<i>River Restoration Centre</i>)	15 mins
16:10	Discussion	Discussion	Discussion	10 mins

Session 3 – continued...

16:20	Living Heritage of the River Don Rachel Walker (<i>Don Catchment Rivers Trust</i>)	Silt management can be easy...why are so many people getting it wrong? Richard Haine (<i>frog environmental</i>)	CatMan: a Natural Capital framework based on whole catchment modelling of land use, asset improvement, diffuse pollution and flood risk Rachelle Ngai (<i>JBA Consulting</i>)	15 mins
16:35	‘Smarter Water Catchments’ in the Evenlode – working in partnership to reduce phosphorus in rivers Helena Soteriou (<i>Thames Water</i>)	Partnership working in the Sussex Ouse catchment Simon Lohrey (<i>South East Water</i>) & Emily Long (<i>National Trust</i>)	Community modelling – shaping the future of London rivers Rosie Nelson (<i>Thames 21</i>)	15 mins
16:50	Discussion	Discussion	Discussion	10 mins
17:00	SHORT BREAK TO MOVE TO KEYNOTE SESSION			10 mins

Session 4
Conference Theatre

CHAIR: *Fiona Bowles (River Restoration Centre)*

17:10	Accounting for the environment in catchment management Paul Leinster (<i>Cranfield University</i>)	25 mins
17:35	Questions and reflections	20 mins
17:55	Poster competition prizes, final announcements and close Martin Janes (<i>River Restoration Centre</i>)	5 mins
18:00	END OF DAY 1	



19:30 – PRE-DINNER DRINKS

Entrance Foyer

&

20:00 – UK RIVER PRIZE AWARDS DINNER

Banqueting Suite

2018 UK RIVER PRIZE FINALISTS

LOVE YOUR RIVER TELFORD	HILLS TO LEVELS	CONNSWATER COMMUNITY GREENWAY	TAME VALLEY WETLANDS LANDSCAPE PARTNERSHIP
<i>PAGE 25</i>	<i>PAGE 26</i>	<i>PAGE 27</i>	<i>PAGE 28</i>

AND

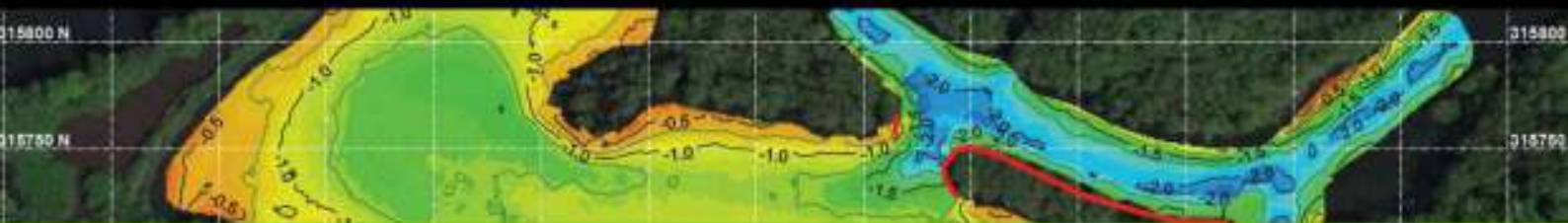
‘RIVER CHAMPIONS’

PAGE 30

Healthy Catchments. Future Resilience.



EXO Environmental



About Exo



Dredging Consultancy & Support



Consents & Licensing
(WAMITAB certified)



Project Management



Site Management & Supervision



GIS & Data Management



Habitat Creation & Restoration



Surveying & Monitoring



Research & Development

Exo Environmental provides services for integrated sediment and water management, specialising in dredging and the **beneficial use of dredged material**.

Our projects exist at the complex interface of terrestrial, freshwater and marine environments where we create solutions for a wide range of clients including:

- Environment Agency
- Natural England
- RSPB
- Somerset Drainage Boards Consortium
- Norfolk Rivers Trust
- Wivenhoe Town Council
- Brightlingsea Harbour Commissioners
- Essex Wildlife Trust
- Lee Valley Marina
- Windsor Marina
- Morgan Marine
- LDA Design
- Taylor Wimpey
- Miles Water Engineering

And many others



CONTACT US



0330 80 80 377 | enquiries@exo-env.co.uk

www.exo-env.co.uk



DAY 2:**--- WEDNESDAY 25TH APRIL ---****Registration opens at 8:30am**

Session 5

9:00

PRE-BOOKED SITE VISIT OR WORKSHOP

3 h 30 min

Conference Suite 3**Workshop A:**

A Focus on Floodplains

Facilitator: Emma Rothero (*Floodplain Meadows Partnership*) & Ann Skinner

This workshop will explore the concepts, potential and knowledge required for large scale, innovative river AND floodplain restoration for multiple benefits. We will look at the history and benefits of different floodplain habitats, tease out the meaning behind the language used in floodplain restoration and investigate skills gaps and mechanisms for unlocking the exciting potential for large scale river/floodplain restoration. Presentations will cover land use in English floodplains, the benefits floodplain habitats provide, and some case study examples of floodplain restoration.

Key players in floodplain degradationSeb Bentley & George Heritage (*AECOM*)**Multi-objective floodplain restoration from California, USA**Chris Bowles (*cbec eco-engineering*)**High impact river and floodplain restoration of the Hampshire Avon near Upavon**Martijn Antheunisse (*Wiltshire Wildlife Trust*)**Conference Suite 4****Workshop B:**

Large Wood in Rivers

Facilitator: Angela Gurnell (*Queen Mary University of London*)

The workshop will look at the benefits of using large wood in rivers, a technique which has become integral in many river restoration schemes. Several studies have shown how introducing wood can impact river hydrology, geomorphology and ecology. This workshop will discuss the benefits of large wood through sharing best-practice ideas, and determine the role of large wood in ecosystem functioning.

The influence of large woody dams on sediment dynamicsMatthew McParland (*University of Liverpool*)**The impact of wood on benthic and hyporheic invertebrates**Chiara Magliozzi (*Cranfield University*)**Practical aspects of using large wood in river restoration & channel management**David Holland (*Salix*)**Wood in river restoration and Natural Flood Management: emulating natural river forms and processes**Angela Gurnell (*Queen Mary University of London*)

12:30

LUNCH

65 mins

Session 5

9:00	PRE-BOOKED SITE VISIT OR WORKSHOP continued...	3 h 30 min
<u>Conference Suite 1</u> Workshop C: River Restoration for Biodiversity	<u>Conference Theatre</u> Workshop D: Natural Capital and Ecosystem Services: Accounting for Benefits	
<p>Facilitator: Angus Tree (<i>Scottish Natural Heritage</i>)</p> <p>This workshop will focus on the benefits and evidence for specific techniques for river restoration – how they improve the natural function of rivers and positively influence the ecology of that system for its biological communities and associated habitat.</p> <p>We will set out progress on this IUCN branded UK and Republic of Ireland task since 2013. Two short presentations will outline the importance of understanding historic geomorphic changes to inform natural process based restoration decisions; and, the findings of recent evidence reviews on the justification for commonly implemented river restoration techniques. We will then discuss the experience of the audience in relation to techniques where the evidence is deemed to be strong, and how this might be strengthened further. We will also present and discuss the nine less well understood techniques that the IUCN steering group has chosen to focus its efforts to raise significant funds to implement demonstration and evidence projects.</p> <p>There will also be two short presentations on gathering evidence and analysing the results in a robust way, focused on a single key species; and as applied to all projects whatever the focus or scale.</p> <p>Restoring Freshwater Mussel rivers Ceri Gibson (<i>Freshwater Biological Association</i>)</p> <p>Understanding historic change and using natural processes to inform future decision making Matthew Hemsworth (<i>JBA Consulting</i>)</p>	<p>Facilitator: Jenny Mant (<i>Ricardo</i>)</p> <p>There are a plethora of approaches to Natural Capital Accounting and ecosystem service benefit assessment along with a growing set of open source data sets that can be used to help support benefits assessments. Whilst it may on the surface appear ‘relatively’ easy to speculate benefits, trying to identify which is the best approach to use for a specific scheme is not always clear. Similarly handling and understanding different spatial scales and ascertaining the extent of benefit can add the complexity.</p> <p>This workshop will aim to discuss the needs of different sectors in terms of understanding natural capital. It will provide a forum to discuss different approaches, assess how we can apply financial values to restoration projects and identify how NCA and ecosystem service assessment is valuable to a range of stakeholders.</p> <p>Monetising environmental benefits – three case studies Steve Maslen (<i>JBA Consulting</i>)</p> <p>What have wetlands ever done for us? David Gasca (<i>Atkins</i>)</p>	
12:30	LUNCH	65 mins

Session 5		
9:00	PRE-BOOKED SITE VISIT OR WORKSHOP continued...	3 h 30 min
<div> <div> Conference Suite 2 Workshop E: Managing Sediment already in Rivers </div> <div> Site Visit 1: Titchfield Park & Day Brook </div> </div>		
<div> <div> Facilitators: Simon Whitton (<i>APEM Limited</i>) & Di Hammond (<i>Affinity Water</i>) <p>The mobilisation of fine sediment in watercourses creates a number of issues and is often difficult to manage. The costs of removing fine sediment are often substantial and ever tightening waste regulations mean that it is becoming harder to beneficially use dredged material.</p> <p>Following on from last year's successful workshop on sediment sources and pathways, this workshop will focus on how to deal with sediment that is already in the river system.</p> <p>Ways of reducing the amount of fine sediment entering the channel Duncan Ferguson (<i>Spey District Fishery Board</i>)</p> <p>Methods for dealing with excavated silt Ian Bailey (<i>Kalex Limited</i>)</p> <p>Dredged Material – Disposal or Reuse Bill Gush (<i>Land & Water</i>)</p> <p>A project planning tool for re-profiling and de-silting activities Leela O'Dea & Richard Haine (<i>frog environmental</i>)</p> </div> <div> Facilitator: Claire Sambridge (<i>Nottingham Wildlife Trust</i>), Lee Sycamore (<i>Ashfield District Council</i>) & Rebecca Brunt (<i>Environment Agency</i>) <p>This will be a two part site visit to a couple of urban projects in Nottingham. We will visit Titchfield Park where a small brook has been broken out of a concrete channel. Here, good stakeholder and community engagement was essential for the project to go ahead. We will also visit Day Brook where comparisons can be made between habitat feature enhancements, and a site further upstream where improvements have been made to take the brook out of a straightened channel.</p> </div> </div>		
<div> <div> </div> <div> Site Visit 2: Croxall Lakes </div> </div>		
<div> <div> </div> <div> Facilitator: Nick Mott (<i>Staffordshire Wildlife Trust</i>) & Andrew Crawford (<i>Environment Agency</i>) <p>Croxall Lakes sits at the confluence of 3 rivers in the Midlands – the Tame, Trent and Mease. The aim of the Croxall Lakes site was to restore some of the habitats and wildlife, including river island restoration.</p> <p><i>*Please note, if you are attending this site visit, packed lunches will be provided on the return coach journey</i></p> </div> </div>		
12:30	LUNCH	65 mins

Session 6				
<u>Conference Theatre</u>		<u>Conference Suite 2</u>	<u>Conference Suite 3</u>	
Natural Processes and Morphological Adjustment		Approaches to Planning and Implementation	Catchment Scale Thinking	
CHAIR: <i>Oliver Lowe (Natural Resources Wales)</i>		CHAIR: <i>Will Bond (Alaska Environmental Contracting Ltd)</i>	CHAIR: <i>Phil Boon (RRC Board/Freshwater Biological Association)</i>	
13:35	The importance of decadal scale morphological change in flood risk management – the Cashen Estuary, County Kerry <i>Claire Barrett-Mold (Black & Veatch)</i>	River restoration wipeout <i>Simon Whitton (APEM Limited) & Di Hammond (Affinity Water)</i>	Improving natural functioning at the catchment scale <i>Mark Philips (Natural England)</i>	15 mins
13:50	Let the river erode! Giving a gravel-bed river back its freedom space...what do you get? <i>Richard Williams (University of Glasgow)</i>	Alien invaders ahead! – Are you watching out for them? <i>Phil Aldous (Thomson Ecology Ltd)</i>	Riverlands – exploring people’s connections to rivers as a catalyst for change <i>Richard Higgs (National Trust)</i>	15 mins
14:05	Discussion.	Discussion.	Discussion.	10 mins

Session 6 – continued...

14:15	Sediment and managed naturalisation: results from the monitoring of Swindale Beck George Heritage (<i>AECOM</i>)	South Calder Water – challenges in urban river restoration Chris Pittner (<i>Peter Brett Associates</i>)	Water Friendly Farming: engaging farmers in a catchment-scale research demonstration project Jeremy Biggs (<i>Freshwater Habitats Trust</i>)	15 mins
14:30	How do we properly implement the process-based river restoration approach? Hamish Moir (<i>cbec eco-engineering</i>)	Erosion risk screening in engineering design on major infrastructure projects Helena Parsons (<i>Jacobs</i>)	Network topology: the “missing link” in understanding catchment controls on instream habitats? Eleanore Heasley (<i>Kings College London</i>)	15 mins
14:45	Discussion	Discussion	Discussion	10 mins
14:55	MOVE TO GRAND FINALE!			10 mins

Session 7
Conference Theatre

CHAIR: *Martin Janes (River Restoration Centre)*

15:05	Incised lowland sand-bed streams in the Netherlands Christian Huising & Maarten Veldhuis (<i>Waterboard Vallei en Veluwe</i>)	15 mins
15:20	Recreating anastomosing streams to restore channel-floodplain connectivity and recover lost habitats and ecosystem services Colin Thorne (<i>University of Nottingham</i>)	15 mins
15:35	Restoring UK catchment scale biodiversity – rivers, lakes, ponds and wetlands Stewart Clarke (<i>National Trust</i>)	15 mins
15:50	Questions, thoughts and parting insights	30 mins

16:30	END OF CONFERENCE <i>with tea and coffee</i>	
-------	--	--



south east water

We **know** about water and **how** to protect it

South East Water provides top quality drinking water to 2.2 million people in the south east of England within a supply area of 5700 km². Through a network of more than 9,000 miles of pipelines, we deliver 521 million litres of water every day to our customers.

Over 70 per cent of the water we supply comes from groundwater resources, the remainder comes from surface water sources and bulk supplies from neighbouring water companies.

How do we protect our water supplies?

Working in partnership with Catchment Sensitive Farming, our catchment management team supports farmers and growers to find practical ways of preventing soils, nutrients, bacteria and pesticides from washing into rivers and groundwater sources. We provide specialist advice, training and incentives to help improve farm efficiencies and promote best practice.

Want to know more?

Visit: corporate.southeastwater.co.uk/catchmentmanagement

Email: catchment@southeastwater.co.uk

In partnership with



Pure know h₂ow

On Tuesday 24th April, one of the four shortlisted finalists will be announced as the winner of the 2018 UK River Prize and Nigel Holmes Trophy.

The UK River Prize celebrates the achievements of those individuals and organisations working to improve our rivers and catchments, and recognises the benefits to society of having a healthy natural environment. After much deliberation the judges selected the four category winners below. The overall 2018 Winner will be presented with the Nigel Holmes Trophy on Tuesday evening.

The finalists for the 2018 UK River Prize are:

Finalist	Category winner	Lead applicant
Love Your River Telford Shropshire	Innovation project <i>Demonstrating an innovative approach to protecting and improving the river environment</i>	Environment Agency
Hills to Levels Somerset	Catchment-scale project <i>Demonstrating an integrated catchment-wide approach to raising awareness and tackling river quality problems</i>	Farming & Wildlife Advisory Group South West
Connswater Community Greenway Belfast	Urban rivers project <i>Working on highly constrained and modified urban watercourses to improve biodiversity, flood protection, access and recreation</i>	Connswater Community Greenway Trust
Tame Valley Wetlands Landscape Partnership Warwickshire & Staffordshire	Multiple benefit partnership project <i>Demonstrating a long-term partnership approach to restoring the ecology and natural functioning of rivers and wetlands</i>	Warwickshire Wildlife Trust

“The 2018 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, River Restoration Centre

2018 UK River Prize Finalist

Love Your River Telford (Shropshire)

Innovation project



This project has created an award winning multi beneficial urban catchment management model, encouraging stakeholders and organisations to work together in partnership to improve water quality in Telford in Shropshire. It combines and compliments community engagement and physical improvements in an innovative way based around the Clean Stream Team.

Before implementation of the Love Your River Telford project, stakeholders worked independently, with disconnected approaches and duplication. This project has combined the efforts of all stakeholders, sharing knowledge, experiences, tools and authority, to improve water quality and biodiversity while reducing flood risk and creating multiple benefits for the local community and businesses. The project partners have improved watercourses at 18 locations across Telford. Restoration techniques include deculverting, wetland creation, flood storage creation, highways SUDS, raingardens, riparian habitats, natural flood management, and floodplain reconnection.

Project partners

- Environment Agency
- Shropshire Wildlife Trust
- Telford & Wrekin Council
- Severn Trent Water
- Business Environmental Support Scheme for Telford
- Telford Green Spaces Partnership



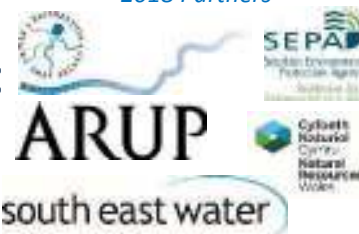
Other UK towns have successfully implemented this innovative urban catchment management model created in Telford, and the Love Your River Telford Project will continue to provide advice and guidance to these towns. The monitoring and evaluation of pre- and post-project data has highlighted water quality improvements, with five of eight waterbodies in the catchment improving by at least one Water Framework Directive status over the course of the project. 29,000m² of habitat has also been created, with 23,100m² doubling as flood storage. A long term monitoring programme has been set up to help identify issues, focus resources where they are most needed, and observe and evaluate the progress of techniques.



2018 UK River Prize Finalist

Hills to Levels (Somerset)

Catchment-scale project



The Hills to Levels project focuses on Catchment Sensitive Farming, providing advice on soil and land use management in order to reduce sediment runoff, improve infiltration and hydrological processes, reduce flooding and improve drought resilience. This is one of the largest catchments (2871km²) implementing Natural Flood Management (NFM) in the UK, having experienced severe flooding, with changing climate bringing intense rainfall. Councils, technical advisory groups, community action groups, and landowners work together, sharing knowledge and expertise, and addressing issues to reach the common goal of flood alleviation. The project also worked with partners in Belgium and the Netherlands.

Many streams in the area are failing Water Framework Directive objectives for sediment, phosphate and fish; as well as being heavily modified. Measures have been installed to slow flow, filter sediments and store runoff, including floodplain reconnection, edge of field measures and leaky woody dams. This included 453 woody structures and ponds helping store 25,000m³ of flood water; planting 11ha of woodland; and restoring the function of 3.5km of headwater streams. Flow pathway data was used to target problem areas, and monitoring including data loggers, time lapse cameras, fixed point photography, invertebrate surveys and infiltration tests are helping to quantify the benefits.

400 farms were visited, with more than 100 implementing NFM methods. The scheme worked over five main catchments – River Parrett, River Tone, West Somerset Streams, River Brue and River Axe, with tours carried out across the catchments.

The long term vision is for NFM to become part of land management, for farmers to become ambassadors of NFM, encouraging others to implement techniques, and strive towards the land acting like a sponge, providing healthy river systems.

Project partners

- Farming & Wildlife Advisory Group South West
- RSPB
- The Wildlife Trust Somerset
- The Royal Bath & West of England Society



2018 UK River Prize Finalist

Connswater Community Greenway (Belfast, Northern Ireland)

Urban rivers project



The Connswater Community Greenway (CCG) Project has created a park through East Belfast, aiming to connect green areas and revitalise polluted river systems on the Connswater, Knock and Loop Rivers. Extreme, intense rainfall events in Northern Ireland in the last decade caused widespread flooding in east Belfast. This project looked at bringing rivers 'back to life', involving the community, to create accessible, safe parkland for recreation and activities.

The project included realignment of the Knock River involving moving the channel further into the park to improve access to the channel; as well as construction of river pathways, improving connectivity of the river to the surrounding landscape. Waste materials were reused or recycled wherever possible to reduce refuse. The project was completed in 2017, creating a vibrant, attractive, parkland for recreation, improving community welfare and encouraging healthier, active lifestyles with new play parks, sports pitches, and shrub and tree planting, plus £11m dedicate to flood protection for local properties. The area creates a landmark for the community to enjoy.

Community engagement was encouraged through training activities, educational resources, increasing environmental awareness and improving green sustainable transport routes such as 16km of cycle and pathway. Involving the local community instilled a sense of ownership, stewardship and inclusion.

The project has helped minimise flood risk, as well as habitat creation and increased biodiversity. Success of the project was monitored, and recorded a 14x return on economic investment. Ecologically, indicators have shown water quality and biodiversity improvements, and the project plans to continue monitoring these indicators. In the long term, CCG will manage the use and benefits of green spaces, manage a programme of physical activity, education, recreation and tourism in the area, as well as a volunteering programme, whilst Belfast City Council manage and maintain the work through a 40 year contract.

Project partners

- Connswater Community Greenway Trust
- Belfast City Council
- Department for Communities
- DfI Rivers
- Northern Ireland Environment Agency



2018 UK River Prize Finalist

Tame Valley Wetlands Landscape Partnership (Warwickshire & Staffordshire)

Multiple benefit partnership project



The Tame Valley Wetlands Landscape Partnership (TVWLP) was formed in 2005 and brings together 23 organisations including local groups, wildlife charities, DEFRA Agencies, Parish, Borough and County Councils. TVWLP developed a four year scheme, supported by the Heritage Lottery Fund, to restore the River Tame and its tributaries in the Tame Valley Wetlands, located between Birmingham and Tamworth and part of the Humber River Basin. All are failing EU Water Framework Directive targets.

Mineral extraction, power generation, pollution and dredging have shaped the river and its landscape since the industrial revolution, with transport links fragmenting the landscape in more recent times. Covering an area of 104km², the scheme is on track to deliver 35 different projects over four main themes:

- A. Restoring the built and natural heritage
- B. Increasing community participation
- C. Improving access and learning
- D. Providing training and skills

Working with multiple partners, landowners, volunteers and the local community, Theme A has focussed on restoring the natural environment along 28km of the River Tame.

Works include restoring functional river processes along 520m of incised channel on the Tame; creating more natural channel profiles by redesigning the inside of a meander bend and instating dredged gravels to create riffle and berm features; creating a 140m back channel reinstating an island feature lost in the 50's providing valuable fish refuge; improving natural flow paths; increasing channel capacity and lateral connectivity to floodplain; 35ha of priority wetland habitat mosaic created or restored to improve connectivity of the river corridor and biodiversity value whilst also creating flood storage and cleaning water; footpath creation and visitor interpretation help to tell the story of the heavily modified River Valley and its ongoing recovery. Other work includes working with CABI scientists to introduce a biocontrol to Himalayan balsam at various sites, improving 1.1km of bankside vegetation at sites where water voles were once present, carrying out mink monitoring and restoration of 1.5km of hedgerow.



Tameside LNR, Tamworth 140m back channel fish refuge

© FreshFX (Warwickshire Wildlife Trust) 2018

Lead project partner

- Warwickshire Wildlife Trust

Supported by 23 partners



Nature Driven Design: River Restoration Solutions



Our approach

Royal HaskoningDHV is a specialist water environment consultancy that has a solid track record of successful, award-winning, planning, policy, design and implementation projects across the UK. Under our motto “Enhancing Society Together”, our team work hard to improve the water environment through the restoration of natural processes, delivering value for money and outcomes that meet the needs of riparian landowners, rivers trusts, regulators and other key stakeholders such as local authorities. Although the main driver of these projects is often to restore and enhance the environment we have identified and delivered wider benefits for natural flood risk management, biodiversity and amenity/educational greenspace as part of our integrated schemes.

Our wealth of experience means we are well placed to create environmentally driven and sustainable designs for the restoration of river and lake systems that provide significant benefit to people, biodiversity and the historic environment alike. 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, hydrology 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.

Our recent experience

Channel restoration and floodplain reconnection

Our team has an established track record of successfully delivering river restoration schemes from inception and stakeholder engagement through to detailed design. We have recently completed a number of channel modification projects to identify options to restore natural river processes and design sustainable solutions. Recent project examples include: **River Nith Feasibility Study** and **Ugbrooke Restoration Project**.

Fish passage enhancement

Our project experience in relation to fish passage encompasses a range of technical passes, low cost baffles, rock ramps and natural solutions, such as bypass channels. We have also completed several weir removal projects, including project managing the physical removal of **Creamery Weir** (pictured above). Our engineers, fisheries specialists and geomorphologists work together to deliver robust and innovative designs. Other recent project examples include: **Powick Weir Removal**, **Gottar Water Weir Option Development**, **Creamery Weir Removal** and **Midlothian Esks Detailed Design**.



Water and sediment quality

Our team are experienced in monitoring and appraising water and sediment quality, including data analysis and interpretation against relevant water quality standards to provide evidence-based recommendations to improve river habitat quality, for example on the **River Mease SAC/SSSI**. We are also writing **CIRIA guidance for the assessment and management of contaminated sediments**, for those working in rivers, lakes, estuaries and the marine environment.

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 or 01444 476632.



2018 River Champions



'River Champions' seeks to celebrate the outstanding efforts of individuals contributing to river restoration. Below is a brief introduction to the 2018 River Champions, more information about each will be showcased by the RRC over the next year on our website and social media platforms.

Stephen Frye

Stephen helped to rebuild the Greyshot Angling Club, securing funding for a habitat improvement project on the North Wey Branch, involving large wood installation and backwaters. Stephen helps to encourage junior angling events. He is also treasurer for the Wey Valley Fisheries Consultative, arranging presentations and events.

Jim Gregg

Working to improve the Six Mile Water for more than 20 years, Jim has been instrumental to the project, including organising river clean ups. Jim is an advocate for the river and encourages his friends to also get involved in improvements and activities. Jim also contacts the council to encourage local schools to uptake environmental works in the area such as riparian tree planting.

Chris McArthur

Chris is a passionate environmentalist with a keen interest in water quality and land management. He is considered the linchpin for his help and efforts with Essex and Suffolk Rivers Trust through staff, project and budget control, strategic planning and guidance.

Robert McConnell

Robert volunteers as the Deveron, Bogie and Isla Rivers Charitable Trust's membership secretary, encouraging membership and securing funding over the last 14 years. This funding has helped build fish passes, run educational projects for schools, and invasive species control projects.

George Mackintosh

George has been a volunteer and the treasurer of Slamannan Angling Protective Association for over 15 years, helping to restore the River Avon in Scotland, as well as helping the River Forth Fisheries Trust engage younger generations. George helps restorative efforts on the Avon, for fish and wildlife. He helps secure funding and lead on projects, implementing techniques such as berms and willow spilling.

Sean O'Loughlin

Sean works on the ground to clear obstacles, improve water quality and replace gravels, creating spawning habitat for wild brown trout in the lower Erne River system, as well as encouraging others to get involved in river restoration.

Chris Ryder

Recently voted in as the new Chair of Yorkshire Dales Rivers Trust, and the chair for the Catchment Partnership, Chris is invaluable in helping design their Catchment Management Plans. Chris is also a member of his local London Catchment Partnership, ensuring practitioners working on the ground are heard nationally through the Catchment Based Approach.

Glenn Smithson

Glenn works with the Lark Angling Preservation Society and Wild Trout Trust in locations nationwide. He is a partner in the River Lark Catchment Partnership and works with many organisations implementing different restoration techniques.





Meet the RRC Team

Martin Janes – Managing Director

As Managing Director, Martin's role combines technical, business management and industry liaison elements. He works closely with our core funder to ensure that the RRC provides the expertise they need. Martin enjoys keeping involved with 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.

Marc Naura – Science and Technical Manager

Marc provides technical advice and expertise on river restoration schemes 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.

Josh Robins – River Restoration Adviser

Josh's role is to provide technical river restoration advice to enquiries and on-site projects. This involves assisting with all stages of a project including scoping new possible projects, visiting project sites, providing best practice case studies and advice to illustrate techniques, and evaluating the success of projects. Josh also manages RRC's annual program of events such as site visits, as well as coordinating or delivering training courses, workshops and site visits.

Alexandra Bryden – Information Officer

Alex's role is to collect, manage and disseminate information on river restoration. She manages the National River Restoration Inventory (NRRI) through adding new projects and improving existing information. This involves helping to manage the RiverWiki and updating the RRC UK Projects Map. Alex is also the editor of the monthly RRC Bulletin which we use to disseminate restoration information and events, and share good practice. Her other roles include managing the RRC's social media platforms, updating the RRC website, and, when required, stepping up to help coordinate events and support on project site visits.

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. 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.

Jackie O'Regan – Accounts Technician

Jackie undertakes the management accounting functions of the business and works alongside the Managing Director and Science and Technical Manager with business planning, project management and support to the Board. Jackie supports the Administrator and Managing Director by carrying out invoicing and purchasing tasks, as well as day to day accounts.

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. Chiara is approaching completion of her PhD in June, and we wish her the best of luck for the future.



Back row, left to right:

Marc Naura, Nicola Mackley, Chiara Magliozzi, Alex Bryden

Front row, left to right:

Martin Janes, Jackie O'Regan, Josh Robins



the River Restoration Centre

Working to restore and enhance our rivers

RRC Membership Benefits

TECHNICAL TRAINING, TAILORED TO YOUR NEEDS



DISCOUNTED ANNUAL
CONFERENCE REGISTRATION



PROMOTE YOUR BUSINESS OR INDIVIDUAL EXPERTISE
TO OUR NETWORKS



SITE VISITS TO BEST PRACTICE OR
INNOVATIVE RIVER RESTORATION
PROJECTS

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



INDEPENDENT TECHNICAL ADVICE

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 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.



Epping Forest District Council is a local government in the Essex region. The Engineering, Drainage and Water Team control and manage flood damage by forward planning and making sure the district's surface water and land drainage systems perform in a satisfactory way.

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.



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 rivers 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 Guidance

Best Practice Advice

Contact us to find out how we can support your restoration project at any stage of progress. For example we can:

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



Information and Support

Through RRC's involvement in projects, initiatives and strategies, we:

- Share information and understanding within the UK and across Europe
- Build the UK evidence base through collating, updating and reporting trends. There are now **4800** projects in the NRRI
- Provide a forum for exchange of knowledge and developments (the RRC Annual Network Conference and the RiverWiki)
- Update through a monthly Bulletin, social media and the RRC website
- Our website provides a range of advice and tips for project development, planning and monitoring



Training Courses and Guidance

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

- Previous course topics have included Introduction to Hydromorphology, Natural Flood Management, and River Habitat Survey Certification
- We also publish high quality best practice technical guidance on our website such as the Manual of River Restoration Techniques and Science Digest literature reviews



Website: therrc.co.uk

Email: rrc@therrc.co.uk

Telephone: 01234 752979



the River Restoration Centre

Working to restore and enhance our rivers

National River Restoration Inventory (NRRRI)

The NRRRI 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
4,894



3,941



473



319

N. Ireland

120

719
in chalk
rivers

491
Projects involving
flow deflectors

291
Re-meandering
projects

413
Floodplain restoration
projects

244
Projects added
since the 2017
RRC conference

NRRRI Update

RRC transferred the NRRRI into Microsoft Access so it can be searched with more ease. Objective and contextual keywords were 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	1365
Longitudinal connectivity	976
Fishpass	904
Barrier modification	640
Pollution source control	620
Barrier removal	588
Species habitat creation	570
Flood storage area	527
Bank protection	515
Marginal planting	400

River type (Top 5)	No. of projects
Lowland High Energy	155
Lowland Low Energy	111
Up and Low Energy	89
Coastal High Energy	29
Up and High Energy	27

Land use (Top 5)	No. of projects
Arable and horticulture	142
Suburban	126
Improved grassland	120
Urban	26
Broadleaved woodland	12

Geology (Top 5)	No. of projects
Clay, silt, sand and gravel	120
Mudstone, siltstone, sandstone	84
Chalk	65
Sandstone and conglomerate	30
Mudstone, siltstone, limestone	18

Projects
All England Wetlands (Rhone 1) in Liverpool
Ash (divided bypass channel) Environments
Adrian's Lake (divided flood storage basin)
Atterborough on River Erewash Diversion
Barn Elms Wetland Centre, South West London
Barnes Common
Bull Green Clay Works, Salford
Reverley Ponds

Library
Enhancing the Environment - 25 Case Studies from the Thames Region

Images
Digital Imagery - England/Barn_Elms



the River Restoration Centre

Working to restore and enhance our rivers

RRC Advisory Projects

RRC can provide targeted technical support at any stage of projects, at any scale from a single site to a whole catchment. Here is some of the work that we have been involved in over the last 12 months:

Hydromorphological assessment to inform a restoration plan

Millersford Brook, New Forest

A hydromorphological survey of the Millersford Brook was carried out on behalf of the Forestry Commission. The aim was to identify the physical habitat quality and characterise the hydromorphology in advance of undertaking proposed wetland restoration. Five River Habitat Surveys were carried out alongside sediment sampling and continuous 360 photos. The data were analysed using indices and predictive models.



Restoration design study

Struthan Bhraigh nan Allt, Scotland

The Struthan Bhraigh nan Allt is designated for its freshwater pearl mussel population, and is currently in unfavourable condition as it passes through a narrow artificial cut within a degraded peat landscape. Lochaber Fisheries Trust wished to refine a restoration option for a relic course into a practical and achievable design to inform contractors to be able to undertake the peatland and channel restoration work.

Natural flood management and flood risk feasibility

Shimna River, Newcastle, Co. Down, Northern Ireland

Due to the history of flooding in this area over the last 4 decades, Newcastle is termed an Area of Potential Significant Flood Risk. RRC was asked to review an options scoping document to look for additional natural flood management options and river specific improvements. In addition, RRC looked at the wider environmental issues and multiple benefit opportunities for aesthetic improvement of the river and the proposals.

Hydromorphological assessment and opportunity appraisal

River Machno, North Wales

The River Machno is a high energy tributary of the River Conwy which has been heavily modified in the past. RRC used basic hydromorphological assessment techniques to find that the Machno has a lot of energy and a large sediment supply. RRC suggested the option of assisted natural recovery as it has the potential to recover on its own if the constraints on the channel are removed.





the River Restoration Centre

Working to restore and enhance our rivers

Identifying catchment-scale impacts and opportunities

River Irk, Manchester

The River Irk is a heavily modified water body which has been impacted by industrialisation and urbanisation over the last 200 years. The river has been re-aligned, re-sectioned and constrained by bank protection. There are also a number of large barriers to fish migration and issues with pollution throughout the catchment.



The Environment Agency and its partners have been working to reverse some of these impacts and restore habitats and native species to the river. However, this is an enormous task due to the scale and complexity of the issues in the catchment. RRC was asked to survey the Irk to identify issues and opportunities for improving the river ecology, and to show how those issues and opportunities should fit into a catchment strategy.

RRC followed a methodological framework where catchment and site assessments are used to identify impacts, objectives and prioritise projects. During the site survey, over 2,000 360° photos were taken and uploaded to Google maps. Features, impacts and opportunities were also mapped on Google. This was found to be a great tool for communication, learning and information gathering. Please speak to a member of staff to find out more about this.



Contribution of each section to catchment issues										
Section	Poor longitudinal connectivity	Barriers to fish populations	Poor in-channel habitats	Poor floodplain habitats	Reduced natural sediment supply	Sources of artificial material	Poor riverside areas for community	Flood risk due to a lack of floodplain connectivity	Water quality	Invasive Species
Section 1	3	3	3	3	2	2	3	1	U	U
Section 2a	3	U	3	3	2	3	1	2	U	U
Section 2b	1	U	2	2	2	2	1	2	U	U
Section 3	3	U	3	3	3	1	2	3	U	U
Section 4a	3	U	3	2	3	3	1	2	U	U
Section 4b	3	U	3	3	3	1	3	3	U	U
Section 4c	3	U	3	3	1	3	3	3	U	P
Section 4d	3	U	2	2	2	3	1	2	U	U
Section 5	3	U	3	3	3	1	3	3	U	P
Section 6	3	U	3	3	3	2	3	3	U	P
Section 7a	1	U	3	3	3	2	2	3	U	P
Section 7b	2	U	2	2	1	1	2	2	U	P
Section 7c	2	U	1	2	1	1	3	2	U	P
Section 8a	2	U	1	1	1	2	1	1	U	P
Section 8b	1	U	2	3	2	3	2	3	U	P
Section 8c	1	U	1	2	1	1	1	2	U	U

To prioritise works for improving the Irk, RRC developed a method which identifies the catchment pressures and scores each reach based on its contribution to catchment issues. This is used to target the worse reaches and create catchment objectives. The opportunities are then prioritised based on the level of impacts in the reach and expected improvement of the opportunities. We are looking at developing a training course on catchment planning and prioritisation. Speak to a member of staff to find out more.





Penny Anderson Associates Ltd

CONSULTANT ECOLOGISTS

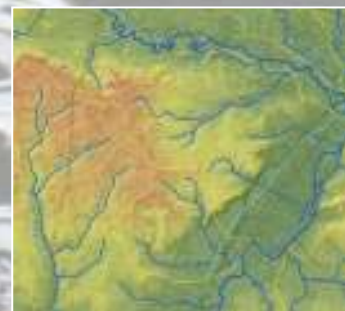
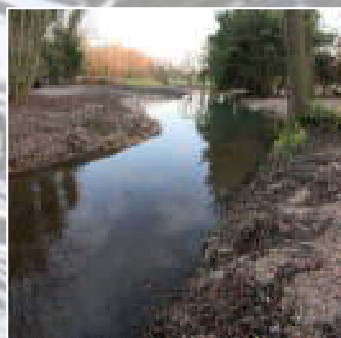


We are one of the leading ecological consultancies in the UK, and have been advising organisations on ecological issues since the early 1970s. Our areas of expertise are:

- Ecology
- Hydrology
- Geology and Soils
- GIS and Environmental Data Analysis

Key Services:

- Applied Hydrology (including fluvial audit)
- Advanced Remote Water Quality Monitoring
- Ecosystem Services
- Ecological Impact Assessment
- Catchment Management
- Flood Modelling and Natural Flood Risk Management
- Diffuse Water Pollution Mitigation
- Urban and Rural SuDS
- Constructed Wetlands
- River and Floodplain Restoration
- Wetland Creation
- Aquatic Surveys (including HSI and macroinvertebrates)
- Topographic Survey and Geospatial Services
- Water Framework Directive Assessment
- Habitat Regulations Assessment
- Mitigation Licenses and Works
- Ecological Survey and Evaluation
- Habitat Creation and Restoration
- Soils, Geology and Geomorphology





the River Restoration Centre

Working to restore and enhance our rivers

ABSTRACTS

Kindly sponsored by:



...providing discounted places for charities, trusts, students and volunteers



0370 350 1851

info@salixrw.com

www.salixrw.com

@SalixBio



River Restoration

Wetland Habitat Creation

Natural Flood Management

Native Plant Nursery



Building with Nature

Session 1:

Conference Theatre

ENGAGING WITH RIVERS – RESTORATION IN SCOTLAND AND NEW SOUTH WALES – A TALE OF TWO TWEEDS

C. SPRAY¹, L. COMINS², D. ROBESON² & T. ALLETSON³

1 University of Dundee, 2 Tweed Forum, 3 Tweed Shire Council, New South Wales

On the face of it, the Tweed in the Scottish Borders and the Tweed in New South Wales might be expected to have little in common, other than possible ancient claims of historic connectivity. However, what began as an idle moment of web-based curiosity has developed into a real partnership between two key organisations involved in promoting and implementing sustainable management of their respective catchments over 16,000 km apart. Growing realisation that Tweed Shire Council in New South Wales (NSW) and Tweed Forum in Scotland shared many challenges when it came to river and catchment management was further strengthened by discovery that they had both developed innovative approaches to meeting them. This led to further communication and, eventually to two visits to Australia hosted by Tweed Shire Council (Tom Alletson) - in 2016 (Derek Robeson) and 2017 (Luke Comins and Chris Spray).

In this presentation we report on the comparative river management challenges facing the local communities and institutions in the two locations. We explore the importance of stakeholder engagement and the different governance mechanisms in place, we describe the approaches developed towards river restoration and we showcase examples of action on the ground in Australia and Scotland.

The dominant land uses of the two Tweed catchments, present and past, frame the current approaches to river management and restoration initiatives. Forestry and farming, especially sugar cane (NSW), sheep and barley (Scotland) are important drivers when it comes to decision-making on river management. Whilst flood risk has always been part of the background to decisions on farming practices and indeed settlement locations, recently the increasing threats of major floods has added a new dimension to thoughts of catchment management and flood risk reduction. At the same time, the loss of riverine biodiversity is becoming ever more apparent, alongside the encroachment of invasive non-native species. Challenges of economic and agricultural productivity remain, as does the need to engage with local communities in the development of solutions.

We describe the development of approaches by the two organisations to increased stakeholder engagement across different facets of river life and management. We place river restoration centrally in this discussion, drawing out comparative barriers and solutions from the two locations, with examples of ongoing programmes and successes in each catchment. Finally, we look at what general lessons could be learned by others from our experiences.

A PARTNERSHIP APPROACH TO MISCONNECTIONS IN LONDON: THE 'OUTFALL SAFARI'

J. PECORELLI¹ & J. BRYDEN²

1 The Zoological Society of London, 2 Thames 21

In the spring of 2016, Catchment Partnerships in London worked together to produce a position statement on the issues surrounding misconceptions that are degrading the city's rivers. One communally agreed area of action was the need to understand the extent of the problem. From this came the Outfall Safari, a citizen science method for surveying outfalls in river catchments and reporting and prioritizing those that are polluting. Over 100 citizen scientists have been involved in delivering this work on 6 catchments across Greater London. The data collected have revealed the true scale of the problem and helped shape Thames Water's investment plans to tackle it. This presentation

will run through the Outfall Safari methodology, the findings from applying it on multiple catchments in Greater London, the action taken by Thames Water in response to the findings and the spread of the work beyond London.

HANDING OVER DESIGN OF A MAJOR FLOOD RELIEF CHANNEL AND ITS SURROUNDS TO STAKEHOLDERS – DID IT MAKE A DIFFERENCE?

V. LUTYENS¹

1 Black & Veatch

The River Thames Scheme (Datchet to Teddington) is one of the UKs largest flood risk management schemes of recent years. It involves construction of a 17km long major flood relief channel through west London plus associated measures. Black & Veatch is leading outline design for the Environment Agency and partners. A deliberative approach was adopted to engage with the wide variety of stakeholders, including authorities, user groups, conservation bodies and landowners. This paper discusses how, through a series of meetings, stakeholders suggested 100s of enhancement opportunities that were captured in the design of the channel and surrounding landscape. It will summarise how: a) design suggestions from stakeholders were incorporated and shaped a vision that linked the history of the River Thames with the functionality of the scheme; b) consultees were able to influence areas of uncertainty. Specific examples will be shown of design areas that were influenced by engagement.

NATURAL FLOOD MANAGEMENT: SHAPING SUCCESS THROUGH PARTNERSHIPS

J. BROOMBY¹

1 JBA Consulting & University of Leeds

Partnerships are an increasingly popular means of implementing natural flood management (NFM) schemes owing to the necessary collaboration between multiple parties. The inextricable link between river restoration and the multiple benefits of NFM imply that partnership working is also crucial to river restoration projects, whose success similarly depends on cooperative working. This study explored the factors that shape the success of partnerships in NFM schemes, including several projects seeking to achieve river restoration. A number of commonalities were identified and provide valuable guidance for future NFM and river restoration partnerships. In particular, the role of proximity in its many forms (physical, spatial, institutional, social, technological and relational) is crucial to the success of a partnership and can be impacted by factors such as collaboration with local communities, existing relationships, project champions, trial catchments and neutral agents.

INFRASTRUCTURE DEVELOPMENT: OPPORTUNITIES AND CHALLENGES FOR MANAGING RIVERS AND THEIR CATCHMENTS

T. STYLES¹ & O. IACOB¹

1 Arup

Flagship river and catchment management projects in the UK are typically focussed on environmental and local community outcomes, with scarce funding and limited resources. Against this, the UK is in the middle of an infrastructure boom, with HS2, Crossrail, Thames Tideway and Hinkley Point having a combined cost potentially reaching £100 bn. In addition, thousands of miles of road and railway are built or upgraded each year, hundreds of thousands of houses and millions of square meters of commercial space constructed. This contribution to the conference proposes that in addition to stand-alone river restoration or catchment management projects, the application of innovative management techniques on watercourses and catchments associated with infrastructure projects can, in aggregate, unlock significant multifunctional benefits associated with traditional river restoration schemes.

Session 2:

Conference Theatre

Natural Flood Management in Practice

NFM: DELIVERING MULTIPLE BENEFITS THROUGH FLOOD RISK MANAGEMENT

A. FRASER¹ & S. REANEY²

1 Jacobs, 2 Durham University

NFM provides significant opportunities to deliver flood risk management interventions that seek to address the root cause of flood risk rather than mitigating the potential impact of such events upon the receptor. The techniques available can also have significant benefits for water quality and available habitat. Durham University used two complementary approaches to plan NFM interventions:

- 1: rapid connectivity and risk mapping assessment (SCIMAP-Flood)
- 2: detailed physically based, fully spatially distributed, simulation of catchment hydrology (CRUM3)

Combined, these methods provide a powerful toolkit to target interventions within the catchment and simulate potential impact on flood peak through a variety of NFM techniques. Furthermore, as sediment transfer and diffuse pollution are synonymous with overland flow, it is possible through managing runoff before it connects to the channel that there could be significant improvements to water quality.

REDUCING FLOOD RISK THROUGH GREEN INFRASTRUCTURE ON THE RIVER SOAR, LEICESTER

A. McDONALD¹, H. O'BRIEN² & R. NEEDHAM³

1 Environment Agency, 2 Leicester City Council, 3 Trent Rivers Trust

The Leicester conveyance scheme targeted underused public open space of low ecological value. Through reconnecting the river with its floodplain more opportunity for wetland species has been created. The scheme has worked hard to design solutions to flood risk that incorporate pockets of natural habitats to help to build more diverse and resilient ecological communities.

This talk will cover how working in partnership, green infrastructure was put at the heart of a flood scheme, the benefits seen to urban regeneration and the local community as well as the ecology of the area.

PRIORITISING RESTORATION AND NFM IN THE RIVER PEFFERY, SCOTLAND

E. J. T. LEWIN¹ & H. REID²

1 Jacobs, 2 SEPA

SEPA's MImAS (Morphological Impact Assessment System) datasets and tool have been utilised by the River Peffery Flood Alleviation scheme, Dingwall, Scotland, for planning natural flood management and morphological improvements delivered through river restoration. MImAS uses field-based mapping of morphological pressures on the watercourse and calculates the impact of these pressures on the waterbody. This provides an efficient quantitative tool that highlights where to focus restoration works, as demonstrated by its use in the River Peffery.

MImAS datasets, which include morphological pressures and stream type, are available for all WFD waterbodies, providing a nationwide tool to inform and prioritise NFM measures and river/floodplain restoration in Scotland. The tool robustly quantifies expert judgement, in terms of the location and intensity of human impacts within a catchment, allowing effective and rapid prioritisation of restoration measures at the catchment-scale.

DO WE NEED AN NFM REALITY CHECK?

E. GILLIES¹, H. MOIR² & L. CAMELO³

1 cbec eco-engineering UK Ltd and University of Glasgow, 2 cbec eco-engineering UK Ltd and University of the Highlands and Islands, 3 cbec eco-engineering UK Ltd

Many of the natural flood risk management tools we have at our disposal seem relatively simple to apply: at a reach scale we set back or remove embankments, create inset floodplains, and re-meander. In some cases judicious use of NFM tools works well at promoting reductions in flood risk. However, the effects of NFM can often be good at low return periods, but detrimental at high return periods. Application of standard NFM tools can sometimes have unforeseen effects, especially when existing embankments trap water on the floodplain and so store more water than an NFM design which, with its setback embankment and consequent reduction in water levels, potentially stores less water. We use unsteady hydraulic modelling of several NFM scenarios to demonstrate cases where NFM works, and where NFM tools could be detrimental. However, we also show how the hydraulic modelling can be used to tune and adjust a basic NFM design to achieve the desired lowering of flood risk.

NOTES

Session 2:

Conference Suite 2

Evidencing Change

EVALUATING RIVER RESTORATION TECHNIQUES: SETTLEMENT PONDS IN THE AFON EDEN CATCHMENT, NORTH WALES

H. MARPLES¹ & S. HEARN²

1 Bangor University, 2 Natural Resources Wales

A number of interventions were carried out between 2011-2015 in the catchment of the Afon Eden as part of the LIFE funded Pearls in Peril project (LIFE11 NAT/UK/000383), with the aim of improving habitat quality for the freshwater pearl mussel population. Several settlement ponds were created and numerous ditches blocked in an area of former conifer plantation in order to trap sediment and prevent it from entering the river downstream. This study re-visited ten of the ponds in 2017 (two years' post construction) and carried out water quality monitoring of the inflows and outflows as well as measuring accrued sediment. In general, water in the outflows was found to have lower concentrations of suspended solids, nitrates, phosphates and conductivity than water in the inflows, along with higher levels of dissolved oxygen and water temperature. It is concluded that the ponds are effective in trapping and storing suspended sediment as well as improving other parameters of water quality. Recommendations for future sampling and analysis are made along with suggestions for the design of constructed wetlands as part of future river restoration projects.

THE ROTTAL BURN RESTORATION PROJECT: COLLABORATIVE EVIDENCE AND IMPACT FROM RIVER CHAMPIONS, RESEARCH COLLABORATORS (AND LOTS OF STUDENT PROJECTS)

R. WADE¹, K. A. DEMPSEY² & C. MacINTYRE³

1 Abertay University, 2 River South Esk Catchment Partnership, 3 Esk Rivers and Fisheries Trust

The Rottal Burn restoration project provides an example of successful stakeholder, landowner and agency collaboration, coupled with research and monitoring impact provided via multiple diverse student projects. These working relationships have been delivered through excellent communication and collaboration initiated by Esk Rivers & Fisheries Trust, along with Angus Council, and in conjunction with several Scottish universities. This talk, jointly presented by a researcher and a representative of the catchment partnership, will explore the evidence for benefits to wildlife, communities and business from working together on this exemplar case study site.

IMPLEMENTING FLOOD RISK MANAGEMENT AND RIVER RESTORATION TO CONSERVE INSTREAM HABITAT FOR BROWN TROUT

N. V. ANGELOPOULOS¹, J. P. HARVEY¹, J. D. BOLLAND¹, M. A. SMITH¹, M. J. TAYLOR¹, A. D. NUNN¹, R. A. A. NOBLE¹, I. G. COWX¹, J. E. G. MASTERS² & J. MOXON²

1 Hull International Fisheries Institute, School of Environmental Sciences, University of Hull, 2 Environment Agency, Fisheries, Biodiversity and Geomorphology

Flood Risk Management (FRM) is imperative to reduce the risk of flooding to properties and infrastructure but can profoundly affect the physical habitat of a river and key biota, such as fish. FRM can involve the removal of key riverine habitat characteristics, for example, meanders and instream features such as trees, riparian vegetation, shallow gravel areas and islands to create a wider, often deeper and less complex channel to support the conveyance of large volumes of water. This process subsequently degrades the principle functional habitat units in rivers required for fish spawning, recruitment, feeding and refuge and therefore, can have undesirable effects on the survival of a

particular life stage of fish, resulting in displacement, gradual or sudden declines in populations or mortality.

FRM is dependent on political support through legislation, such as the European Floods Directive (2007/60/EC) and in the UK, the Flood and Water Management Act ((FWMA) 2010), developed in response to the Pitt Review (2008) commissioned following the 2007 floods. Historically, FRM in Europe was used to merely support economic and social benefits, but now, where possible, the process endeavours to incorporate ecological integrity under the European Water Framework Directive (EU WFD) and Habitats Directive. This synergistic approach between cross-sectoral river ecosystem services such as FRM and river restoration aims to support and maximise multiple benefits between sectors. FRM activities are predicted to intensify in the future because of an increase in extreme flow events, yet few studies provide ecological monitoring and evaluation for the integration of FRM and river restoration, limiting our understanding of how rivers and fish populations respond to instream works. The lack of studies are often due to restricted timescales and limited funding for monitoring and evaluation but post implementation evaluation is critical to inform river managers, policy makers, project partnerships and stakeholder groups in the planning and development of future FRM and river restoration projects.

In June 2007, following a 1-in-150 year flood event in Sheffield, South Yorkshire, England, 4,000 homes and 1,800 businesses were flooded (Pitt Review 2008). In England, the Environment Agency is responsible for delivering sustainable FRM and in 2009 they undertook FRM works at Malin Bridge, Sheffield to reduce the risk of flooding. Subsequent river restoration aimed to rehabilitate the physical habitat and conserve the local brown trout (*Salmo trutta L.*) populations. In this paper we present the findings of long term (8 years) habitat and brown trout investigations at Malin Bridge, and includes, pre-FRM works (2009), post-FRM works (2010), post-restoration works (2011) and subsequent annual investigations (2011-2016). Specific objectives were to compare juvenile, sub-adult and adult brown trout (i) habitat quality and availability (ii) population density and (iii) utilisation of habitat, before, during and after FRM and river restoration works.

ENGAGING WITH RIVERS IN FOUR DIMENSIONS

L. SHUKER¹, A. M. GURNELL², G. WHARTON², J. ENGLAND³ & D. J. GURNELL⁴

1 Thames 21/Cartographer Studios Ltd, 2 Queen Mary, University of London, 3 Environment Agency, 4 Cartographer Studios Ltd

Many excellent monitoring initiatives are evolving across catchment partnerships, engaging enthusiastic citizen scientists. However, existing methods provide sparse information about physical processes, structure and habitat of rivers.

The Modular River Survey provides a framework for river managers and volunteers to investigate physical aspects of river environments. The survey combines data at three scales: short river reaches (10-40m length) to link with biological data; intermediate reaches (100-400m length) to synthesise the river's physical habitat structure and functioning; and long reaches (10+km) to précis the river type (slope, width, sinuosity), modifications (land use, infrastructure) and rate of adjustment (widening, narrowing, migrating) over decades.

The three scales of survey are nested to reveal the changing physical character of a river in space, and the fourth dimension: time. We report on the survey's first year of application and future direction.

Session 2:

Conference Suite 3

Barriers

NOVEL DESIGN, INSTALLATION AND ASSESSMENT OF COARSE FISH PASSAGE USING LOW COST BAFFLE (LCB) SOLUTION AT A GAUGING STATION

T. HULL¹, A. LOTHIAN², C. GARDNER³, J. TUMMERS², D. GRIFFITHS⁴, M. LUCAS²

1 South East Rivers Trust, 2 Durham University, 3 South East Rivers Trust, 4 Environment Agency

Kingston gauging weir on the Hogsmill River is the most downstream obstruction in the catchment and presented a complete barrier to fish passage. The weir is atypical, having a down slope of 1:3.3 (30%). The use of the standard Low Cost Baffles (LCB) arrangement on this steep gradient is unproven and unlikely to be effective due to hydraulic considerations. A collaborative project between SERT and the EA developed a novel design of LCB aimed to achieve multi-species passage whilst maintaining gauging accuracy.

The study has demonstrated 45% and 35% passage efficiency over the baffles and whole structure respectively, for a range of coarse fish species of different sizes. The study explored the effects of various parameters on passage. Now that the novel design has been demonstrated as being effective, the principle can now be disseminated and implemented on other weirs with similar gradients which have previously been considered unsuitable for the LCB solution.

THE IMPACT OF WEIR REMOVAL ON THE FORAGING AND ACTIVITY OF BRITISH BATS

S. SCOTT¹, C. TURTLE¹ & J. COLLINS²

1 Environment Agency, 2 Bat Conservation Trust

The impact of weir removal on bat activity is not widely considered when carrying out river restoration schemes. The change in river morphology to a pool/riffle system can potentially have a negative effect on some species, and deselect species that use smooth water habitats. For example, bats use a sophisticated system of echolocation for navigation that can be disrupted by irregular/ highly mobile objects. Sound echoes produced from echolocation calls scatter when in contact with irregular surfaces and make foraging and navigation difficult. On rivers, bats have been known to avoid using riffle habitats for this reason. Removing large areas of important foraging habitat could affect the conservation status of British bats, particularly the Daubenton's bat. The Environment Agency and Bat Conservation Trust are working in partnership to investigate this issue. The outcome will be an evidence directory of case studies, monitoring methodology and guidance on mitigation techniques.

NEW GUIDE TO FISH PASSAGE AND SCREENING AT FLOOD RISK MANAGEMENT AND LAND DRAINAGE STRUCTURES BASED ON PRACTICAL EXPERIENCE

O. SHOLI¹, R. PILCHER¹, T. HARDING², J. BOLLAND³, A. DEACON¹ & R. HORSFIELD²

1 AECOM, 2 THA Aquatic Ltd, 3 Hull Institute of Fisheries

The Environment Agency is collaborating with AECOM and a research team comprising THA Aquatic and HIFI to: "Develop a new guide and supporting tools which synthesise existing research, guidance and practical experience to help the planning / appraisal, design, construction and maintenance of fish and eel screens, deterrents, passes and fish-passible pumps."

This new guide will build on existing guidance such as the Environment Agency Eel Manual to provide much needed updated advice on choosing appropriate passage and deterrent measures in a range of situations based on the options available, expected performance and whole-life costs. The new guide will synthesise recent experience and good practice gained in planning, installing and

maintaining passage and deterrent measures at land drainage and flood risk management structures, including pumping stations, weirs, locks, sluices and tidal outfalls at sites both in the UK and abroad.

APPROACHING 10 YEARS ON - SHEDDING LIGHT ON STREAM DAYLIGHTING AROUND THE WORLD

A. T. BROADHEAD¹ & T. C. WILD²

1 Arup, 2 University of Sheffield

Deculverting, or 'daylighting', involves opening up buried watercourses and restoring them to more natural conditions. It is often claimed to provide multiple benefits to society, the environment and the economy, and spans multiple disciplines in river restoration, flood risk management, urban design and ecology. As a form of river restoration, it has arguably gone mainstream in the last decade, with numerous projects from understated to prize-winning, large and small, urban and rural, across the UK and internationally in recent years. Daylighting, and specifically "lost rivers", are subjects that continue to inspire the public and popular media. This talk will assess the current state of stream daylighting in 2018, drawing on nearly 10 years of case study data collected from around the world via www.daylighting.org.uk. We examine changes in policy and practice, look at the best examples and lessons learnt, and attempt to shed light on the future of daylighting our lost urban rivers.

NOTES

NATURAL FLOOD MANAGEMENT

Visit our stand to use the JBA Trust's augmented reality sand box which will demonstrate flood protection measures and scenarios. This new and interactive model shows many different scenarios including how engineering solutions help reduce flood risk from rivers and the sea.

Visit our Natural Flood Management
webpage at www.jbaconsulting.com
steve.maslen@jbaconsulting.com

 @JBAConsulting |  JBA Consulting

A photograph of a river flowing through a lush green landscape with tall reeds and trees in the background under a clear blue sky.

**Talk to the
experts in river
restoration and
aquatic ecology.**



- Over 15,000 km of rivers surveyed
- The UK's biggest, best equipped specialist field team
- Internationally recognised experts
- Catchment based approach
- Over 30 years' experience

⇒ Find us at our
stand or contact:

T: 0161 442 8938

E: enquiries@apemltd.co.uk

W: www.apemltd.co.uk

Session 3:

Conference Theatre

Working in Partnership

BETTER TOGETHER - HOW WORKING IN PARTNERSHIPS HAS ACHIEVED SO MUCH MORE IN TELFORD'S URBAN CATCHMENT

G. PLUCKWELL¹

1 Environment Agency

The Love Your River Telford project is a holistic, all inclusive, partnership approach, aimed at improving water quality, biodiversity and flood resilience within the town of Telford by complimenting physical improvements with community engagement. By bringing together organisations with similar aspirations and working with, volunteers, schools, business, and the local community, significant benefits have been achieved. This efficient and proactive partnership approach has resulted in both non-financial and financial benefits. Watercourses have already shown improvements with a jump up in at least 1 WFD status in 5 of the 8 present, habitats have been created and enhanced, localised flood risk reduced and a potential saving in excess of £3M for project partners realised. The urban catchment management model created in Telford works and has gained recognition both in the UK and overseas, resulting in a number of towns either implementing the model or seeking funding to do so.

TOWARDS A WILDER RIVER CRANE: BENEFITS OF PARTNERSHIP DELIVERY

T. WHITE¹ & P. SOVIC DAVIES²

1 London Wildlife Trust/Groundwork South, 2 London Wildlife Trust

London Wildlife Trust worked with 4 local authorities to develop & deliver improvements for over 5km of river, covering 10 public open spaces along the Crane Valley in west London. We worked with over 200 volunteers, empowering local people with a duty of care for the river, while reinstating the corridor as an important natural asset. Intervention design was driven by several key needs: delivery by local people, use of local recycled materials, improvement of general aesthetics & public access.

The implemented improvements, suitable for heavily modified urban rivers, included low flow channels, softening reinforced banks with recycled willow faggots, removal of unnecessary bank reinforcements & management of riparian vegetation. The project demonstrated that volunteer retention & long-term maintenance of the sites can be forged with public engagement, inclusive volunteer training leading to hands-on delivery & close liaison with local authorities through all project stages.

LIVING HERITAGE OF THE RIVER DON

R. WALKER¹

1 Don Catchment Rivers Trust

The ambition of Don Catchment Rivers Trust is to reconnect people, communities and decision makers back to the River Don and its rich natural, cultural, built and industrial heritage. We want to change their beliefs and attitudes so that the River Don and its heritage will be better valued as a major asset to South Yorkshire and better protected into the future. In 2015 DCRT received major funding from the Heritage Lottery Fund for the Living Heritage of the River Don project. We now have a dedicated team of volunteers, as well as corporate volunteers. We run public events, youth art projects and a 'River Guardian' schools project to engage young people with their local river. Working in partnership with local authorities, community groups & organisations has ensured the success of the project and brought the Trust closer to its ambition of connecting people back to the river.

‘SMARTER WATER CATCHMENTS’ IN THE EVENLODE – WORKING IN PARTNERSHIP TO REDUCE PHOSPHORUS IN RIVERS

Y. de GARIS¹, J. WESTLAKE¹, M. HUBAND² & S. OLNEY³

1 Thames Water, 2 Atkins, 3 Natural England

Thames Water is running a trial in the headwaters of the River Evenlode to explore how we can work with farmers and environmental partners to reduce the loss of phosphorus to rivers (www.thameswater.co.uk/evenlodecatchment). The trial set out a) to explore the logistical challenges of a water company working with farmers in catchment management; b) to better understand the value of catchment management to customers and c) to assess its effectiveness at managing phosphorus in a lowland Thames catchment. This paper discusses the successes and challenges of the trial so far, and draws out novel aspects. It explores how long-term strong relationships are essential to securing buy-in to the scheme. It also reports on an evidence base developed to direct investment within the trial and to assess the value of the scheme to our customers. Finally we emphasise the importance of flexibility within the scheme to accommodate the needs of individual participants.

NOTES

Session 3:

Conference Suite 2

Managing Sediment and Pollutants

CONTAMINATED SEDIMENT: ASSESSING RISKS IN UK RIVERS

I. DENNIS¹, C. RODGERS¹, P. WILLIAMSON¹ & J. KWAN²

1 Royal HaskoningDHV, 2 CIRIA

The UK's rivers have a long history of exploitation that has resulted in widespread contamination, with sediments containing many substances in concentrations that could pose a risk to ecosystem and human health. A new guide providing practical information on contaminated sediment has been developed by Royal HaskoningDHV for CIRIA. This is targeted at a wide range of stakeholders who may encounter contaminated sediment while working in the aquatic environment. The guide draws on Royal HaskoningDHV's recent research for Defra to assess contaminated sediment risks across the UK, and provides the reader with an accessible summary of the information they need to understand, assess and manage contaminated sediment risks. Our presentation will discuss the key messages from guide for anyone working in water environments where contaminated sediments are likely to be a risk, and will explain how the CIRIA guide can be used to assess and manage this risk to support a healthy river environment.

MANAGING ACCUMULATED SEDIMENTS: BENEFICIAL USE OF DREDGED MATERIAL (BUDM) AND WORKING WITH NATURE (WwN)

W. COULET¹ & W. MANNING¹

1 Exo Environmental

The management of accumulated sediments within riverine and coastal systems is a complex challenge. Dredging offers a potential solution, helping to ensure good water quality and habitat health, supporting the management and alleviation of flood risk and providing sufficient water depth critical for navigation. However, as dredged material is defined as a waste under the EU Waste Framework Directive (WFD), handling, transportation and disposal of the arising material presents additional challenges.

This presentation by Exo Environmental Ltd aims to provide an introductory overview of the available options for the "Beneficial Use of Dredged Material (BUDM)" and employing the "Working with Nature (WwN)" philosophy, both of which offer significant benefits over historic approaches to sediment management. Possible BUDM applications will be illustrated, with relevance to flood defence, habitat restoration and agricultural improvements.

SILT MANAGEMENT CAN BE EASY...WHY ARE SO MANY PEOPLE GETTING IT WRONG?

R. HAINE¹

1 frog environmental

This presentation will draw from the practical experience of frog environmental and our associate practitioners over the past 12 months from visiting construction projects that have had varying degrees of impact on nearby rivers.

A review of the main underlying reasons for failures that lead to silt pollution events will be discussed. These range from organisational issues such as poor communication through to more practical issues such as a lack of site investigation and monitoring.

Climate change, a dynamic evidence base and a firmer line taken by regulators regarding silt pollution all lead us towards a rethink on how we should be managing the risk of silt pollution.

This talk will also use practical examples of good practice to demystify some of the challenges of controlling silt and put forward the argument that with good planning the majority of projects can protect local watercourses by using low cost, passive methods that are readily scalable.

PARTNERSHIP WORKING IN THE SUSSEX OUSE CATCHMENT

S. LOHREY¹, R. KELLY² & E. LONG³

1 South East Water, 2 Natural England, Catchment Sensitive Farming, 3 National Trust

Each day, South East Water abstracts and treats more than 565 million litres of water from the environment and supplies it to around 2.1 million customers. South East Water's Catchment Management Team is developing new and innovative ways of tackling raw water quality problems at their source, not just at the water treatment works downstream. This includes working with farmers and other stakeholders to identify the cause of drinking water quality deterioration, and deliver community-based partnership solutions.

As part of this work the team identified an opportunity to work with the National Trust on their river restoration project at Sheffield Park. The National Trust were able to adapt the design of the scheme to incorporate the priorities of South East Water and other stakeholders to secure funding which helped to make the project possible. The final scheme incorporates bank regrading, in-channel hydraulic controls and floodplain scrapes to encourage sediment deposition.

NOTES

Session 3:

Conference Suite 3

Novel ways of using Data

HISTORICAL STUDIES FOR INFORMING SUSTAINABLE RIVER RESTORATION STRATEGIES

J. COX¹

1 Ricardo/University of Portsmouth

Understanding the history of rivers is important for shaping their future. The accessibility to resources that may support historical studies has improved over the last two decades. This project aimed to explore these resources to inform river restoration strategies of the River Rother, West Sussex. Concerns for the river's ecological health and drinking water abstraction operations have been raised due to fine sediment accumulation. These sediment issues have largely been attributed to increased fine sediment inputs from agricultural sources since the 1970s. This project challenges previous research with new evidence that suggests in-channel sediment transport processes may be responsible for a significant amount of the fine sediment issues observed in the lower catchment. The findings of this study, which were informed mostly by open data sources, highlight the importance of reviewing historical evidence to inform sustainable river restoration strategies.

SIMPLE MAPPING FOR FLOOD RISK AND STORAGE

M. NAURA¹

1 River Restoration Centre

Mapping historic floodplain boundaries and surface runoff is important for maximising flow retention and planning for Natural Flood Management. In this presentation, we will show the benefits and limitations of using existing flood and 'opportunity' maps for delivering NFM at local scale. We will present simple tools and techniques for mapping potential flood storage areas and surface runoff using Open Source software and data that can be applied by non-specialists.

CATMAN: A NATURAL CAPITAL FRAMEWORK BASED ON WHOLE CATCHMENT MODELLING OF LAND USE, ASSET IMPROVEMENT, DIFFUSE POLLUTION AND FLOOD RISK

R. NGAI¹, R. SMALE² & S. FOX³

1 JBA Consulting, 2 Vivid Economics, 3 United Utilities

Defra and other regulators are increasingly asking key sectors to utilise natural capital and valuation approaches to represent the flow of benefits from investment decisions. JBA Consulting, with Vivid Economics, created a natural capital decision support model to test and target solutions to achieve the best value outcomes for catchments and United Utilities' customers. The decision model was trialled for the Petteril catchment informed by stakeholder consultation. The model utilises existing water quality modelling tools such as FARMSCOPE and SIMCAT to define the percentage change in diffuse load reductions for Nitrate and Phosphate. Additionally, JFlow (JBA's 2D hydrodynamic modelling software) was used to investigate the benefits of catchment interventions on flood risk. These outputs informed the natural capital valuation to determine the net present value of management options. The results are presented in an integrated interface called the CatMan (Catchment Management) tool.

COMMUNITY MODELLING – SHAPING THE FUTURE OF LONDON RIVERS

R. NELSON¹, P. WHITEHEAD², G. BUSSI² & C. LANDSTROM²

1 Thames 21, 2 University of Oxford

Community modelling has previously been successfully used to reduce flood risk in Otley. Adapting this concept for water quality, Thames21 is creating three community groups within North London catchments; the Salmons, Pymmes and Ching Brook's to identify sources, test scenarios and prioritise actions to improve the water quality in each of the rivers. The aim is to create catchment management plans for each river by giving communities the tools to produce empirical evidence. Meetings will occur between September 2017 and February 2018 in which water quality issues will be raised, potential solutions will be discussed and different scenarios will be tested. Scenarios can vary from installing Sustainable drainage solutions (SuDS), to the effect climate change will have on water quality. Success will be judged on the catchment plans produced by each group, the level of engagement felt and the implementation of the scenarios proposed.

NOTES

Session 4:

Conference Theatre

Keynote Address

ACCOUNTING FOR THE ENVIRONMENT IN CATCHMENT MANAGEMENT

P. LEINSTER¹

1 Cranfield University

Professor Paul Leinster CBE has over 40 years of experience working in the environmental sector. Paul has been in his current role as Professor of Environmental Assessment at Cranfield University since October 2015.

Prior to this he was Chief Executive of the Environment Agency for 7 years.

Paul is a member of the government's Natural Capital Committee, the Centre for Ecology and Hydrology's Advisory Committee and the Scottish Government's Rural and Environment Science Strategic Advisory Board. He chairs the Bedfordshire Local Nature Partnership and is a board member of the Institute of Environmental Management and Assessment. He is a non-executive director of Flood Re and a Patron of the UK Environmental Law Association.

NOTES

Five Rivers

ENVIRONMENTAL CONTRACTING

www.five-rivers.com

01722 783041

Aquatic Ecology

Rivers & Wetlands

Design & Build

Habitat Creation

Ecological Mitigation

Catchment Assessment

Environmental Consultancy

Wetland Restoration

Fish Passage

Riparian Management Invert Sampling

Hibernacula creation Habitat Monitoring

Macrophyte sampling Flood Alleviation

Lake & Pond Fish Rescue

Management Crayfish Survey

Woodland Management

Abstraction Monitoring ISO 18001

Floodplain Reconnection

Habitat Monitoring De-silting
Flex MSE®

ISO 9001 Tree Felling Bat & Bird Boxes

Invasive Species Management ISO 14001

Tree Coppicing Fish Removal

Kingfisher bank creation Hydroseeding

Session 5:

Conference Suite 3

Workshop A:

A Focus on Floodplains

Facilitator: Emma Rothero (Floodplain Meadows Partnership)

RRC Lead: Josh Robins

We will present information on the extent of different landuses in English floodplains, what the issues are in terms of ecosystem service delivery, and what natural capital different landuses provide in floodplains, through two presentations. These will be followed by a discussion session to explore the meaning of regulated vs unregulated hydrology (what is natural and what isn't?) and to what extent are our floodplains regulated. We will pose questions to discussion groups asking what solutions there might be to unwanted regulation, and whether regulation is always good/bad? We will be looking for ideas to celebrate our socio-economic heritage, which has relied on regulated hydrology to a greater or lesser degree. Throughout this session, we will use technology to display answers to questions from the groups. A case study will be presented from the UK on floodplain restoration. We will use this case study to discuss this wider question of regulation of hydrology and the issues around re-wilding.

For the second discussion session, we will present a second case study looking at large-scale multi-objective floodplain restoration in California. We will pose questions about how do you decide what habitat to aim for in your restoration project. The second discussion session will focus on extracting delegates experience of river and floodplain restoration, what opportunities and challenges there are with such projects, and where are the skills gaps. Throughout this session we will use technology to gather feedback using on-line mind mapping tools.

The workshop will be facilitated by Emma Rothero (Floodplain Meadows Partnership), Ann Skinner (Floodplain Meadows Partnership and River Restoration Centre), George Heritage (AECOM), Neil Entwistle (Salford University), Martijn Anthéunisse (Wiltshire Wildlife Trust) and Chris Bowles (CBEC Eco-engineering)

KEY PLAYERS IN FLOODPLAIN DEGRADATION

S. BENTLEY¹, N. ENTWISTLE² & G. HERITAGE¹

1 AECOM, 2 University of Salford

Active temperate alluvial rivers flood quite frequently and rework valley floor deposits creating a variety of floodplain morphologic units that are linked with the main river. The result is a morphologically and ecologically varied wetland dominated ecotone whose diversity is maintained by the action and flooding and shallow groundwater processes. Floodplain areas are, however, sensitive to disruption and many have been significantly degraded as a result of activities that alter flow processes and manage vegetation communities. Analysis of floodplain land use for rivers in England since 1990 reveals intense and near ubiquitous modification of natural floodplain characteristics. Very little floodplain remains as rough largely uncultivated areas with the majority subject to farming pressures. This paper reviews the progressive loss of natural floodplain in England and investigates the impact that this has had on natural floodplain functioning, floodplain ecology and flooding regimes.

MULTI-OBJECTIVE FLOODPLAIN RESTORATION FROM CALIFORNIA, USA

C. B. BOWLES¹

1 cbec eco-engineering

This presentation is an update and an extension to a presentation given at the RRC Conference in Brighton in 2017. Here a more in depth investigation of two large scale floodplain restoration projects (case studies) will be presented as examples of floodplain restoration in California, showing the successes and shortcomings of these projects. The first, the Bear River Levee Setback Project, constructed in 2005, was the first of its kind in California and the exposed floodplain that has been reconnected to the river now has a flourishing riparian forest that has established on the frequently inundated floodplain. The second case study that will be presented is the Southport Levee Setback Project in Sacramento, California. This project is currently under construction. It is unique in its location and design in California. A lot can be learned from large scale projects like these from overseas.

HIGH IMPACT RIVER AND FLOODPLAIN RESTORATION OF THE HAMPSHIRE AVON NEAR UPAVON

M. ANTHEUNISSE¹, P. WELLER¹, R. SPENCER² & L. DAHL¹

1 Wiltshire Wildlife Trust, 2 Five Rivers Environmental Contracting

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. The partner organisations leading on the River Avon Restoration Plan– the 2017 UK Riverprize winner – aim to improve this by delivering habitat improvement and river restoration projects on the ground.

This individual project, led by the Wessex Chalk Streams Project focussed on restoring the Upper Avon south of Upavon. In September and October 2017, a new channel of approximately 400 meters length was excavated in the middle of the floodplain, and the existing, artificial channel at the edge of the floodplain was filled in. A 1d/2d hydraulic model helped with identifying optimum dimensions, length and gradient of the channel. The floodplain was lowered and reconnected, gravel and wood was introduced in the channel. In the winter, volunteers helped planting a native wet woodland on the floodplain.

NOTES



old channel



cartographer

Integrated monitoring, mapping
and interpretation
for environmental groups

All of your data in one place

Collect all the data you need and analyse multiple datasets directly within the software. Upload photographs, PDFs, MS Office or any other type of file and store them alongside of your surveys.

Smart, easy to use surveys

Minimize training requirements with bespoke surveys that match your needs, interests, and capabilities. Our integrated QA process lets you sense-check data before making it available.

Instant maps and reports

Our interactive maps automatically update with no manual publishing step. Share data instantly with volunteers, partners, and the public. Choose the level of visibility for your needs.

Visualizations to inform and engage

Publish maps with integrated data and clear visuals in your bids and reports. Add maps to your web page to keep your followers and wider community updated on activities.

Used by trusted organisations across the UK



Book a free no obligation demo at

<http://www.cartographer.io>

Session 5:

Conference Suite 4

Workshop B:

Large Wood in Rivers

*Facilitators: **Angela Gurnell (Queen Mary University of London)***

*RRC Lead: **Chiara Magliozzi & Marc Naura***

Large wood (LW) has become an integral component of many river restoration schemes. Several studies have shown that the introduction of wood into a stream induces changes in river hydrology, geomorphology and ecology. The connection between wood structure and its ecosystem functions has not been extensively described in a restoration context.

Therefore, the aim of this workshop is to discuss the benefit of large wood by sharing the latest science and best-practice with regards to incorporating wood in rivers. We will tease out the role of LW in ecosystem functioning using evidence from geomorphology and ecology, and we will discuss the advantage and disadvantages for river restoration.

THE INFLUENCE OF LARGE WOODY DAMS ON SEDIMENT DYNAMICS

M. MCPARLAND¹ & J. HOOKE¹

1 University of Liverpool

Research on Large Woody Dams (LWDs) has typically focused on quantifying the contribution LWDs make to attenuating flooding by modelling changes to a stream's hydrograph and hydraulics. However, the impacts that LWDs can have on sediment dynamics has been overlooked. Based on analogous literature examining naturally occurring woody debris, it was hypothesised that changes to sediment deposition and erosion caused by the construction of LWDs, would reduce their effectiveness as a flood defence measure.

This was investigated by monitoring and modelling LWDs that were installed on a small stream in Northwest England. Significant sediment deposition was observed to occur, reducing the flood water storage capacity of the LWD. Erosion of the stream bed has also caused the stream flow to undercut the dam. This demonstrates that the effectiveness of this NFM measure can lessen over time which is currently rarely accounted for in the planning or design of LWDs, presenting a source of risk.

THE IMPACT OF WOOD ON BENTHIC AND HYPORHEIC INVERTEBRATES

C. MAGLIOZZI¹, R. GRABOWSKI¹, A. ROBERTSON² & M. JANES³

1 Cranfield University, 2 Centre for Research in Ecology, 3 River Restoration Centre

Large wood (10 cm diameter and 1 m long- LW) is a key element of river channels and one of its hypothesised benefits is an increase of hyporheic exchange flow which drives ecological diversity. However, this connection has not been well evidenced in empirical studies of hyporheic invertebrates. This study examined the effects of submerged, channel-spanning LW on the hyporheic and benthic invertebrate communities. Invertebrates were surveyed seasonally in the Hammer stream (UK) along with measurements of streamflow, sediment size, water chemistry and wood morphology. Results show that LW produces consistent patterns of habitat variability within the reaches. Such effects were more visible in the sandy reach, where wood represents the main source of in-channel structural complexity. Results of invertebrates' diversity, abundance and biomass will be presented. This study is improving our scientific understanding of how wood impacts on biological communities.

PRACTICAL ASPECTS OF USING LARGE WOOD IN RIVER RESTORATION & CHANNEL MANAGEMENT

D. HOLLAND¹

1 Salix

Large wood can be used to create multiple benefits in watercourses, however practical issues can reduce the potential applications and limit successful delivery. Using several case studies the best methods to anchor wood in the long term are considered as is how to introduce wood into artificial high energy channels. Case studies will look different large wood techniques based on range of differing risks and energy (River Rhiw Channel stabilization, Cwmparc large wood scheme). Sourcing of suitable wood is discussed as well as key design and installation lessons learned.

WOOD IN RIVER RESTORATION AND NATURAL FLOOD MANAGEMENT: EMULATING NATURAL RIVER FORMS AND PROCESSES

A. GURNELL¹

1 Queen Mary University of London

As a result of a long history of land clearance coupled with intensive riparian tree and wood management, the presence of riparian woodland and wood along British rivers is limited. Recently large wood has started to be reintroduced during restoration and natural flood management activities, but it is essential to apply such measures in appropriate quantities, locations and with designs that mimic natural tree-wood features if these activities are to be sustainable. This presentation will highlight the knowledge that is needed to support wood emplacement activities including the characteristics of the riparian tree species that are present and the wood that they produce; the importance of the size of the river relative to the size of the trees and wood pieces; and the way trees, wood and geomorphic processes interact across rivers and floodplains of different energy and style.

NOTES

Session 5:

Conference Suite 1

Workshop C:

River Restoration for Biodiversity

Facilitator: **Angus Tree (Scottish Natural Heritage)**

RRC Lead: **Martin Janes**

With much focus on meeting WFD targets, how can we be sure we are looking beyond immediate outputs at the long term integrity of our river systems?

This workshop will focus on the benefits and evidence for specific techniques for river restoration - how they improve the natural function of rivers and positively influence the ecology of that system for its biological communities and associated habitat.

We will set out progress on this IUCN branded UK and Republic of Ireland task since 2013 (summarised in the 2016 report – [River Restoration and Biodiversity: Nature-Based Solutions for Restoring the Rivers of the UK and Republic of Ireland](#)). Two short presentations will outline A, the importance of understanding historic geomorphic change to inform natural process based restoration decisions, and B, the findings of recent evidence reviews (REFORM) on the justification for commonly implemented river restoration techniques. We will then discuss the experience of the audience in relation to techniques where the evidence is deemed to be strong, and how this might be strengthened further. We will also present and discuss the nine less well understood techniques that the IUCN steering group has chosen to focus its efforts to raise significant funds to implement demonstration and evidence projects.

After the break we have two short presentations on gathering evidence and analysing the results in a robust way. A, focussed on a single key species - Freshwater Pearl Mussel, and B, as applied to all projects whatever the focus or scale. The discussion session will range across experiences and constraints to gathering meaningful evidence, and then what the critical needs and challenges for the any big experimental projects which can inform all future more modest cost-constrained evaluation requirements.

The Workshop will be facilitated by Martin Janes (RRC), Angus Tree (SNH), Phil Boon (FBA/RRC), Judy England (EA), Jenny Wheeldon (NE) and by our speakers Matthew Hemsworth (JBA Consulting), Ceri Gibson (FBA) and Jennifer Dodd (Veritas Ecology).

RESTORING FRESHWATER MUSSEL RIVERS

C. GIBSON¹, R. A. SWEETING¹, C. WEST², M. WEST³, S. HIRST⁴, I. MOSER⁵

1 Freshwater Biological Association, 2 West Cumbria Rivers Trust, 3 South Cumbria Rivers Trust, 4 North York Moors National Park, 5 Devon Wildlife Trust

The Freshwater Pearl Mussel (FPM), *Margaritifera margaritifera* is critically endangered (IUCN 2011), in decline throughout its range and currently protected by the Habitat's Directive. Its complex lifecycle requires a healthy salmonid population and clean, non-compacted, stable river gravels particularly for the earlier life stages. River restoration requires clear validation. FPM and its reliance on salmonids provide a useful long-term case study.

After 10 years of conservation and captive-rearing of *Margaritifera margaritifera* at the Freshwater Biological Association Ark, Windermere and a more recent 3 year national river restoration project the first juvenile mussels have been reintroduced to their native river and are being monitored for survival. This paper discusses the design of a short-term project requiring annualised deliverables alongside the

wider catchment and historic considerations as well as presenting monitoring requirements for the reintroduced juveniles.

UNDERSTANDING HISTORIC CHANGE AND USING NATURAL PROCESSES TO INFORM FUTURE DECISION MAKING

M. HEMSWORTH¹ & S. ROSE¹

1 JBA Consulting

Too often flood risk management schemes have been implemented with little regard for historic catchment change or understanding. A traditional engineering approach has frequently been applied, and the flooding problem has been pushed elsewhere. Any form of river works need to understand catchment wide processes and flow regimes. Crucially, an understanding of how the channel has been modified over time will improve our understanding of existing channel processes and responses, which should be used to inform future restoration and flood risk management schemes. This presentation uses recent examples from across the UK to discuss the lessons learned to date, potential cost implications and savings, together with the challenges ahead to overcome the engineering barrier in order make this approach more attractive to landowners and regulators.

NOTES

Session 5:

Conference Theatre

Workshop D:

Natural Capital and Ecosystem Services: Accounting for Benefits

Facilitator: **Jenny Mant (Ricardo)**

RRC Lead: Josh Robins

There are a plethora of approaches to Natural Capital Accounting and ecosystem service benefit assessment along with a growing set of open source data sets that can be used to help support benefits assessments. Whilst it may on the surface appear 'relatively' easy to speculate benefits, trying to identify which is the best approach to use for a specific scheme is not always clear. Similarly handling and understanding different spatial scales and ascertaining the extent of benefits can add the complexity.

This workshop will aim to discuss the needs of different sectors in terms of understanding natural capital. It will provide a forum to discuss different approaches, assess how we can apply financial values to restoration projects and identify how NCA and ecosystem service assessment is valuable to a range of stakeholders.

MONETISING ENVIRONMENTAL BENEFITS – THREE CASE STUDIES

S. MASLEN¹, A. PETTIT¹ & C. ANDERTON¹

1 JBA Consulting

In a world of restricted budgets and competition for limited funds, the ability to demonstrate that your project costs are outweighed by the benefits, in addition to achieving the stated aims and wider benefits, is becoming ever more important. Whilst there are a multitude of techniques available to consider and qualify project aims and any wider social/environmental benefits, the failure to quantify the monetary benefits of restoration projects can risk underselling a business case. We will present practical applications into the monetisation of environmental benefits for three quite different environmental improvement projects: a managed realignment in Wales; forestry planting in Nottinghamshire; and NFM in an urban catchment in Scotland. We will highlight practical tools and applications for these three diverse projects and illustrate the types of benefits that can easily be valued and incorporated within a benefit-cost assessment or to assist with obtaining partnership funding.

WHAT HAVE WETLANDS EVER DONE FOR US?

M. BARKER¹ & D. GASCA¹

1 Atkins

What ecosystem services do wetland provide us with? How can we communicate their value to an external audience? Should we invest in restoring degraded wetlands or creating new ones? And how can we unlock funding to create more of what we want? These are all questions that natural capital valuation can help us answer.

This paper will present a framework for assessing river and wetland ecosystems. It will also describe the role of partnership working in the collection of data to support these assessments. We will discuss the use of natural capital valuation in demonstrating the impact of Camley St Natural Park, an urban wetland 1 ha in size located in King's Cross, London and how it helped unlock the funding to construct new visitor facilities. We will contrast this urban assessment with examples from more rural settings that identify ways of planning for the delivery of multiple benefits.

Session 5:
Conference Suite 2
Workshop E:
Managing Sediment already in Rivers

*Facilitator: **Simon Whetton (APEM Limited) & Di Hammond (Affinity Water)***
*RRC Lead: **Alexandra Bryden***

The mobilisation of fine sediment in watercourses creates a number of issues and is often difficult to manage. The costs of removing fine sediment are often substantial and ever tightening waste regulations mean that it is becoming harder to beneficially use dredged material.

The workshop will build upon the session from last year's conference on sediment sources and pathways, and will explore options to deal with fine sediment that is already in the channel – either managing it *in situ* in the watercourse or removing it for disposal. Where possible, we will identify the consents/permits required and how permit exemptions can be used to provide options for the disposal of excavated material.

A PROJECT PLANNING TOOL FOR RE-PROFILING AND DE-SILTING ACTIVITIES

L. O'DEA¹ & R. HAINE¹
¹ frog environmental

River restoration may require the re-profiling or de-silting of a channel or feature to improve the hydrological regime and ecological status. This activity has the potential to suspend silt and result in a large volume of wet material that may become waste. It is critical to understand the potential human and environmental impacts of handling such material as well as determining the most appropriate end use or disposal route in advance of starting the work. The material handling costs can equate quickly should this not be adequately addressed in project planning.

Frog environmental will lead you through their basic planning tool that outlines a series of questions designed to trigger site specific actions to protect both human and environmental receptors throughout the project phases and promote compliance with environmental regulation.

NOTES

Session 5:

Site Visit 1 – Titchfield Park and Day Brook

*Site visit lead: **Claire Sambridge (Nottingham Wildlife Trust), Lee Sycamore (Ashfield District Council) & Rebecca Brunt (Environment Agency)***

This will be a two part site visit to a couple of urban projects in Nottingham. We will visit Titchfield Park where a small brook has been broken out of a concrete channel. Here, good stakeholder and community engagement was essential for the project to go ahead.

First created in 1914, Titchfield Park in Hucknall includes areas for formal recreation as well as a range of more informal, wildlife-friendly habitats. Titchfield Brook runs through the centre of the site and until recently has been formally constrained by its containment within a block-lined channel. 'Wetland Landscapes for All' funding has enabled Ashfield District Council to restore a stretch of the channel to a more natural and wildlife rich habitat. The brook has been 'broken out' of its channel for a length of 50m on the northern side to create a meandering stream with baffles, riffles and pools providing varied habitat. Seeding and planting was carried out by pupils from the local Broomhill Junior School and the Friends of Titchfield Park volunteer group to aid in rapid establishment of high quality wetland habitat. It is hoped that this has provided a stepping stone for further improvements to the remaining length of Titchfield Brook which are currently in discussion.



Titchfield Park, Hucknall channel naturalisation works



Titchfield Park following construction



Day Brook, July 2008, the new channel running through a flood storage area and the old channel infilled on the left

We will also visit Day Brook, another site where improvements have been made to improve the biodiversity and conservation value of an urban greenspace. There are two sections along Day Brook – one where the brook has been taken out of a straightened channel; and one site designed as a habitat feature.

Session 5:

Site Visit 2 – Croxall Lakes

Site visit lead: Nick Mott (Staffordshire Wildlife Trust) & Andrew Crawford (Environment Agency)



Croxall Lakes is a 50 hectare nature reserve that lies at the confluence of three major Midlands' rivers: the Tame, the Trent and the Mease. Croxall is situated just off the A38 between Lichfield and Burton-upon-Trent. It is also at the heart of the Central Rivers Initiative (CRI) which is one of The Wildlife Trusts' Living Landscape projects.

The site at Croxall was a Redland (now Tarmac) sand and gravel quarry until the mid-late 1980s. The restoration was dominated by a large, deep, rectangular sailing lake. Approximately 30% of the site was infilled with pulverised fuel ash from Drakelow Power Station. The National Forest Company purchased the site as a new nature reserve in 2000 and then sold the majority of the holding to Staffordshire Wildlife Trust (SWT). Several phases of river rehabilitation were previously completed by SWT and the Environment Agency between 1997 and 2008.

The main aim was to recreate some of the habitats which were once common features along our main rivers prior to their modification in the 19th and 20th centuries. It's ironic that some of the driest places in the Trent valley are the top of the riverbanks. This demonstrates just how heavily our main rivers have

been engineered in the past. They have been deepened and straightened and the riverbanks have been raised to reduce the frequency of flooding. Natural processes have been controlled and natural features such as river islands, anastomosing rivers, gravel shoals, backwaters and swamp margins have been deleted. At Croxall we wanted to unshackle the river from its engineered channel and allow it the freedom to 'express' itself over time and allow it to 'generate its own habitats'. The river was once much shallower and wider. Simply removing material away from the river margins and widening the channel (over 90 metres in places) would, we felt, provide conditions to activate new areas of deposition and biocomplexity.

The whole scheme has been an experiment to try new river rehabilitation techniques. It is being carefully monitored to identify how successful these trials have been in terms of new habitats and favourable responses from wildlife.

A baseline geomorphological survey was been carried out by JBA Consulting and the University of Salford. Ongoing monitoring by the science partners has helped evaluate the effectiveness of these techniques.

The aim is to use the scheme for demonstration purposes to inspire similar work at appropriate locations in the Central Rivers Initiative (CRI) area and elsewhere in the UK. We are particularly keen to encourage mineral companies, mineral planners, local authorities, the Environment Agency and local communities to get together to consider river widening schemes at other appropriate existing and former quarry sites. The CRI Action Plan has targets to promote river widening schemes at Tucklesholme, Barton, Barton West and Whitmore Haye quarries. Further afield, Uttoxeter Quarry, on the River Dove, would also be a superb site to undertake a similar phased project.

NOTES



Soil Stabilisation and
Erosion Control Specialists

RIVER RESTORATION, EROSION CONTROL & SOIL STABILISATION EXPERTISE



Bioengineering Products

- Pre-planted Coir Rolls • Coir Pallets
- Brushwood Faggots • Grass Seed
- Live Willow Revetments • Rock Rolls
- Rock Mattresses • Silt Fence • Silt Curtains
- Covamat Fresh • Floating Islands
- Covamat Plus • Pre-seeded ECB
- Non-seeded Biodegradable Blankets and Nets
- River Mat • Sediment Control

Envirolok Vegetated Wall System

“Envirolok” is a vegetated mechanically stabilised earth wall system for retaining walls, slope stabilisation, erosion control and shoreline protection. “Envirolok” enhances the natural surroundings and turns what was once unstable soil into a beautiful focal point.



GEOWEB®

Greenfix offer the World's best cellular confinement system for Bank and Shoreline Protection, Channel Protection, Earth Retention, Load Support, Slope Protection and Tree Root Protection.



info@greenfix.co.uk | 01608 666027 | greenfix.co.uk



clean
water

waste
water

water
courses

civils

SPECIALIST CONTRACTORS FOR THE CONSTRUCTION & MAINTENANCE OF WATERSCAPES & WATER COURSES

REFURB/MAINTENANCE: IMPOUNDING & SERVICE RESERVOIRS - WATER TOWERS - CLEAN & SEWAGE TREATMENT WORKS DAMS - SPILLWAYS - AQUEDUCTS - PIPE BRIDGES - PIPEWORK - BUNDS - TANKS & VESSELS **SERVICES:** INSPECTION/SURVEY - RELINING - SPECIALIST COATINGS - CORROSION PROTECTION - WATERPROOFING CONCRETE & STEEL REPAIRS - CLEANING & CHLORINATION - FLOOD ALLEVIATION **DESIGN/INSTALL:** STEEL WATER CONTROL STRUCTURES - M&E **CIVILS:** NEW BUILD RESERVOIRS & TANKS - LAGOONS - DEEP EXCAVATION - PIPEWORK - VALVES - DRAINAGE - RETAINING WALLS **WATER COURSES:** ENVIRONMENTAL - PONDS - LAKES - REVETMENT - RIVERS - STREAMS - CANALS - EMBANKMENTS - WEED CONTROL

Session 6:

Conference Theatre

Natural Processes and Morphological Adjustment

THE IMPORTANCE OF DECADAL SCALE MORPHOLOGICAL CHANGE IN FLOOD RISK MANAGEMENT – THE CASHEN ESTUARY, COUNTY KERRY

C. BARRETT-MOLD¹

1 Black & Veatch

This presentation examines the importance of understanding historical morphological evolution and processes when assessing management for flood risk. The Cashen Estuary (Co. Kerry) is typical of the estuaries of western Ireland. The wider catchment is predominantly agricultural and is managed with an extensive artificial drainage and polder system. To minimise the duration of flood inundation the main river channel has been historically dredged to maintain effective land drainage. As part of a review of current flood risk management in the catchment a hydromorphological study of the estuary was used to inform future management. This study identified a rapid progradation of the dune system 160 years ago. The resulting constriction had the effect of throttling and increasing the period of the ebb tide with consequent impacts on sedimentation and hydrology. Identification of this key control meant that informed management options could be proposed that were effective and sustainable.

LET THE RIVER ERODE! GIVING A GRAVEL-BED RIVER BACK ITS FREEDOM SPACE...WHAT DO YOU GET?

R. WILLIAMS¹, H. MOIR², J. WHEATON³ & E. GILLIES⁴

1 University of Glasgow, 2 cbec eco-engineering/University of the Highlands and Islands, 3 Utah State University, 4 cbec eco-engineering/University of Glasgow

River restoration practice tends to interpret geomorphic “stability” as “static” & thus promotes restoration designs that create & maintain a prescribed morphology. Resilient river systems typically adjust their morphology; such systems yield diverse & productive habitats. However, restoration practitioners & managers don’t always identify “increased dynamism” as a design objective. This presentation will answer the question: “if we let what was once a dynamic, wandering gravel-bed river erode its banks again, do we get more diverse in-channel habitat?” We use a timeseries of topographic surveys at the Allt Lorgy (Scotland) restoration scheme to systematically map geomorphic unit (GU) mosaics, using GUT (GU Toolbox) software. Results show restoration created a rich assemblage of GU diversity. This presentation provides: (i) the first systematic quantification of how GU diversity increases with freedom space; (ii) a framework for using HRT surveys to test process-based design hypotheses.

SEDIMENT AND MANAGED NATURALISATION: RESULTS FROM THE MONITORING OF SWINDALE BECK

G. HERITAGE¹, L. SCHOFIELD² & N. ENTWISTLE³

1 AECOM, 2 RSPB, 3 University of Salford

Restoration of rivers in the UK has undergone a significant change over the last decade with approaches favouring channel and floodplain modification that is in line with current fluvial processes to increase the chances of longer term success. The recognition that a river can do a lot of the restoration work itself has become recognised and river naturalisation, where minimal targeted intervention is designed to rejuvenate fluvial features and processes, has become a popular approach to improving our river and floodplain systems. Here we review the short term (18 months) response of Swindale Beck, an active upland gravel bed river in the English Lake District, to naturalisation. Monitoring of the site has occurred following works on almost 3 km of watercourse, changing the

system from a straight revetted plane bed system to a mixed, pool-rapid and sinuous single thread system strongly connected to its former floodplain.

HOW DO WE PROPERLY IMPLEMENT THE PROCESS-BASED RIVER RESTORATION APPROACH?

H. MOIR¹ & E. GILLIES²

1 cbec eco-engineering/University of the Highlands and Islands, 2 cbec eco-engineering/University of Glasgow

Restoration projects often involve a limited number of design components and are spatially restricted. Therefore, application of the 'process-based' approach is limited, with the impacts to physical process not able to be fully addressed. We present information from a large-scale river restoration project in the headwaters of the River Nairn, Highland where designs were implemented over >60% of mainstem river length. The river had been straightened/ embanked, with the channel becoming perched above its floodplain. The approach is fundamentally process-based with specific design elements including channel realignment, gravel augmentation, large wood placement, embankment removal and wetland development addressing the root causes of impacts to geomorphic condition. Repeat topographical and sediment surveys reveal rapid channel adjustment towards increased complexity, especially close to large wood structures. Biological sampling will monitor ecological responses to physical evolution.

NOTES

Session 6:

Conference Suite 2

Approaches to Planning and Implementation

RIVER RESTORATION WIPEOUT

D. HAMMOND¹ & S. WHITTON²

1 Affinity Water, 2 APEM Limited

You will all have seen presentations about successful river restoration projects, but what you may not know is some of the detail behind achieving the final product. The path to success is often as tricky to navigate as walking up an algae-covered rock-ramp in the dark and you are guaranteed to get your feet wet, if not more. So, just when you thought it was safe to proceed along the narrow, slippery path towards your goal, yet another issue or bit of bureaucracy swings in from the side, knocks you off your feet and sends you back a few places – maybe back to the Start.

Hazards to negotiate could include fickle landowners, multiple stakeholders with conflicting advice or requirements, inexperienced regulatory staff lacking pragmatism, land designations, protected species, bombs and unmarked utilities and graves.

This presentation aims to illustrate some of these issues and to suggest useful ways to negotiate your way through the River Restoration Wipeout Course.

ALIEN INVADERS AHEAD! – ARE YOU WATCHING OUT FOR THEM?

P. ALDOUS¹

1 Thomson Ecology Ltd

Excellent work is being conducted in river restoration, whether that is to aid in flood mitigation or achieving Good Ecological Potential (GEP), through better river management or removing the restricting structures built in previous years. Yet another hidden danger is lurking out of site that could undermine all this good work - the alien invader. Are you doing all you can to protect the water environment when you're working on site and between sites. This paper explores the risks and mitigation measures that the river restoration supply chain needs to build into business as usual.

SOUTH CALDER WATER – CHALLENGES IN URBAN RIVER RESTORATION

C. PITTNER¹

1 Peter Brett Associates

SEPA and North Lanarkshire Council, embarked on an ambitious project to restore a reach of the South Calder Water flowing through Shotts, North Lanarkshire. The objectives of the project were to restore the river to improve ecological potential, and break the pollutant linkage with the watercourse to improve water quality creating an environment where the local community can enjoy and interact with a revived waterbody. The presentation will cover the methodology and process of restored option selection, with particular focus on the many challenges faced including contamination, mine workings, utilities, topography, restricted working area, land ownerships, public interface and anti-social behaviour.

EROSION RISK SCREENING IN ENGINEERING DESIGN ON MAJOR INFRASTRUCTURE PROJECTS

H. PARSONS¹

1 Jacobs

Changing perception of river engineering solutions to major infrastructure developments poses not only one of our biggest challenges but also some of our biggest opportunities. Following decades of engineering rivers to suit infrastructure design, through current legislation we hold the power to

influence design to reduce environmental impacts upon our watercourses and deliver improvements and mitigation through design. Whilst this change of approach to designing infrastructure and river engineering is taking greater account of fluvial geomorphology, incorporating fluvial geomorphology into design is still often seen as something that can be 'worked around'. This presentation provides examples of design solutions to major infrastructure projects that deliver benefits to the fluvial functioning of rivers and also provides significant benefits to ecology, water quality, and flood risk.

NOTES

Session 6:

Conference Suite 3 **Catchment Scale Thinking**

IMPROVING NATURAL FUNCTIONING AT THE CATCHMENT SCALE

L. WEBB¹ & M. PHILIPS¹

1 Natural England, Catchment Sensitive Farming

This presentation explores the range of measures that have been delivered through Catchment Sensitive Farming and considers their role in catalysing improved hydrological function at the wider catchment scale. Integrated delivery for water quality and flood risk will be examined and questions will be posed on how to improve the links between this work and river restoration programmes.

RIVERLANDS – EXPLORING PEOPLE’S CONNECTIONS TO RIVERS AS A CATALYST FOR CHANGE

R. HIGGS¹

1 National Trust

Riverlands is a programme of work led by a national partnership of the National Trust, the Environment Agency and Natural Resources Wales, and will take place in eleven catchments in England and Wales, with the first phase starting in early 2018 concentrating on seven of these. Covering the rivers themselves, the land that drains into them, and the species and habitats that exist within the catchments, it will also focus on the cultural heritage of the river catchments, including the ties that have bound people to the rivers in the past, the way that people’s lives have been influenced, and their relevance today. A programme approach will give this work real impact on a national scale. Our approach is to start by exploring people's connections rivers: as neighbours, users, visitors or landowners. Through this we will find partners, advocates and supporters and from there will flow land use change. We will outline why we have adopted this approach and how it has developed.

WATER FRIENDLY FARMING: ENGAGING FARMERS IN A CATCHMENT-SCALE RESEARCH DEMONSTRATION PROJECT

J. BIGGS¹ et al.

1 Freshwater Habitats Trust

Water Friendly Farming is a research demonstration project assessing the effectiveness of measures to protect freshwater habitats and the ecosystem services they provide in the rural environment, whilst maintaining the profitability of farm businesses. The project is based in the East Midlands and works closely with a voluntary partnership of farmers in three headwater catchments of the rivers Welland and Soar centred on Tilton-on-the-Hill in Leicestershire. The project, which began in 2010, is intended to provide answers to three key water and land management questions:

- Can we protect and increase freshwater biodiversity without impinging on farm profitability?
- Do land management measures reduce diffuse water pollution?
- Can we hold back water in headwater catchments to help reduce downstream flooding?

From 2011 to 2013 the project created a detailed physical, chemical and biological baseline description of the water environment – ponds, streams and ditches – in three catchments, work which was described in Biggs et al. (2014). From spring 2014 onwards mitigation measures were installed in two experimental catchments to hold back sediments, nutrients and water, and increase the variety of freshwater wildlife (biodiversity) across the landscape. A third catchment is used as a control where no changes are being made.

NETWORK TOPOLOGY: THE “MISSING LINK” IN UNDERSTANDING CATCHMENT CONTROLS ON INSTREAM HABITATS?

E. L. HEASLEY¹, N. J. CLIFFORD², J. D. A. MILLINGTON¹ & M. A. CHADWICK¹

1 Kings College London, 2 Loughborough University

The structure of the river network, or network topology, is often either over-simplified or ignored by catchment-scale assessments. This is despite evidence that morphological and ecological changes occur at confluences due to inputs of water and sediment from incoming tributaries. This presentation will give a brief overview of how network topology influences instream functioning and presents original research using data from the River Habitat Survey to identify how instream habitat diversity is impacted by the spatial position and characteristics of confluences in the river network. Examples from the Demonstration Test Catchments illustrate how habitat diversity generally increases as the network becomes denser, and how only specific confluences impact habitat diversity. The presentation will also discuss how to make the most of the natural diversity provided by the network in the context of restoration.

NOTES



When it comes to river restoration, the team at Thomson Ecology are your go-to experts.

Our specialists have delivered high-profile assessments, improvements and monitoring programmes on some of the most complex and challenging projects in the UK freshwater environment.

With a sharp focus on delivering robust and accurate outcomes for our clients, we help you meet regulatory, stakeholder and planning requirements, enabling the sustainability of our rivers, and their wildlife.

As specialist environmental consultants, Thomson Ecology can help you with all your river restoration requirements, including:

- **Planning and design**

- Initial site appraisal including river habitat surveys and ecological assessments
- Development of phased management plans
- Scheme design using industry standard software CAD, and GIS mapping and flow modelling
- Consenting and permitting.

- **Specialist river restoration contract services**

- Large scale works including dredging, bed level raising, meander and backwater creation, channel narrowing and flood plain reconnection
- Installation of flow deflectors, groynes, woody debris and log jams
- Planting and management of marginal and aquatic vegetation
- Removal and/or modification of obstacles to fish migration and movement
- Design and installation of fish passes.

- **Pre and post restoration monitoring**

- Quantitative and qualitative fish surveys using netting and electric fishing techniques
- Macroinvertebrate surveys and calculation of biotic indices (RICT/RIVPACS, WHPT, BMWP and ASPT)
- Water quality monitoring utilising in situ probes and laboratory testing
- Invasive non-native species surveys covering fish, macroinvertebrates and macrophytes.

Talk to us today about your river restoration requirements!



Ricardo
Energy & Environment

Water and Environment

About us:

Ricardo Energy and Environment are a nationally and internationally recognised consultancy offering a comprehensive range of specialist water and environmental services. Within the UK our diverse portfolio of clients includes regulators, water companies, developers, government and catchment partners.

We provide:

Catchment scale to local scale solutions, to complex environmental issues on land and in water.

Our services:

River restoration and Natural flood management

Options screening and appraisal, expert multidisciplinary advice on river restoration and natural flood management projects. Pre- and post-project appraisal.



Catchment modelling

Creation and application of physically-based statistical and GIS based models. Development and use of 1D and 2D integrated catchment models covering the impacts of land use management measures, land-use change and climate change on hydrology, water quality and sediment dynamics.

Natural capital accounting and ecosystem service assessment

Ecosystems services assessment and valuation of natural capital to support cost-benefit and financial appraisal of catchment management, natural flood management and river restoration schemes.



Geomorphology

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.

Flood risk

Flood Risk Assessment and Strategic Flood Risk Assessment to support strategic planning, planning and flood defence consent applications and EIAs.

Stakeholder engagement

Bespoke focus group facilitation, design and implementation of a wide range of stakeholder engagement activities.

Contact:
Website:

Dr. Jenny Mant
ee.ricardo.com

Email:
Telephone:

jenny.mant@ricardo.com
+44 (0) 1235 753 000

Session 7:

Conference Theatre

INCISED LOWLAND SAND-BED STREAMS IN THE NETHERLANDS

K. C. HUISING¹, R. C. M. VERDONSCHOT² & M. VELDHUIS¹

1 Waterboard Vallei en Veluwe, 2 Wageningen Environmental Research

Due to increasing peak discharges due to land use changes and climate change, the Leuvenumse Beek in the Netherlands, suffers from channel incision and degradation of the stream ecology. Waterboard Vallei en Veluwe and Natuurmonumenten are trying to restore the stream by artificially supplying sand to the stream, creating sand slugs which elevate the streambed and reconnect the stream with its original riparian zone. To assess the impact of this restoration measure on the stream ecosystem, bed morphology, substrate heterogeneity, macroinvertebrate assemblage structure and riparian vegetation composition were monitored since the start of the measures in 2014. After recovery from the initial disturbance, an increase in instream microhabitat heterogeneity and current velocity was observed, which was also reflected in the macroinvertebrate community recorded. Rewetting of the riparian zone resulted in the establishment of fringe of marsh vegetation along the stream margins.

RECREATING ANASTOMOSING STREAMS TO RESTORE CHANNEL-FLOODPLAIN CONNECTIVITY AND RECOVER LOST HABITATS AND ECOSYSTEM SERVICES

C. THORNE¹, B. CLUER² & J. CASTRO³

1 University of Nottingham, 2 NOAA Fisheries, 3 US Fish and Wildlife Service

Prior to the anthropogenic disturbance the majority of alluvial streams featured multi-threaded, anastomosed channels that inundated their floodplains several times a year but restoration design continues to favour single-thread, meandering channels with bankfull capacities equal to the 1.5 year flood. Life cycle modelling demonstrates that a river ecosystem cannot recover fully without at least some reaches being restored to an anastomosing planform, as represented by 'Stage Zero' in the Cluer and Thorne (2013) Stream Evolution Model (SEM). We provide an overview of the SEM, explain how eco-physical processes are both affected by and help drive incised stream evolution and recovery, and use recent restoration projects in upland, mid-basin and tidal streams in Oregon State to illustrate how restoring to Stage Zero can not only reverse the adverse impacts of past disturbances but also build resilience to future disturbance by, for example, changes in climate or land use.

RESTORING UK CATCHMENT SCALE BIODIVERSITY – RIVERS, LAKES, PONDS AND WETLANDS

S. CLARKE¹

1 National Trust

We are increasingly recognising the need to view river restoration at greater spatial scales, placing reach scale restoration in the context of both upstream and downstream reaches and the wider catchment. Addressing the needs of freshwater wildlife requires this and more. I will explore how we might look across the range of different freshwater habitats to take a catchment or landscape scale approach to freshwater conservation. Using examples from completed and ongoing National Trust projects, I will show how a greater understanding of the ecology of key species and the interactions of stressors might help us develop better approaches.



HYDRO APP
SYSTEMS

Applications

- River Restoration, Scour Protection & Natural Flood Management
- Ecology and Habitat Creation
- Landfill and Quarry Restoration
- Land Remediation
- Construction and Quarry Dust Control
- Blast Zone Protection on Airports and Military Bases



Experts in Hydroseeding and Hydraulically Applied Erosion Control



GreenArmor™

GreenArmor™ is the ultimate reinforced vegetation system for:

- Extreme slopes
- Scour protection
- Storm drainage
- Flood defence schemes

The GreenArmor® System is available in three performance options with the following vegetated permissible velocities:

Futerra 7010: 4.9 m/sec
Futerra 7020: 6.1 m/sec
Futerra R45 HP-TRM: 9.1m/sec



New EcoFlex™ HP

- Flexible Growth Medium

- Designed for erosion control and re-vegetation on very steep slopes:

- Provides superior erosion control immediately upon application
- Enhances seed germination without endangering the natural environment
- Retains more than 99% of soil
- Reduces the turbidity of runoff for up to 18 months
- Increases wet bond strength for greater resistance to sheet flow
- Delivers 600% better initial germination and 250% greater biomass than the other specifications

Tel: 0800 470 1508 Email: info@hydro-app.co.uk



HYDRO APP
SYSTEMS



Solutions for your Environment

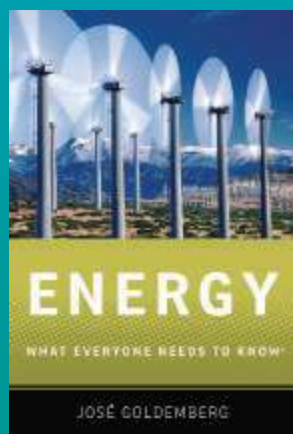


www.hydro-app.co.uk

WHAT EVERYONE NEEDS TO KNOW ABOUT...



£10.99
9780190250171



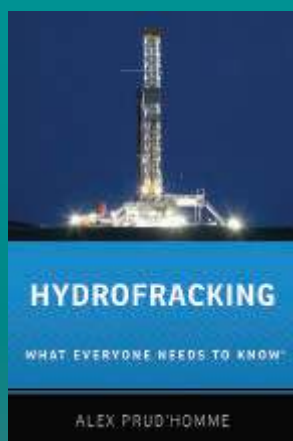
£10.99
9780199812929



£10.99
9780190223076



£10.99
9780199322381



£10.99
9780199311255



£10.99
9780199922017



£10.99
9780199996681



£10.99
9780199798148

Written by leading authorities in their fields, in a concise question-and-answer format, each volume offers a balanced and authoritative primer on complex current issues.

www.oup.com/academic

OXFORD
UNIVERSITY PRESS

POSTER PRESENTATIONS

DURHAM SUITE

Kindly Sponsored by



1

Patterns of geomorphic channel adjustment in upland rivers: a regional scale analysis of channel planform changes over 150 years

H. M. JOYCE¹, J. Warburton¹, R. J. Hardy¹

1 Durham University

2

Ecosystem services foregone when WFD objectives are not met

J. Whitmore¹, L. Haines²

1 JBA Consulting, 2 Natural Resources Wales

3

Trent Gateway – restoring the River Trent

J. R. Freeborough¹, S. Ward¹, M. P. Buck¹

1 Environment Agency

4

Science and Monitoring Underpinning River Restoration: A Case Study

G. D. Gilfillan¹, D. M. Harper², L. Smallwood¹, P. Barham¹

1 Welland Rivers Trust, 2 University of Leicester

5

Overcoming the engineering barrier: A natural approach to tackling contaminated sediment

R. Ing¹, M. Hemsworth¹, A. Thomas¹

1 JBA Consulting

6

Wyre Fluvial Audit – a catchment-based approach to reducing flood risk

N. Todd-Burley¹

1 JBA Consulting

7

Data-driven performance assessments for river restoration schemes

J. R. Cox¹

1 Ricardo/University of Portsmouth

8

Delimiting Freedom Space for Rivers Using GIS and Remote Sensing: Tools for managing functional and resilient river systems

F. Hugue¹, J. L. Eyquem², P. M. Biron³

1 Concordia University/AECOM, 2 AECOM, 3 Concordia University

9

Carrshield Mine tailings tip – working in partnership to resolve potential conflicts between EU Directives

L. THOMAS¹, H. POTTER², T. MILLS³, M. McDONALD¹

1 JBA Consulting, 2 Environment Agency, 3 Coal Authority

10

Determining the effects of restoration on fish and invertebrate community structure in urban rivers

A. M. LAVELLE¹, M. A. CHADWICK¹, N. R. BURY²

1 Kings College London, 2 University of Suffolk

11

Camera based monitoring of chalk streams

M. DUBOIS¹, R. GRABOWSKI¹

1 Cranfield University

12

Dragonfly Detectives: new eyes help to draw a map of London's Odonata

P. SOVIC DAVIES¹, J. CLARKE¹, D. COURTNEIDGE¹, M. FRITH¹

1 London Wildlife Trust

13

Making Space for Water: A Geomorphological Perspective

M. HEMSWORTH¹, R. THROWER¹, S. ROSE¹, K. SHEEHAN¹

1 JBA Consulting

14

In Partnership to Improve the River Don

D. LATHAM¹, R. CARR², M. HOGG³, D. PHILLIPS⁴

1 JBA Consulting, 2 Environment Agency, 3 South Tyneside Council, 4 Tyne Rivers Trust

15

Allan Water: Partnership working without national priorities

L. BELLENI¹

1 River Forth Fisheries Trust

16

Great collaboration leads to great outcomes – river restoration in Warrington

C. MCILWRATH¹, L. SWIFT¹, B. SHORTLAND²

1 Environment Agency, 2 Jacobs

17

Citizen science assessment to link habitats and ecological quality

J. ENGLAND¹, E. BEACH², B. FINN LEEMING³, A. M. GURNELL⁴, G.

WHARTON⁴, L. SHUKER⁵, D. J. GURNELL⁶

1 Environment Agency, 2 University of Hertfordshire, 3 University of Aberdeen, 4 Queen Mary University of London, 5 Thames 21/Cartographer Studios Ltd, 6 Cartographer Studios Ltd

Modular Data Integration: Integrating diverse data to support catchment partnership activities and investigations

18

L. SHUKER¹, J. ENGLAND², A. M. GURNELL³, G. WHARTON³, D. GURNELL⁴

1 Thames 21/Cartographer Studios Ltd, 2 Environment Agency, 3 Queen Mary University of London, 4 Cartographer Studios Ltd

Using the Modular River Survey in river restoration assessment

20

J. ENGLAND¹, E. BEACH², B. FINN LEEMING³, L. SHUKER⁴, L. DOBBEK⁵, A. M. GURNELL⁵, G. WHARTON⁵, D. GURNELL⁶

1 Environment Agency, 2 University of Hertfordshire, 3 University of Aberdeen, 4 Thames 21/Cartographer Studios Ltd, 5 Queen Mary University of London, 6 Cartographer Studios Ltd

The natural capital of temporary rivers: characterising the value of our aquatic-terrestrial ecosystems

21

R. STUBBINGTON¹, J. ENGLAND²

1 Nottingham Trent University, 2 Environment Agency

Quantifying the benefits of Natural Flood Management approaches in Groundwater catchments

22

I. C. SMITH¹, T. SYKES², M. HOLDEN², I. MILLER²

1 University of Southampton, 2 Environment Agency

Integrated River Evaluation for Management (IREM): A Novel Approach to Understanding the Role and Impact of Groundwater-Surface Water Interactions on In-Stream Water Quality

23

R. SMITH¹, L. J. BRACKEN¹, J. WAINWRIGHT¹

1 Durham University

Functional washlands and nature conservation

24

J. J. GRAHAM¹ & C. TERO¹

1 Environment Agency

Restoration Feasibility Study of Deyne Brook, Bury

25

G. HAWLEY¹, C. CHAPMAN¹

1 Penny Anderson Associates

Wooler Water – a wandering gravel bed river on the move!

26

C. M. PATTISON¹, G. HERITAGE², D. LATHAM¹

1 Environment Agency, 2 AECOM

Restoration and Wandering Channels

27

G. HERITAGE¹, C. PATTISON², N. ENTWISTLE³, A. LAVERTY²

1 AECOM, 2 Environment Agency, 3 University of Salford

- 28** **River MImAS 2.0: A tool for assessing the eco-geomorphological health of rivers and for scoping potential restoration measures**
C. BROMLEY¹
1 Scottish Environment Protection Agency
- 29** **Investigating conditions of the rhizosphere in a suburban river in response to WWTP effluent unloading**
S. PARAMJOTHY¹, A. SOROLLA¹, F. SABATER², M. RIBOT BERMEJO
1 Naturealea Conservacio, 2 University of Barcelona, 3 CEAB-CSIC
- 30** **The River Blythe SSSI Restoration Plan**
K. JENNINGS¹, R. THROWER¹, K. SHEEHAN¹
1 JBA Consulting
- 31** **Sociogeomorphic river recovery: integrating human and physical processes**
S. A. MOULD¹, K. A. FRYIRS¹, R. HOWITT¹
1 Macquarie University
- 32** **Hampshire Avon, Western Arm river restoration site monitoring approach for assessing ecological benefits**
E. TUOMINEN¹, A. HOUSE¹, L. DAHL², P. WELLER²
1 Wessex Water, 2 Wiltshire Wildlife Trust
- 33** **Severn Trent Water's Programme of Investigations into Anthropogenic Pressures on Aquatic Ecology in the East Midlands at the Sub-Catchment Scale**
P. DAILY¹, L. DAVIS², A. BANHAM²
1 ESI Consulting, 2 Severn Trent Water
- 34** **Evaluation of a Catchment Management and Lessons for Policy, Practice and Investment**
P. HULME¹, K. FILBY², J. RETTINO²
1 ESI Consulting, 2 Severn Trent Water
- 35** **Developing a natural capital assessment method for water company use**
R. GRIFFITHS¹, D. ROYLE²
1 ESI Consulting, 2 eftec
- 36** **Lower Hawkcombe Stream: Opportunities to establish a more natural course**
A. HALWYN¹
1 JBA Consulting

37

Stream Evolution Triangle: accounting for geology, hydrology and biology in stream restoration

J. CASTRO¹, C. THORNE²

1 US Fish and Wildlife Service, 2 University of Nottingham

38

Working strategically with volunteers

L. E. DAHL¹, G. COLLEY¹, S. J. STORK¹

1 Wiltshire Wildlife Trust

39

BIOTOPES show how, and how well, river restoration projects work

D. HARPER¹, A. AL ZANKHANA², L. SMALLWOOD¹, N. COOMBS¹, P. BARHAM¹

1 Welland Rivers Trust, 2 University of Leicester

40

BACI show how, and how well, river restoration projects work

D. HARPER¹, A. AL ZANKHANA², L. SMALLWOOD¹, N. COOMBS¹, P. BARHAM¹

1 Welland Rivers Trust, 2 University of Leicester

41

IUCN NCUK River Restoration and Biodiversity Project

A. TREE¹

1 Scottish Natural Heritage

42

Integrated Catchment Delivery Events

D. MARTYN¹

1 Environment Agency

43

Natural Flood Management slowing flows in the Evenlode, Thames Basin

J. C. OLD¹, D. McKNIGHT¹, R. BENNETT², V. LEWIS³

1 Environment Agency, 2 Wild Oxfordshire & Evenlode Catchment Partnership, 3 Windrush AEC & Evenlode Catchment Partnership

44

River Prize Finalist – Love Your River Telford

45

River Prize Finalist – Connswater Community Greenway

46

River Prize Finalist – Tame Valley Wetlands Landscape Partnership

47

River Prize Finalist – Hills to Levels



2018 River Champions

THE RRC



RRC Membership; Not yet part of our network of members?

THE RRC



Using the National River Restoration Inventory (NRRI)

THE RRC

NOTES

Specialists in Aquatic Habitat Restoration



Loch of Leys Restoration, Banchory

OHES provides practical solutions to create new aquatic habitats, or to renew and restore those which are damaged or degraded. Our team provides a range of surveys, design and project management capabilities to help our clients realise their aspirations and deliver successful projects from concept to completion.

Our expertise extends to:

✧ Restoration Projects for:

- ✧ Rivers, streams and canals
- ✧ Wetlands
- ✧ Lakes, ponds and formal landscapes
- ✧ Estuarine and coastal habitats (managed realignment)

✧ Water Quality Investigations and Catchment Nutrient Studies

✧ Management Plans and Hydrological Studies

✧ Ecological Surveys and Habitat Assessments

✧ Fisheries Science and Management

✧ Ecological Impact Assessments (EcIA, WFD, HRA)



For further details please contact us
on info@ohes.co.uk
or call 0333 600 2424
www.ohes.co.uk





the River Restoration Centre

Working to restore and enhance our rivers

DELEGATE LISTS

AS COMPILED ON 11TH APRIL 2018

Kindly sponsored by:



Name	Organisation
<u>RRC Staff</u>	
Alexandra Bryden	Information Officer
Martin Janes	Managing Director
Nicola Mackley	Centre Administrator
Chiara Magliozzi	Marie Curie Researcher in River Processes
Marc Naura	Science and Technical Manager
Jackie O'Regan	Accounts Technician
Josh Robins	River Restoration Adviser
<u>RRC Board Members</u>	
Will Bond	Alaska Ecological Contracting Ltd
Phil Boon	RRC Board/Freshwater Biological Association
Fiona Bowles	RRC Board
Ann Skinner	RRC Board
Kevin Skinner	RRC Board/Atkins
<u>Delegates</u>	
Will Akast	Environment Agency
Phil Aldous	Thomson Ecology
Ahmed Al-Zankana	University of Leicester
Tim Anderson	Land & Water Services Ltd
Karen Andrews	Environment Agency
Cliff Andrews	BRCC
Natalie Angelopoulos	University of Hull
Chris Ansell	GeoGrow
Martijn Anthéunis	Wiltshire Wildlife Trust /Wessex Chalk Stream & Rivers Trust
Alison Appleby	Natural England
Sarah Aubrey	Natural Resources Wales
Kate Bailey	North York Moors National Park
Ian Bailey	Kalex Limited
Jon Balaam	Upper & Bedford Ouse Catchment Partnership
Hannah Barclay	Environment Agency
Iain Barker	Cornwall Wildlife Trust
Monica Barker	Atkins
Claire Barrett-Mold	Black & Veatch
Nancy Baume	Environment Agency
Lauren Baxter	Environment Agency
Ellie Beach	Countryside Management Service (Hertfordshire County Council)
Simon Bennett	Environment Agency
Seb Bentley	AECOM
Aiken Besley	Environment Agency
Jeremy Biggs	Freshwater Habitats Trust
Louise Bingham	Arup

Katharine Birdsall	Environment Agency
Maria Bislingen	Norwegian Environment Agency
Claire Bithell	Environment Agency
Mike Blackmore	Wild Trout Trust
Rick Bossons	Alaska Ecological Contracting Ltd
Louise Bowe	River Thame Conservation Trust
Chris Bowles	cbec eco-engineering US
Jackie Bowley	Environment Agency
Gareth Bradbury	WWT Consulting
Andrew Braid	Millard Consulting
James Brand	Environment Agency
Gillian Branson	Natural Water
Natalie Breden	River Thame Conservation Trust
Adam Broadhead	Arup
Tim Brooks	Environment Agency
Jenny Broomby	JBA Consulting
Sue Brothwood	Environment Agency
Rebecca Brunt	Environment Agency
Luke Bryant	West Cumbria Rivers Trust
Joseph Buckman	Environment Agency
Nathan Bunn	Environment Agency
David Bunt	Sustainable Eel Group
Ed Byers	South East Rivers Trust
Daniel Cadman	APEM
Tom Cartmel	Land & Water Services Ltd
Pete Case	Freshwater Habitats Trust
Katherine Causer	Environment Agency
Ka-yan, Karen Chan	Drainage Services Department, The Government of the HKSAR
Richard Charman	Environment Agency
Fei Kit Cheung	Drainage Services Department, The Government of the HKSAR
Stewart Clarke	National Trust
Lee Clarke	Envireau Water
Wim Clymans	Earthwatch Europe
Polly Coleman	Environment Agency
George Colley	Wiltshire Wildlife Trust
Laura Collins	Greenfix
Seamus Connor	Department of Agriculture, Environment and Rural Affairs
Niall Cook	Environment Agency
Rosie Cope	Anglian Water Services
Thomas Cowan	Department of Agriculture, Environment and Rural Affairs
Jennifer Cox	Ricardo Energy & Environment
Marleen Crabtree	cbec eco-engineering UK Ltd
Nicola Craven	Lincolnshire Rivers Trust
Andrew Crawford	Environment Agency
Judith Cudden	Jacobs
Jo Cullis	Jacobs

Lev Dahl	Wiltshire Wildlife Trust
Paul Daily	ESI Consulting
Peter Dam	Natuurmonumenten
James Darke	WWT Consulting
Keith Davie	Environment Agency
Dewi Davies	National Trust
Bella Davies	South East Rivers Trust
Basil Dean	Environment Agency
Ashley Deane	Cheshire Wildlife Trust
Kelly Ann Dempsey	River South Esk Catchment Partnership
Casey Denman	Environment Agency
Liam Dennis	Environment Agency
Ian Dennis	Royal HaskoningDHV
Lewis Dickinson	Wildlife Trust BCN.
Andrew Disney	Environment Agency
Jennifer Dodd	Veritas Ecology
Kimberley Dodge	Kingcombe Stonbury
Yi Dong	University of Birmingham
Andrew Down	Natural England
Prof Alastair Driver	University of Exeter
Mickael Dubois	Cranfield University
Richard Edwards	Salix
Judy England	Environment Agency
Caroline Essery	Environment Agency
Jane Everett	Affinity Water
Duncan Ferguson	Spey Fishery Board
Karen Fisher	Buckinghamshire County Council
Laura Foden	Arup
Jo Fraser	Groundwork MSSTT
Alex Fraser	Jacobs
James Freeborough	Environment Agency
Galen Fulford	Biomatrix
Sarah Gaffney	Environment Agency
Lizzie Gardner	Arup
Madeleine Gardner	Environment Agency
David Gasca	Atkins
Helen George	Environment Agency
Sally German	Arup
Ceri Gibson	Freshwater Biological Association
Eric Gillies	cbec eco-engineering UK Ltd
Rachel Gordon	Environment Agency
Alan Graham	Trent Rivers Trust
Andy Graham	Wildfowl & Wetlands Trust
Ruth Green	Arup
Rosanna Griffiths	ESI Consulting
Dawn Grundy	Environment Agency

Dave Gurnell	Cartographer
John Gurnell	Cartographer
Angela Gurnell	Queen Mary University of London
Bill Gush	Land & Water Services Ltd
Richard Haine	frog environmental
Edward Hall	Amenity Water Management Ltd
Anissia Halwyn	JBA Consulting
Gene Hammond	Penny Anderson Associates Ltd
Diana Hammond	Affinity Water
Gail Hammond	Environment Agency
Josh Hammond	Lincolnshire Chalk Streams Project
Bethany Hancock	Atkins
Kathryn Hardcastle	River Nene Regional Park CIC
David Harper	Welland Rivers Trust
Heather Harrison	Environment Agency
Ruth Hawksley	Wildlife Trust BCN
Gerard Hawley	Penny Anderson Associates Ltd
Roy Hayes	FWAG SW & CSF
JoJo Head	Earthwatch Europe
Sarah Healy	Environment Agency
Suzanne Hearn	Natural Resources Wales
Eleanore Heasley	King's College London
Matthew Hemsworth	JBA Consulting
George Heritage	AECOM
David Hetherington	Arup
Richard Higgs	National Trust
Nick Hill	Environment Agency
Winnie HO	The Government of Hong Kong Special Administrative Region
Sadie Hobson	Natural England
Sophie Hocart	Five Rivers Environmental Contracting
David Holland	Salix
Jayne Hornsby	Land & Water Services Ltd
Samuel Horton	University of Birmingham
Jill Howells	Natural Resources Wales
Daryl Hughes	Newcastle University
Samantha Hughes	South East Rivers Trust
Christian Huising	Waterboard Vallei en Veluwe
Toby Hull	South East Rivers Trust
Claire Hutchinson	Wildfowl & Wetlands Trust
Dawn Hynes	NIEA
Oana Iacob	Arup
Fran Igoe	Local Authority Waters & Communities Office (LAWCO)
Hanoch Ilsar	Yad Hanadiv
Matthew Irvine	Cain Bio-Engineering
Tim Jacklin	Wild Trout Trust
Mike Jenkins	Natural Resources Wales

Hannah Joyce	Durham University
Sarah Kay	Environment Agency
Evangeline Kebble	University of Birmingham
Punam Khaira	Environment Agency
Alexander Kimberley	University of Birmingham
Andrew Kneen	Manx Utilities
Jevgenijs Kuzmins	University of Birmingham
Ann Langdon	Farming and Wildlife Advisory Group South West
Anna Lavelle	King's College London
Matthew Lawrence	Environment Agency
Chris Lawrence	Natural Resources Wales
Penny Lawson	Spey Catchment Initiative
Paul Leinster	Cranfield University
Heb Leman	Environment Agency
Emma Lewin	Jacobs
Paul Lockhart	Environment Agency
Simon Lohrey	South East Water
Emily Long	National Trust
Nikki Loveday	Environment Agency
Jason Lovering	Five Rivers Environmental Contracting
Naomi Lowden	Atkins
Oliver Lowe	Natural Resources Wales
Glenn Maas	Environment Agency
Michele MacCallam	Groundwork NE & Cumbria
Craig MacIntyre	Esk Rivers and Fisheries Trust
Ian Maddock	University of Worcester
Stuart Malaure	Environment Agency
Will Manning	Exo Environmental
Jenny Mant	Ricardo Energy & Environment
Heather Marples	Freshwater Biological Association
Jenny Marshall Evans	Black & Veatch
Tim Martin	Greenfix
Steve Maslen	JBA Consulting
Richard Mason	Loughborough University
Jeremy Matthews	Environment Agency
Louise Maxwell	Environment Agency
Paul McAleavey	Department of Agriculture, Environment and Rural Affairs
Alex McDonald	Environment Agency
Sabine McEwan	Farming and Wildlife Advisory Group South West
David McKnight	Environment Agency
Matthew McParland	University of Liverpool
Jess Mead	South East Rivers Trust
Nina Menichino	Forestry Commission
Phil Metcalfe	AECOM
Laura Millar	Environment Agency
Alexander Milner	University of Birmingham

Hamish Moir	cbec eco-engineering UK Ltd
Callum Monteith-Roberts	University of Birmingham
Eleanor Morrison	EnviroCentre Ltd
Sophie Mortimer	Affinity Water
Isabelle Moser	Devon Wildlife Trust
Simon Mould	Macquarie University
Rob Mungovan	Wild Trout Trust
Thomas Myerscough	Wyre Rivers Trust
Lauren Naish	Environment Agency
Rosie Nelson	Thames21
Rachelle Ngai	JBA Consulting
Pam Nolan	Environment Agency
Beth Norbury	University of Birmingham
Ruairí Ó Conchúir	Local Authority Waters & Communities Office (LAWCO)
Leela O'Dea	frog environmental
Joanne Old	Environment Agency
Sheelajini Paramjothy	Naturalea
Suzanne Parkinson	Manx Utilities
Matt Parr	Environment Agency
Helena Parsons	Jacobs
Alex Partington	360 Virtual Tours UK
Claire Pattison	Environment Agency
Julian Payne	Environment Agency
Paula Pearson	Groundwork MSSTT
Owen Peat	Hampshire County Council
Joe Pecorelli	The Zoological Society of London
David Penny	Natural Resources Wales
Mark Philips	Natural England
Elinor Phillips	Environment Agency
Tim Pickering	Environment Agency
Chris Pittner	Peter Brett Associates
Shaun Plenty	Thomson Ecology
Guy Pluckwell	Environment Agency
Rebecca Powell	National Trust (on secondment from Natural England)
David Price	Dorset Wildlife Trust
Celina Rajanayagam	Affinity Water
Sim Reaney	Durham University
Mathew Reed	Environment Agency
Mair Rees	Natural Resources Wales
Liam Reynolds	WCSRT
Robert Riddington	Peter Brett Associates
James Robins	University of Birmingham
Cat Robinson	Environment Agency
Andrea Robson	Environment Agency
Clare Rodgers	Royal HaskoningDHV
Steve Rose	JBA Consulting

Emma Rothero	Open University
Chen Rozilio	Ministry of Agriculture, Israel
Claire Sambridge	Nottinghamshire Wildlife Trust
Toni Scarr	Environment Agency
Sarah Scott	Environment Agency
Andrea Shaftoe	Environment Agency
Omar Sholi	AECOM
Lucy Shuker	Thames21/Cartographer
Lesley Shuttleworth	Environment Agency
Stuart Silver	Ecus Ltd
Martin Slater	Environment Agency
Rebecca Smith	Durham University
Helena Soteriou	Thames Water
Petra Sovic Davies	London Wildlife Trust
Russell Spencer	Five Rivers Environmental Contracting
Kirsty Spencer	OHES Environmental Limited
Christopher Spray	University of Dundee
Kath Stapley	Derbyshire Wildlife Trust
Moragh Sterling	South East Rivers Trust
Lucie Stewart	SEPA
Simon Stokes	Environment Agency
Samantha Stork	Wiltshire Wildlife Trust
Eilidh Stott	University of Glasgow
Will Stringer	Cain Bio-Engineering
Rachel Stubbington	Nottingham Trent University
Tom Styles	Arup
Mark Summers	Cornwall Wildlife Trust
Nicola Swain	Environment Agency
Richard Teague	Environment Agency
Ekaterina Telegina	University of Birmingham
Caroline Tero	Environment Agency
Jennifer Thomas	Natural England
Fiona Thompson	cbec eco-engineering UK Ltd
Colin Thorne	University of Nottingham
Annie Thurgarland	Kentish Stour Countryside Partnership
Mary Toland	NIEA
Aleksandra Tomczyk	Jacobs
Angus Tree	Scottish Natural Heritage
Vincent Tsang	Black & Veatch Hong Kong Limited
Esa-Pekka Tuominen	Wessex Water
Richard Turner	DAERA Inland Fisheries
James Tyers	Hydro App Systems Ltd
Joanna Uglow	Farming and Wildlife Advisory Group South West
Michael Underwood	University of Birmingham
Natasha Vaughan	Peter Brett Associates
Maarten Veldhuis	Waterboard Vallei en Veluwe

Lauren Vickers	AECOM
Rebecca Wade	Abertay University
Rachel Walker	Don Catchment Rivers Trust
David Wallace	SEPA
Gry Walle	Norwegian Environment Agency
Simon Ward	Environment Agency
Arnie Warsop	Environment Agency
Josh Wells	Nottingham Trent University
Andrew Went	OHES Environmental Limited
Melanie Westlake	Staffordshire Wildlife Trust
Geraldene Wharton	Queen Mary University of London
Jenny Wheeldon	Natural England/Environment Agency
Tom White	London Wildlife Trust/Groundwork South
Tania White	Environment Agency
Jon Whitmore	JBA Consulting
Simon Whitton	APEM
Daniel Widdowson	AECOM
Nick Williams	Kingcombe Stonbury
Adrian Williams	APEM
Neil Williams	AECOM
Richard Williams	University of Glasgow
Kate Williams	JBA Bentley
Lizz Willott	Environment Agency
Elizabeth Willows	Arup
Hazel Wilson	University of Nottingham
Duncan Wishart	Environment Agency
Marcus Woodward	University of Birmingham
Peter Worrall	Penny Anderson Associates Ltd
Stephen Wright	National Trust
Kayleigh Wyatt	Environment Agency

NOTES

