Restoring Europe's Rivers

RESTORE Events: Reporting

THEME

Improving morphology and fish passage in high energy rivers

DATE

25th September 2012 with optional site visits on 26th September 2012

LOCATION

The Birnam Institute, Dunkeld, Scotland

AUDIENCE

Practitioners

LIFE 09INF/UK/000032

The RESTORE project is made possible with the contribution of the LIFE+ financial instrument of the European Community

and works in partnership with

1. Key issues identified

- Perceived lack of confidence regarding high energy rivers
- Lack of awareness about current best practice for fish passage and hydropower
- How can we encourage people to share information about projects?
- What tools are available to assess fish passability?

2. Background

This event focused on the impact of barriers (to sediment, flow and fish) on high energy river systems, and the benefits of implementing natural fish passage, including discussion about what barriers fish can really pass. It aimed to discuss current best practice for fish passage, and identify how the EU RESTORE partnership can disseminate this information to policy makers, river basin manager and other key stakeholders in Europe. The one day event was attended by around seventy delegates included presentations on hydropower needs and fish passage, the development of tools for the assessment of passability of riverine obstacles for fish, and to support the cost effective implementation of restoration measures.

The PowerPoint presentations associated with this workshop can be found at: http://www.therrc.co.uk/rrc_restore.php

Site visits to the Inchewan Burn a tributary of the River Tay, where a previously degraded river was restored to mimic natural process and improve fish passage, together with Pitlochry Dam and the River Tummel provided delegates a chance to discuss challenges highlighted within the workshop.

3. Findings

3.1 Sediment mobility is a key concern

Sediment release when removing obstacles to fish passage was seen as the key concern, together with the risk of contaminated sediment release. Delegates stated a need for further research and monitoring programmes in this area. A case study presented by Scottish Natural Heritage highlighted the issues of barrier removal for freshwater pearl mussels, which have been identified as a threatened species by the IUCN (International Union for Conservation of Nature and Natural Resources) Red list. Removal of barriers has the advantage of re-connecting sediment transport mechanisms to ensure sediment replenishment of important mussel habitats. However, it may also threaten these habitats due to sediment release which can smother juveniles and other essential habitats such as coarse sand and gravels.

Follow-up action:

RESTORE will work with REFORM (REstoring rivers FOR effective catchment Management), identified as a project that is aiming to develop protocols and procedures, that will help address this. RESTORE plans to work closely with this project in the future to ensure that lessons learnt are transferred and incorporated into these initiatives.

3.2 Weir removal in high energy rivers is complex

Decision making in some river systems may be more complex increasing the risk and uncertainty associated in applying restoration principles. Weir removal in high energy environments in particular was identified as difficult. The impacts both up and downstream of the proposed removal are often seen as unknowns. More guidance was called for and the idea of a handbook was discussed. This, it was suggested, could help reduce the risk associated with barrier removal by identifying areas of possible sediment deposition within the river system, and could help to facilitate the production of policies that promoted river connectivity techniques for fish passage and natural river processes.

Follow-up action:

RESTORE will provide current guidance and case studies on the River Wiki to inform practitioners and others about best practice examples of weir removal in different environments.

3.3 Research fish biology and associated design criteria

During the workshop a requirement was highlighted for additional research into fish biology appropriate to the needs of practitioners. A need was identified for structures to mimic the slope, morphology and hydraulic conditions of the original stream and enable fish of different species to migrate, taking into account the different swimming capabilities of fish. EIFAC (European Inland Fisheries Advisory Commission) aim to define design criteria for fish passes in high energy rivers based on species, and produce best practice guidance on up and downstream fish.

Follow-up action:

RESTORE will make publications relating to fish biology and design criteria/ manuals available on the website.

3.4 Considering hydropower while promoting natural bypass channels

Hydropower plants and dams have been identified by the WFD as one of the top hydro-morphological pressures in Europe due to their restrictions on flow and sediment regime. Mitigation measures and ecological compensation should therefore be a requirement for any hydropower schemes in all countries in order to meet good ecological status for the WFD. Natural bypass channels, it was suggested, should be designed beyond the requirement of fish passage, allowing for morphological and ecological connectivity.

Follow-up action:

The RESTORE partnership will make policymakers aware of the importance of compensation ecology as a requirement of hydropower schemes in order to ensure that this is put in place in all European countries rather than just some as it is currently. Guidance will be posted on the RESTORE website.

3.5 Role of stakeholders important

It was recognised that stakeholders have often been sceptical about the idea of restoring rivers especially in the context of flood risk. It is vital that the restoration community outline the variety and significance of benefits that restoration can bring, and provide examples of the likely benefits.

Follow-up action:

The RESTORE River Wiki online resource for best practice river restoration projects across Europe will provide demonstration sites to illustrate success stories.

4. Attendance

73 people attended the RESTORE workshop with representatives from six RESTORE countries. Participants had varying backgrounds and experience in river restoration.

First Name	Surname	Organisation	Country
Addy	Stephen	James Hutton Institute	Scotland
Akoumianaki	Ioanna	Dundee University	Scotland
Anderton	Caroline	JBA Consulting	Scotland
Armstrong	Rowan	Galloway Fisheries Trust	Scotland
Atkinson	Paul	Tyne Rivers Trust	England
Baker	Christopher	CB Consulting	Scotland
Bankhead	Judith	DARD - Rivers Agency	Northern Ireland
Barrett-Mold	Claire	Environment Agency	England
Bean	Colin	Scottish Natural Heritage	Scotland
Birkeland	Kjersti	SEPA	Scotland
Brackley	Robert	University of Glasgow	Scotland
Bryan	Richard	Aberdeenshire Council	Scotland
Bull	Colin	Stirling University	Scotland
Clarke	Edward	Fairhurst	Scotland
Collins	Michael	Office of Public Works	Republic of Ireland
Cornforth	Ian	Scottish Agricultural College	Scotland
Cullagh	Alan	Inland Fisheries Ireland	Republic of Ireland
Cuming	Simon	Environment Agency	England
Darbyshire	John	JDC Ecology	Scotland
Drake	John	Halcrow	Scotland
Elbourne	Nicholas	River Restoration Centre	England

Eynon	Karen	Don Catchment Rivers Trust	England
Fisher	Lara	Scottish Water	Scotland
Girvan	Joanna	River Forth Fisheries Trust	Scotland
Graham	Jackie	Galloway Fisheries Trust	Scotland
Greer	Gareth	DARD - Rivers Agency	Northern Ireland
Gunn	Iain	Centre for Ecology and Hydrology	Scotland
Henderson	James	Nith District Salmon Fishery Board	Scotland
Holmes	Richard	Tees Rivers Trust	England
Hudson	Steve	Wear Rivers Trust	England
Hutcheson	Amanda	Scottish Water	Scotland
Iveson	Rachel	RPS Group	Scotland
Janes	Martin	River Restoration Centre	England
Jormola	Jukka	Finnish Environment Institute	Finland
Kerr	Pete	Northumberland Rivers Trust	England
Lynch	Peter	DCAL Inland Fisheries N. Ireland	Northern Ireland
MacDougall	Kenneth	EnviroCentre Ltd	Scotland
Mackinlay	Lindsay	National Trust for Scotland	Scotland
Mant	Jenny	River Restoration Centre	England
Marshall	Tony	RPS	Scotland
Marshall	Shona	West Sutherland Fisheries Trust	Scotland
Mathieson	Linda	Aberdeenshire Council	Scotland
McAleese	Martin	DCAL Inland Fisheries N. Ireland	Northern Ireland
McCafferty	Gerry	Inland Fisheries Ireland	Republic of Ireland
Mitchell	Rob	RAFTS	Scotland

Moir	Hamish	cbec eco-engineering UK Ltd	Scotland
Murphy	Patrick	Northern Ireland Environment Agency	Northern Ireland
Nailon	Peter	Wear Rivers Trust	England
Nutt	Neil	Halcrow (CH2M Hill)	Scotland
O'Donaill	Cian	Office of Public Works	Republic of Ireland
Olbert	Caroline	Scottish Water	Scotland
Oliver	Drew	Mouchel	Scotland
Parke	Debbie	Nith Catchment Fishery Trust	Scotland
Peacock	Caroline	City of Edinburgh Council	Scotland
Pedley	Gareth	Wild Trout Trust / Eden Rivers Trust	England
Pert	Francesca	Environment Agency	England
Pollard	Aidan	Tyne Rivers Trust	England
Price	Conor	Scottish Borders Council	Scotland
Redeker	Marq	ARCADIS	Germany
Roger	Gordon	Clackmannanshire Council	Scotland
Sinclair	Gary	Mouchel	Scotland
Third	Edwin	Dee District Salmon Fishery Board	Scotland
Thomas	Rhian	University of Glasgow	Scotland
Thompson	Emma	Environment Agency	England
Thompson	Fiona	University of Sterling	Scotland
Toland	Mary	Northern Ireland Environment Agency	Northern Ireland
Tosney	Jonah	Wester Ross Fisheries Trust	Scotland
Tree	Angus	Scottish Natural Heritage	Scotland
Tuck	Julie	SEPA	Scotland
Urquhart	Jamie	River Don Trust	Scotland

Watson	Matthew	Strath Caulaidh Ltd	Scotland
Webb	John		England
Young	Sally	Angus Council	Scotland

5. Support for Restoration Practices

Greater awareness of guidance documents, tools to aid decision-making and the presentation of best practice case studies would help to reduce uncertainty and risk when designing or implementing river restoration activities. Future actions that the RESTORE projects can help to deliver have been identified.

6. Building on Network Capacity

Feedback forms identified that the workshop was useful in updating attendees on the latest tools and developments. The workshop discussion centred on some of the key issues and challenges that delegates had wanted to raise themselves, and the response to the format of the workshop and site visits the following day was well received.

Delegates were interested in more information on:

- Funding to deliver schemes
- Natural fish pass solutions
- River restoration techniques suitable to high energy rivers
- More examples of completed projects and details about how they were delivered
- Historic projects which have had 5-10 years to recover, particularly in high energy environments to help overcome their own, or stakeholder uncertainty
- Different types of barrier removal and more evidence on the impact this has on fish habitat
- Environmental flows

The RESTORE project will be able to consolidate this information and where applicable, will ensure that new information is updated on the project's website, wiki-database and with the case study handbook for all to access. These aspects will be followed up by the RESTORE partnership in order to further understanding.

7. Promoting Effective Knowledge Transfer

The workshop centred on short presentations with time set aside for thematic discussion in each case following each speaker. The approach to open-up discussion to the floor work effectively as some of the topics of debate raised by the audience needed to be discussed in more detail. Some needed Q&A interaction between the RESTORE facilitators and participants and the output of this was clarity in respect to what could be done moving forward. All debates and in particular the actions associated with each item, will ensure that knowledge will now be transferred to a wider audience through RESTORE dissemination methods. Some of the key elements will also be picked up again in future RESTORE workshops across Europe.

8. Dissemination of Event Outcomes

Outputs were emailed to all attendees of the workshop. Comments were invited and a request made for other people that would be interested in receiving outputs made. If you have further questions or are interested in the outputs described for this event please contact either the:

RESTORE project manager Antonia Scarr

antonia.scarr@environment-agency.gov.uk

River Restoration Centre

rrc@therrc.co.uk

9. Workshop photographs

David Gilvear (SEPA) describing a novel approach to understanding fluvial dynamics upstream of the Inchewan Burn restoration project.

Pitlochry dam fish passage ladder

Undertaking a rapid assessment of the River Tummel river corridor to identify geomorphological features

Encouraging natural processes has led to the movement of sediment across the River Tummel creating a diverse range of habitats and flows.

10. Press releases

Article included in the *"Managing Water e-magazine, November 2012", page 19.*

Improving morphology and fish passage in high energy rivers

By Jenny Mant and Victoria West (the River Restoration Centre, UK)

The EU RESTORE partnership (www.restorerivers.eu) is funded by the EULife+ information and communications programme. As part of the RESTORE project the partners are required to organise workshops based on specific topics of interest and priority. This event focused on the impact of barriers (to sediment, flow and fish) on high energy river systems, and the benefits of implementing natural fish passage, including discussion about what barriers fish can really pass. It aimed to discuss current best practice for fish passage, and identify how the EU RESTORE partnership can disseminate this information to policy makers, river basin manager and other key stakeholders in Europe. The one day event, followed by a site visit, was attended by around seventy delegates included presentations on hydropower needs and fish passage, the development of tools for the assessment of passability of riverine obstacles for fish, and to support the cost effective implementation of restoration measures.

Some of the key findings were as follows:

Sediment release when removing obstacles to fish passage was seen as the key concern, together with the risk of contaminated sediment release.
A case study presented by Scottish Natural Heritage highlighted the issues of barrier removal for freshwater pearl mussels, which have been identified as a threatened species by the IUCN (International Union for Conservation of Nature and Natural Resources) Red list. Removal of barriers has the advantage of re-connecting sediment transport mechanisms to ensure sediment replenishment of important mussel habitats. However, it may also threaten these habitats due to sediment release which can smother juveniles and other essential habitats such as coarse sand and gravels. Delegates highlighted that there was a lack of confidence in dealing with possible issues of sediment release, stating a need for further research and monitoring programmes in this area. REFORM (REstoring rivers FOR effective catchment Management) was identified as a project that is aiming to develop protocols and procedures that will help address this. RESTORE plans to work closely with this project in the future to ensure that lessons learnt are transferred and incorporated into these initiatives.

More extensive river systems were acknowledged as more complex hence potentially increasing the risk and uncertainty associated in applying restoration principles.

Weir removal in high energy environments in particular was identified as difficult. The impacts both up and downstream of the proposed removal are often seen as unknowns. More guidance was called for and the idea of a handbook was discussed. This, it was suggested, could help reduce the risk associated with barrier removal by identifying areas of possible sediment deposition within the river system, and could help to facilitate the production of policies that promoted river connectivity techniques for fish passage and natural river processes.

Hydropower plants and dams have been identified by the WFD as one of the top hydro-morphological pressures in Europe due to their restrictions on flow and sediment regime. Mitigation measures and ecological compensation should therefore be a requirement for any hydropower schemes in all countries in order to meet good ecological status for the WFD. Natural bypass channels, it was suggested, should be designed beyond the requirement of fish passage, allowing for morphological and ecological connectivity. During the workshop a requirement was highlighted for additional research into fish biology, and associated design criteria for specific species which is appropriate to the needs of practitioners. A need was identified for structures to mimic the slope, morphology and hydraulic conditions of the original stream and enable fish of different species to migrate, taking into account the different swimming capabilities of fish. EIFAC (European Inland Fisheries Advisory Commission) aim to define design criteria for fish passes in high energy rivers based on species, and produce best practice guidance on up and downstream fish. Once completed the RESTORE webpage will link to this guidance.

The role of stakeholders was also highlighted at the workshop. It was recognised that they have often been sceptical about the idea of restoring rivers especially in the context for flood risk. It is vital that the restoration community mitigate this by outlining the variety and significance of benefits that restoration can bring, and give details of the likely success of the proposed works. Demonstration sites would be useful, it was deemed, to illustrate "success stories" and the RESTORE River Wiki online resource for best practice river restoration projects across Europe will provide a useful and updateable resource (http://riverwiki.restorerivers.eu/wiki/index.php?title=Main_Page).
Site visits to the Inchewan Burn a tributary of the River Tay, where a previously degraded river was restored to mimic natural process and improve fish passage, together with Pitlochry Dam and the River Tummel and Ballinluig all provided the participants a chance to discuss the challenges highlighted within the workshop.
The full details of this workshop will soon be posted on the RESTORE website and can be found alongside the other initiatives that have been the focus of this project across Europe. The website provides a wealth of information about all aspects of river restoration and we would always be interested to hear about your project, issue or concern. For further information contact the River Restoration Centre (www.therrc.co.uk) who manage part of the RESTORE project and speak to one of the technical team.

Inchewan Burn below the A9
Before restoration (above) and after (below)

Sediment bar on the Inchewan Burn