



River Restoration NEWS

Newsletter of the RIVER RESTORATION CENTRE

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River Restoration World-wide

The European Centre for River Restoration (ECRR) held their 4th conference from the 16th-21st June this year and was hosted by the Italian River Restoration Centre (CIRF). Jenny Mant reports.

Natural bypass channel for fish passage, Villach, Austria

Historical differences

An Island in the Venice lagoon under stormy skies was the perfect setting to host this conference. It provided an opportunity for nearly 300 participants from all over the world to discuss river dynamics and restoration in the context of ecological functioning. Gordon Grant (USDA Forest Service, USA) commenced the proceedings stressing that river restoration had to be considered in the context of a country's social and economic history and that an appreciation of this can explain the differences that are observed in terms of local impacts and river management approaches.

A call for reference sites

Discussion soon moved to the contentious issue of what we are restoring too? We may have a 'dream' of restoring to natural reference conditions but in reality this is rarely achievable. In reality, restoration measures world-wide are generally completed on a reach basis and even in situations where 'larger' scale channel and floodplain projects have been completed local constraints result in a mosaic of restored 'sections'. These sections tend to be

interspersed with human impacted reaches which are often monitored to explain the impacts that river management and engineering have had on natural forms, processes and ecological dynamics. When it comes to assessing the success or failure of restoration though, these studies fall short of being able explain the extent or trajectory of change induced by the restoration intervention and hence the call to extend the network of natural reference sites.

Enhancement, not gardening

In Europe, river restoration practices are generally considered as a supportive tool for the implementation of various EU Directives. However, it was also recognised that river restoration has the potential to go beyond these aspirations. Currently

though, there remain many uncertainties about how local restoration initiatives both affect and are affected by larger-scale regional factors. To answer these questions it was felt that there needs to be much clearer guidelines and policies that ensure projects define 'wish' conditions that help ensure measurable objectives are devised to answer river management concerns.

Furthermore, given that uncertainty will increase with current climate change predictions, restoration provides the opportunity to increase ecosystem resilience to a range of natural perturbations. In some cases, this may mean that species diversity may reduce locally, but we must be

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careful not to go down the route of landscape and habitat gardening but instead be mindful of whole catchment processes and community dynamics.

Stakeholders and policy

Of course it is not only the physical changes and local constraints that can have an impact on the successful outcome of river restoration projects. Tim Moss (IRS, Germany) eloquently advocated the need to understand policy drivers and the impact that these might have both regionally and nationally in terms of project implementation: an issue that becomes even more complicated when you add in floodplains. The Long Eau, Lincolnshire was used as an example of a project where the local Environment Agency officer and other stakeholder's aspirations to 'get on and do the job' resulted in a cost-effective outcome. He went on to explain that this inspirational approach may be more difficult to replicate under today's policy scenario because of stricter procedures that surround restoration projects in terms of accountability. Whilst he advocated that these controls are necessary to ensure transparency for stakeholders, there needs to be more synergy between policy makers and on-the-ground practicalities to ensure that the policy is focused on facilitating work with stakeholder engagement.

Future restoration

It was clear that there are many opportunities to learn from different country's experiences and to this end there was a call for national databases of information. Each country needs

to appreciate its own uniqueness and how this affects what can be done locally. The conference highlighted two main points to help forward the aspirations and success of river restoration. These included:

- More emphasis should be attached to basin dynamics through both lateral (floodplain) and longitudinal (river) connectivity;
- There should be a shift from pure research to practical on-the-ground implementation, with scientific understanding and prediction translated into design guidance and outcomes.

Site visits

A dramatic change in weather conditions facilitated discussion about climate change and impacts on river systems. It also coincided with a series of site visits which emphasized the human induced pressures facing European rivers, how these are impinging on opportunities for ecological restoration and how these are being overcome.

The Tagliamento River that drains the Eastern Alps and flows into the Adriatic Sea is recognized as one of the near pristine rivers of Europe. As such it has been designated as a Water Framework Directive reference site. However, the pressure to retain flood flows is immense and WWF are currently battling to save this unique watercourse from the construction of a large flood retention basin and the removal of 30 million m³ of gravel.

In contrast the River Drava (that rises in Italy before joining the Danube in Hungary) has been heavily modified in many locations. At Villach in Austria longitudinal connectivity has been successfully improved through the introduction of a fish pass allowing salmonids to access spawning grounds for a considerable distance upstream. The project, which incorporated both a natural bypass channel and a vertical slot ladder has provoked considerable

A widened gravel-bed restoration project, River Drava, Kleblach-Lind, Austria

interest not least because of the help and financial input from the key stakeholder (the hydroelectric power company that controls the dam).

Flood risk is another issue on this river which has resulted in river channelization. For a recent restoration scheme at Kleblach-Lind, Austria, a 2km stretch has been widened to encourage natural morphological development of in-channel bars and a multi-channel system, together with improved flood protection and habitat benefits. Even though the project was completed in 1999, the river morphology is still adjusting and thus the precise impact and environmental success of the project remains uncertain. Results from the monitoring suggest that in situations where you aim to restore physical processes outcomes are dependent on the flow regimes experienced after the restoration.

At all sites, the projects were backed up by continuous systematic monitoring related either to restoration objectives or specific research question. In all cases the changes recorded have demonstrated the necessity to monitor on a long term basis to increase the confidence of current and new techniques.

A reference river: the near pristine Tagliamento river, Italy

Further information

Numerous workshops and papers provided the backbone to this conference: too many to mention here.

The conference proceedings will be published this year. Outputs will be available on the ECRR website www.ecrr.org or contact either Jenny or Martin at the RRC.

The Development of the London River Restoration Action Plan 2008 to 2015

With the Mayor of London's plan to restore more rivers there has been a need to systematically identify potential restoration opportunities. Dave Webb (Environment Agency) reports on a new initiative to help achieve these aspirations.

London's lost rivers

Excluding the lost rivers which have been incorporated into the sewer system, in London there is approximately 600km of river which flows into the Thames. The majority of this length has been modified through straightening, culverting, armouring and other engineering works. Most stretches have additional problems such as poor water quality and invasive species.

Over the last 10 years approximately 1km per year of river has been improved in various ways by a range of organisations and community groups. This has resulted in the delivery of improved environmental services such as increased use of public open space, ecological gain and improved flood risk management. Partly in recognition of the success of these schemes, the recently amended Mayor of London's Plan now has targets to restore 15km by 2015 and 25km by 2020.

An action plan in progress

To achieve these targets, the London River Restoration Action Plan (LRRAP) is being developed to champion a single London-wide approach to river restoration. It will establish a network to share knowledge and develop wider partnerships through the development of a website that will be hosted by the RRC.

The development of the plan will be instigated through an agreement between local government, governmental agencies and NGOs. The plan itself will contain catchment maps identifying the location of completed projects and future opportunities, plus

Mayes Brook, LB Barking and Dagenham

detailed case studies and links to best practice and policy.

The plan will contribute to a suite of London-wide policy aspirations, such as improving Londoner's access to nature and delivering increased flood storage. It will also inform the implementation of green infra-structure plans such as the East London Green Grid and contribute to the emerging London climate change adaptation strategy. The delivery of the programme will be through a variety of mechanisms, such as community-led partnerships, and flood risk management schemes.

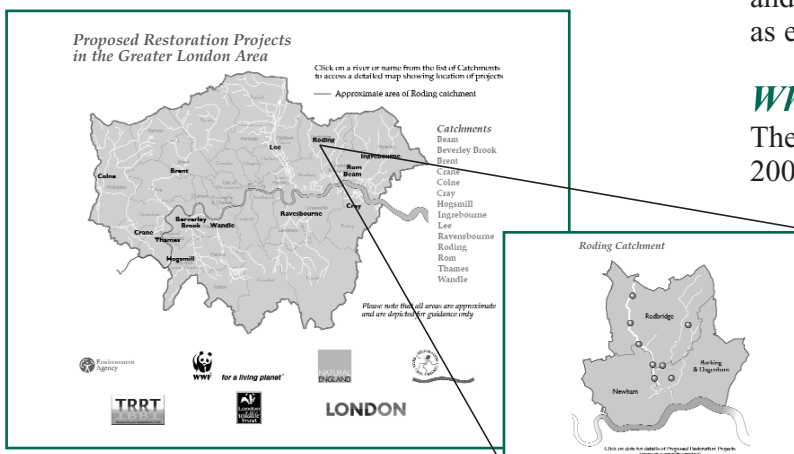
Demonstration of restoration benefits

Running in parallel with the LRRAP is the development of a flagship river restoration site aimed at demonstrating a wide range of environmental services that can be provided through river restoration including social and economic benefits. Mayes Brook (Barking and Dagenham Borough) has been identified by the steering group as a potential front runner site and feasibility studies are currently being completed by Jacobs.

It is hoped that this project will help to inform developers, local groups and planners who wish to see the techniques and processes of river restoration demonstrated as well as evidence of the benefits.

What next?

The LRRAP will be completed towards the end of 2008 with an official launch during November.



Screenshots of how the web pages might look

If you are interested in this work and would like to be kept informed or feel you can contribute in terms of providing information about potential or completed projects in the London area then please contact the RRC.

Inchewan Burn

Remediation work on damaged ecological systems can encompass many scientific disciplines and require the services of varied commercial interests. Stevie Jarron, SEPA, provides an introduction to the Inchewan Burn project near Dunkeld, Perthshire. This is a commendable example of cooperation between SEPA departments and other outside organisations.

A burn in need of restoration

The plight of the Inchewan Burn was brought to the attention of SEPA's Jo Long, Senior Ecologist, (then Water and Wetlands Sub-group leader for the Tayside Biodiversity Partnership) by John (Jock) Monteith, the local Head Gillie for the Newtyle Beat on the Tay & Salmon Fish Scotland in 2005. Jock sought SEPA advice and support (moral and legislative rather than financial!) for a spawning burn improvement project on the Inchewan Burn, a tributary of the Tay impacted by historic engineering works.

The burn flows from a small reservoir, down a glen between Birnam Hill (The Birnam Wood of Macbeth fame) and Ladywell forestry plantation, 4km to a bridge under the A9 and through the village

of Birnam where it enters into the River Tay. Much of the upstream section is less managed and retains much of its character other than a weir with a number of water off-takes and an access path up the burn into the wood which required some bank modification.

When the village was bypassed by the A9 a reach of the burn was engineered by encasing it in gabion baskets (stone-filled wire baskets) which provided structural protection for the roadway piers and Reno mattresses (sheets of wire encasing stones) to prevent down-cutting by the burn and concrete walls to provide the foundation for the roadway piers.

A fish trap in the making

In the high energy environment of the burn the very mobile coarse bed material load abraded both the protective PVC coating of the Reno mattresses and the underlying galvanized coating. These 'rotted' and split open in places and larger holes were ripped open by logs and boulders. Once the mesh started to fail the stone within had nothing to hold it in place and soon washed out leaving a mass of wire. The remaining wire effectively became a fish trap, snaring any fish able to jump the downstream drop. At the downstream 'exit' from the A9 reach, a deep pool developed where the bed protection ended and the original channel was rejoined. It was reported that a gabion mesh 'net' had been extended over the downstream pool acting as a barrier to any fish trying to jump the 1m plus step up to the channel.

Restoration works in progress - local contractors work to recreate the natural step pool bed (August 2007)

The gabions were also porous so that in times of low water parts of the burn had no surface flow at all – the water flowed through rather than over them. Due to this, no Salmonids have spawned in the 3km reach above the A9 in recent years.


Restoration plans

SEPA's James Davidson, Ecologist (then acting Habitat Enhancement Specialist with Central Advisory Unit) joined Jo for a visit to the burn with Martin Janes of the River Restoration Centre. SEPA's annual subscription to the RRC covered the cost of Martin's initial visit to the site and a subsequent report. The RRC's input into the project was crucial.

Jo and James also discussed the tree management with Paul Schofield of Scottish Native Woods, Aberfeldy, who prepared a proposal of works to ensure that factors such as bats were taken into consideration for deciduous tree management on the middle section of the burn, and supported his plans for plantation removal from the upper reaches where there was over-shadowing, to be replaced by small stands of native riparian species, and individual trees in places to mimic a more natural tree distribution.



Before restoration - degraded gabions were a lethal trap for fish (prior to summer 2007)



Transerve Scotland who did the original A9 works paid for local contractors John Langley Construction. The full cost of the whole project was around £100,000.

A 'natural' gravel bed reborn

As it is a very steep stretch of watercourse, it was hard to engineer a suitable channel. It involved the placing of boulders into the channel bed, creating a step pool type system which will naturally collect sediments around these permanent features. The local contractors excelled in the task. They gathered stones from local fields as opposed to a quarry, some of them so big they couldn't even use a JCB. The large stones were moved into place using levers and pulleys. They were cemented in to prevent movement by heavy spate flows from the Inchewan catchment, but the cement was designed such that it would remain unseen once gravels from the burn were put back in, thus creating an extremely natural looking watercourse.

Upstream, Chris Ford of the Forestry Commission undertook the removal of 1000 tonnes of commercial forest plantation, including scrub willow, some of which may be replanted in the remaining structural gabion baskets along the side of the A9 stretch. The final touches to the project will be interpretation boards

funded by Perth & Kinross Countryside Trust and some native tree planting by the local primary school children's eco-schools programme, arranged by Head Teacher Sandy Howe of The Royal School of Dunkeld.

Salmonids return

All SEPA staff involved, modest about their part in the work, recognise the drive, impetus and substantial fundraising Jock Monteith contributed throughout the 2–3 year project and his undeniable part in the success of the project in general. Jock himself is full of praise for SEPA staff mentioned during every aspect of the project over the last few years. With the major work now completed, what better crowning glory than the news from Jock, that this December for the first time in years, Salmon, Sea Trout and Brown Trout have been seen passing over the reconstructed river section and up the Inchewan Burn once more.

From these discussions and site visits the aims of the rehabilitation works were scoped out and aspirations included:

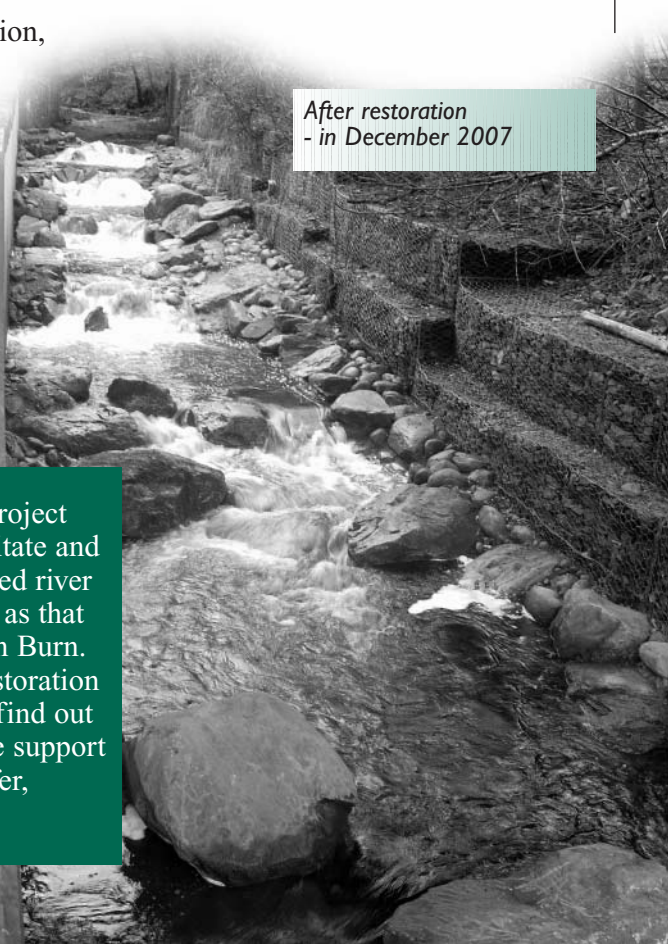
- Restoring free passage for fish;
- Allowing natural sediment transport (of silt, gravel, cobbles);
- Mimicking a 'natural' section of the burn (landscape and aesthetic benefits);
- Not posing a greater than existing flood risk to people, properties and infrastructure.

Working together

Gillie Jock Monteith had been seeding the burn with fry for a few years and hoped that the work would be completed ASAP to allow for this year's migration. SEPA's Pauline Silverman, Environmental Protection Officer in Perth, handled the licensing part of the scheme. It had come to her as an application and allowed her to be around during most of the works. The licence was granted mid-October and the works completed by late November 2007. The licence under CAR was granted a degree of flexibility whilst still protecting the water environment. This was due to the need for the contractor to work in a more 'artistic' way in trying to mimic the natural step pools further upstream which is ideal for fish passage.

For more information contact:
Stevie Jarron, SEPA
steven.jarron@sepa.org.uk

After restoration
- in December 2007



The RRC can provide project advice and reports to facilitate and support potential or planned river restoration projects, such as that provided for the Inchewan Burn. If you are involved in a restoration project and would like to find out more information about the support that the RRC can offer, please contact us.

Mill Weir Breach on the River Exe

The breaching of Thorverton Mill Weir has led to significant operational impacts on a downstream gauging station. Mary-Rose Lane and Tim Shipton provide an introduction to this interesting case study.

Thorverton Gauging Station (GS) weir is an important flow monitoring site on the River Exe in Devon; information is used to monitor and regulate water resources in the catchment. There are two structures upstream of the GS, which have a bearing on its operation. The first is Thorverton Mill (TM) weir, located 250m upstream, the second is a pair of disused railway footings, located 375m upstream (Figure 1).

Normally, the level of water passing over the GS weir is measured and converted to flow using established stage-discharge relationships. However, during a high flow event in December 1999 the TM weir failed leading to significant local changes in the river's dynamics. Large amounts of gravel, originating from both the TM weir structure and via bed and bank erosion, are now depositing at the GS during high flow events. These gravel deposits mean that existing stage-discharge relationships no longer apply. Efforts have been made to develop short term relationships, but the bars are unstable.

Prior to the breach the TM weir pool used to cause ponding approximately 500m upstream, reducing local velocity and storing bed material. The two disused railway bridge footings used to be submerged by the ponded water, but are now exposed causing a split flow which is directed at a rapidly eroding river bank. The effects of the increased velocities are being noticed at least 400m upstream (Up Exe Mill).

Gravel has historically been an issue here, but the TM weir failure demonstrates the effect the structure was having on transfer and deposition of river substrate. As this river adjusts to a new geomorphological regime there is a need to think about best practice ways to deal with the sediment load where it interacts with an Environment Agency (EA) asset. In excess of 600 tonnes of gravel were removed (with Land Drainage Consent and following a geomorphological assessment)

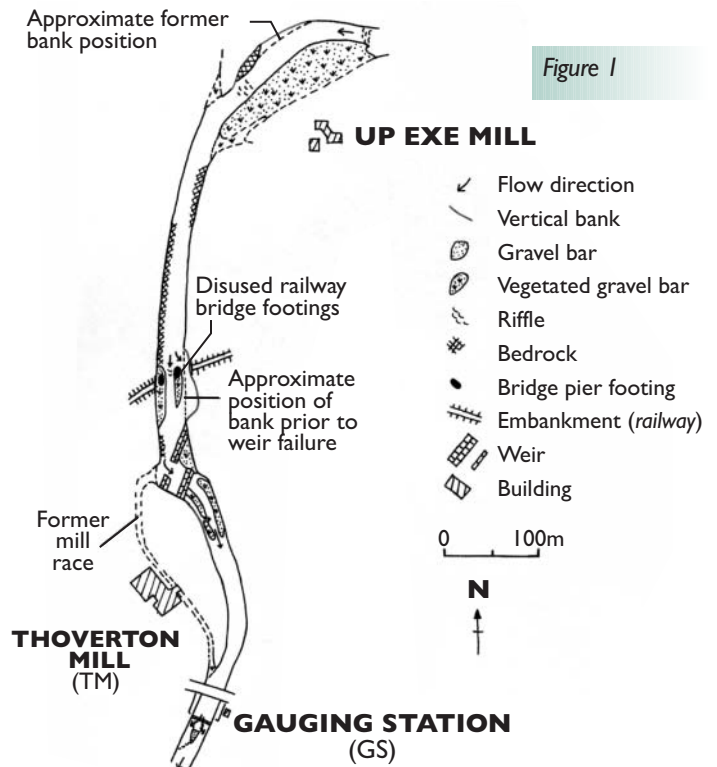


Figure 1

from the site in September 2003 but by December, after one high flow event, the gravel bars were back. 200-300 tonnes of gravel were removed in July 2004, August 2005 and June 2007. It is likely that 400-500 tonnes will be removed in 2008. Historically, all gravel removed from the river has been distributed to the riparian owners for use on their land. With the changes in policy and WFD objectives this approach is no longer generally acceptable. The EA now plans to return the gravel to the river upstream to supplement salmon spawning gravels that have been degraded by old riparian management practices.

The failure of the TM weir structure demonstrates how rapidly a river responds in terms of sediment transfer. Whilst there is likely to be an ongoing management issue at this site, there are opportunities to use this process to help restore other river sections.

There is no single solution to the problem. As the river stabilises, gravel removal required may diminish but other solutions such as the removal of the railway bridge footings are also being considered. Over time this site provides an opportunity to evaluate the impacts of a weir failure.

Reference: Babbie, Brown and Root/Environment Agency. River Exe at Thorverton Gauging Station Geomorphological Assessment. BWA 000141127 revision A01 August 2004.

For more information contact: Tim Shipton, Field Monitoring Data Officer or Mary-Rose Lane, Fisheries, Recreation and Biodiversity Technical Specialist (EA, Devon Area).

Gauging Station weir (April 2008)
– gravel deposits clearly visible

RRC Annual Network Conference - a short review

This year's Annual Network Conference was held in Exeter. The conference title, "Is restoring back the way forward?", evoked a lot of interesting papers and discussion on the implementation of river restoration schemes. Presentations were given from UK, European and US viewpoints and provided examples of applied river restoration in the context of current policies.

Four workshops were run as part of the conference, these looked at:

- Evidence base for river restoration and habitat management;
- Costing river restoration;
- How do rivers fit in the Wetlands Vision for England;
- A site visit to the RSPB Goosemoor regulated tidal exchange project.



River Tale, Escot House

On the final day, three site visits were organised to Harbertonford, Escot House and Exmoor Mire.

Each site examined different areas of restoration including the engineering of flood alleviation schemes; practicalities of habitat creation and environmental education on a private estate; and

mire habitat restoration and gravel management along the River Exe. These visits provided an opportunity for greater discussion of river restoration within the context of a specific site and provided the impetus for the article on Thorverton weir (*page 6*) in this newsletter.

The presentations from this conference can be found on the RRC website: www.therrc.co.uk/rrc_conferences.php

A date for your diary

RRC's 10th Annual Network Conference

1st - 3rd April 2009

University of Nottingham

The dates are a little earlier than usual so please make sure you note them in your diary!



Book review

Moss, T. and Monstadt, J. (2008).

Restoring floodplains in Europe: policy contexts and project experiences.

IWA, London

£80

ISBN: 1843390906

This book seeks to bridge the gap between river and floodplain restoration.

It acknowledges that

floodplain restoration can deliver a range of ecosystem services (including aiding flood protection) and biodiversity gain. Yet despite the many European-wide and individual State policies and NGO programmes that highlight the multiple benefits of floodplain reconnection and restoration, in reality there are very few projects that have been successfully implemented.

The authors ask the question, why is this the case? and look to the different member states' policy developments to see how they may have impacted upon past floodplain restoration objectives. Six

example schemes are used to evaluate the site specific constraints and drivers (including 2 UK projects). The main objective of these case studies is to provide a vehicle to enable researchers, policy makers, project managers and other practitioners interested in floodplain restoration to make more informed future decisions.

It is stressed that the path to floodplain restoration that delivers a range of flood defence, agricultural and biodiversity benefits is complex. Nevertheless a positive conclusion ensues, suggesting that recent policy shifts may provide better opportunities for a new generation of multi-objective floodplain restoration schemes. To understand exactly how the editors come to these conclusions and what recommendations are outlined to achieve this ideal, in the context of shifts in land-use planning and options for environmentally-sensitive forms of agriculture and forestry, you will need to read this book.

Throughout, the editors have clearly kept their primary audience in mind and the result is a coherent text that is easily accessible, yet at the same time provides an informative and interesting book that links policy decisions to on-the-ground examples.

**RRC welcomes ECO-tech systems
as a new Corporate Member**

ECO~tech systems

News and Events

Book release

River Restoration: Managing the Uncertainty in Restoring Physical Habitat

Stephen Darby (Editor)
David Sear (Co-Editor)

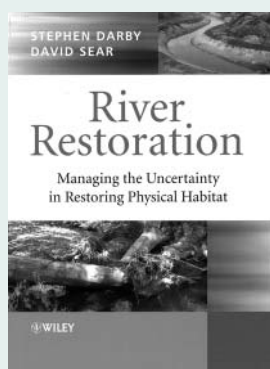
This book provides a systematic overview of the issues involved in minimising and coping with uncertainty in river restoration projects. A series of thematic sections are used to define the various sources of uncertainty in restoration projects and how these show at different points in the life cycle (design, construction and post-construction phases) of restoration projects.

The structure of the book offers a rational theoretical analysis of the problem while providing practical guidance in managing the different sources of uncertainty. A wide range of case studies are included from Europe, North America and Australasia.

ISBN: 978-0-470-86706-8 £95.00

For more information and to purchase a copy go to the Wiley website:

<http://eu.wiley.com/WileyCDA/WileyTitle/productCd-047086706X.html>



New Staff

We would like to welcome Ian Brown (*pictured*) as the newest member of the RRC's staff.

Ian has taken over the role of Assistant Administrator from Audrey Johnson, who took early retirement in May this year.

We would like to thank Audrey for her hard work for, and contribution to, the RRC over the last 3½ years.



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Conferences

2008 World Water Week - Progress and Prospects on Water: For a Clean and Healthy World
August 17th to 23rd 2008 - Stockholm, Sweden

For more information visit: <http://www.worldwaterwork.org/>

FBA Conference in Aquatic Biology: The Inaugural Freshwater Biology Summit Multiple Stressors in Freshwater Ecosystems
September 1st to 4th 2008 - Windermere

For more information visit:
<http://www.fba.org.uk/index/events/summit.html>

Catchment 08
September 17th & 18th 2008 - Peterborough

For more information visit: <http://www.catchment08.co.uk/>

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 Management Board.



the River Restoration Centre, Building 53, Cranfield University, Cranfield, Bedfordshire MK43 0AL



RRC is grateful for the continued support of Cranfield University.