THE RIVER RESTORATION CENTRE
Working to restore & enhance our rivers

# River Restoration News

Issue 43 December 2013

# Rodley weir by-pass channel

Main photo: Arup

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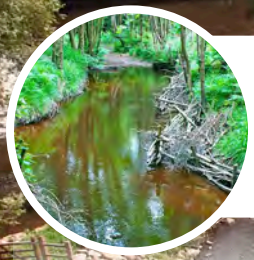
**rrc@theRRC.co.uk**

*Meeting WFD objectives*
## Addressing barriers to fish passage



*The winners of the 2013*
## WTT/Thames Water Awards

Keep up to date with important news and events through our monthly bulletin. Join the debate on LinkedIn, Twitter or Facebook, or contact the Centre directly.

***Don't forget***
The RRC is able to provide an independent source of advice and information.

*A major update for the*
## RRC Manual of River Restoration Techniques

*Perspectives from the*
## 5th ECRR Conference

# Addressing barriers to fish passage

**Kathryn Turner**
Biodiversity and EMS Advisor, Yorkshire Water

*Rodley weir by-pass channel September 2013*
*Photos – ARUP*

*Rodley weir*

*Photo – Kathryn Turner*

**Water industry investment** has transformed the water quality of our rivers over the last 25 years and morphology is now one of the significant challenges to return river life to as natural condition as possible. In the last three years Yorkshire Water has undertaken several projects designed to investigate how to tackle these barriers. Rodley weir by-pass channel is the first of these to be completed.

**Rodley weir** sits in the main channel of the River Aire near Leeds, it has a head of 1.8m and presents a significant barrier to the movement both of migratory species, such as brown trout, lamprey, salmon and European eels, and other course fish in the river. It was identified as one of around 11 key barriers to fish movement in the Aire by the Environment Agency and Aire action group.

## Planning and design

The Rodley weir is situated between Yorkshire Water owned land, leased to the Rodley Nature Reserve, to the North and privately owned land to the South. As the private landowner declined to discuss the project, removal of the weir had to be ruled out. The options were then either an on-weir fish pass on the Yorkshire Water side, such as a Larinier Super Active Baffle Fish pass, or a by-pass channel.


*The by-pass channel being excavated*


*Plan of the ARUP channel design*

Since the weir could not be taken out and more natural processes restored in the river, the highest quality solution was a by-pass channel which provides greater biodiversity gains and lower maintenance.

The route of the fish pass was heavily constrained by the presence of an overhead electricity pylon. In addition to the physical constraints associated with the pylon, the ARUP design team's challenges included complex hydraulic factors. Ensuring that a strong flow emerged from the fish pass was critical to attract fish to the entrance, whilst ensuring that the channel was deep enough and water velocities low enough for fish to advance upstream without becoming exhausted.

Rock armour stone on the base and bed of the channel encourages heterogeneous flow conditions, provides crevices for refuge and protection against damage during high flow events. The design includes provision for maintenance with access to each side of the channel; a landscape and planting scheme was devised with the additional function of providing protection to the channel banks in the short term until vegetation was established. Redi-Rock wall blocks (precast concrete modular wall system with the look of natural stone) were used at the downstream entrance to the channel. This addressed the construction issues that were faced due to piling not being possible under the overhead services lines.

Regular stakeholder meetings were held throughout the project planning and design phase. The estimated project budget was £570k. The Environment Agency made a partnership contribution of £25k.


*Dave Nesham, Rodley Nature Reserve Manager, on the site before the build began*

Photo: Yorkshire Water

*Photograph showing the membranes, rock import and check weir construction*

## Construction

Construction began in winter 2011/spring 2012. The land on which the pass was built was relatively low lying with a tall herb ruderal flora and subject to flood during high flows. Access into the site was restricted, as the only route was via a narrow swing bridge across the Leeds-Liverpool canal, with a weight restriction of 25 tonnes. This affected the size of equipment able to reach the site. Working in and adjacent to the River Aire during the wettest summer in 100 years also presented challenges for the project team. River levels rose rapidly over a matter of hours so it was necessary for the team to monitor levels throughout the day, ceasing work if levels were too high. This resulted in materials and structures being washed away, followed by some significant rebuilding. The irony being that we avoided construction during the previous winter which turned out to be a dry and calm one!

This led to additional time and a partial redesign to adapt the pass to high flows, and has resulted in an additional spend of around £350k on the project.

We reused all excavated materials on site creating raised bird hides and pond banks on Rodley Nature Reserve, thereby saving both disposal costs and landfill space, whilst increasing the biodiversity value of the site. The channel was completed in July 2013. The bare ground is under colonisation from Himalayan balsam which is regularly tackled by the reserve staff to allow a more native flora to colonise.

Photo: Yorkshire Water

*View showing the detailed leveling to create the gentle 1.8 m drop*

*Another view showing the membranes and rock import, and check weir construction*

Photo: Yorkshire Water

## First signs of success

We set up a fish monitoring project which placed solar powered data loggers in the channel to pick up fish tagged this summer. Preliminary results show brown trout entering and leaving the pass and this strongly indicates that the pass is doing what it was designed to. This summer, dippers and grey wagtails were regularly seen, and a male otter has set up on site and is using it as a feeding station – indeed he may have eaten a few of our tagged fish. Clouds of fry were seen in the channel during the mid-summer works, which is a positive sign that course fish may be breeding in it.

We are very proud of our achievement on this site and the delivery of an innovative solution to the problem posed by Rodley weir and meeting the Water Framework Directive requirement for fish passage that supports a much higher biodiversity than any on-weir solution. It forms part of our commitment to "taking responsibility of the water environment for good" and our investigations into how to meet the regulatory requirements for healthy aquatic environments without putting up customers' bills.

## Further and future work

Yorkshire Water has river restoration investigations underway at Cudworth Dyke near Royston Barnsley, Guiseley Beck and Yeadon Gill at Esholt near Leeds and at Ingbirchworth and Swinsty reservoirs alongside a barrier removal investigation above Broomhead reservoir. For the future we are investigating barriers to fish passage at more than 20 sites. The challenges posed by post-industrial rivers require more innovative partnership working to achieve greater benefits and this will form a more fundamental part of our work on river restorations in the future. This work at Rodley is the first step in understanding how to develop cost effective efficient approaches.

ARUP presented the design of this channel to the River Restoration Centre conference in April 2013 and we look forward to discussing this and other projects at future conferences and through this newsletter.

Project partners: Environment Agency, Rodley Nature Reserve, Yorkshire Water, ARUP and the contractors MMB

**For more information about Yorkshire Water's river restoration and barriers to fish passage projects contact**

**Dr Kathryn Turner** – Biodiversity Advisor
**Kathryn.turner@yorkshirewater.co.uk** (Main river barriers)

or

**Mark Tinsdeall** – Environment & Catchment Team Leader
**Mark.tinsdeall@yorkshirewater.co.uk** (HMWB barriers)

# Wild Trout Trust – Thames Water Conservation Awards 2013

**Paul Gaskell** WTT,
**Jenny Mant** RRC
and **Ulrika Åberg** RRC

Photo: ARK

*The work by Action for the River Kennet (ARK) in Stonebridge Wild River Reserve in Marlborough, Wiltshire, was rewarded with winning the **partnership category***

This year marked the 15th anniversary of the **Wild Trout Trust's Conservation Awards**, celebrating achievements in river habitat enhancement.

The competition is often hard-fought and the 2013 entries amply lived up to this reputation. The awards are sponsored by Thames Water and the ceremony was held at the lavish Savile Club in Mayfair, London. This year, three trophies were awarded in the following categories:

**Professional**: best project carried out by a professional body – often on a comparatively large scale.

**Amateur**: best project undertaken by non-professionals in an innovative way – often smaller scale with highly innovative use of limited resources.

**Partnership**: best project carried out as a partnership between a charity or volunteer group enabled by collaboration in a partnership with other bodies and groups.

## Professional Category

For the professional category winners – a heroic reinstatement of natural river processes at both Buxted and Spring Meadows sites in Sussex by **Ouse and Adur Rivers Trust** was recognised. This was achieved by removal of significant structural impoundment and also reinstating a previously-straightened river into its historic, meandering channel. The project also incorporated a strong ethos of pre-project consultation (with responsive adaptations to feedback) and diligent engagement initiatives.

*River Uck, Buxted - aerial view of works*

Photo: Ouse and Adur Rivers Trust

Photo: Ouse and Adur Rivers Trust

Photo: WTT

*Above: Mark Bennett and Pete King receiving the Professional category winers award*

*Left: River Uck, Buxted, after channel re-meandering*

Clever cost-controls, by rescheduling and redistribution of assets between parallel on-going projects, were also achieved in the face of inhospitable weather conditions during the works. A thorough understanding of river processes, key impacts and winning the support and acceptance from local stakeholders were all crucial factors for project success, and securing the award.

## Amateur Category

**Pickering Fisheries Association** fishing club won the amateur project award. They utilised interventions to both surrounding land-use and extensive volunteer-led in-channel works to generate increased variety in the structure of the whole river corridor in the Pickering Beck in North Yorkshire. Noting terrestrial wildflower and butterfly diversity in combination with Riverfly Partnership aquatic invertebrate monitoring and improved angler catches has already demonstrated biological improvements resulting from a very large volunteer work effort. Working parties that encouraged attendance by family members of all ages were a key mechanism for engagement as well as labour. The work also dovetailed with, and contributed to, the efforts of the "slowing the flows" project that is designed to generate floodwater storage upstream of a notorious bridge bottleneck for flooding the town of Pickering. Inventive use of heavy-horses to undertake coniferous forestry management solved difficulties with vehicular access.

Photo: WTT

*Left: Martin Smith and Dave Southall with the amateur project award*

*Right: View of a restored section of Pickering Beck, North Yorkshire*

Photo: Pickering Fishing Association

## Partnership Category

**Action for the River Kennet** (ARK) was awarded the prize for best partnership project for the creation of wonderful habitats in Stonebridge Wild River Reserve in Marlborough, Wiltshire. Access measures were designed so that public enjoyment of the site did not degrade or destroy the sensitive flora and fauna. The owners of the left bank, St John's Foundation Trust, offered ARK a peppercorn lease agreement allowing a boardwalk, new hedge and river habitat work to be completed.

*Charlotte Hitchmough receiving the Partnership category winers award on behalf of Action for the River Kennet*

Photo: WTT

After initial resistance to conservation works from the previous owner of the right bank, ARK was able to purchase the 15 acre meadow and around 800m of river in partnership with Marlborough Town Council. This allowed significant development of the project. Work was conducted using a volunteer workforce, alongside contractors for tasks too dangerous or specialised for amateurs. The site is now maintained by volunteers and has seen improved densities of wild trout as well as providing homes for a wide variety of reptile, amphibian and bird species of special conservation value (such as the rare grasshopper warbler).

## Runners-up

Runners-up this year (in no particular order) included these fascinating projects:

**Hampshire and Isle of Wight Wildlife Trust & Aquascience** presented a wonderfully forward-thinking restoration scheme of lush marginal flora and fauna of the Itchen Navigation canal, alongside restoring and enhancing public access and interpretation. Especially noteworthy was the provision for solid future custodianship of a wildlife-rich and publicly-accessible valuable green space.

**Galloway Fisheries Trust** (Wigtownshire) incorporated mixed limestone and ordinary river gravels, and allowed them to be redistributed by natural processes, to form spawning beds in High Cree. This innovative work, along with a demanding programme of sampling and measurement, has noted successes in significantly increasing salmonid egg and alevin survival. Human-induced impacts of acid rain have exhausted the soil's capacity to "buffer" low pH flushes in this watercourse. The project takes a considered approach to ameliorating impacts of acid-flush on aquatic communities – and quantifying the results.

**Environment Agency** improved fish passage (notably sea trout) at a bottleneck of structures on the Cadnam River in Paulton's Park (Hampshire). Tackling four obstructions that are concentrated together in a very short reach of river is intended to open up more than 90% of the catchment for fish. An educational programme (incorporating the life-cycle of sea trout) aimed at the 15,000 schoolchildren who visit the park annually is planned - as is the installation of cameras to relay video of fish passing the structures. Working closely with the Park proved crucial to completing these works.

**Lincolnshire Chalk Streams Project** completed a series of river corridor management and habitat creation works along three kilometres of the Laceby Beck (Grimsby). This included a section of river within the grounds of a local golf club – and the engagement with its members has been central to the success of works there. As well as canopy management to promote in-stream productivity, the creation of a wetland shelf, ongoing assessments of changes in bat, invertebrate and fish populations, a local village-residents' group has been formed to care for the Beck in the future.

**Hillington Fly Fishing Syndicate** (Norfolk) turned an impounded estate lake back into a flowing section of chalkstream on the River Babingley. In doing so, fish passage has been eased and a transition from chironomid-based insect life now means there is a greater diversity of fly and plant life that are classically associated with chalk stream habitats.

The judges Paul Gaskell (WTT) and Jenny Mant (RRC) would like to reiterate their sincere thanks to all applicants for finding the time to talk to us and having the patience to grapple with Skype.

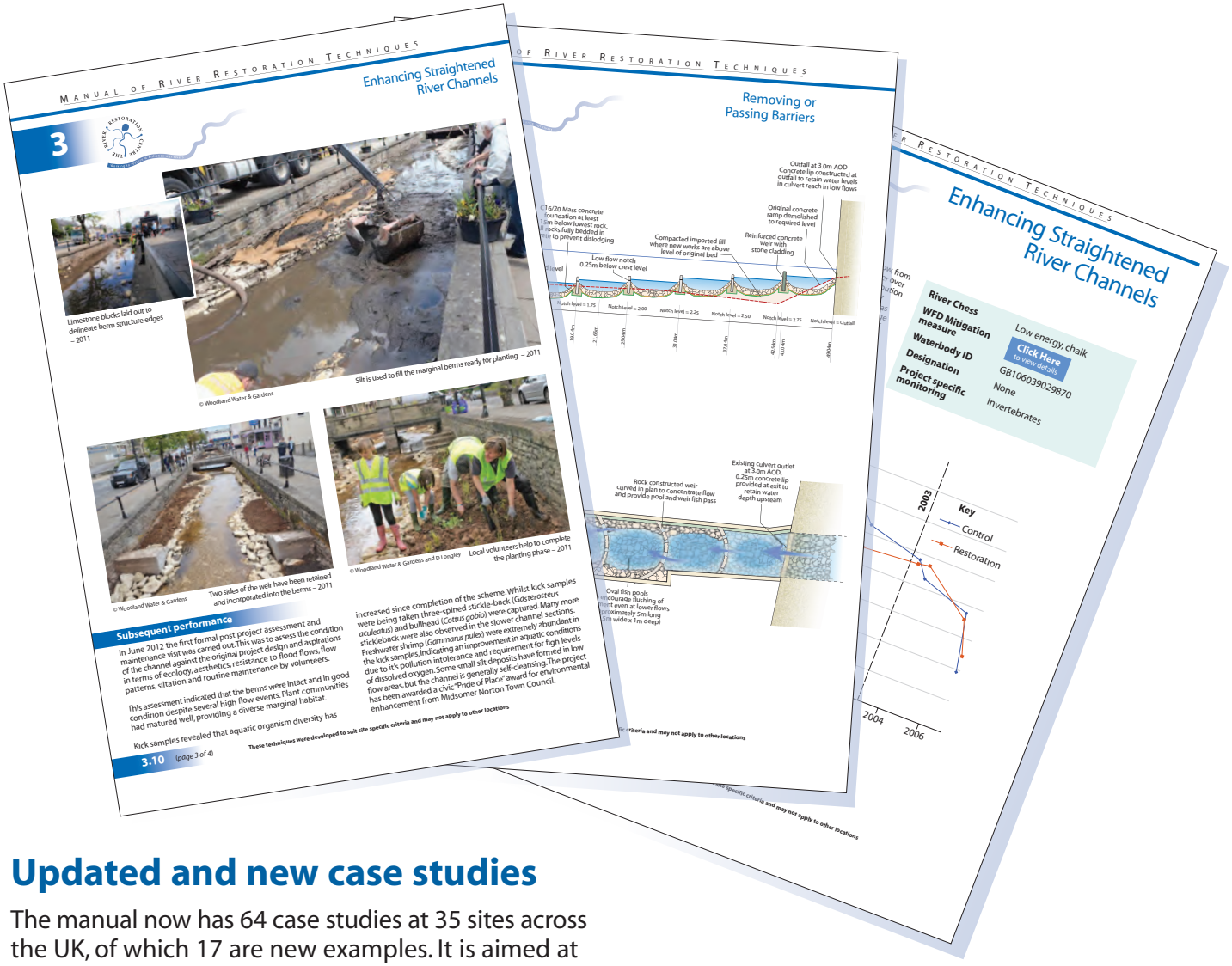
The sheer enthusiasm and drive of all the individuals involved was really inspiring.

**We look forward to hearing next year's 'tales from the riverbank'. So start thinking about your entries now!**

# A major update for the Manual of River Restoration Techniques

**Di Hammond** River Restoration Centre

The River Restoration Centre is proud to announce the arrival of our updated Manual of River Restoration Techniques. RRC staff have been beavering away since last July on the new version. We have gone back to all the old existing techniques and found out how they have fared since the last manual update in 2002. The performance of the technique has been summarised and any monitoring results discussed.




RRC & Rob ert and Rhoda Burns

## Updated and new case studies

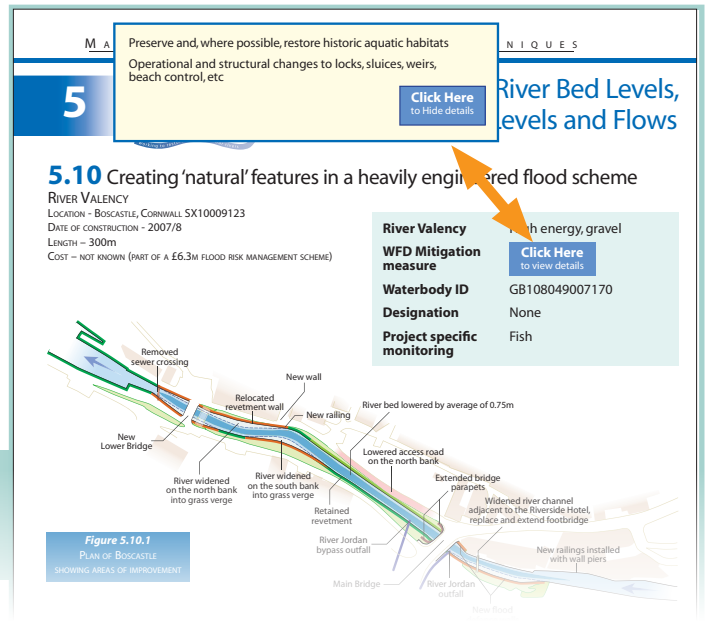
The manual now has 64 case studies at 35 sites across the UK, of which 17 are new examples. It is aimed at river restoration and enhancement practitioners, river engineers and managers, environmental consultants, local authorities and rivers trusts. The manual is now an online only resource and includes a newly designed interactive map, as well as an extended list of reference material.

*Examples of pages from the new techniques added to the updated manual*

## New features

Other new additional features include listing the Water Framework Directive (WFD) mitigation measures that each of the techniques address. There are separate measures for England, Wales Scotland and Northern Ireland. When looking at an individual technique, you can click on the box on the front page of each case study to see all the mitigation measures that are addressed by the technique. Projects can also be searched for by river name, by site designation (National Park, RAMSAR, SPA, SAC etc.) and by technique.

*Each case study example in the manual now includes a list of the WFD mitigation measures it has addressed*




## Using the Manual

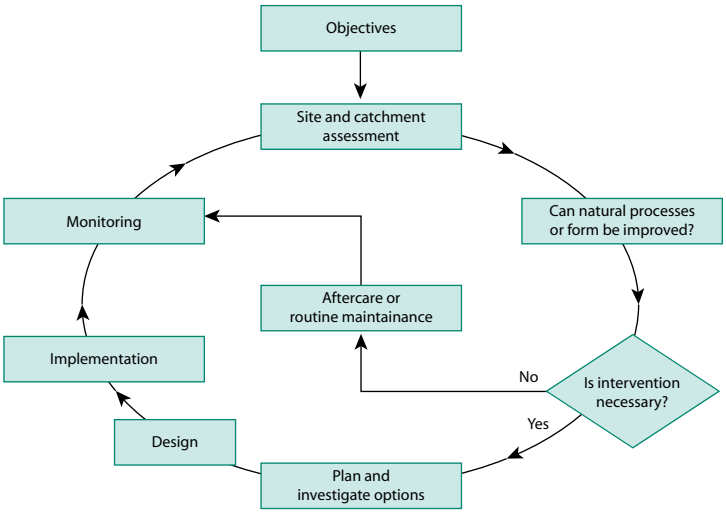
To help you get the most out of the Manual there is an introductory section which includes:

- How to use the Manual
- Understanding your site, and
- Planning, design and management of restoration works

The case studies range from large-scale civil engineering products through to small-scale interventions using local labour and equipment. Each technique has a description of the site, a comprehensive summary of the design with detailed diagrams and photographs. There is also a section on subsequent performance and the results of any monitoring that was carried out.

The case studies cover the following broad areas:

- Restoring meanders to straightened rivers
- Enhancing Redundant river channels
- Enhancing straightened rivers
- Revetting and supporting river banks
- Modifying river bed levels, water levels and flows
- Managing overland floodwaters
- Creating floodplain wetland features
- Providing public, private and livestock access
- Enhancing outfalls to rivers
- Using spoil excavated from rivers
- River diversions
- Mitigation for barriers (e.g. weirs)




*Flow chart showing the process of managing river restoration works – from initial objective setting through to planning and designing, implementation, monitoring and adaptive management*

The Manual is not a design tool and techniques should not be transferred to another site without due consideration and appropriate design. The techniques in the Manual can be used on a range of different scales. Whatever the scale or type of restoration works, there is a sequence of activities to plan, design, implement and subsequently manage and monitor.

We are positive that the updates and additional techniques will continue to provide a good source of technical support on river restoration. Please let us know your thoughts, and if you would like to see any further additions.

If you have any questions or would like some advice, we are happy to answer your queries **rrc@therrc.co.uk**

The Manual can be found on the RRC website by **clicking here**

# Celebrating success and addressing challenges: perspectives from the 5th ECRR Conference

Ulrika Åberg RRC

Photo: Krisztian Juhasz (viennamotion)

In September 2013, the **5th European River Restoration Conference** was held in Vienna, Austria. The conference also marked the official end of the RESTORE project, an EU Life+ funded partnership to share knowledge and promoting best practice on river restoration in Europe. The RRC has been one of six key partners in this three year project and functioned as the lead for Western Europe. During this time the RRC has delivered a number of events including workshops, a technical river restoration course and two field visits to France and Germany. Additionally we provided a strong lead in the development of the river-WIKI, an interactive Google-map based database of case studies, and the production of a "Rivers by Design" guide for developers, planners and landscape architects.

Over 320 delegates from 44 nations came to enjoy a range of presentations, workshops, panel discussions, posters and site visits. Wetlands International CEO, Jane Madgwick also interviewed several dignitaries including Janez Potocnik, European Commissioner for Environment and Peter Gammeltoft, Head of Unit for Water, DG Environment. At the impressive gala dinner, successful river restoration was celebrated with the first ever European Riverprize, awarded by the International River Foundation to the River Rhine. The talented 'quatschtronaut' Christian Ridder also captured the many topics on the state, restoration and future of our rivers discussed at the conference in his fantastic artwork.


Photo: Krisztian Juhasz (viennamotion)

*Christian Ridder's artwork capturing discussions and findings from the conference.*

# Conference perspectives

We asked three of RRC's members to give their perspective on the content and outcomes from the conference.

**Judy England**, Hydromorphology research scientist, Environment Agency

The conference provided an excellent opportunity to network and meet with people undertaking similar work across Europe (and beyond). Realising the challenges of working at different scales and across borders was rather eye opening.

The variety and content of the talks was excellent. Of particular interest was the talk by Klement Tockner from Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB) about the Science of River Restoration. He explained how rivers are functionally linked to adjacent terrestrial, subsurface and aerial systems and that organisms with complex life cycles such as amphibians and aquatic insects effectively link aquatic-terrestrial ecosystems. Another highlight was the talk by Christian Wolter from the IGB on the ecological responses to hydromorphological degradation and restoration. His talk gave an overview of the exciting work anticipated from the REFORM (REstoring rivers FOR effective catchment Management) EU project. The development of conceptual frameworks and idea of identifying the most relevant hydromorphological pressures using fuzzy logic cognitive maps were fascinating. The tools being developed as part of this project should improve our scientific understanding and enable the restoration decisions we make to be based on the best available evidence.

The workshops and site visits provided an excellent opportunity to discuss projects, share lessons learnt and understand the different challenges faced. But most of all, the conference participants were full of enthusiasm and were an inspiration to me to make a difference. Many thanks to everyone who made it such a success.

Photo: Ulrika Åberg

*Jane Madgwick interviewing Peter Gammeltoft*

**Oliver Southgate**, Regional project manager, Northern Ambition

I anticipated the conference to be interesting, but at a very high level, and not include real on-the-ground examples of successful restoration projects. I was so wrong! Nearly all of the information and presentations relayed where extremely relevant to the restoration work that I am delivering in the UK. My work across Northwest England is very diverse; ranging from breaking rivers out of heavily modified (Victorian engineered) channels in urban Manchester to restoring Sites of Special Scientific Interest in the Lake District by improving our river networks and corridors.

Photo: Ulrika Åberg

*Right: The National Park manager Carl Manzano explaining how they are working to preserve the last major wetlands in Europe.*

*Below: Site visit to the Donau-Auen National Park*

Photo: Krisztian Juhasz (viennamotion)

The conference presentations addressed both rural and urban issues and gave me some great food for thought and ideas that I can share with my river restoration colleagues back home. We are particularly interested in monitoring and measuring the tangible benefits of river restoration, not just for ecology and wildlife but also for people and our communities.

It was really refreshing to hear some honest examples of restoration projects being delivered and the challenges that people faced to successfully deliver them. The conference was a great forum for river enthusiasts to share learning and experiences between one another!


Photo: Krisztian Juhasz (viennamotion)

*Klement Tockner (IGB) presenting 'The science of river restoration'.*

**Seb Bentley**, Chartered Senior Hydromorphologist, JBA
**George Heritage**, Technical Director, AECOM

The conference was well attended with a good spread of practitioners from across Europe, representing a variety of groups ranging from trusts and regulators to conservation organisations and consultants. The conference acted as a showcase for restoration projects and was an excellent forum for ideas sharing. The presentations were varied and interesting (if a little light due to time constraints) with a variety of projects reported. We found it interesting that there appears to be a significant variance in the application of geomorphology and working with natural processes across the river restoration projects that were presented. From our perspective, successful schemes are built on a firm understanding of river and floodplain form and dynamics, and the role of catchment flow and sediment drivers.

In some schemes presented, the lack of process consideration could have implications into the future if the rivers respond in an unanticipated way. We feel, however, that the launch of a river basin community of practice where both successes and failures of river restoration techniques and theories are communicated across Europe is a positive step to ensuring that best practice and scientific knowledge is applied to new projects. The outputs of the EU RESTORE partnership for knowledge and information sharing will hopefully go a long way towards supplying key information on restoration successes across Europe.

In our view it was the posters that best illustrated the scale and variety of river restoration practice across Europe, highlighting some excellent and ambitious work that has been carried out. It also highlighted some interesting geographical variation, both in spending and ambition. It would certainly be good to build on this to encourage greater innovation at the next conference, emphasising naturalisation and working with natural processes, rather than working to generic templates, to restore our watercourses across the continent.

All outputs from the conference can be found on the RESTORE website **www.restorerivers.eu/**.


Photo: Krisztian Juhasz (viennamotion)

*The River Rhine received the European Riverprize for remarkable achievements in integrated river basin management following a 50 year legacy of river degradation.*

# RRC 15th Annual Network Conference

## 7th–8th May 2014 Sheffield Hallam University

# River restoration: delivering multiple benefits

Rivers and their catchments provide a wide range of natural and societal services. River restoration can play a pivotal role in increasing the provision of many of these. The RRC Annual Network Conference aims to capture an holistic view of river restoration and to provide a unique opportunity to connect all sectors interested in and involved with restoring rivers.

## Topics at the 2014 Conference will include:

- Building river restoration into flood risk management
- Engaging society in river restoration
- EU Water Framework Directive 2016 – 2021: planning to delivery
- Monitoring and evaluation for different purposes
- Applying cutting edge science to river restoration – application and benefits for practitioners

## Who should attend to join the discussion?

This conference should appeal to academics (natural and social science), river engineers, planners, practitioners, consultants, contractors, statutory agencies, environmental economists, trusts, NGOs and local authorities with an interest in restoring rivers for communities, ecology and those aiming to work with natural processes to achieve flood risk benefit.