



# River Restoration NEWS

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Newsletter of the RIVER RESTORATION CENTRE

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## RRC's 10th Annual Conference: A time for reflection

*Since this year's River Restoration Centre Annual Network Conference, held at the University of Nottingham on 1st and 2nd April 2009, was its 10th, it was both inevitable and appropriate that the old dogs looked back at the gestation and development of the RRC.*

*Will Bond (Alaska Environmental Contracting Ltd) presented a paper at the conference and reports on the success of the event.*

Looking back can be nostalgic, but when related to our current position also gives a sense of trajectory; a concept used by both keynote speakers (Alastair Driver of the Environment Agency and Chris Spray of SEPA) to identify where river restoration is heading in the next decade. Both talks looked back 10 years to a time when river restoration was little more than an interesting concept, to the present, when it is an established art or science (depending on your background). They both suggested that river restoration is likely to

continue to grow in scope, recognition, importance and funding, and that it may well get a lot bigger (or must get a lot bigger, if it is to hit the very ambitious targets discussed throughout the conference). Of course, it is easy to convince ourselves of this when we are gathered together and full of enthusiasm - but does it look likely in the real world?

### *WFD and beyond*

Lucy Bolton of the Environment Agency presented a paper which set

*Site visit to Sence Valley Forest Park, Leicestershire*

out clearly what needs to be done to achieve good ecological potential for the Water Framework Directive; and confirmed that around 75% of sites still not meeting the standard will require one or more 'river restoration-type' interventions. This built on Alastair Driver's statistics for the need to get 18 river SSSI's heading for favourable condition by

*Continues on Page 2*

## Inside this issue

	Pages		Pages
RRC's 10th Annual Conference 2009	1 - 2	River Cam Habitat and Access Enhancement Project	6 - 7
An opportunity to participate – First Call for Papers	3	News and Events	8
Hydromorphological Stream Restoration in France	4 - 5		

*Continues from Page 1*

2010; an expensive ambition, even if supported by a new River/Catchment Restoration Fund expected to be set up by Defra\*. Between them there seemed little doubt that river restoration will continue to grow, although possibly rather jerkily.

As always the papers covered a wide range of other topics, including an excellent paper from Graeme Peirson on the use of floodplains by fish (reminding us that we need to include fish passage in our designs), and of course lots of examples of individual projects, from which so much can be learned. I was rather taken with Nick Haycock's statistic that 42% of England's fresh water drains through National Trust land; a thought-provoking statistic.

Any conference should include experiences and perspectives from beyond our domestic borders. The rest of the world was well represented, with papers presented of work in France, Japan and Hungary and posters of work in the Czech Republic, China, Germany, and Slovenia. Jean-René Malavoi from France may not have been fluent in English, but demonstrated in his presentation that with good slides and an interesting subject, language need not be a barrier and slides of dams being blown up provided excellent entertainment for the audience.

Community involvement was a recurring theme in various guises; the uses of partnerships, the interaction between river restoration and social cohesion, and lots of urban river restoration projects, culminating in Dave Webb's presentation on the London Rivers Action Plan. There are 600km of rivers in London, of which 400km are heavily modified 20% culverted or in a concrete

channel. The plan is to restore 15km by 2015.

This is an interesting and ambitious project, which is being run in conjunction with the RRC. As well as the obvious mutual benefits, it may introduce the engineers and contractors involved to river restoration as a serious driver of work, rather than merely being the constraint it is often perceived to be on infrastructure projects where it has been offered as mitigation.

### *Looking to the future*

So, is river restoration on the increase? Our keynote speakers and others painted a compelling picture of growth, based on statutory needs, proven ecological and social benefits and community demands. There were even glimpses of increased funding to make it happen, and certainly in discussions I had outside the formal proceedings more than one project was mentioned that would push the boundaries.

Now, back to the conditions under which the RRC was first dreamed up. It is a feature of this conference that it is friendly, possibly because quite a lot of beer is still consumed, possibly because the numbers are manageable, and almost certainly because the RRC staff somehow manage to find the energy to both run the show and be sociable hosts to the members and delegates. Whatever the reasons, it is still very much a show where people come to share experiences and there is always someone to talk to. Such conditions are conducive to realism and encourage discussions about problems as well as successes.

Alastair Driver, looking back, showed pictures of live willow spiling for bank reinforcement that should have



*The author himself (centre) tackling the RRC quiz*

been kept trimmed, but which, a victim of maintenance cuts, had grown away: emphasising that we need to anticipate such regime changes and their consequences. Other speakers were open about their mistakes; Pete Worrall talked about 'Minimal impact restoration - is it worth all the effort?', and Andrew Crawford led the site visit to Sence Valley Forest Park to show not only the good work, but also to be open about the features that with hindsight were less successful.

Those were reflections with hindsight; Will Bond's paper looked forward to ask the question of whether sudden increases in the amount of river restoration work would lead to a damaging drop in standards?

Discussions included the need to use monitoring to improve the evidence base for what does and does not work, and to inform adaptive management. Several papers explored the need to allow for climate change in project designs, demonstrating that it involves more than just tinkering; for example, SEPA are designing for peak river flows 80% higher than present.

In the words of Lucy Bolton (EA) "*In the next 10 years hopefully a lot of action*", and from Karen Fisher (RRC Chairman) "*The future's bright - wear shades*" (and not just because of the hang-over!).

\*This has now been set up – see: [www.defra.gov.uk/news/2009/090629a.htm](http://www.defra.gov.uk/news/2009/090629a.htm)



*The RRC Gala Dinner Quiz 'eggheads'*

Additional information and copies of the presentations are available on the RRC website. Proceedings for some papers will also be available shortly. [www.theRRC.co.uk/rrc\\_conferences.php](http://www.theRRC.co.uk/rrc_conferences.php)

# An opportunity to participate in the 11th Annual Network Conference

14th - 15th April 2010 University of York

## First Call for Papers

### *A big thank you*

Thanks to all of you who attended this year's conference and found the time to feedback comments to us. It really does help us to determine the main themes you would like to be discussed.

*If you missed the conference this year then here's your chance to participate next year.*



### *Abstracts and deadlines*

The most important aspect of this conference is to provide a place for transferring information and getting to know your fellow river restoration colleagues in a relaxed environment.

Whilst the following themes are based on your suggestions they are only for guidance. If you feel you have something that will be of interest outside these topics please let us know.

*To present a paper or poster please contact Abi Pryce at [rrc@therrc.co.uk](mailto:rrc@therrc.co.uk) regarding abstract format and send to us by 30th September 2009. We will respond by the end of November.*

### *Key suggested themes*

- **Putting river restoration into planning policy:** Recently there has been a lot of discussion about the social, economic and landscape benefit of river restoration, yet projects that demonstrate these benefits remain limited.
- **Planning restoration for the Water Framework Directive (WFD):** River Basin Management plans will be finalised by December 2009. It has been suggested that successful achievement of WFD will necessitate the integration of existing initiatives such as catchment sensitive farming (CSF), higher level stewardship (HLS), the control of invasive species, and the removal of weirs to encourage fish passage etc. Does this go far enough and how can river restoration help deliver targets?
- **Wider global perspectives:** Our conference audiences always look to learn from outside the UK especially in terms of river restoration initiatives and how the WFD programmes of measures (PoMs) will be delivered in Europe.
- **Project appraisal for adaptive management and reducing uncertainty:** Learning from our past experiences is essential to help guide us in the quest for most appropriate use of river restoration techniques. Examples from the physical or the social sciences will be welcome.

## MANAGING NATURA 2000 Rivers

In late June, 120 delegates from across the UK, Denmark, France, Sweden and Poland, gathered at a village hall on the outskirts of Salisbury to find out about the restoration work that has been completed on the River Avon during the last 4 years as part of the Life Nature and partner Living Rivers, Heritage Lottery funded projects.

### **In summary the event discussed:**

- Chalkstream restoration techniques: successes and lessons learnt
  - Project management and how to avoid pitfalls
  - Monitoring and appraising your projects: best approaches
- Aspirations for the New LIFE projects on the Oisín Naughton, Ireland and the Houting river, Denmark
- Lessons learnt and project 'afterlife' for the River Avon catchment

Further details and reports related to this conference and the projects can be found at [www.streamlife.org.uk](http://www.streamlife.org.uk)

# Hydromorphological stre

*Since 2000, The European Water Framework Directive (WFD) has set out the objectives for ambitious results relating to the ecological status and potential of rivers. However, in France it has been identified that hydromorphological functioning is the main barrier to achieving good ecological status for a large number of surface water bodies. Jean-René Malavoi (ONEMA, France) discusses the problem and the potential for restoration.*

## What is the problem?

Good hydromorphological functioning can be characterised by a number of parameters such as diverse flow patterns, natural unprotected banks, varied riparian vegetation, a wooded river corridor and, above all, the most natural river dynamics possible. Following decades or centuries of modification, thousands of kilometres of French streams and rivers no longer meet these criteria.

The main types of human actions affecting French rivers, which have undoubtedly altered their hydromorphological functioning, include overwidening, culverting and channelisation, removal of riparian vegetation, sand and gravel extraction and construction of weirs and dams. The effects of these actions depend on the river type concerned (channel pattern), the length affected, and the age and magnitude of the works. In addition, many rivers have undergone multiple alterations and the restoration works required to restore more natural functioning are frequently complex.

## Restoration techniques

Hydromorphological restoration techniques are now well known thanks to 25 years of experience, especially in Germany, Switzerland and England. However, surveys carried out in France (Malavoi and Biotec, 2006 and 2007) have concluded that the number of river restorations undertaken or planned in France are still too few, of generally limited ambition and cover very modest areas.

A hydromorphological restoration can be carried out "passively" or "actively" (by more radical actions) (Boon *et al*, 1992). Active restoration is necessary on sluggish streams with little sediment transport. It requires more costly works and generally provides less spectacular results. It is likely that the more powerful the stream, the more easily its banks erode, the greater the sediment supply and transport, the greater the space for restoration and the better the water quality. It is therefore more likely that the system will respond positively, the effects will occur more rapidly and the ecological benefits of the restoration

will be longer lasting. The financial cost will also be lower, because the stream processes will help to carry out the restoration process.

## Levels of ambition

Three main categories of action can be defined with the aim of preserving or restoring efficient hydromorphological functioning:

- **Preservation.**

If the morpho-ecological functioning of the stream is still good, then the aim is to implement preservation activities in sectors that have undergone little or no alteration but which are threatened by latent human pressures

- **Limitation.**

If the morpho-ecological functioning is only slightly degraded it may not be necessary to carry out restoration work, but actions should be taken to stop malfunctions already occurring

- **Restoration.**

If the status of the stream is degraded, a hydromorphological restoration programme must be



**Figure 1.** Examples of Level R1 projects (a small scale habitat enhancement) (photos by JR Malavoi)

# Stream restoration in France



**Figure 2.** Example of a Level R2 project (reconnecting longitudinal and lateral connectivity), the Bolbec at Bolbec before works (left) (photo by Silène, Biotec), and afterwards (right) (photo by Biotec)

implemented. Within this category three levels of restoration objectives can be distinguished, which also correspond to three levels of ambition: R1, R2 and R3. It should be noted that the categorisation of restoration levels forms a continuous gradient ranging from the restoration of a limited number of functions (R1) to a maximum number of functions (R3)

## Level R1.

This has the objective of restoring a compartment of the hydrosystem, often for fish habitat, where it is not possible to carry out a genuinely functional restoration. This generally entails setting up structures to diversify flows and habitats such as deflectors, small sills, fish shelters, or spawning grounds. This level of ambition does not require a large area of land

## Level R2

More global functional restoration objectives are targeted, such as sediment transport, aquatic habitat, or riverine vegetation. This level requires a larger amount of land (from 2 to 10 times the natural width of the stream bed)

## Level R3

This is Level R2 but incorporating space for mobility or functionality. It involves complete functional restoration of the hydrosystem

including treatment of erosion dynamics and the river corridor. The amount of land required to ensure that this level of ambition is feasible is at least 10 times the width of the stream bed before restoration

## Conclusions

Very few French public promoters are now tempted to implement restoration work because:

- they are often relatively satisfied with the current status of their rivers (few floods, little erosion, linear landscapes, etc.);
- they cannot see the advantage of questioning often recent hydraulic developments, which were

technically well-justified at the time of their construction by the government departments responsible;

- the political cost of attempting to return to a more natural status is high, particularly for neighbouring populations and especially farmers;
- it is financially expensive, in spite of large subsidies being available;
- the arguments in favour of the hydromorphological restoration of streams and rivers have not been sufficiently developed and are difficult to get across, especially to non-scientists. It is not enough (and above all counterproductive) to simply say "We are obliged by a European Directive".

## References

- Boon P., Calow P. & Petts G. (1992). *River Conservation and Management*. Wiley & Sons Ltd. (470pp).
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- Malavoi J.R. & Biotec (2007). *Manuel de restauration hydromorphologique des rivières*. Agence de l'Eau Seine-Normandie (à paraître).

**Figure 3.** Example of Level R3 (full-scale functional restoration), re-meandering of a small stream straightened in the 60s. Upstream non-restored (left), downstream restored (right) (photos by JR Malavoi).



# River Cam Habitat and Access Enhancement Project

*Enhancements to the River Cam at Trumpington Meadows will deliver significant social and environmental benefits for the river and the surrounding area. Rob Mungovan (Ecology Officer, South Cambridgeshire District Council), Dr Frances Elwell (Hydraulic Engineer, Mott MacDonald) and Karen Fisher (Expert Adviser, RRC) report on the proposed works.*

## *A community park*

Trumpington Meadows is located on the outskirts of Cambridge where 1200 new homes are to be built. To serve the new community Trumpington Meadows Land Company and the Wildlife Trust will establish a 60 hectare Riverside Community Park adjacent to the River Cam; this reach of the River Cam is proposed for enhancement.

The River Cam is a County Wildlife Site (CWS). It provides an important biodiversity resource as a largely unmodified major river with good water quality and plant diversity. The river is abutted by re-created wildflower meadows and pollarded

willows, and a drainage ditch runs parallel to the river. These habitats complement the river's setting and provide further interesting biodiversity features.

## *A history of dredging*

The river has been dredged historically and scrape marks remain visible on the riverbed. Dredging has resulted in levees along the banks, which have been colonised by weeds such as nettles. As with many slow flowing parts of the Cam, the riverbed has become a settling point for silt, and lilies and bur-reed can choke summer flows. These plants are periodically removed by Environment Agency maintenance teams.

## *The case for enhancement*

The Cam is a chalk river. Where the river has gradient and natural regeneration is taking place, a gravel and chalk bed can be observed (*Photo 1*). The water clarity is good and chalk river indicator species such as water crowfoot, starwort, brown trout and mayflies can be found. The Cambridgeshire biodiversity action plan seeks the restoration of rivers and CWS.

Whilst increased access to the countryside is generally welcomed, concern has been expressed about the risk of increased disturbance to a presently remote reach of river. The site contains an occasionally used artificial otter holt, a kingfisher bank, and chub and minnow spawning areas. These habitats could be

disturbed and damaged by people, especially if paddling becomes popular at the reach's only riffle! It became clear that the environmental capacity of the river needs to be increased to counteract the disturbing impact of human access.



**Photo 1:** A gravel and chalk bed can be seen in some sections of the river

## Enhancement techniques

Through site investigation, hydraulic modelling and detailed consideration of longitudinal surveys a holistic scheme for the river has evolved so as to make best use of the data and time spent considering the entire reach of the river.

### Gravel shoals

Eight gravel shoals, totalling 195m in length, will provide opportunities to diversify water velocities without significantly raising water levels upstream. Localised bed raising will compensate for historic dredging, which has over-deepened the river. The shoals are expected to increase fish spawning areas, invertebrate habitat and substrate for water crowfoot while enabling public access for paddling.

The original design had been to create gravel riffles by raising the bed across the entire river width. Hydraulic modelling of normal flow conditions indicated that this approach would have raised river levels upstream, possibly drowning out the existing riffle. Concerns were also raised at the possibility of riffles becoming fording points giving access to privately owned farmland.

### Bank re-grading

The riverbanks are steep and densely vegetated (*Photo 2*). Bank re-grading over 225m will create a gentle slope located adjacent to the shoals. This will create a safe and accessible approach to the river.

Levees act to retain floodwaters within the river at low return-period floods. Bank re-grading will allow water to spill out onto a wet meadow at lower flood levels, which is likely to deliver local flood storage benefits and biodiversity gain for wetland birds. Hydraulic modelling has been used to demonstrate that the maximum flood levels and extents for higher return periods are not affected.

### Bank revetments

Large woody debris will be fixed to over 350m of riverbank to provide fish with refuge from predators and high flows. This should increase the

fish holding capacity of the river while also benefiting invertebrates. The wooden revetments will be planted with locally sourced vegetation.

### Flow deflectors

The river is relatively low energy, being of shallow gradient. Six flow deflectors will introduce diversity to water velocities, assisting the river in scouring silt. The shelter provided by the deflectors is expected to increase fish and invertebrate populations.

### Ditch and sluice restoration

A dilapidated ditch system of 730m runs parallel to the river. Water levels in the ditch will be raised so that the ditch acts as a “wet fence”.

### Backwater habitat creation

Observations of the river in flood indicated that there were few places of shelter. It is proposed to integrate the river and existing ditch system to create three backwater habitats. Backwaters will enhance coarse fish spawning and nursery areas. A reed bed will also be planted.

### Project delivery

The project manager is Rob Mungovan for South Cambridgeshire District Council. The RRC has provided expert advice in developing concept ideas. Hydraulic modelling was undertaken by Mott MacDonald. The Environment Agency has

**Photo 2:** Steep and densely vegetated banks along the River Cam

undertaken ecological monitoring and has provided guidance throughout the project development.

The project is funded by the Department of Communities and Local Government / Cambridgeshire Horizons Housing Growth Fund and is due for completion in August 2009. Additional funding is being provided by the Environment Agency, the Cambridgeshire and Peterborough Biodiversity Partnership and the Cam Valley Forum.

### Conclusion

- The River Cam Habitat and Access Enhancement Project is expected to deliver significant environmental and social benefits.
- The proposed works are based on a sound understanding of the river's form and flow types.
- The proposed measures are appropriate to the landscape type and setting.
- The works will enhance the experience of visitors to the proposed Community Riverside Park.
- The works are expected to act as a showcase for river restoration techniques for the local area and therefore as a catalyst for similar projects.

# News and Events

## Courses

### *Understanding River Restoration: Processes, ecology, planning and assessing potential (Module 2)*

29th and 30th September 2009, UK  
(venue to be confirmed)

This course is Module 2 of a two module set; participants are expected to have already completed Module 1 of the set.

For more information please contact the RRC:  
rrc@therrc.co.uk

## Conferences and Seminars

### *BES Annual Meeting*

8th to 10th September 2009,  
University of Hertfordshire, UK

For more information please visit:  
[http://www.britishecologicalsociety.org/meetings/current\\_future\\_meetings/2009\\_annual\\_meeting](http://www.britishecologicalsociety.org/meetings/current_future_meetings/2009_annual_meeting)

### *12th International Riversymposium - Rivers from Source to Sea*

21st to 24th September 2009, Brisbane, Australia

For more information please visit:  
<http://www.riversymposium.com>

### *A Joint CIWEM/EWA/ASTEE Conference: WFD - Emerging Water Management Challenges*

29th and 30th September 2009, Lille, France

For more information please visit:  
<http://www.ciwem.org/events>

### *The Conservation and Management of Rivers: 20 Years On*

6th to 9th September 2010, University of York, UK

This conference is sponsored by the Joint Nature Conservation Committee, Environment Agency, Scottish Environment Protection Agency, Northern Ireland Environment Agency and Scottish Natural Heritage. The emphasis of the conference will be on habitat and wildlife conservation but this will be set within the wider context of water management with a broad, international perspective.

For more information please visit:  
[www.jncc.gov.uk](http://www.jncc.gov.uk)

## Guided Site Visits for RRC Members

Throughout the summer period we will be offering a number of free guided site visits to RRC Members looking at restoration projects and techniques that we hope you will find both beneficial and informative.

The first site visit took place along the River Cam, led by Rob Mungovan, on 10th July and future locations will hopefully include Wales (led by Salix) and the New Forest (led by Alaska Consulting).

*If you are interested in attending any of the site visits or have any suggestions for future visits please contact Ian Brown at the Centre.*



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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.



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