



River Restoration NEWS

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NEWSLETTER of the RIVER RESTORATION CENTRE

Tel/Fax: 01525 863341 Email: rrc@theRRC.co.uk

A New Member of the Family

The Yorkshire Dales River Trust is just one of the growing number of such Trusts springing up across the UK.

The decision to become a Trust has acted as a catalyst to deal with a range of issues relating to the rivers that flow through the stunning landscape of the Dales.

John Shillcock (an RRC Director and Chairman of the Yorkshire Dales River Trust) explains how.



Ranunculus on the R Nidd, Yorkshire Dales

In February the Yorkshire Dales Rivers Trust covering the rivers Swale, Ure, Nidd and Wharfe registered as a charity and so became the most recent member of an ever growing family of rivers trusts. So why a trust for the Yorkshire Dales rivers? The rivers look lovely, they are scenically stunning and tourists flock to areas like Aysgarth Falls on the Ure, and the Wharfe at Bolton Abbey.

Those who have marvelled at the renaissance of the South Yorkshire rivers might well ask what is so wrong with their more northerly neighbours that they need a trust to care for them. The North Yorkshire Dales rivers, unlike their South Yorkshire counterparts, have never suffered, in recent times, the depredations caused by the coal, steel and textile industries and the inadequately treated effluent from the cities that grew up around them.

The challenge for these rivers now lies in the progressive and diffuse nature of the products of the way land is managed throughout their catchments. It is this malaise that will reveal itself to the carers of the South Yorkshire rivers now the point source polluters have been identified and largely regulated.

The Yorkshire Dales Rivers Trust is extremely fortunate in having trustees not only with an extensive academic and practical knowledge of the rivers, but experience in managing the moor and agricultural land that drains the catchments. Most of the trustees have had a lifetime of involvement with the rivers and without exception a passion for conserving them. Early on in its existence the Trust made an important policy decision which is enshrined in its business plan. As far as possible the Trust will base everything it does on

sound science. As well as doing the right thing this makes good economical sense. Although charities have good access to funds through grant-in-aid the pot of gold is not easy to come by, and it is essential to spend it wisely. Other trusts have learnt this the hard way. Research by Leeds and Durham Universities in upper Wharfedale on hydrological connectivity modelling has show clearly that, if your goal is to regulate runoff and reduce erosion and sediment transport, focussing on a small number of key areas is much more effective than dealing with the whole catchment.

Laudable though pursuing sound science might be the Trust is well

Algae at Kilgram



INSIDE THIS ISSUE

Spawning Channel on the River Conon, Scotland Page 2

Restoring Rivers with Engineered Log Jams Pages 3/4/5

6th River Restoration Centre Conference Pages 7/8

News and Events Page 8

aware that there are strong opinions as to what needs to be done and those giving financial support will want to see tangible results. Support for research will take time to bear fruit. In the meantime the Trust will listen and consult extensively on what the stakeholders would like to see done and doubtless the Trust will focus in on some early high profile projects with local impact. The long-term challenge for the Trust is that there is no obvious single target. The Dales rivers are littered with potential projects. The ever familiar litany of upland drainage, flash flooding, bank erosion, sedimentation, eutrophication, diffuse pollution, obstructions to fish passage and invasion by alien

Cattle poaching on Bishopdale Beck



plants are all there demanding urgent attention. The trustees are under no illusions. There is plenty to do.

For further information contact Nick Buck Yorkshire Dales River Trust Secretary 01677 424294.

Bank erosion on the upper Ure

A New Spawning Channel on the River Conon, Scotland

A short review by Martin Janes

On a recent trip to Scotland I went to the River Conon near Dingwall and was given a tour round the Dunglass Island spawning channel by Simon Cohen (Scottish Natural Heritage) and Simon McKelvey (Conon District Fishery Board).

We initially looked round the site in 2002. The idea of re-excavating the defunct, but mature alder lined channel for the benefit of salmon and trout, as spawning grounds was discussed. The Island itself has a designation for wet alder woodland, but this channel area had been over-planted with conifer, due to be harvested.

The Fishery Board were keen to show their members and others how they benefit the river fishing by spending hard earned resources upstream on improving spawning grounds. Unfortunately this work is a long way from the Island, it being just upstream from the mouth of the Cromarty Firth. The spawning channel was an ideal way of demonstrating this approach within the lower reaches, and restoring the feature.

In 2004 the conifers were felled by the supportive landowner, the channel was re-dug and field stones were placed by hand over the 500m length by Simon McKelvey and his gang. Due to the need to protect the Island from flooding, the surrounding embankment was breached by a penstock upstream and a culvert downstream. The culvert was oversized and half buried in the bed to allow easy passage in for spawning fish.

Although early days, the channel has already seen use, the alder is regenerating and sand martins are nesting in the banks. This project is a great example of how to

restore a defunct channel, requiring minimal excavation, and it has been recently recognised as such, highly commended by the 2005 SEPA Habitat Enhancement Awards.

For more information contact RRC or Simon Cohen (simon.cohen@snh.gov.uk)

The old alder lined channel within the conifer plantation



The restored channel after a year. The mature alders give it an established feel



Complete with original alder islands

Restoring Rivers with Engineered Log Jams

Following on from the RRC conference we thought those unable to attend would be interested in reading more about the concept of Engineered Log Jams.

Roy Richardson (SEPA) provides the following summary of the work.

Engineered Log Jams (ELJs) have been used widely on the west coast of North America as an alternative to traditional hard engineering for bank protection and as a tool in restoring damaged in-stream habitats, particularly for benefit of Pacific Salmon. The design of ELJs is based on naturally occurring stable accumulations of large woody debris in largely undisturbed forested river systems. At the heart of the technology is the philosophy that intervention in river environments is more likely to be sustainable if it is done in a way that mimics the natural conditions and processes to which the landscape and aquatic ecology have developed (*Herrera 2005*).

ELJs first appeared as a technique in river engineering following observations by researchers at the University of Washington that natural log jams not only introduce physical complexity to rivers but can also create stable “hard points” within otherwise dynamic systems (*Abbe and Montgomery 1996, 2003*). By increasing the natural diversity of physical habitat, log jams are thought to significantly increase the biological productivity of river systems, particularly for salmon and trout. At a local scale, log jams encourage the formation of pools, bars and riffles, in addition to supplying complex cover and acting as in-stream recycling points for organic material. At reach scales, the effects of log jams on energy and sediment dynamics can have dramatic impacts on channel morphology. Where log jams are present, complex morphologies can form consisting of pools and riffles in reaches that otherwise might be characterised by plane beds or bedrock (*Montgomery and Buffington 1997*). Log jams can also promote the creation of secondary channels and floodplain wetlands, dramatically increasing the aquatic habitat within reaches (*Abbe et. al. 2003*).

The intensification of agriculture and growth of urban areas has resulted in loss of large woody debris in river systems around the world. In the United Kingdom, these effects have been felt over longer periods than in the more recently modified landscapes of the west coast of North America. The loss of large woody debris has been linked to lower fish numbers, average size, and biomass for

salmonid fish species (*Dolloff 1986, Coulston and Maughn 1983, Elliott 1986, Fausch and Northcote 1992*).

The use of ELJs provides an opportunity to reverse the loss of large woody debris in river systems, while at the same time providing a more sustainable greener option for problems such as controlling bank erosion. They have been successfully applied to a number of major river projects in Washington and Oregon States, and their use has spread as far afield as Australia.

The design of individual ELJs is based on the architecture of naturally occurring accumulations of large woody debris. (*Abbe et. al. 1993*) classified log jams into various types based on observations from the Queets River basin on the Olympic Peninsula in Washington. Several of these types have been used as the basis for a number of successful river engineering projects over the past decade. Following the natural architecture of log jams, projects can be designed without the use of artificial materials. Native trees of sufficient size and density, and alluvium are all that is needed to ensure stability. However, where project constraints dictate increased factors of safety, additional ballast can be added in the form of rock or steel pilings. Artificial logs formed from concrete have also been used in a limited number of projects.

A formal civil engineering design process has been developed by practitioners working in North America to ensure the success of ELJ projects. At the centre of the design process is a geomorphic and habitat based reach analysis. This is conducted at sufficient temporal and spatial scales to ensure a thorough understanding of the past evolution and likely future development of the project site under a range of conditions. Project alternatives are then formulated and tested for their feasibility, cost and habitat benefit. Finally a preferred layout of ELJs is selected and their design is refined through hydraulic and structural analysis.

Hydraulic analysis is used to predict impacts on local water surface elevations, which can be

important if local flooding is of concern, or if increasing channel/floodplain connectivity is a goal of the project. The hydraulic analysis also provides important information for the structural design, to calculate loadings on the structure under a range of flow conditions, and to predict likely scour depths to ensure adequate depth of key members.

Environmental Science and Technology Online recently reported on the success of the largest ELJ project to date, constructed in the summer of 2004 on the Hoh River, in Washington State's Olympic National Park. The project was designed to protect the State Highway 101, which had been repeatedly washed out over the past 20 years, despite the best attempt of engineers to halt erosion in this dynamic river system using vast amounts of rip-rap. The project consists of 12 ELJs in total, comprising of two basic types. Mid-channel ELJs were designed to deflect 40-50% of the flood-stage river away from the road into a newly constructed side channel. Eight bank structures were then used to prevent further erosion of the road by reinforcing the bank while providing additional fish habitat (*Figure 1*). Steel pilings and rock were used to anchor the structures and ensure their stability during the 100-year design flow.



Figure 1 – Hoh River Bank Protection Works, Olympic Peninsula National Park, Washington State
Photograph Courtesy WSDOT

ELJs have also been applied successfully to numerous small river systems to restore damaged in-channel habitats and reconnect floodplains. In the summer of 2003, the habitat in 1km of Redwood Creek, California, was enhanced using 12 ELJs (*Figures 2 and 3*). Redwood Creek drains a catchment of approximately 23 square kilometres on the southern slopes of Mt. Tamaplais in the Golden Gate National Recreation Area, North of San Francisco. The catchment supports threatened populations of Coho Salmon and Steelhead Trout. The project reach was located in the lower portion of the catchment in a relatively unconfined alluvial valley. The reach represented a significant proportion of the total



Figure 2 – Mid-channel ELJ constructed on Redwood Creek, Golden Gate National Recreation Area, California

available rearing habitat for juvenile salmonids in the entire catchment. Therefore the restoration of habitat was critical to the overall productivity of the catchment with respect to these threatened species (*Philip Williams & Associates 2002*). Early monitoring of the project by researchers at the University of California at Berkeley indicates the success of the ELJs in dramatically increasing the complexity of physical habitat in the form of pools, bars and complex cover.

The successful application of ELJs in highly dynamic and environmentally sensitive rivers on the west coast of North America indicates similar approaches may offer viable solutions to similar river management issues in the United Kingdom, particularly in our higher energy gravel bed rivers. Many of these rivers support important populations of Atlantic Salmon and Sea Trout, which may derive similar benefits to Pacific Salmon from the use of ELJs. SEPA have recently commissioned a review of ELJ technology in North America with a view to developing pilot

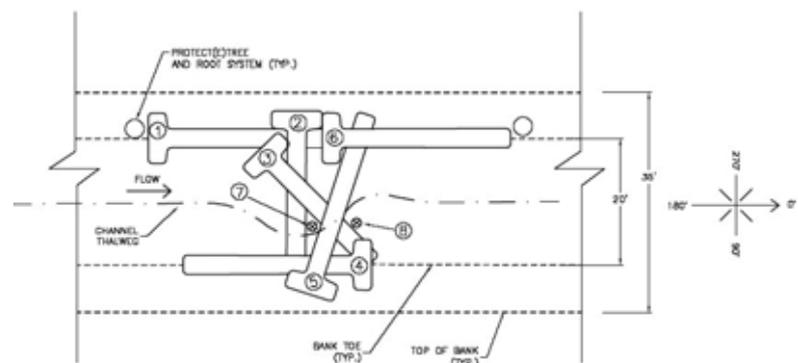


Figure 3 – Engineering design detail for mid-channel ELJ on Redwood Creek, California
Image courtesy of Philip Williams & Associates



Golden Gate National

projects in Scotland. It is hoped that the transfer of this technology may offer greener solutions to traditional engineering problems and help practitioners meet the requirements of new legislation designed to protect aquatic habitats.

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**For further details contact:
roy.richardson@sepa.org.uk
01896 754797**

A date for your diary RRC 7th Annual Network Conference 2006

Next year's conference will be in Scotland during the last week in April. As soon as we have more details we will email you. So, if you think your contact details may be wrong please provide us with an update.

And if you have any burning issues you think should be included at next year's conference and you haven't already told us now is your chance to have your say! We are always open to suggestions and challenges.

Can you help with sponsorship?

Last year's conference was sponsored by WWF and the Environment Agency (NE area Thames Region). This enabled us to keep costs down and provide discounted places for those with an interest in River Restoration but on limited budgets. We will be looking for sponsors again this year. If you think you know an organisation that would be interested in sponsoring next year's conference or, it is something your organisation would be interested in supporting, please contact the centre for further information.

Our continued work to enable all interested parties in river restoration to attend and share their ideas for the benefit of our rivers depends on such financial help.

The River Restoration Centre, Silsoe, Beds. MK45 4DT

Tel/Fax: 01525 863341

Website: www.theRRC.co.uk

Email: rrc@theRRC.co.uk

6th River Restoratio

Judith Bankhead Rivers Agency's Conservation Officer kindly offered to provide a summary of the RRC Annual Network Conference 2005, de Havilland Campus, Hatfield. The following provides an entertaining yet informative review – so read on!

Having attended conferences 1 to 6, it is truly laudable how the team at RRC have managed to organise sunny weather for most of these occasions. For those of us who travel across the water to mainland UK on an infrequent basis, it does at least allow a good view of the countryside as we sit on the numerous trains required to get from the airport to the conference centre.

This year's conference at Hatfield promised much and delivered plenty. Dave Gilvear got the conference off to a good start by emphasising the need to try and move from reach based restoration to catchment scale – maybe this is why his batteries ran low after the first couple of minutes! His talk led on to an excellent and thought provoking talk from Walter Binder which gave us the simple, but true message that river restoration, particularly when linked to flood control requires space. Space allows rivers to “sort themselves” to a greater extent and the added benefits of “exploding beavers” brought a tear to the eye of even the most care worn environmentalist! His thoughts of more space for rivers coming through changes in agriculture is timely, and surely an achievable way forward.

David Collins of Defra made a more than able replacement for the minister Elliot Morley, and shared his thoughts on the move from flood defence to flood management, linking very much with Walter's space concept.

The post tea and danish pastries session was based around a number of project based presentations.



Both Paul Smith and Paul Ritchie's presentations demonstrated some of the problems and solutions involved with this type of project, and also highlighted aspects such as linking with catchment based pollution and fishery plans, and the need for good information and consultation from the concept stage of the project.

Wrapping up this morning session of day 1, Warren Bradley provided some slightly shocking information regarding the weighting of environmental scores in the overall Defra Priority scoring. Certainly, it seemed that much of the audience was surprised at the small amount of difference that creating acres of biodiversity priority habitat would have on the overall rating. David Collins undertook to look into this – perhaps an area for follow up for next year's conference?

The afternoon of day 1 focussed on sustainable flood management and river restoration, and restoration in more urban settings. Mike Donaghy provided a wonderful overview of the River Devon scheme in Clackmannanshire, which looks much more at a catchment scale solution, and includes a wide range of stakeholders – is this the way forward under WFD? it looks likely. Just a thought, is there a River Clackmannan in Devon? One issue which did come out from the afternoon sessions was the fact that urban and rural restoration are two different animals – well, horses of a different colour perhaps. Different opportunities occur in different places and there is room for the more piecemeal urban approach as a part of the rural based catchment based methods.

At this point, the opportunity should be taken to mention some of the less cerebral aspects of the conference – it is true to say that a few bottles of Newcastle Brown can strike a blow against many things cerebral. The evening conference dinner was a noisy and enjoyable do, and a chance to make new acquaintances. Full marks to Martin for leading the singing – maybe not quite X factor but 10 out of 10 for effort. I now also realise that the de Havilland in question is a plane maker and not an actress from the 1930s – these conferences are a real education!!

Space, the final frontier, was very much to the fore on the second day of the conference. Within the Sinderland Brook presentation, the idea of a freely self-adjusting river reducing maintenance was well received by the audience. Food for thought for engineers, and this hardy breed were further highlighted during the be-suited Tony Burch's talk (that's how you know he's an engineer!). Tony linked the

n Centre Conference

River Brent,
Tokyngton Park,
Wembley.
RRC site visit 2005



history of land drainage through to WFD aspects such as floodplain utilisation – is it facetious to suggest that more of this linking of engineers and geomorphologists/restorers would be a good way forward. Maybe next year some of the new faces at the conferences might come from the river engineering side of the house – just a thought but maybe there is room for us all to wear jeans on the bottom and a jacket on top??

The parallel sessions and workshops offered a wide range of subject matter, and my apologies for commenting on one set of each. The “techniques” session kicked off with the irrepressible Simon Johnson and his “pint and a pie” philosophy for restorative works. To note though that when others sponsor awards, his tastes extend to classic malt!! But joking aside, great thoughts regarding real projects carried out in a practical and cheap way. Log jams in North Carolina was eye opening – maybe not one readily digestible for the “suits”, but the need for carefully engineering these structures was strongly emphasised by Roy Richardson.

The two presentations by Sally Sudworth and Pete Worrall showed the potential for restoration works as part of enforced river engineering, an area of work that most of us have been involved in. Pete also introduced us to “Supervole” who can cross two runways and the M25 to get to the original channel – but does he wear his pants outside his little vole trousers?

The ask the experts session in the afternoon started slowly, but built momentum. It is nice to know that other people may be having the same problems and concerns as yourself, and this session epitomised the

sharing aspect of RRC. It was worthwhile to try this out at the conference.

The Hatfield conference was, to my mind, one of the best RRC conferences that I have attended. The same key issues came forward in many of the presentations. The one that shouted out was that space is important and needs to be designed in at an early stage. The whole question of who can obtain the space (joined up government?) is important and leads into the whole stakeholder concept of WFD. The availability of space should also help to move towards the catchment based concept of restoration, which has been voiced for so long, but is so hard to achieve on the ground. Rivers being allowed to do their own thing, and the knock on effect on maintenance was also food for thought – in fact, the whole question of maintenance and biodiversity was raised by the audience and is probably a subject for another day. And finally (to quote Tony Burch) the environmental weighting in the priority scoring system, whilst only a small element on the conference, could have tremendous benefits for restoration practitioners, if addressed properly.

No conference runs on its own. The two days enjoyed by us all were the culmination of months of effort and angst by the RRC staff. The thanks of all the participants go to the speakers and presenters, and to those in RRC who were paddling like blazes below the surface while the conference glided on. As a better known, and certainly better paid fellow countryman of mine says “you’re very, very nice people”.

Sponsored by WWF and the Environment Agency (NE Thames region)

News and Events

Conferences

Working with rivers

Scottish Natural Heritage in association with the RRC

13th September 2005 - Banchory, Scotland

For more information contact Lorna Brown and Tess Darwin 01738458559 or email sgp@snh.gov.uk

Sustainable flood management: are we getting there?

Scottish Natural Heritage in association with the RRC and Scottish Executive's National Technical Advisory Group on flooding

14th September 2005 - Battleby, Scotland

For more information contact Lorna Brown and Tess Darwin 01738458559 or email sgp@snh.gov.uk

Water Framework Directive: Flood and river management CIWEM

9th November 2005 - London

For more information contact CMS bob.earll@coastms.co.uk

International Conference on Urban River Rehabilitation

21st – 23rd September 2005 in Dresden, Germany

Urban river rehabilitation and riverfront development has become a major field of interest for cities that seek urban renewal. Sustainable development of a river and its waterfront is a complex task, requiring a comprehensive planning approach that considers ecological, social as well as economic aspects through interdisciplinary cooperation.

Themes of the conference are assessment methods and tools, planning and management procedures, stakeholder participation and technical measures of implementation.

Case studies of implemented projects will be presented. The conference will foster an exchange between scientists, practitioners, planning- and implementation related professional groups and urban decision makers.

Early registration is possible until the 25th of July 2005.

Further information on conference registration and contents are to be found at www.tu-dresden.de/urban-rivers-conference

Publications

Ecohydrological Guidelines for Lowland Wetland Plant Communities

B.D. Wheeler, D.J.G. Gowing, S.C. Shaw, J.O. Mountford and R.P. Money

Edited by A.W. Brooks, P.V. José, and M.I. Whiteman Environment Agency - Anglian Region

For a copy: <http://publications.environment-agency.gov.uk/pdf/GEAN0305BIPZ-e-e.pdf>

This publication aims to provide a guide to the ecohydrological requirements of specific freshwater wetland communities especially those designated under the EU habitat directive. (e.g. wet grasslands, fen and mire, ditch communities, wet heath and wet woodland). In addition specific plant communities, which breeding birds of European importance depend upon are included.

The guidelines should be useful for a variety of purposes including defining plant/wetland community condition/status, assessing the impact of human activities on wetland water regimes (e.g. flood defence, abstraction etc) and for determining restoration/rehabilitation potential.

Monitoring Stream and Watershed Restoration

Edited by P Roni, Northwest Fisheries Science Centre, Seattle, USA

The degradation of aquatic systems through human activities has led to large efforts throughout the world to restore aquatic habitats for economic, cultural and environmental reasons. Nowhere is this more evident than in temperate streams, rivers and estuaries. This book provides a practical resource for those wanting to develop monitoring and evaluation programmes for freshwater habitat restoration at various scales. Combining theory with practical examples, it discusses principles of worldwide relevance.

To find out more about the book or to order online visit: www.cabi-publishing.org/bookshop

CABI Publishing Paperback ISBN 0 85199 907 7 £40.00. *Published in North America by the American Fisheries Society.*

New Corporate Member

Recently Salix River & Wetland Services Ltd has become a corporate member of the River Restoration Centre. They join Halcrow, The Cain Consultancy, Maccaferri, and Cranfield University at Silsoe. We would like to take this opportunity to say thank you for their support.

RRC is most grateful to all those who have contributed text or photos for this Newsletter

The following statutory organisations provide Core Funding for the River Restoration Centre and their Representatives form the Advisory Board who together with RRC's Directors make up the RRC Council.

