

# **River Restoration Centre 16th Annual Network Conference**



People and Process-Based River Management: Restoring River Processes; Natural Flood Management; Healthy Catchments

















**Delegate** Pack Including programme, abstracts, workshop and site visit information, and notepaper

19th & 20th May 2015 Whittlebury Hall Hotel and Spa, Northamptonshire



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# Fluvial hydrology and ecohydrology titles from Wiley

**Rivers in the Landscape:** Science and Management Ellen Wohl

Offers a comprehensive and accessible overview of the current state of knowledge for river process and form, taking a holistic approach to the subject with coverage of integrated river science and management in practice.

Paperback 330 pages 2014 ISBN 978-1-118-41489-7 USD \$89.95 £39.95 €50.00

Stream Restoration in Dynamic

Edited by Andrew Simon, Sean J. Bennett & Janine M. Castro

contributors in stream restoration science

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to provide comprehensive consideration of process-based

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This book brings together leading

Tools



Stream and Watershed Restoration: A Guide to **Restoring Riverine Processes** and Habitats Edited by Philip Roni and Tim Beechie

With \$2 billion spent annually on stream restoration worldwide, there is a pressing need for guidance in this area, but until now, there was no comprehensive text on the subject. Filling that void, this unique text covers both new and existing information following a stepwise approach on theory, planning, implementation, and

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#### **River Restoration: Managing** the Uncertainty in Restoring **Physical Habitat** Stephen Darby & David Sea

The designers and managers of river restoration projects frequently face high levels of uncertainty due to such problems as having to use different models reflecting different results on the same problem.

incomplete or absent data, and climatic/social/cultural changes. This book will provide a systematic overview of the issues involved in minimizing and coping with uncertainty in river restoration projects.

Hardback 328 pages 2007 ISBN 978-0-470-86706-8 USD \$223.95 £140.00 €175.00

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This book provides an overview of how changes in legislation, policies, institutional responsibilities, science, technology, practical techniques and public perception have influenced how rivers have been managed over the past 20 years and the

challenges that lie ahead during the next



Restoration

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Hardback 432 pages 2012 ISBN 978-0-470-68208-1 USD \$127.95 £79.95 €100.00

#### The Regulation of Peace River: A Case Study for River Management

This book presents a comprehensive overview of the first longitudinal study of the downstream response of a major river to the establishment of a large hydropower facility and dams. Peace River, a

northward flowing boreal river in northwestern Canada was dammed in 1967 and the book describes the morphological response of the 1200 km downstream channel and the response of riparian vegetation to the change in flow regime over the first forty years of regulated flows

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#### Geomorphic Analysis of River Systems: An Approach to **Reading the Landscape** Kirstie A. Fryirs & Gary J. Brierley

This book covers concepts and principles in fluvial geomorphology. The authors focus on developing mastery skills for "reading the landscape." This text provides a learning tool that documents a way of seeing and thinking about river forms and processes.

Paperback 360 pages 2011 ISBN 978-1-4051-9274-3 USD \$95.95 £42.50 €53.20





20 years.



#### NORTH, CENTRAL & SOUTH AMERICA

# River Restoration Centre 16th Annual Network Conference

# People and process-based river management: Restoring river processes; Natural Flood Management; Healthy Catchments



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# Welcome



#### ... from the RRC Managing Director

Welcome to this year's River Restoration Centre Annual Network Conference at Whittlebury Hall in Northamptonshire. Over the past 16 conferences the phenomenal success of this annual gathering is due to the enthusiastic contributions of speakers and attendees. Without your participation in speaking, questioning, encouraging and sharing, this conference would not be such a success. Let us all make the most of this year's collective updates and the predictions for what is to follow.

Every year there is a greater impetus, urgency and understanding of what we need to do to manage and restore our river systems. In answer to this need for action, there has been a rapid expansion both within organisations, and of new partnerships. This is particularly notable in England with 108 formalised Catchment Partnerships being tasked to deliver ecological improvements to their sub-basin, but is mirrored too in Scotland, Wales and Northern Ireland through similar trusts and local partnerships. This expansion requires support, advice, training and guidance, key facets of RRC's role.

Following last year's fantastic response to the RRC programme of workshops, site visits and technical training courses, we are working with partners to deliver more this year (details on page 12). We hope to see many of you at these throughout the year.

The RESTORE EU Life+ project has been confirmed as one of the two Best of the Best 'Information and Communication' projects, a great result for the RRC and the Environment Agency. The winner is to be announced at the Brussels 'Green Week' on 4th June. RRC manages the ongoing legacy of that project, the RiverWiki, for best practice case studies, on behalf of the European partners and the European Centre for River Restoration (ECRR).

Following the success of last year's England River Prize (awarded to the River Wensum) and enthusiasm from the rest of the UK, RRC is proud to be able to host the UK River Prize awards for 2015. The River Prize celebrates the best in river restoration and catchment management. The standard of the 19 entries was exceptionally high and we look forward to recognising the achievements of the finalists at the awards dinner later this evening.

Many of you will have worked with or heard of Nigel Holmes, who died suddenly in October whilst supervising a river restoration project and, in his words, "getting on with it". Nigel was a founder member of the River Restoration Centre, a true man of the river (or man in the river) and an inspiration to a great many. RRC, with the support of a long list of friends, has been honoured to be able to commission the Nigel Holmes Trophy, to be awarded to the UK River Prize winner.

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

Martin Janes, Managing Director



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River Restoration Wetland Habitat Creation Natural Flood Management Native Plant Nursery



# **Building with Nature**

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# **Restoration Specialists for Freshwater and Coastal Environments**

### **River and Floodplain Restoration**

Process-based restoration, opportunity mapping, catchment-scale restoration prioritisation, detailed restoration design, construction supervision

## **Natural Flood Management**

Floodplain reconnection, wetland creation, catchment-scale prioritisation, hydrodynamic modelling-based assessments, upland landuse management, flood hydrographic attenuation and desynchronisation

### Modelling

We employ a range of hydrological and hydrodynamic modelling platforms for applications including flood risk, restoration design, NFM potential, assessment of geomorphic process, habitat availability, water quality and fish passage

### **Field Services**

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	<b>PROGRAMME OF EVENTS</b>	
DAY 1	l: TUESDAY 19 <sup>th</sup> MAY	
08:30	REGISTRATION in the Hotel Reception Area REFRESHMENTS in Bentleys & Astons Suite	80 mins
09:50	Brooklands Suite Welcome and Announcements Martin Janes (RRC)	10 mins
	<b>CHAIR:</b> Kevin Skinner ( <i>Atkins</i> )	
10.00	<b>River Restoration Centre introduction</b> Fiona Bowles ( <i>RRC Chairman</i> )	15 mins
10.15	Diagnosing the root causes of hydromorphological degradation and identifying sustainable management solutions for a chalk river Robert Grabowski ( <i>Cranfield University</i> )	15 mins
10.30	<b>Floodplains: the forgotten and abused component of the fluvial system</b> George Heritage ( <i>AECOM</i> )	15 mins
10.45	Discussion	10 mins
10:55	BREAK with tea and coffee	30 mins
	Session 1	
	<b>CHAIR:</b> Glenn Maas (Environment Agency)	
11:25	<b>Natural flood management – barriers to progress</b> Duncan Huggett ( <i>Environment Agency</i> )	15 mins
11:40	How to restore morphology and manage floods naturally Shona McConnell (SEPA)	15 mins
11:55	<b>The Catchment Restoration Fund – What have we achieved?</b> Jerry Gallop ( <i>Environment Agency</i> )	15 mins
12:10	Implementing strategic river restoration plans in England Jenny Wheeldon (Natural England/Environment Agency)	15 mins
12:25	Discussion	15 mins
12:40	LUNCH in Bentleys & Astons Suite	60 mins

# Session 2

	<b>Brooklands Suite</b>	<u>Indianapolis</u>	<u>Monza</u>	
	The Catchment Restoration Fund	Natural Flood Management	Restoring Designated Rivers	
	CHAIR: Peter King	CHAIR: Lydia Burgess-Gamble	CHAIR: Phil Boon	
	(Ouse & Adur Rivers Trust)	(Environment Agency)	(Scottish Natural Heritage)	
13:40	<b>River Worfe Restoration Initiative</b> Joseph Allaby ( <i>APEM Ltd</i> )	<b>From Source to Sea: Sound bites from</b> <b>Holnicote</b> Steve Rose ( <i>JBA Consulting</i> )	'Pearls in Peril' LIFE + Nature – Improving freshwater pearl mussel habitat through restoration of natural processes Kenneth McDougall ( <i>Envirocentre</i> )	15 mins
13:55	<b>Addressing Fish Passage on a Catchment</b> <b>Scale in an Urban Environment</b> Toby Hull ( <i>South East Rivers Trust</i> )	<b>Flood alleviation through river restoration</b> Andy Palmer ( <i>AECOM</i> )	<b>Volunteer delivered river restoration</b> <b>project on the Wylye</b> Martijn Antheunisse ( <i>Wiltshire Wildlife</i> <i>Trust</i> )	15 mins
14:10	Discussion.	Discussion.	Discussion.	10 mins

#### Session 2 – continued...

14:20	A holistic approach to river restoration - restoring the Welland for wildlife and for people at Market Harborough David Harper (Welland Rivers Trust)	<b>Rapid Evaluation of NFRM Measures: River Elwy case study</b> Cathryn Spence ( <i>AECOM</i> ) & Jacques Sisson ( <i>NRW</i> )	Land use and river restoration in a predominantly rural catchment – lower River Wye SSSI Ellie Phillips (Jacobs)	15 mins
14:35	Experiences of restoring physical habitat with an artificial riffle Jennifer Cox (University of Portsmouth)	Holnicote – Exploring a PES approach Sacha Rogers ( <i>Penny Anderson</i> )	Lower Woodsford river and floodplain enhancement Alasdair Maxwell (Environment Agency) & Jo Cullis (Halcrow CH2M HILL)	15 mins
14:50	Discussion.	Discussion.	Discussion.	10 mins
15:00		POSTER SESSION in Bentleys with tea and coffee		45 mins

#### Session 3

	<u>Indianapolis</u>	<b>Brooklands Suite</b>	<u>Monza</u>	
	Dealing with Weirs	Addressing Multiple Constraints	New Tools for River Restoration	
	CHAIR: Dan Alsop	CHAIR: Sally German	CHAIR: Jo Cullis	
	(Dan Alsop Chartered Engineer)	(Arup)	(CH2M Hill (Halcrow))	
	CIRIA Weirs Guide	Constraints on fish passage easement in	Advances in bank erosion modelling	15 mine
15:45	Sebastian Bentley (JBA Consulting)	Rotherham David Mould (JBA Consulting)	Victoria Janes (Cranfield University)	15 mms
16:00	<b>Pont Aran – weir removal in a town centre</b> Jo Barlow ( <i>Black &amp; Veatch</i> ) & Oliver Lowe	Restoring a contaminated ex-industrial river	Rapid aerial survey: A useful new tool for river restorers and managers	15 mins
	(Natural Resources Wales)	Alan McCulloch (SEPA)	Neil Entwistle (University of Salford)	
16:15	Working with landowners to deliver WFD objectives Peter King (Ouse & Adur Rivers Trust) & Gareth Williams (Environment Agency)	The Doe Lea - restoration in an agricultural and industrial catchment Claire Barrett-Mold ( <i>Environment Agency</i> )	Monitoring post-restoration morphology using structure-from- motion photogrammetry Richard Williams (Aberystwyth University)	15 mins
16:30	Discussion.	Discussion.	Discussion.	15 mins
16:45	SHORT I	BREAK TO MOVE TO FINAL JOINT SESS	SION	10 mins

#### Session 4

#### **Brooklands Suite**

	<b>CHAIR:</b> Alastair Driver (Environment Agency)	
16:55	Keynote Address The Rhine – a phoenix rising: How the "Sewer of Europe" became the winner of the 2014 Thiess International River <i>Prize</i> Nathalie Plum (International Commission for the Protection of the Rhine (ICPR))	25 mins
17:20	Discussion (Keynote and General)	20 mins
17:40	<b>Poster competition prizes, final announcements and close</b> Martin Janes ( <i>RRC</i> )	15 mins
17:55	END OF DAY 1	

### **19:30 – Pre-Dinner Drinks Reception**

Astons Suite

### &

# 20:00 – UK RIVER PRIZE AWARDS DINNER

Brooklands Suite



# **RRC Events Programme 2015**

The River Restoration Centre is pleased to announce our exciting programme of Technical Training Courses and Site Visits for 2015.

#### **Technical Training Courses 2015**

More information about the courses and booking forms can be found on our website: <u>http://www.therrc.co.uk/rrc-courses-and-workshops</u> - Please book early to avoid disappointment!

Date	Location	Course title
21 <sup>st</sup> April	Belford, Northumberland	Natural Flood Management: concepts, design, project management and delivery
9 <sup>th</sup> June	River Medlock, Greater Manchester	Best practice river restoration design: Concept to Delivery
9 <sup>th</sup> July	Hexham, Northumberland	Valuing ecosystem services for river and floodplain restoration and natural flood management schemes
24 <sup>th</sup> Sep <mark>te</mark> mber	Colne, Lancashire	Developing strategic monitoring schemes - the what, when, how

#### Site Visits 2015

More information can be found on our website: <u>http://www.therrc.co.uk/rrc-members-site-visits</u> Site visits are FREE to RRC members and £30 for non-members. To book a place, send an email to <u>rrc@therrc.co.uk</u>

Date	County	Restoration project
30 <sup>th</sup> April	London	River Wandle and Hogsmill (CRF project)
ТВА	ТВА	Winner of the UK River Prize
14 <sup>th</sup> July	Devon	River Taw (CRF project)
13 <sup>th</sup> August	Powys	River Wye (CRF project)
August/September	Aberdeenshire	River Dee (Pearls in Peril project)

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#### --- WEDNESDAY 20<sup>th</sup> May ---

Opens at 8:30am

#### Session 5

9:00

#### CHOICE OF SITE VISIT OR WORKSHOP

3 hours 30 mins

<u>Indianapolis</u>	<u>Monza</u>
Workshop A:	Workshop B:
Citizen Science and Monitoring	Best Practice Channel Management

How to cost-effectively demonstrate the success of river restoration projects is a subject that has been discussed at previous river restoration conferences. With a more catchment focus on river restoration now being driven at the local community and river trust level, there is enthusiasm for carrying out citizen-science style monitoring. This workshop will provide examples of where such approaches have been completed, assess what these approaches are able to tell us, and evaluate how these increased data sources can, collectively, be used to establish river restoration trends.

#### **RiverSearch: Delivering river restoration through citizen science**

Jim Jones & Glen Skelton (Surrey Wildlife Trust)

#### Engaging all ages in chalk stream restoration

Ruth Craig (Lincolnshire Chalk Streams Project)

## Community-based monitoring for catchment management and restoration

Eleanor Starkey (*Newcastle University*)

**The 'Citizen Crane' monitoring network** Richard Haine (*Frog Environmental*)

#### **RiverEYE:** A citizen science tool for whole catchment reporting Sarah Taigel (*University of East Anglia*)

Where, when and how should we manage our rivers? Through short introductory presentations and discussion sessions, the workshop will identifying different scenarios of management and suitable intervention; what guidance exists to make decisions and who should make those decisions.

#### The channel management handbook

Phil Williamson (Royal HaskoningDHV)

**Rural river maintenance** Rachael Hill (*Environment Agency*)

**Emergency dredging of the Somerset Levels – responsible riverworks at speed** James Maclean (*Land & Water Services Ltd*)

#### LUNCH

	Sessio	on 5	
9:00	CHOICE OF SITE VISIT OR	WORKSHOP Continued	3 hours 30 mins
	<u>Melbourne</u>	<u>Priory</u>	
	Workshop C:	Workshop D:	
Managing l	Rivers with the Water Industry	How to Best Assess Mor and Physical Char	rphology 1ge
Flows intera	ct with sediments to help shape	Rivers are dynamic systems and	l restoration
the physical	characteristics of rivers.	works often trigger predictable	morphological
Impoundme	nts and water abstraction	change. This workshop will dise	cuss the tools we
reduce flows	s and impact negatively on	use to assess, monitor and evalu	iate
habitat diver the triggerin workshop w	rsity and other functions such as g of fish migration. This ill look at how we can mitigate	morphological change and the r from them.	esults we expect
against low f	flows and use restorative	Fluvial Audit: An essential too	l for all river
measures to	lessen the impacts of water	related projects	
abstraction.	1	George Heritage (AECOM)	
Morphologi	cal measures to improve low	Ecological evaluation of the 'Pı	cocess
flow environ	nments	Restoration' philosophy on the	Allt Lorgy,
Sebastian Be	ntley (JBA Consulting)	Scotland	
		Hamish Moir (cbec eco-engineerin	19)
Addressing	legacy infrastructure in rural		
catchments	in the north west	Learning from monitoring rive	r restoration in
Junaid Pater	(United Utilities)	dynamic Cumbrian rivers	a)
Rainstating	hydro-mornhological	Helen Keid (Environment Agency	()
nrocesses in	a Heavily Modified Water	Hydraulic modelling for river	restoration on
Body	a neavily mounica water	the Allt Lorgy, Scotland	cotoration on
Sally Germa	n ( <i>Arup</i> )	Eric Gillies (cbec eco-engineering)	
Use of river impacts of in approach in Irantzu Lexa (Arup)	restoration to mitigate the mpoundments: a process based Yorkshire artza-Artza & Daniel Newton		

12:30

LUNCH

	Session	15	
9:00	CHOICE OF SITE VISIT OR V	VORKSHOP Continued	3 hours 30 mins
	Luffield Site Visit:		
	Workshop E:	Ouse Valley Park Floodpla	ain Forest
River	Restoration and Biodiversity	& Cosgrove Weir Ren	noval
This workshop builds when an UICN Expert. This is a sherres to visit two yours different sites			

This workshop builds upon an IUCN Expert Workshop (supported by SNH, RRC, EA, NE, NRW, OPW, RA, NIEA, SEPA, and IFI) held in November 2014 to summarise and discuss best practice in river restoration for supporting biodiversity, for enhancing ecosystem services and for developing a more consistent approach to the Habitats Directive, WFD and Floods Directive. The workshop will aim to share, discuss, and reach common position statements on our confidence in applying river restoration for biodiversity objectives. It will also explore proposals for demonstration projects and strategic restoration plans.

# The progress of river restoration in UK and Ireland

Phil Boon (Scottish Natural Heritage)

# Towards a report on the current practice and future of river restoration

Phil Boon (*Scottish Natural Heritage*)/Stephen Addy (*The James Hutton Institute*)

# Thinking laterally: Floodplain meadows: a case for restoration

Emma Rothero (*Open University*/Flood Plain Meadows Partnership)

**Building consensus – position statements** on a range of aspects of river restoration All This is a chance to visit two very different sites and to interact with those that are directly involved in their restoration. The first site will be the Ouse Valley Park. Here 50 hectares of floodplain are being restored to create a network of habitats which include wet woodland, pools and channels. Following this, we will visit the Cosgrove Weir removal site on the River Tove. The failure of this weir provided an opportunity to improve channel conditions and help deliver WFD objectives.

This site visit will involve walking a distance of up to 2 miles.

Session 6				
	<b>Brooklands Suite</b>	<u>Monza</u>	<u>Indianapolis</u>	
	Working with Urban Rivers	Monitoring: Effective Assessment	Partnership Delivery	
	CHAIR: Paul Chapman	CHAIR: Judy England	CHAIR: Karen Fisher	
	(London Borough of Lewisham)	(Environment Agency)	(Buckinghamshire County Council)	
13:35	<b>The Sketchley Brook: An Example of</b> <b>Urban River Restoration</b> Daniel Allum ( <i>BWB Consulting</i> )	<b>Restoration, conservation and resilience in</b> <b>lowland rivers</b> Murray Thompson ( <i>University College</i> <i>London</i> )	<b>Sheffield model for sustainable investment,</b> <b>flood reduction, and multiple benefits</b> Helen Batt ( <i>River Stewardship Company</i> )	15 mins
13:50	<b>Urban Pocket Wetlands: A Biodiversity</b> <b>Offsetting Solution</b> Leela O'Dea ( <i>Frog Environmental</i> )	Lessons learned from monitoring the ecological outcomes of river rehabilitation works in the UK Michelle Smith (Hull International Fisheries Institute)	Maximising the value of large infrastructure projects – delivering river restoration as part of major capital works Lyndon Baker ( <i>Atkins</i> )	15 mins
14:05	<b>Restoring Natural Processes in Wandle Park</b> Ian Dennis ( <i>Royal HaskoningDHV</i> )	<b>Monitoring sediment and nutrient</b> <b>pollution on the Lid Brook</b> Simon Browning ( <i>Wavelength Environmental</i> )	Ballymoney Riverside Park restoration: from boating lake to salmonid channel in three months Gareth Greer ( <i>Rivers Agency</i> ) & John Kane ( <i>DCAL Inland Fisheries</i> )	15 mins
14.20	Discussion.	Discussion.	Discussion.	15 mins
14.35	SHC	ORT BREAK TO MOVE TO FINAL JOINT S	ESSION	10 mins

### Session 7

### **Brooklands Suite**

<b>CHAIR:</b> Nick Clifford
(King's College London)

<b>Nene Valley Nature Improvement Area – Making space for nature</b> Jim Rouquette ( <i>University of Northampton</i> )	15 mins
<b>Developing Lewisham's rivers</b> Paul Chapman ( <i>London Borough of Lewisham</i> )	15 mins
5:15 <b>River restoration – Priorities for action</b> RRC	
Discussion and Close.	15 mins
END OF CONFERENCE	
REFRESHMENTS tea and coffee available	
	Nene Valley Nature Improvement Area – Making space for nature   Jim Rouquette (University of Northampton)   Developing Lewisham's rivers   Paul Chapman (London Borough of Lewisham)   River restoration – Priorities for action   RRC   Discussion and Close.   END OF CONFERENCE   REFRESHMENTS   tea and coffee available



# Best practice advice

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

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



# Guidance and training

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

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

# **Update on Support &** Advice from the RRC



# Available information

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

- Share information and understanding within the UK and across Europe.
- Build the UK evidence base through collating, updating and reporting trends. There are now 3,900 projects in the NRRI.
- Provide a forum for the exchange of knowledge and developments (the RRC Annual Network Conference and the RiverWiki).
- Update through a monthly Bulletin, social media (Facebook, Twitter, LinkedIn & YouTube) and our new Website.







# **The Wild Trout Trust Conservation Awards 2015**

#### An Invitation to Apply

The Wild Trout Trust Conservation Awards, supported by Thames Water and the River Restoration Centre, seek to recognise and encourage excellence in wild trout habitat management and conservation and celebrate the efforts, ingenuity and imagination of all those involved.

#### Am I Eligible?

The competition is open to entry from individuals or organisations and amateurs or professionals across Britain and Ireland. PLEASE NOTE that we are equally keen to see and spread the word about **successful, small-scale efforts** to improve a stream at the end of the garden just as much as **catchment-wide work** funded by government agencies.

#### **Choose Your Award Category**

• *Large-Scale Habitat Enhancement Scheme:* A *trophy* for projects delivered by government agencies, contractors and larger rivers or wildlife trusts.

• *Medium-Scale Habitat Enhancement Scheme:* A £1000 prize and trophy for projects delivered by small to medium-sized NGOs e.g. rivers or wildlife trusts.

• Contribution to Wild Trout Conservation: A **£1000 prize and trophy** aimed at amateur community groups (e.g. fishing clubs or other conservation groups) whose voluntary efforts, either through delivery of a specific habitat enhancement project and/or general ethos of management, have furthered the cause for wild trout conservation.

#### The Judging

Entrants will be expected to demonstrate to a panel of judges (made up from representatives of the Wild Trout Trust and the River Restoration Centre) that a project or management programme has benefited wild trout and their environment in a river, lake, loch or lough. Consideration will also be given to aspects such as conservation value, appropriateness of the scheme for the site, funding and value for money, techniques used, sustainability, local involvement, ease of access and post-project management.

#### How to Apply

The application form and further information of the Conservation Awards is available through the Wild Trout Trust website <a href="http://www.wildtrout.org/content/conservation-awards">http://www.wildtrout.org/content/conservation-awards</a>

Applications must be received by WTT NO LATER than 31 July 2015.

#### Wild Trout Hero Trophy Nominations

This trophy will be awarded to a professional whose work has furthered the cause of wild trout conservation and management in Britain and/or Ireland. Our Hero could be a riverkeeper, fishery manager, scientist or administrator. Wild Trout Hero nominations should be submitted to the WTT Director (director@wildtrout.org) no later than 31 July 2015.

### Awards Ceremony and announcement of winners at:

# The Savile Club, London, 6<sup>th</sup> October 2015



# THIS HAS A NEW HOME

The critically endangered freshwater pearl mussel develops on the gills of salmon.

Reconnecting and restoring natural river features are ensuring this vital species' interaction can continue.

aecom.com

# **UK RIVER PRIZE & NIGEL HOLMES TROPHY**

"Rewarding the best in river restoration and catchment management"

## On the 19<sup>th</sup> of May, one of the four shortlisted finalists will be announced as the winner or the UK River Prize and Nigel Holmes Trophy for 2015

After much deliberation the judges selected the four category winners for the 2015 UK River Prize. The overall winner will be presented with the Nigel Holmes Trophy, named after a hugely influential and passionate river restoration and conservation advocate. The winner also receives £10,000 prize money to further the work on their river.

Finalist	Category	Lead applicant
<b>Ballinderry River</b> , County Tyrone	<b>Catchment-scale project</b> Demonstrating a whole river approach to restoration.	Ballinderry Rivers Trust
<b>River Adur</b> , West Sussex	Innovative and novel project Demonstrating cost-effective achievements, innovation and novel approaches.	Knepp Castle Estate
<b>River Tweed</b> , Scottish Borders and North Northumberland	<b>Partnership project</b> Demonstrating wide-ranging involvement in the planning and delivery of restoration.	Tweed Forum
<b>Rivers Kennet &amp;</b> Lambourn, Berkshire and Wiltshire	Multiple benefit project Demonstrating significant contribution to catchment ecology, sustainable water management and local communities.	Environment Agency

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

"The UK River Prize has attracted an exceptional and diverse group of projects from across the four countries and demonstrates how much passion and effort goes into restoring the health and vitality of our rivers.

The standard of work carried out by charities, volunteers, local partnerships and agencies, in restoring their cherished river, is exceptionally high. Each of the four category winners had to really justify their top spot.

We would like to thank all of the applicants who submitted their projects for consideration."

Martin Janes, Managing Director, the River Restoration Centre

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#### **Martin Janes**

I have direct responsibility for the overall leadership and business planning of the RRC, working with the Company's Board of Directors. My role includes providing national strategy advice on restoration to the UK statutory environment agencies and conservation bodies. I also apply my 20 years' experience in river restoration concepts, planning and delivery by supporting the technical advisory and audit work and through training and guidance.

#### **Jenny Mant**

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

#### **Emma Turner**

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

#### Ulrika Åberg

In my role I provide technical advice, assess river restoration works and carry out a range of advisory visits. I manage the UK and the EU-wide project datasets (NRRI and RiverWiki) and support the planning and coordination of technical training courses. My main area of expertise lies within the field of eco-hydromorphology, and I am working on bridging the gaps between science and practice.

#### **Joshua Robins**

My role is to collect, manage and disseminate information on river restoration. I manage and improve the NRRI database through adding new projects and improving existing information. This involves helping to manage the RiverWiki and updating our UK Projects Map. I also produce the monthly RRC Bulletin, manage our social media platforms and update our new website.

#### Julie Boyes - Temporary Administrator

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



# From left to right:

Josh Robins - Information Officer Emma Turner - Business and Finance Co-ordinator Martin Janes - Managing Director Ulrika Åberg - Restoration Adviser Jenny Mant - Science and Technical Manager

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# **A**BSTRACTS

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# We shape a better world A sustainable approach to Catchment Management

The principles of sustainable catchment management and fluvial geomorphology are at the core of our work. Our robust understanding of these principles drives our approach to process restoration and supported by innovative methods, ensures that multiple benefits are delivered long-term.

ARUP

# Introduction:

### **Brooklands Suite**

#### DIAGNOSING THE ROOT CAUSES OF HYDROMORPHOLOGICAL DEGRADATION AND IDENTIFYING SUSTAINABLE MANAGEMENT SOLUTIONS FOR A CHALK RIVER

R.C. GRABOWSKI<sup>1</sup>, A.M. GURNELL<sup>2</sup> 1 Cranfield Water Science Institute, Cranfield University, 2 Queen Mary, University of London

One of the fundamental challenges of integrated river management and restoration is the identification of solutions that tackle the root causes of hydromorphological degradation. In this study we address this challenge by applying a process-based hierarchical assessment framework, developed within the EU-funded REFORM project, to the River Frome (Dorset, UK) to identify hydromorphological pressures, assess the current status of the river and its sensitivity to change, and identify sustainable management solutions. The river is assessed as having poor to moderate hydromorphological functioning with high levels of alteration and artificiality. Fine sediment is the most significant hydromorphological pressure in the system, and is responsible for colmation of the gravel bed and a narrowing of channel widths over the last 50 years. Detailed study of 4 sub-reaches suggests that a relaxation of aquatic and riparian vegetation management may be a key component of the sustainable restoration of the River Frome.

#### FLOODPLAINS: THE FORGOTTEN AND ABUSED COMPONENT OF THE FLUVIAL SYSTEM

G. HERITAGE<sup>1</sup>, K. SHEEHAN<sup>2</sup> 1 AECOM, 2 JBA

River restoration focusses strongly on in-channel initiatives often overlooking the fact that many rivers have developed floodplain units which would naturally operate as integrated functional systems, moderating the effects of extreme floods by distributing flow energy and sediment transport capacity through out of bank flooding. This paper argues for greater consideration of the floodplain in relation to river management. It presents several examples of the local and wider values of reinstating floodplain form and function, demonstrating major ecological gains, improvement to downstream flood reduction, elevation of water quality status and reductions in overall fine sediment loss from our farmland. It calls for a re-think regarding our approach to funding floodplain restoration, arguing for greater recognition of the natural role of the floodplain as a resource for upstream flood management and as an agent for overall biotic improvement in line with Water Framework Directive objectives.

Notes

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CH2M HILL is proud to sponsor the 2015 RRC Annual Network Conference.

## Session 1:

#### **Brooklands Suite**

#### NATURAL FLOOD MANAGEMENT – BARRIERS TO PROGRESS

D. HUGGETT<sup>1</sup> 1 MCIWEM

Natural flood management – using natural features in the landscape such as the floodplain and natural processes such as retention of water in wetlands – is widely promoted as a sustainable way to manage flood risk as climate changes. However, practical implementation of natural flood management remains challenging and successful examples are still quite limited. This paper will explore some of the reasons for this.

#### HOW TO RESTORE MORPHOLOGY AND MANAGE FLOODS NATURALLY

S. MCCONNELL<sup>1</sup>, R. JEFFRIES<sup>1</sup> 1 Scottish Environment Protection Agency

In 2012 SEPA embarked on an ambitious pilot project to deliver catchment-scale restoration of physical condition in combination with natural flood management, as well as incorporating wider environmental, social and economic benefits. The primary aim was to achieve good morphological status (for the Water Framework Directive) and to reduce flood risk by natural flood management (for the Floods Directive) – and to see how measures for both outcomes overlap one another: can one restoration site really provide significant morphology and NFM benefits? The project has successfully worked out the level of overlap, revealing several useful lessons along the way – about stakeholder engagement, confidence in predicting benefits from measures, where to work to get maximum benefit, how to deal with heavily modified water bodies and the practical challenges of building large-scale restoration works. This presentation will cover the approach we've developed, what we've achieved to-date, lessons learned and how this has influenced our restoration strategy for the second river basin planning cycle.

#### THE CATCHMENT RESTORATION FUND – WHAT HAVE WE ACHIEVED?

J.I. GALLOP<sup>1</sup> 1 Environment Agency

The Catchment Restoration Fund formally ended on March 31st 2015. The presentation will provide a reminder of the aims of the fund, the selection process used for projects and how this has been used to influence current funding opportunities. There will also be a summary of key project delivery and an overview of the outcomes associated with the completed work along with the added value that the programme has provided.

#### **IMPLEMENTING STRATEGIC RIVER RESTORATION PLANS IN ENGLAND** J. WHEELDON<sup>1</sup> 1 Natural England and Environment Agency

Natural England and the Environment Agency have a joint national programme to restore rivers designated as Sites of Special Scientific Interest (SSSIs). A summary of the programme and progress so far will be presented. Examples from different rivers will be used to illustrate aspects such as partnership working and links to the catchment approach, and delivery of restoration projects on the

ground (particularly the more unusual or major schemes). The key issues that need to be addressed in order to successfully restore designated rivers over the long term will be explored, with particular focus on how getting more from existing delivery mechanisms, and potential new approaches.

Notes

## Session 2:

#### Brooklands Suite The Catchment Restoration Fund

#### **RIVER WORFE RESTORATION INITIATIVE**

P.M. DENNIS<sup>1</sup> 1 APEM Ltd

Working in partnership with Severn Rivers Trust (SRT) APEM Ltd. undertook a series of catchment surveys in the River Worfe watershed, a sub-catchment of the River Severn system in Shropshire, England. Particular interest was focussed on a sub-catchment of the River Worfe, Wesley Brook which has, historically, been influenced by a wide variety of human activity. The brook was selected as a priority catchment which has significant capacity for improvement using funds made available to SRT via the Catchment Restoration Funding initiative. The integrated, multidisciplinary surveys undertaken informed a series of prioritised mitigation work designed to improve ecological status in the catchment, whilst addressing diffuse pollution issues, as required by the Water Framework Directive (WFD). The surveys enabled intervention measures to be targeted to the specific issues impacting the water body and, as a result, provided the most cost effective mitigation strategy.

#### ADDRESSING FISH PASSAGE ON A CATCHMENT SCALE IN AN URBAN ENVIRONMENT

T.A. HULL<sup>1</sup>

1 South East Rivers Trust

The Hogsmill River is 6.5 miles long and situated in the urban sprawl of south London. Along its length were 15 obstructions ranging from historic milling weirs, bridge footings, railway culverts and a range of concrete 'controlling' structures. These obstructions resulted in the available habitat, of which much is heavily degraded, being highly fragmented and therefore limiting. The South East Rivers Trust, through the Catchment Restoration Fund, has been addressing each of these obstructions. It is anticipated that fish passage has now been provided on a catchment scale from the chalk source to the Thames. The diverse array of structures, in combination with the urban environment, has called for variety of solutions. The presentation covers the various techniques used, highlights the problems as well as opportunities that arise from working within an urban catchment and looks at the benefits of engaging the community.

#### A HOLISTIC APPROACH TO RIVER RESTORATION - RESTORING THE WELLAND FOR WILDLIFE AND FOR PEOPLE AT MARKET HARBOROUGH

D. HARPER<sup>1</sup>, L. SMALLWOOD<sup>2</sup> 1 Welland Rivers Trust, 2 University of Leicester

A £600,000 river restoration project on the river Welland as it runs through the town of Market Harborough has been implemented under the Catchment Restoration Fund. The presentation will focus on the main objectives of the project which were ecological, hydrological and social – a true ecohydrological approach in the concept espoused by UNESCO. A holistic approach to restoration design was adopted, incorporating geomorphological principles and ecological principles of 'biotopes' which are the essential jigsaw pieces of a natural river, found to be different in degraded engineered rivers. Restoration works included the removal of six weirs, the re-opening of a backwater channel, and the creation of a meandering pool-riffle system in over 1.8kms of river. Ongoing works include four PhD projects at the University of Leicester which are assessing the physical and ecological response of the river to restoration.

#### EXPERIENCES OF RESTORING PHYSICAL HABITAT WITH AN ARTIFICIAL RIFFLE

J.R. COX<sup>1</sup>, P.J. SOAR<sup>1</sup> 1 University of Portsmouth

Habitat enhancement on the River Rother, West Sussex, funded by the Catchment Restoration Fund saw the construction of an artificial gravel riffle in August 2013. Eighteen months of high resolution monitoring of bathymetry and 3D velocities has enabled detailed mapping and assessment of physical habitat before and after construction. Notable morphological adjustment to the feature was observed following the extreme 2013-14 winter flooding (estimated as a 1 in 100 year event). The wider catchment suffers from sedimentation issues and extensive deposition of sandy bed material has occurred within the study reach associated with the floods. Further surveys are needed to evaluate project success and reveal if this deposition is temporary, to be mobilised by subsequent events, or a more permanent feature of the reach. Despite an extreme event during the first year, the rehabilitated reach now exhibits greater diversity in morphology and physical habitat than the pre-restored condition.

Notes
#### Session 2:

#### Indianapolis Natural Flood Management

#### FROM SOURCE TO SEA: SOUND BITES FROM HOLNICOTE

S. ROSE<sup>1</sup>, P. WORRALL<sup>2</sup> 1 JBA Consulting, 2 Penny Anderson Associates

The implementation of Natural Flood Management (NFM) Measures across the rural landscape has been at the heart of the Holnicote Multi-Objective Flood Management Demonstration Project in West Somerset since 2009. A comprehensive catchment monitoring and assessment platform, complimented by detailed modelling and engagement activities, has been providing definitive evidence on the effects of a range of NFM measures on flood risk in rural communities, together with the provision of a much wider suite of benefits to the environment and society. This paper will describe the range of NFM measures that have been explored and implemented to date in two catchments at Holnicote from source to sea; explore how they affect runoff generation, hydrological connectivity and flood risk; and discuss the whole process of identifying and implementing practical NFM measures that are truly cost-effective and acceptable to land managers, regulators, statutory consultees and local communities.

#### FLOOD ALLEVIATION THROUGH RIVER RESTORATION

A. PALMER<sup>1</sup> 1 AECOM

With increasing development pressure on our urban spaces, the integration of effective water management into planning and design is essential to ensure future development is both sustainable and delivers multiple benefits for local communities. AECOM have worked closely with Harrow Borough Council to deliver flood alleviation solutions that utilise the water environment whilst simultaneously delivering social and environmental benefits. This paper presents three case studies where river restoration techniques have been used to deliver flood alleviation within the constraints of the existing system. The methods used and the outcomes of the project are discussed, demonstrating effective utilisation of the water environment to deliver options with multiple benefits.

#### RAPID EVALUATION OF NFRM MEASURES: RIVER ELWY CASE STUDY

J. SISSON<sup>1</sup>, C. SPENCE<sup>2</sup> 1 Natural Resources Wales, 2 AECOM

Natural flood risk management (NFRM) is increasingly seen as a valuable addition to conventional flood protection approaches and is being trialled across several catchments in the UK. Currently there is no spatially integrated approach to assessing the relative impact of combined measures across a catchment. This paper presents an integrated approach to evaluating the flood risk benefits of NFRM measures using the River Elwy catchment in North Wales as a case study. The study combines robust modelling with Ecosystem Services Approach to identify natural flood risk management options that provide multiple benefits. Readily available data in the form of LIDAR and web-based aerial photography was combined with a flood routing model to test multiple scenarios which optimised flood relief to urban areas downstream. Results of the study are presented with preliminary results suggesting that upper catchment measures probably represent the most tangible benefits in this catchment.

#### **HOLNICOTE – EXPLORING A PES APPROACH**

S. ROGERS<sup>1</sup>, S. ROSE<sup>2</sup>, N. HESTER<sup>3</sup> 1 Penny Anderson Associates Ltd, 2 JBA Consulting, <sup>3</sup> National Trust

The Holnicote Payment for Ecosystem Services (PES) Scheme aims to identify 'buyers' and 'sellers' of ecosystem services focused around flood risk management and other multiple benefits in order to create sustainable new markets for continued investment in land management interventions to reduce flood risk. The project has engaged with a diverse range of stakeholders to explore opportunities and constraints around flood risk, water quality, biodiversity, sustainable tourism and carbon. The project is aiming to take PES forward from concept to implementation stage. We will highlight methods and tools used to engage with stakeholders and discuss opportunities and constraints for the creation of 'real' and sustainable markets including research into 'visitor giving' and use of agri-environment payments. Particular focus will be given to linking multiple benefits as a way of engage stakeholders in investing in natural approaches to flood risk management. We will share lessons learnt and discuss the transferability of the approach to other catchments.

NOTES

#### Session 2:

#### Monza Restoring Designated Rivers

#### 'PEARLS IN PERIL' LIFE + NATURE – IMPROVING FRESHWATER PEARL MUSSEL HABITAT THROUGH RESTORATION OF NATURAL PROCESSES

K. MACDOUGALL<sup>1</sup>, S. ADDY<sup>2</sup> 1 EnviroCentre, 2 The James Hutton Institute

'Pearls in Peril' is a UK-wide project to safeguard the future of the freshwater pearl mussel. Sites have been identified where removal of morphological pressures could restore natural river processes and improve freshwater pearl mussel and salmonid habitat. Included are three reaches with bank protection pressures in the River South Esk in Angus and three reaches with croys on the River Dee in Aberdeenshire, all in high energy gravel-bed rivers. A combination of field based mapping, detailed survey and sediment characterisation combined with 1D and 2D hydraulic modelling were used to assess the baseline hydromorphology and habitat conditions. Using hydraulic modelling and expert based judgment gained from the baseline assessment, predictions of hydromorphological changes created by removing structures were made. These predictions in turn informed the prioritised selection of restoration actions by using a multi-criteria assessment that considered constraints and likely benefits for morphology and habitat.

#### VOLUNTEER DELIVERED RIVER RESTORATION PROJECT ON THE WYLYE

M. ANTHEUNISSE<sup>1</sup>, M. BLACKMORE<sup>2</sup> 1 Wiltshire Wildlife Trust, 2 Wild Trout Trust

In 2014, angling and conservation interests teamed up to enhance the habitat of a degraded reach on the Wylye – a tributary of the Hampshire Avon. An outline design based on 'working with nature' principles was able to get buy-in of other partners and stakeholders, resulting in financial support by the Environment Agency and the riparian owners. Delivery of the 2km long project took place in October 2014. Volunteers from many different backgrounds (flyfishers, local villagers, wellbeing referrals, team days, Wildlife Trust) carried out most of the work, supervised by just a handful of professionals. Social media and local press were used throughout the project to keep the local community informed and provide a continuous stream of 'fresh' volunteers. Completion of phase 1 paved the way for delivery of a more substantial phase 2 in the next years that involves bypassing a weir, reconnecting the floodplain and creating additional riparian wetlands.

#### LAND USE AND RIVER RESTORATION IN A PREDOMINANTLY RURAL CATCHMENT – LOWER RIVER WYE

SSSI

E.L. PHILLIPS<sup>1</sup> 1 Jacobs U.K. Ltd

The River Wye is a transboundary river that flows through England and Wales. Jacobs were commissioned by the Environment Agency last year to investigate the morphological pressures on the Lower Wye SSSI, which flows predominantly through England. The driver for this study was the unfavourable recovering condition of the majority of the Lower Wye SSSI. The investigation comprised a detailed desk study and targeted fieldwork. An overall restoration vision for the catchment was created, from which reach-by-reach restoration plans were produced with the aim of improving the

physical function, form and associated habitat of the Lower Wye SSSI. Through the investigation it became evident that there are several challenges to overcome in the form of land use (agriculture, forestry, urban areas and associated transport infrastructure) as well as recreational uses (walking, fishing and kayaking) when considering restoration measures in this predominantly rural catchment.

#### LOWER WOODSFORD RIVER AND FLOODPLAIN ENHANCEMENT

A. MAXWELL<sup>1</sup>, J. CULLIS<sup>2</sup> 1 Environment Agency, 2 CH2M HILL (Halcrow)

The Lower Woodsford Project on the River Frome Site of Special Scientific Interest in Dorset comprises 2km of restored river, 15ha of floodplain enhancement including the planting of over 20,000 native trees. The removal of stone revetment and raised embankments has reintroduced natural river processes to encourage Assisted Natural Recovery within the main river channel, while a network of floodplain channels and scrapes and reprofiling over 600m of trapazoidal ditch aims to maximise wetland habitat value.

#### Session 3:

#### Indianapolis Dealing with Weirs

#### **CIRIA WEIRS GUIDE**

S. BENTLEY<sup>1</sup> 1 JBA Consulting

CIRIA has recognised the need to update the current version of the Weirs Guide in light of changes to legislation, policy and environmental drivers in the UK, including the Water Framework Directive. Part of the guide update will involve publishing of a decision making tool for potential weir removal, modification, maintenance or new build projects. Necessary assessments for weir removal projects will be discussed and the geomorphological context to inform weir removal decisions, planning and designing will be highlighted, including the importance of considering the river type. This presentation illustrates early progress in the development of the guide demonstrating positive and negative hydromorphological impacts linked to weir work and demonstrating that a 'one size fits all' approach to evaluating outcomes does not apply to UK weirs.

#### PONT ARAN – WEIR REMOVAL IN A TOWN CENTRE

J. BARLOW<sup>1</sup>, O. LOWE<sup>2</sup> 1 Black & Veatch, 2 Natural Resources Wales

As part of a wider flood risk management scheme in Dolgellau, Snowdonia, the opportunity arose to remove a weir on the Afon Aran, an important salmon, sea trout and eel tributary of the Afon Wnion. This presentation describes the option appraisal for weir removal and the combined engineering, geomorphology and fisheries input to the scheme design. The challenge was to provide the Standard of Protection required by the scheme, in an area highly constrained by properties and infrastructure. This highlights the importance of consultation with residents, councillors and other stakeholders, and the challenges faced during construction while undertaking intrusive works in a confined and very public working area. The weir was removed in September-October 2014, and the presentation will highlight the removal of the weir, the reinstatement of the river bed, lessons learned from construction and plans for monitoring and adaptive management needs in the future.

#### WORKING WITH LANDOWNERS TO DELIVER WFD OBJECTIVES

P. KING<sup>1</sup>, G. WILLIAMS<sup>2</sup> 1 Ouse & Adur Rivers Trust, 2 Environment Agency,

Engaging with landowners and stakeholders is a fundamental component to driving forward WFD and river based conservation objectives. The Adur Restoration of Physical Habitats (ARPHA) project is a partnership between the Ouse & Adur Rivers Trust (OART) and the Environment Agency which aims to deliver WFD benefits to the River Adur catchment in Sussex. A recent project within ARPHA utilised a novel approach in employing the landowner as principle contractor to remove three weirs on two water bodies within his landholding. This approach resulted in multiple benefits to the project when compared with national contractors which would be appointed through the Environment Agency National Framework. Benefits included a greater flexibility in how the project was undertaken, reduced liability for the partners, a cost saving of over £160,000 and provided local ownership in undertaking river improvement works.

#### Session 3:

#### **Brooklands Suite**

Addressing Multiple Constraints

#### CONSTRAINTS ON FISH PASSAGE EASEMENT IN ROTHERHAM

D.C. MOULD<sup>1</sup> 1 JBA Consulting

JBA have been working with a developer to undertake studies leading to fish passage easement at Ickles Weir on the River Don near Rotherham. The developer had to provide fish passage as a planning condition as part of a wider development. A key element of this work was to understand the site specific constraints which shaped the preferred fish passage measure. This proved challenging, with a range of constraints being present at the site, namely, heritage value of the weir, Network Rail infrastructure nearby, contaminated land, and a third party abstraction upstream. The challenges and opportunities faced in dealing with these constraints will be reflected upon, and lessons learnt presented.

#### **RESTORING A CONTAMINATED EX-INDUSTRIAL RIVER**

A. MCCULLOCH<sup>1</sup>, R. JEFFRIES<sup>1</sup> 1 Scottish Environment Protection Agency

SEPA and North Lanarkshire Council are presently restoring the South Calder Water, a river that fails to reach good status for morphology because over the past 200 years it was culverted, realigned several times, and confined in concrete as it ran through (and underneath) an ironworks, between spoil heaps and past mineshafts. The ground works to restore the river began in November 2014 and are planned to finish in June 2015. This presentation will provide an overview of the benefits and challenges of restoring a river through a complex contaminated site, showing how partnership working has been critical to project success. It will also give an insight into how much planning, investigation and design has to be involved in such a challenging project, and how restoration can benefit both the ecosystem and people, especially local communities.

#### THE DOE LEA - RESTORATION IN AN AGRICULTURAL AND INDUSTRIAL CATCHMENT

C. BARRETT-MOLD<sup>1</sup> 1 Environment Agency

The River Doe Lea in Derbyshire has been heavily influenced by the land-use heritage of the catchment. Mining, industry, agriculture and urbanisation have all taken their toll on this watercourse; to such an extent that in 1994 the river had the unenviable reputation as the most polluted watercourse in Europe. With such a range of issues affecting the watercourse over a variety of scales it was important to take a catchment based approach to improve and restore the water quality and physical habitat of the Doe Lea. Within the upper catchment fine sediment input from agricultural sources was identified as the main pressure affecting the river; whereas, in the lower catchment physical modification as a result of mining, industry and urbanisation has had a greater impact. The ongoing restoration and improvement work being undertaken within the catchment and also the particular challenges encountered in this industrial landscape will be discussed.

#### Session 3:

#### Monza New Tools for River Restoration

#### ADVANCES IN BANK EROSION MODELLING AND APPLICATION TO RIVER RESTORATION

V. JANES<sup>1</sup>, I. HOLMAN<sup>1</sup> 1 Cranfield Water Science Institute, Cranfield University

Bank erosion has been shown to significantly contribute to catchment sediment budgets within the UK and may have detrimental impacts on river systems through a reduction in biodiversity and productivity, and delivery of various pollutants. Therefore bank erosion processes may impact various Water Framework Directive elements such as morphological conditions, chemical and ecological standards. In this study the representation of channel bank erosion processes within the physically-based distributed catchment model SHETRAN has been improved. The influences of bank vegetation, channel sinuosity, and the impact of extreme hydrological events on bank conditions has been incorporated within the model providing improved spatial and temporal variation in simulated bank erosion rates. The presentation will describe the application of the model within the Eden catchment, Cumbria, to quantify bank erosion across the catchment and to differentiate between bank sections that would benefit from restoration techniques and those where natural processes will re-establish resilience to bank erosion following extreme events.

#### RAPID AERIAL SURVEY: A USEFUL NEW TOOL FOR RIVER RESTORERS AND MANAGERS

N.S. ENTWISTLE<sup>1</sup>, G.L. HERITAGE<sup>2</sup> 1 University of Salford, 2 AECOM

Surveying has tended to advance by quantum leaps, linked to the development of new technology. Unmanned Aerial Vehicle (UAV) based survey is set to be the next significant advance due to the rapid and coincidental development of low-cost drone systems and user friendly automated photogrammetric software. UAV-based remote sensing systems offer varied solutions for different applications related to the acquisition of information about objects and processes. Their increasing cost-effectiveness makes them attractive as a way of obtaining detailed data on river and floodplain form and process. Image processing using photogrammetry software can produce positional accuracy that is equal to or better than conventional aerial photography and standard GIS software and AutoCAD can be used to stitch and georeference aerial photos to generate orthometric imagery.

#### MONITORING POST-RESTORATION MORPHOLOGY USING STRUCTURE-FROM-MOTION PHOTOGRAMMETRY

R.D. WILLIAMS<sup>1</sup>, J.D. HART<sup>1</sup> 1 Department of Geography and Earth Sciences, Aberystwyth University

There is a need to monitor how rivers respond to new boundary conditions and whether restored channels re-establish normative rates of processes that sustain river systems. Such monitoring exercises, particularly in demonstration projects, are essential for testing hypotheses associated with design principles. Repeat topographic surveys, across both exposed and wet morphology, have the potential to shed considerable light on river adjustment. To date, however, geomatics technologies that are capable of acquiring continuous topographic data have been expensive. In the past few years, developments in image analysis and computer vision, have yielded a novel photogrammetric technique, termed Structure-from-Motion, that is capable of generating dense three-dimensional

point clouds from images acquired using low-cost, consumer-grade digital cameras mounted on unmanned aerial vehicles. The paper presents results from an evaluation of this survey technique, used to monitor the topography of the 1.2 km long Whit Beck scheme, Cumbria, through a sequence of high-flow events.

Session 4:

**Brooklands Suite** 

#### **Keynote Address**

#### THE RHINE - A PHOENIX RISING HOW THE "SEWER OF EUROPE" BECAME THE WINNER OF THE 2014 THIESS INTERNATIONAL RIVERPRIZE

N.M. PLUM<sup>1</sup>

1 International Commission for the Protection of the Rhine (ICPR)

The Rhine figures among Europe's most intensively used rivers. Nevertheless, water quality and ecology are constantly improving since the Sandoz accident in 1986 killed all aquatic life downstream. This successful restoration of the river has been fostered for more than 60 years by the ICPR, whose work was rewarded in 2014 by the Thiess International Riverprize in Canberra (Australia). One of the common objectives of the Rhine states in the 1st and 2nd Internationally Coordinated Management Plan (2009 and draft 2014, see www.iksr.org) is the restoration of river continuity in the main stream of the Rhine as far as Basel and in certain programme waters to improve living conditions for migratory fish and numerous other organisms. In the connection of the different habitats along the Rhine in order to achieve habitat patch connectivity, the ICPR sets definite targets and spatial focal points, linking water protection with nature and flood protection.



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

- Flexible study options: Postgraduate Certificate, Diploma and part-time MSc options for those who want to combine work and study.
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**Funding:** bursaries (up to £2,500) available for September 2015 entry.

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#### Session 5:

#### Indianapolis Workshop A: Citizen Science and Monitoring

#### **RIVERSEARCH: DELIVERING RIVER RESTORATION THROUGH CITIZEN SCIENCE**

J. JONES<sup>1</sup>, G. SKELTON<sup>1</sup> 1 Surrey Wildlife Trust

RiverSearch reconnects people with their most important resource: water. This Surrey Wildlife Trust initiative has trained over 120 volunteers since it started in May 2013. Local volunteers are enabled to monitor aspects of the health of their river and the protected species that live there. The data they gather is used to inform local projects and improve the WFD status of the Wey and Mole catchments. Volunteers educate their own communities about the importance of sustainable water management for people and wildlife. Since 2014 RiverSearch volunteers have also been trained in the RiverFly monitoring scheme, further adding to the monitoring data volunteers are contributing to restoration projects.

#### ENGAGING ALL AGES IN CHALK STREAM RESTORATION

R. CRAIG<sup>1</sup> 1 Lincolnshire Chalk Streams Project

The Lincolnshire Chalk Streams Project (LCSP) understands the need for engaging with all ages to support the long term management and protection of chalk streams. Both with research and by utilising partner initiatives the LCSP has successfully established a school Otter monitoring project and a Riverfly Volunteer Monitoring group and has provided training for both landowners and education officers in the 'Mayfly in the Classroom' project. To help drive this work forward the LCSP has been awarded funding to employ an additional resource to; establish RiverCare community groups, continue building the Riverfly Volunteer Monitoring project, create a Lincolnshire Chalk Streams Conservation group and provide family events to learn more about their chalk streams. The aim is to provide something for everyone to bring people from all over Lincolnshire into the Lincolnshire Wolds to raise awareness, to educate and create that 'sense of ownership' for the future protection of Lincolnshire's chalk streams.

#### COMMUNITY-BASED MONITORING FOR CATCHMENT MANAGEMENT AND RESTORATION

E. STARKEY<sup>1</sup> 1 School of Civil Engineering and Geosciences, Newcastle University

Catchments are complex systems which need to be monitored over time in order to characterise their behaviour on a local level, model, implement mitigation measures and meet policy targets. However, data is often inadequate within small rural catchments and local knowledge is not routinely harvested. Long-term evidence is required to provide stakeholders with confidence if working with natural processes is the way forward. Using effective engagement techniques, a community-based monitoring approach has been implemented within the rural Haltwhistle Burn Catchment (Northumberland). 'River Watch' volunteers are sharing their knowledge and regularly monitoring various catchment parameters in order to understand their water environment. Using training cards and several data collection and submission tools, low-cost monitoring techniques are now being used widely and successfully. Although citizen science is not a new phenomenon, evolving technology and communications provides a timely and low-cost solution to data collection, whilst offering various social benefits, including community empowerment.

#### **THE 'CITIZEN CRANE' MONITORING NETWORK** R. HAINE<sup>1</sup>, R. GRAY<sup>2</sup> 1 frog environmental, 2 Friends of River Crane Environment (FORCE)

The 'Citizen Crane' monitoring network establishes an innovative Citizen Science programme to support restoration efforts of the River Crane. Funded by Thames Water and coordinated by Friends of River Crane Environment (FORCE), Zoological Society of London (ZSL) and frog environmental; the Citizen Scientists are playing an essential role in the project by collecting regular water samples from across the catchment. Samples are being analysed by Thames Water with the data used to help stakeholders determine where limited resources should be directed to achieve the best results. The Citizen Scientists also collect invertebrate data as part of the Riverfly Partnership programme. This research network has already successfully identified pollution incidents and helped Thames Water reprioritise outfalls within their misconnection programme. The project is keeping investigation costs low whilst engaging the community in taking ownership of the environment on their doorsteps.

#### **RIVEREYE: A CITIZEN SCIENCE TOOL FOR WHOLE CATCHMENT REPORTING**

S. TAIGEL<sup>1</sup>, A. LOVETT<sup>1</sup> 1 University of East Anglia,

The collaboration between the Waveney Rivers Trust and the UEA has a low cost open source citizen science smartphone app called RiverEYE. RiverEYE includes a front end smartphone app and a back end database and internet portal. RiverEYE was used by river trust volunteers to capture local knowledge for tracing sources and pathways of damaging runoff which have a cumulative impact on the receptor (river). The focus of the app was the monitoring of specific ecosystem services such as water flow, water quality (pollution, silt, fish kills), river habitat and access across the Waveney catchment. A benefit of using a smartphone/tablet app was the increased precision, option to capture an image and increase understanding of the ecosystem services which the catchment supports. Data from RiverEYE was loaded over Wi-Fi into a backend database which allowed for additional temporal and spatial analysis using maps and charts within the internet portal.

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#### Session 5:

#### Monza Workshop B: Best Practice Channel Management

#### THE CHANNEL MANAGEMENT HANDBOOK

P. WILLIAMSON<sup>1</sup>, F. OGUNYOYE<sup>1</sup> 1 Royal HaskoningDHV

A new handbook promoting good practice in river channel management has been developed by Royal HaskoningDHV for the Environment Agency. Written for flood risk management authorities and land managers, the handbook brings together over 10 years of research and practice to provide guidance on how to manage river channels for land drainage and flood risk benefits. The focus is on good channel management as something that promotes "the natural form and environment of the channel" alongside delivery of flood risk and land drainage benefits. This guidance will encourage decision-makers to consider a broader range of solutions to channel management, looking beyond standard maintenance activities to the restoration of natural processes that can also support a range of ecosystem services. This presentation will discuss the key messages from the Channel Management Handbook and the opportunities this presents to embed consideration of river restoration solutions into channel management decisions for the future.

#### **RURAL RIVER MAINTENANCE**

R. HILL<sup>1</sup> <sup>1</sup> Environment Agency

The presentation will provide background to, and share the lessons learned from, the 9 river maintenance pilots that took place between November 2013 and March 2015. These pilots aimed to:

- Reduce red tape around regulation: If a landowner or tenant chooses to manage assets of watercourses themselves we will make it easier for them to do this by trialling a new regulatory approach to maintenance
- Improve engagement: Work with Landowners and tenant to explain what is happening in terms of asset maintenance and watercourse management and work with them to explore avenues for the future.

A main outcome has been to trial an approach for landowners and tenants to undertake their own maintenance works, particularly dredging, on rural main rivers. The environmental good practice guidance which was produced for the pilots will be explained. The pilots informed how we can be more transparent in our decision making and work better with landowners and communities. They also informed our advice to Defra on how these activities will be incorporated into the developing Environmental Permitting Regulations. In addition the new channel management handbook will be introduced. This new guide covers all aspects of channel maintenance to help landowners, flood risk management authorities and community groups who are planning to undertake maintenance work.

#### EMERGENCY DREDGING OF THE SOMERSET LEVELS – RESPONSIBLE RIVERWORKS AT SPEED

J.A. MACLEAN<sup>1</sup>

1 Land and Water Services Ltd

The presentation sets out the dredging strategy, and the legislative, environmental and social challenges that were overcome at speed to deliver a restored flood channel in the aftermath of the 2013/14 floods. It will look explicitly at the dredging techniques proposed, the rapid mobilisation of plant and equipment and the safe working protocols developed to work on unsuitable ground. The presentation also addresses how the LAWS engaged directly with the local community and played an instrumental role in rebuilding stakeholder relationships, to deliver the works within a highly compressed timescale, and how the "100% re-use" scheme objective was met. Returning the rivers to their 1960's profile to more naturally provide flood management. The project relates to topics, 1, 2, 3 & 4 as we engaged with communities, schools, local resources and adverse groups, turning them into allies by project wind down.

#### Session 5:

#### Melbourne Workshop C:

Managing Rivers with the Water Industry

#### MORPHOLOGICAL MEASURES TO IMPROVE LOW FLOW ENVIRONMENTS

S. BENTLEY<sup>1</sup> 1 JBA consulting

The main action to mitigate the impacts of water resource abstraction is to reduce or change existing abstractions to increase the amount of water in our rivers. However, in some situations we need to undertake complementary morphological restoration measures to enhance the ecological benefits of increasing the amount of water in our rivers, especially under low flow conditions. We need evidence to help us select the right morphological measures to ensure ecological resilience. We explore a new approach to modelling the success of different measures under different flow conditions. We illustrate the findings with a series of case studies.

#### ADDRESSING LEGACY INFRASTRUCTURE IN RURAL CATCHMENTS IN THE NORTH WEST

J. PATEL<sup>1</sup>, M. BUCKLEY<sup>1</sup>, M. SCHOFIELD<sup>1</sup>

1 United Utilities

Much of the water supply and treatment infrastructure in the UK has a long standing legacy reaching back over a century in many circumstances. As the water industry continues to renew assets and respond to its commitments under the Water Framework Directive a fresh perspective on existing assets is being taken. This presents a number of challenges in terms of reconciling competing technical, financial and social objectives. This paper describes three recent projects where significant legacy assets have been removed from the river environment with the aim of ecological enhancement and increased social amenity value. All projects required strong partnership with local stakeholders and community groups to engage, optioneer and communicate to arrive at a blended solution. Each project required the benefits and impacts of structure removal to be considered in terms of ecology, hydrology, geomorphology and landscape. The projects continue to be monitored to better understand how and whether the success criteria have been realised.

#### REINSTATING HYDRO-MORPHOLOGICAL PROCESSES IN A HEAVILY MODIFIED WATER BODY

S. GERMAN<sup>1</sup>, D. NEWTON<sup>1</sup>

1 Arup

The River Washburn, North Yorkshire, is regulated by four water storage reservoirs. It is classified as Heavily Modified under the WFD and sub-optimal flows have been identified as a significant barrier to meeting WFD objectives. Yorkshire Water Services (YWS), owner of the assets, is responsible for ensuring WFD compliance for the waterbody and is using the site downstream of Swinsty Reservoir to investigate whether river restoration can be used to mitigate the impacts of low flows. This site has no formal compensation flow and the morphology of the channel is a relic of a bigger historical flow regime and many years of impoundment. Arup has undertaken the design of the project to rehabilitate the channel to its regulated flow regime, to create a diverse range of habitats and support geomorphological processes. Existing in-channel materials and bankside trees will be used to dictate the new form of the channel. Construction is expected to start in spring 2015.

#### USE OF RIVER RESTORATION TO MITIGATE THE IMPACTS OF IMPOUNDMENTS: A PROCESS BASED APPROACH IN YORKSHIRE

I. LEXARTZA-ARTZA<sup>1</sup>, D. NEWTON<sup>1</sup>

1 Arup

Restoration of a reach of Ingbirchworth Dyke, downstream of Ingbirchworth Reservoir, has been designed to test the use river restoration to mitigate the impacts of impoundments on flows, as part of the investigations Yorkshire Water Services (YWS) is undertaking to inform their responsibilities in delivering Good Ecological Potential to Heavily Modified Water Bodies in which their assets are located. The proposals take into account existing conditions and flow regime, and include re-routing the channel through an old meander, providing additional flood storage, redistribution of in-channel material to better define the low-flow channel, and introduction of a series of flow deflectors, fish ledges and berms to increase morphological and habitat diversity. Construction is expected to take place in winter 2014-2015, and this paper will present early results on hydromorphology and establishment of the new features, and will also discuss the ongoing ecological monitoring programme.

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#### Session 5:

#### Priory Workshop D:

How to Best Assess Morphology and Physical Change

#### FLUVIAL AUDIT: AN ESSENTIAL TOOL FOR ALL RIVER RELATED PROJECTS

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

The majority of UK rivers are low energy, single thread channels of varying sinuosity. Sediment transport and channel change is episodic and often moderated by engineered stabilisation works. Despite this, actions impacting on watercourses can, and often do, result in local morphologic response that is often perceived in a negative way by stakeholders. Despite these unanticipated outcomes linked to river works, river response is essentially predictable following a properly conducted fluvial audit. Schemes that are informed by the audit process benefit from improved process-linked design, reduced environmental and ecological impact and lower long term costs linked to reactive management and maintenance. This paper describes the audit process and demonstrates the value of the various components through examples from the South Esk in Brechin, the River Stour around Suffolk, Norbury Brook, Manchester and the River Ribble SSSI at Long Preston.

#### ECOLOGICAL EVALUATION OF THE 'PROCESS RESTORATION' PHILOSOPHY ON THE ALLT LORGY, SCOTLAND

H.J. MOIR<sup>1, 2</sup>, E. GILLIES<sup>1, 3</sup>

1 cbec eco-engineering UK Ltd, 2 Rivers and Lochs Institute, University of the Highlands and Islands, 3 Aerospace Sciences, School of Engineering, University of Glasgow

Outputs from high resolution hydrodynamic modelling on the Allt Lorgy (Cairngorm Mountains) were applied to indices of instream micro-habitat preference to evaluate 'ecological performance' of an application of the 'process restoration' philosophy. This provided the opportunity to monitor high resolution physical change and the associated implications for instream habitats. We examined preconstruction, immediately post-construction and post-flood event conditions and determined physical and ecological site evolution. Generally, a trajectory towards a greater absolute spatial and temporal availability of target species habitats and greater habitat diversity was observed over the chronological model run sequence. It was determined that it is necessary to characterise physical habitat at a sufficiently high spatial resolution in order to represent important unsteady and non-linear interactions between hydraulics and sedimentary character. However, it is important to stress that hydrodynamic modelling should be employed as one assessment methodology of a strategy to determine appropriate methods to realise ecological improvements.

#### LEARNING FROM MONITORING RIVER RESTORATION IN DYNAMIC CUMBRIAN RIVERS

H.E. REID<sup>1</sup>, D. WISHART<sup>1</sup> 1 Environment Agency

Over the last summer five significant restoration schemes have taken place in Cumbria, equating to  $\sim$  3.5 km of new river channel, located in some of the flashiest and dynamic catchments in the UK. Each scheme differed in terms of the detail in the design process and the extent of monitoring post design. This talk will discuss case studies, looking at the depth of information pre and post restoration and how the constructed design has been impacted by post project channel adjustment. This monitoring

has revealed that rivers in Cumbria will adjust, regardless of the quality and quantity of science used in the initial design. These systems are dynamic and in restoring process, we also restore the uncertainty of process as is inherent in any natural system. However, geomorphic monitoring is vital to determine the success of river restoration and how the site may continue to evolve in the future.

#### HYDRAULIC MODELLING FOR RIVER RESTORATION ON THE ALLT LORGY, SCOTLAND

E. GILLIES<sup>1, 3</sup>, H.J. MOIR<sup>1, 2</sup>

1 cbec eco-engineering UK Ltd, 2 Rivers and Lochs Institute, University of the Highlands and Islands, 3 Aerospace Sciences, School of Engineering, University of Glasgow

The importance of hydraulic modelling for river restoration design is illustrated using the Allt Lorgy river restoration project (Cairngorm Mountains). To achieve this, a rare set of models from the case study, obtained pre-construction, post-construction and post-flood, are presented and used to inform discussion on the use of 2D hydraulic modelling and the interpretation of vorticity patterns, in order to predict geomorphic change. The complexity and limitations of using a computational fluid dynamic approach are highlighted, with particular focus paid to the use of 2D depth averaged hydraulics in predicting erosion and scour. Problems associated with capturing fluid vorticity and convected vortex structures are also emphasised.

#### Session 5:

#### <u>Luffield</u> Workshop E:

**River Restoration and Biodiversity** 

#### FLOODPLAIN MEADOWS: A CASE FOR RESTORATION

E. ROTHERO<sup>1</sup> 1 Open University

Species rich floodplain meadows are a rare yet important habitat, delivering multiple benefits to society, such as biodiversity conservation, flood amelioration, nutrient cycling and habitat for pollinators. The members of Floodplain Meadows Partnership have been researching this habitat for over twenty years and have amassed a substantial database of botanical, hydrological and edaphic information. Using case studies from the UK, we will demonstrate that these habitats can be restored, given the appropriate soil and water conditions. We propose that where a functional floodplain is being rehabilitated, floodplain meadows offer a sustainable land-use, delivering a wide range of benefits to society and their restoration should perhaps be considered and integrated more widely alongside river restoration schemes.



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- Advanced Remote Water Quality
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- River and Floodplain Restoration
- Wetland Creation
- Habitat Regulations Assessment
- Aquatic Surveys (including HSI and macroinvertebrates)
- Mitigation Licenses & Works
- Ecological Survey & Evaluation
- Habitat Creation & Restoration
- Soils/Geology/Geomorphology













#### Session 5:

#### Site Visit (Part 1) – Milton Keynes Floodplain Forest

Located within the Ouse Valley Park, Milton Keynes, the Floodplain Forest project, led by The Parks Trust, is creating 50 hectares of new wetland biodiversity habitat on the floodplain adjacent to the Historical Great Ouse. management practices have resulted in the loss of much of Britain's once diverse and rich floodplain habitats. Dredging, deforestation, channel re-alignment and agricultural practices have left uniform and disconnected systems. These issues were represented in this section of the Ouse Valley Park before 2007.

This changed when The Parks Trust, working with Hanson Quarry Products Europe Ltd succeeded in obtaining planning consent for the floodplain forest habitat creation project in 2002. The project has been enabled through the removal of alluvial aggregates by Hanson from this area of the floodplain and a land restoration scheme that includes a diverse mosaic of lakes, channels and lagoons.



Whilst the aggregates extraction has been a commercial operation, The Parks Trust as the owner of the site has ring fenced the income it has received from the gravel sales to provide a fund for the habitat establishment and ongoing care of the site as a nature reserve freely open to the public. Mineral extraction finished in the main area of the site in 2014 and the Parks Trust is now taking forward the habitat establishment work and providing access infrastructure to enable the public to access the site and experience the nature it will attract.

#### **Objectives**

- The development of a topographically and ecologically diverse habitat mosaic 'floodplain forest'.
- Floodplain restoration by changing the hydrological regime through lowering the level of the land and reconnecting it to the River Great Ouse via new channels.
- To create multiple channels and a mosaic of wet woodland, fen, reedbed, wet grassland, marsh, carr and seasonal and permanent pool habitats.
- Create an additional nature reserve and environmental educational resource for Milton Keynes.

#### Design



The mosaic of channels and low lying land forms and islands have been created by Hanson by carefully replacing the overburden materials and topsoil according to a complex scheme of landforms that provide seasonal, semi-permanent and permanently wet and dry habitat zones. Selective placement of materials has created a variety of shingle banks, beaches and earth cliffs that add to the diversity of habitats. The avoidance of using hard structures within the new channels will ensure that the essential dynamics of the fluvial geomorphic and biological processes that drive the cycle of

succession and reversion will maintain and improve the habitat and species diversity over time.

**NOTES** 

#### Site Visit (Part 2) – Cosgrove Weir Removal

Across the UK, for many years now there has been a movement to remove redundant weirs and restore the natural connectivity of river systems. Weir removals vary significantly in terms of cost, scale and complexity and two weirs are hardly ever the same.

The weir at Cosgrove was a small weir which diverted water into a Mill leet in farmland just outside of Milton Keynes on the River Tove. Like many weirs, this was acting as a barrier to fish migration and restricting the hydro-geomorphological processes upstream.



Location: MK12 5NN SP 80837 42145

#### Implementation



The weir near Cosgrove was redundant and in a bad state of repair. After a period of high flow events it eventually failed and provided the Environment Agency with an opportunity to remove it completely.

The removal was completed in 2013/2014 and now provides an easier passage for fish and the European Eel which is a key species of the Tove. Sediment conveyance has also been improved and flows upstream of the site are now more natural and dynamic.

#### **Post Removal Works**

Monitoring of the geomorphological and ecological response has been undertaken pre and post removal. To further enhance this reach of the Tove further ecological enhancements have recently been completed.

The recent works have included the removal and installation of fencing along 600m of both banks. The new section of fencing combined with five new cattle drinkers will prevent poaching and provide increased riparian cover. Other improvements have included willow planting and the screening of hard bank protection with brushwood, soil and vegetation.



#### Session 6:

#### **Brooklands Suite**

#### Working with Urban Rivers

#### THE SKETCHLEY BROOK: AN EXAMPLE OF URBAN RIVER RESTORATION

D.P. ALLUM<sup>1</sup>, I. RASSOOL<sup>1</sup> 1 BWB Consulting

Previously located beneath the Johnson's dry cleaning factory in Hinckley, Leicestershire, the Sketchley Brook was a forgotten watercourse, running in culvert for almost 260m. Due to the historic industrial processes on site, ground conditions were contaminated and deep sheet-piled lakes were created to hold water for the dry cleaning process. The site was devoid of biodiversity, offered no habitat and imposed a pollution risk to the water environment. As part of a redevelopment of the site the opportunity was taken to daylight the brook and naturalise one of the lakes. This aligned with Hinckley & Bosworth Borough Council's vision to provide a green corridor between the Ashby Canal and Burbage Common, providing flood risk benefits and improving the ecological and environmental credentials of the brook. The daylighting and realignment of the watercourse and naturalisation of the lake is now complete, with various ecosystems established and flourishing within the new environment.

#### URBAN POCKET WETLANDS: A BIODIVERSITY OFFSETTING SOLUTION

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

Creating new resilient habitat in the heart of the capital is a challenging prospect when competition for space is fraught, especially if you are confined to a small development space. Evaluating the wider landscape and its connectivity is essential to identify opportunities for biodiversity offsetting and enhancement. Our urban waterways, so often overlooked, could be used to deliver cost effective and innovative offsetting measures at the same time as achieving Water Framework Directive catchment 'actions'. BioHaven Floating Wetlands have a novel design, overcoming the failings of other floating systems by providing durable and resilient habitat, excellent long-term plant success and proven water quality treatment. BioHaven can be used to create pocket wetlands regenerating waterways bereft of natural habitat as well as being part of a solution to treat poor water quality as an end of pipe solution.

#### **RESTORING NATURAL PROCESSES IN WANDLE PARK**

M. PIERIS<sup>1</sup>, I. DENNIS<sup>1</sup> 1 Royal HaskoningDHV

Royal HaskoningDHV worked in partnership with LDA Design and the London Borough of Croydon to restore the River Wandle in Wandle Park, central Croydon. This project had a range of key challenges that were overcome through the design process, including:

- The restoration of natural hydromorphological processes whilst minimising the potential for large scale channel migration.
- Ensuring that the river could be re-meandered through contaminated land at the site without increasing remobilisation of in situ contaminated sediments and leachate.

• Minimising the need for off-site disposal of contaminated materials and the need to import uncontaminated soils for capping.

This presentation will focus on how these challenges were overcome to deliver a successful river restoration and urban regeneration project. The park is now a popular public open space that is highly valued by the local community whilst providing real habitat benefits and a significant contribution towards WFD targets for the River Wandle.

#### Session 6:

#### <u>Monza</u>

#### Monitoring: Effective Assessment

#### **RESTORATION, CONSERVATION AND RESILIENCE IN LOWLAND RIVERS**

M.S.A. THOMPSON<sup>1</sup>, C.D. SAYER<sup>1</sup> 1 Environmental Change Research Centre (ECRC), Department of Geography, University College London

The natural chemical, physical and biological states of rivers are being altered increasingly by longterm exploitation and habitat modification. Successful restorative intervention is therefore critical for mitigating impacts on biodiversity and ecosystem functioning. Here we investigate the ecological impact of large woody debris restoration and present findings from a pesticide spill using detrital breakdown rates in conjunction with a BACI monitoring design which includes measures across multiple organisational levels, from genes and individuals through to quantified food webs.

#### LESSONS LEARNED FROM MONITORING THE ECOLOGICAL OUTCOMES OF RIVER REHABILITATION WORKS IN THE UK

M.A. SMITH<sup>1</sup>, N. ANGELOPOULOS<sup>1</sup>, I.G. COWX<sup>1</sup> 1 Hull International Fisheries Institute, University of Hull

As a result of numerous anthropogenic stressors, river systems, and consequently fish physical habitat, have undergone considerable transformation. Following the emergence of the EC Water Framework Directive (WFD) and EC Habitats Directive (HD), there has been an increase in river rehabilitation schemes to ameliorate anthropogenic pressures of rivers and augment ecological status to meet specific obligations. However, despite the extensive implementation of river rehabilitation programmes little follow up monitoring, and dissemination of results takes place leaving a paucity of information on the outcomes of such schemes on which new schemes can be designed. Given the importance of fish as an indicator of ecological quality under WFD guidelines a series of rehabilitation projects were monitored for their impact on brown trout (Salmo trutta) population structure and habitat availability. Evaluation of the outcomes of these case studies and the monitoring used highlighted a number of common themes which will be presented as lessons learned from monitoring small-scale rehabilitation projects.

#### MONITORING SEDIMENT AND NUTRIENT POLLUTION ON THE LID BROOK

S. BROWNING<sup>1</sup> 1 Wavelength Environmental

Bristol Avon Rivers Trust and Wavelength Environmental undertook intensive monitoring during two storm events to establish baseline conditions prior to the implementation of remedial works along the watercourse. The primary focus of the field monitoring was to assess pollution due to suspended sediment and nutrients – especially phosphorus. A range of sensors and instrumentation were used including water quality sondes, level sensors, automatic water samplers and open channel flow meters. Samples were collected across two storm events and these were analysed at an accredited laboratory for suspended sediments, nitrate, total phosphorus and ortho-phosphate. Subsequent analysis of the lab results along with in-situ flow data enabled estimations of total pollutant loading (i.e. kg of sediment and phosphorus) to be made. This study showed that, during the 48 hours over which samples were taken, approximately 6 tonnes of soil were lost from the Lid Brook catchment.

#### Session 6:

#### <u>Indianapolis</u>

#### **Partnership Delivery**

#### SHEFFIELD MODEL FOR SUSTAINABLE INVESTMENT, FLOOD REDUCTION, AND MULTIPLE BENEFITS

H. BATT<sup>1</sup>, S. BIRCH<sup>2</sup> 1 River Stewardship Company, 2 Sheffield City Council

The presentation will outline a highly innovative flood defence scheme led by a partnership comprising of Sheffield City Council, Environment Agency, Sheffield Chamber of Commerce and the River Stewardship Company. The project involves the delivery of built flood defences and a programme of river channel maintenance to reduce the risk of flooding in Sheffield's Lower Don Valley, a business and industrial area of national and international importance. Private sector investment has been secured by means of the first Business Improvement District in the UK associated with flood protection, and the river management contract is being delivered by the River Stewardship Company, a local social enterprise. Helen Batt, from the River Stewardship Company, will describe the innovative aspects of the scheme, challenges and benefits and discuss the potential for delivering this approach in other locations with business areas at risk of flooding.

#### MAXIMISING THE VALUE OF LARGE INFRASTRUCTURE PROJECTS – DELIVERING RIVER RESTORATION AS PART OF MAJOR CAPITAL WORKS

L. BAKER<sup>1</sup>, K. SKINNER<sup>1</sup> 1 Atkins

In what has been a very challenging economic climate over the last 6 years there has been increasing pressure to build out of the recession to boost economic growth. This has led to significant investment in large infrastructure projects. Within these developments there remains pressure to deliver them cost-effectively. We also need to protect, preserve and (where possible) enhance our water environment, which is often viewed as a barrier to overcome rather than a partner to embrace. This presentation aims to present a working example of a large infrastructure project (Norton Bridge Rail Improvement scheme). It demonstrates how early engagement and regular discussions encouraged a collaborative approach with engineers and regulators which can achieve multiple benefits for the water environment. Atkins' geomorphologists worked alongside rail engineers to assess the existing baseline conditions and provide mitigation measures on the ground which offer an improvement in the river habitat rather than a loss.

### BALLYMONEY RIVERSIDE PARK RESTORATION: FROM BOATING LAKE TO SALMONID CHANNEL IN THREE MONTHS

G. GREER<sup>1</sup>, J. KANE<sup>2</sup> 1 Rivers Agency, 2 DCAL Inland Fisheries

This presentation will highlight the recently completed river restoration works in Ballymoney (N. Ireland). The scheme was situated in an urban setting where an 'on-line' boating lake was constructed during the early 1970s on an otherwise productive salmonid stream. Concerns had been raised by the local council as to the condition of the pond with increasing sedimentation causing deterioration in the aesthetic and biodiversity value of the area. Informal discussions between biodiversity, fisheries and flood alleviation staff led to a proposal going to the council to re-instate a natural river channel

through the park. Work began in September 2014 and was completed in around 13 weeks. The joint project between DCAL Inland Fisheries, Ballymoney Borough Council and Rivers Agency involved weir removal, channel construction and wetland creation.

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#### Session 7:

#### **Brooklands Suite**

**Partnership Delivery** 

#### **DEVELOPING LEWISHAM'S RIVERS**

C. GRAY<sup>1</sup>, P. CHAPMAN<sup>1</sup> 1 London Borough of Lewisham

This presentation will show, through two examples of dense urban riverside developments, how the practicalities of the development and planning process can pan out. It will look at the process, the tensions, the parties involved and what kind of systems or policies can help navigate us through to consistently positive outcomes. Planners play a crucial role in the decision making process for development near rivers and while local authorities hold the decision making power, the planners dealing with individual applications do not have the resources or knowledge to enter into detailed discussions on the engineering or ecological considerations of proposals. In order to deliver consistently positive development for river corridors as well as other urban planning considerations, Lewisham has developed planning guidance to be used to illustrate the high standard of development that is expected near rivers and that can be used to negotiate good outcomes on different schemes that come forward.

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  - \* 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)



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## **POSTER PRESENTATIONS**

#### **BENTLEYS**

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## Can adaptive land management help reduce the risk of extreme river flows – Research and action on the River Eden

I. PATTISON<sup>1</sup>, K. SMITH<sup>2</sup>, L BUTLER<sup>3</sup> 1 Loughborough University, 2 Durham University, 3 The Rivers Trust



## Indicative channel design: Addressing geomorphological forms and processes

S. S. ROBERTS Jacobs

#### Assessing impacts of abstraction on the River Eden, Kent

H.M. GIBBS, K.S. SKINNER *Atkins* 

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#### **River Avon Restoration Project**

M. PORTER<sup>1</sup>, A. MAXWELL<sup>1</sup>, J. MOON<sup>2</sup> 1 Environment Agency, 2 Black & Veatch

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#### "Above the springs of Wandel"

T. TURPIN Nicholas Pearson Associates

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#### Pollution Busting Measures on an urban river in London: Lessons Learnt

O. V. BIERVLIET, B. DAVIES South East Rivers Trust

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#### Identifying sites to reduce flooding on the Upper Darent

L. EVANS, B. DAVIES South East Rivers Trust



#### **REstoring rivers FOR effective catchment Management (REFORM)**

N. ANGELOPOULOS<sup>1</sup>, J. ENGLAND<sup>2</sup> 1 University of Hull, 2 Environment Agency



## Catchment based approach to restoration of the Kennet and Lambourn SSSIs

P. ST PIERRE The Environment Agency

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#### The Madebrook rises again!

P. LAMBERT Shropshire Wildlife Trust



#### **River Restoration on the Tame - an Integrated Mitigation Solution**

T. RUDD Cascade Consulting

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#### The Salmon for Tomorrow Programme

S. SQUIRES Natural Resources Wales



Cleaning Cleveland's water from orange to clear: Remediation of contaminated water at Saltburn, Cleveland as a result of historical ironstone mining

S. HILL The Coal Authority



#### **Elgin Flood Alleviation Scheme: Delivering resilient flood management and watercourse restoration**

T. POPE Royal HaskoningDHV



#### Delivering an enhanced multi-functionality river realignment using a new conceptual approach to design and best practice river engineering methods.

J. HILLIER Kier Infrastructure UK



## Sheffield model for sustainable investment, flood reduction, and multiple benefits: Lower don valley business improvement district.

H. BATT The River Stewardship Company



#### **Developing London's Rivers**

P. BIDE<sup>1</sup>, P. CHAPMAN<sup>2</sup>, C. GRAY<sup>2</sup>, J. MANT<sup>3</sup>, K. SKINNER<sup>4</sup> 1 Planning for Water, 2 London borough of Lewisham, 3 The RRC, 4 Atkins


# Catchment-scale river restoration on a freshwater pearl mussel river in Northern Ireland

M. HORTON<sup>1</sup>, A. KEYS<sup>1</sup>, L. KIRKWOOD<sup>1</sup>, F. MITCHELL<sup>1</sup>, R. KYLE<sup>2</sup>, D. ROBERTS<sup>2</sup> 1 Ballinderry Rivers Trust, 2 Queens's University Belfast



# Nene Valley NIA – River habitat connectivity improvements in a heavily modified waterbody

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Esmée Fairbairn: supporting community-led projects to improve our rivers for wildlife and people - turning aspirations into reality THE RRC



Evaluation of River Restoration Strategies: Examples from Cumbria and the New Forest THE RRC



Evaluating the effect of river restoration techniques on reducing the impacts of outfall on water quality THE RRC

Notes

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