

Environment Agency · WETLANDS INTERNATIONAL · SYKE · CIRF

Restoring Europe's Rivers

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

and works in partnership with ECRR

SESSION 07:
River Restoration Techniques

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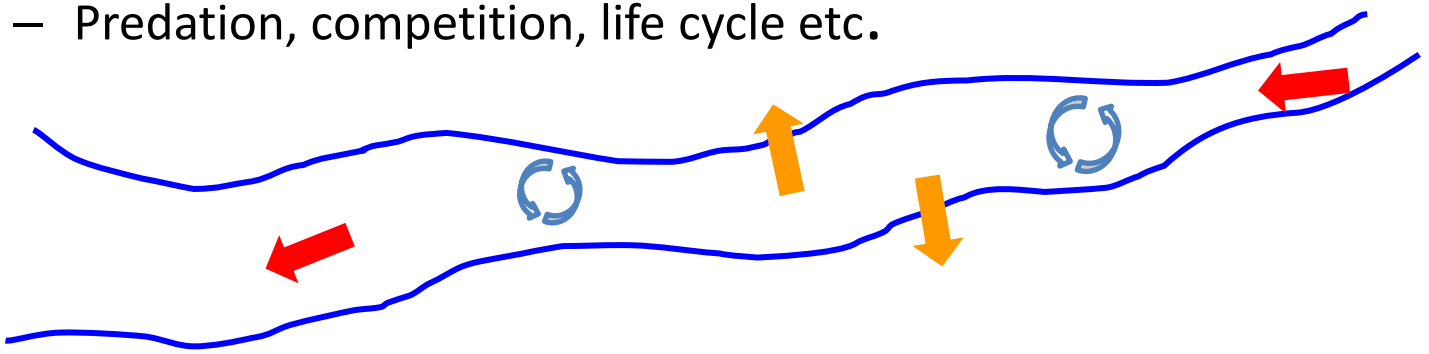
Session Introduction

- large number of techniques and approaches,
- work with natural processes,
- catchment scale approach,
- work at different scales,
- what techniques are available and
- some exciting examples of best practice.

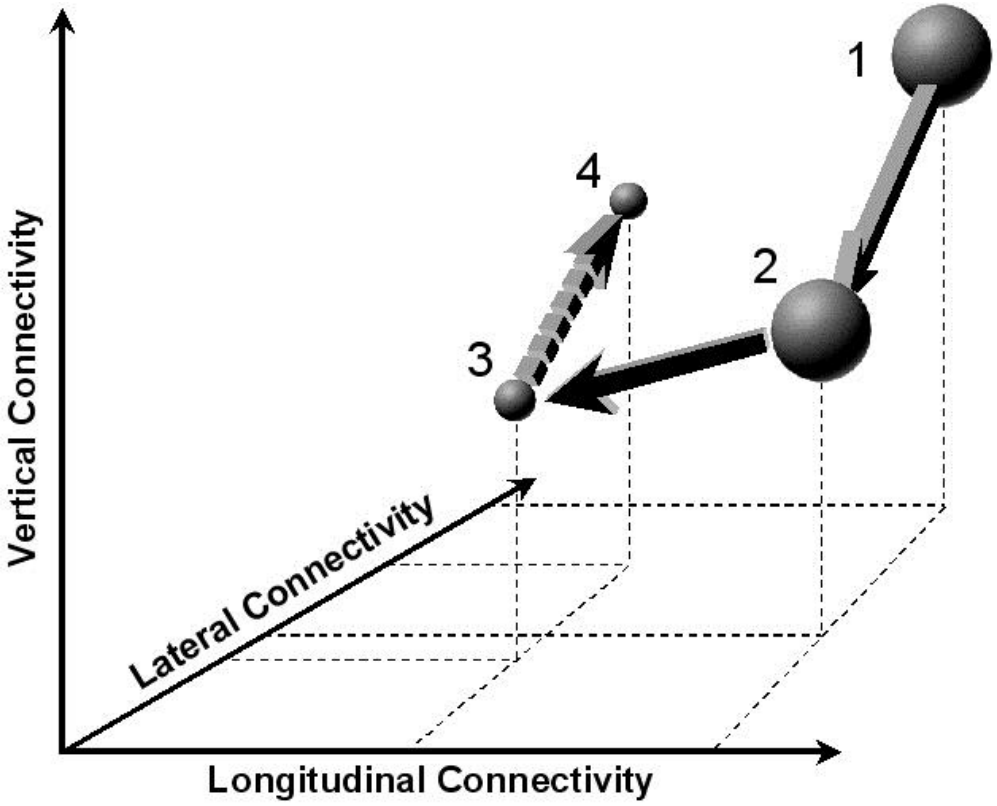


Working with natural processes

- Longitudinal processes:
  - Hydrology
  - Fluvial geomorphology
- Lateral processes:
  - Interactions with riparian zones & floodplains
- Internal processes:
  - Predation, competition, life cycle etc.



Pite River, Sweden



Representation of degradation and restoration trajectory, based on the strength of connectivity.

[The size of each point represents the relative variability in annual flow resulting at each phase]

Phase 1 pre-degradation;
Phase 2, channel simplification and revetments (1870), for log floating;
Phase 3, impoundments (1930);
Phase 4, restoration (revetment removal and structures to recreate complex in-stream habitat).

(Kondolf et al 2006)

UK River restoration techniques

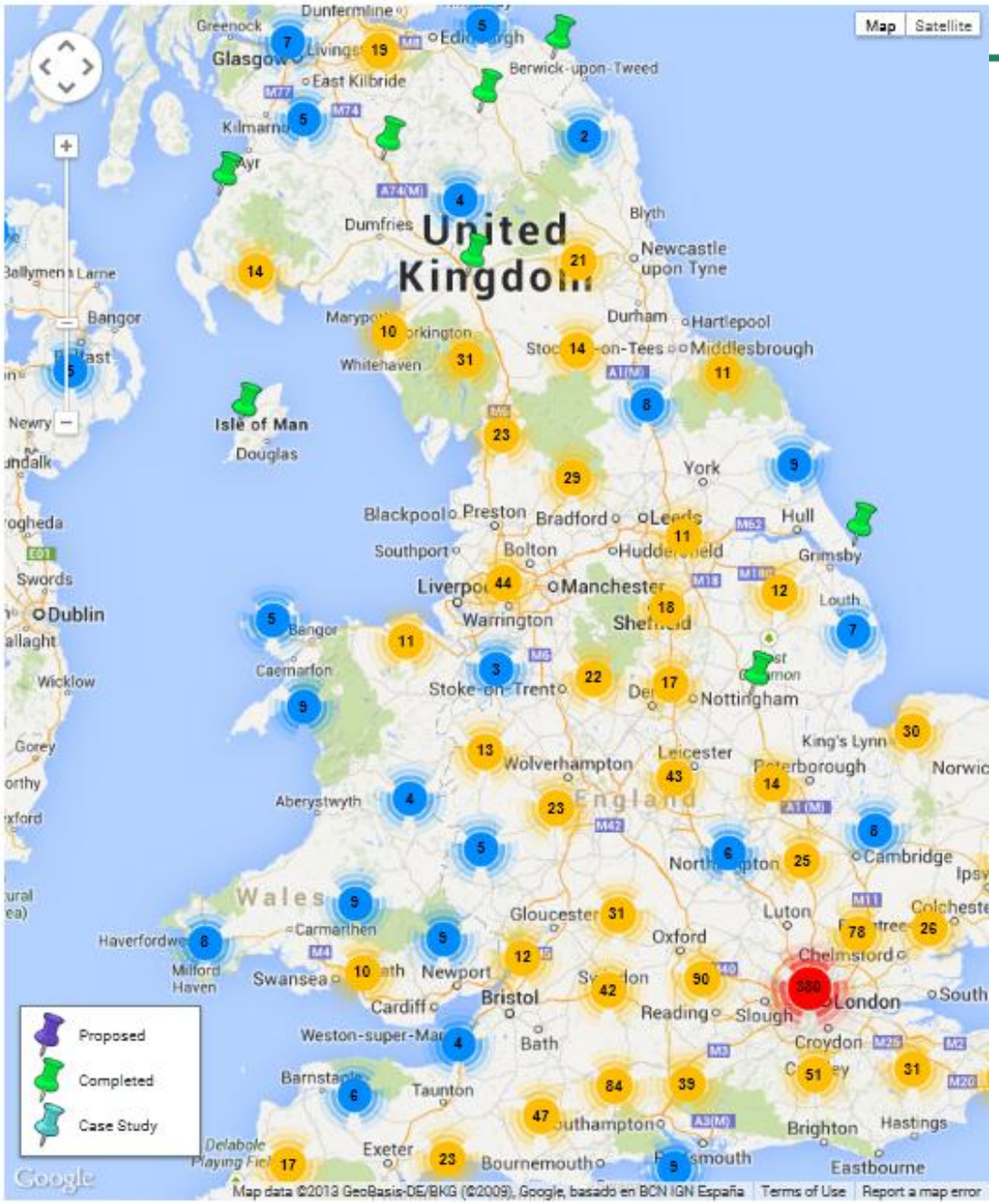
Top 10 techniques used in UK river restoration projects

River restoration techniques	No. of UK projects (NRRI)
River narrowing to increase velocity (by adding structures)	404
Lakes, ponds, wetlands restored or established	324
Obstructing structure replaced/removed	293
Bank re-profiling/hard bank removal	292
Riparian/floodplain vegetation (planting/management)	283
Re-meandering or restoring sinuosity	206
Daylighting/culvert removal	156
River-floodplain reconnection	129
Long section habitat enhancement (pool/riffle sequences)	154
Backwaters and pools established/reconnected	137



the River
Working to

Filters
- Project Name
- River/Tributary
- Project Status
  - Proposed
  - Completed
  - Case Study
- Year Completed
- Aspirations
- Additional Filters
- National Agency Region
- RRC Involvement



UK.

2700 projects,

Proposed and completed work,

On-going update since 1997.

Techniques across Europe

Common techniques used in Europe-wide river restoration

River restoration techniques	No. of UK projects (NRRI)	No. of EU projects (Wiki)
River narrowing to increase velocity (by adding structures)	404	21
Lakes, ponds, wetlands restored or established	324	61
Obstructing structure replaced/removed	293	57
Bank re-profiling/hard bank removal	292	50
Riparian/floodplain vegetation (planting/management)	283	52
Re-meandering or restoring sinuosity	206	69
Daylighting/culvert removal	156	7
River-floodplain reconnection	129	15
Long section habitat enhancement (pool/riffle sequences)	154	53
Backwaters and pools established/reconnected	137	9

Physical modification



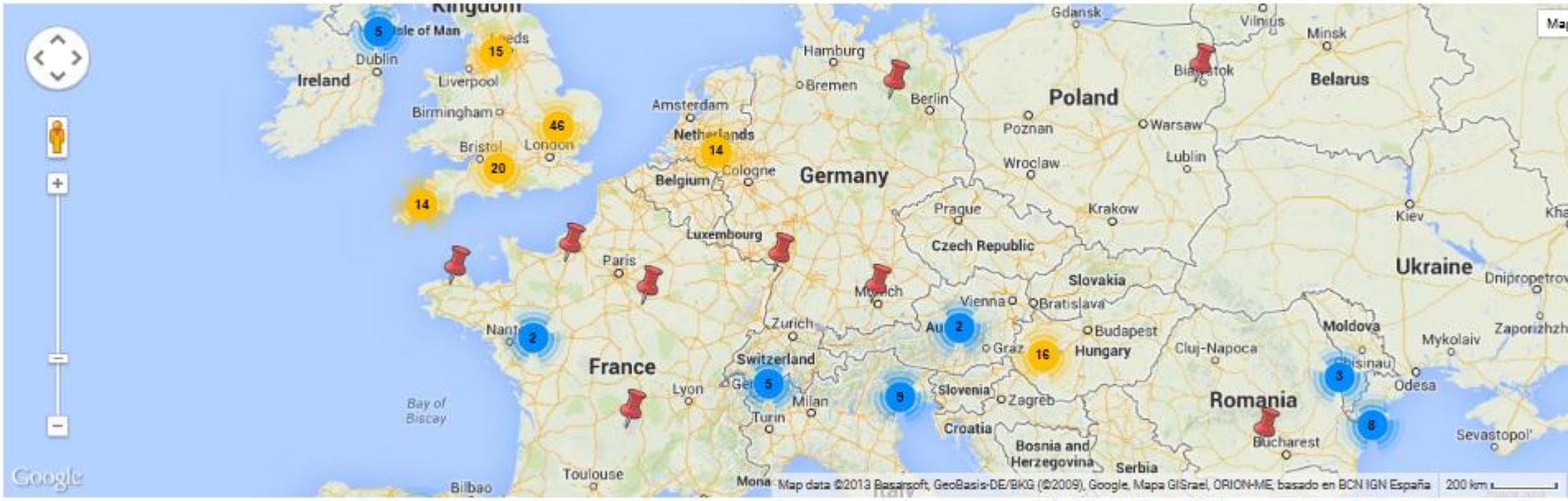
Contents [hide]

Latest updated case studies	Modification date	Country
Morava restoration project	9 September 2013 02:52:10	Austria Slovakia
Ålgårda nature-like bypass channel at River Rolfsån	6 September 2013 18:27:00	
Černý potok stream restoration scheme	6 September 2013 18:25:23	
'Restorations of River Nolån-Fishway in Forsa hydro power plant	6 September 2013 18:24:29	
'Restorations of River Nolån-Bypass channel in Hulta Hydro power plant	6 September 2013 18:23:15	
more..		

Europe

450 projects so far

Map of case studies



Left click to look around in the map, and use the wheel of your mouse to zoom

What you can do:

- You can search the database to find case studies by using the different categories: country; monitoring or implementation costs and many more: click here to search for a case studies
- Please also add your own river restoration scheme to the database: click here to create a new case study.
- Provide us with your feedback: click here to take the survey or add to the discussion pages.

Countries

The following countries are members of the RESTORE partnership. Click any of the links below to view information about that country.

Austria, Belgium, Bulgaria, Denmark, England, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Northern Ireland, Norway, Poland, Portugal, Romania, Scotland, Slovenia, Spain, Sweden, Wa

The right techniques

- Understanding the processes and pressures
- Setting clear and measurable objectives
- Consider multiple benefits and outcomes
- Pick techniques to restore natural processes
  - Long term success and low management needs
  - Alter to make appropriate to the river type
- Monitor and evaluate their success
- Inform the wider evidence base for the future



But where can I find…..??

- **REFORM (FP7)** – scientific evidence base, reviews, assessments, tools and frameworks (reformrivers.eu)
- **Healthy Catchments** - how to manage water for flood risk & the WFD (restorerivers.eu)
- **Manual of River Restoration Techniques** – good practice in river restoration techniques (theRRC.co.uk)
- **RESTORE** – partnership for sharing knowledge and promoting best practice on river restoration in Europe
- **ECRR** – supporting river restoration networks across Europe
- **RiverWIKI** – interactive database of restoration projects

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Restoring E… Rivers

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Add/edit Image Settings

River Restoration | Flood risk management | Healthy Catchments - Flood Risk and th…

Environmental improvements and case studies

Explore

- Creation of compensatory habitat
- Develop a strategy to manage sediment
- Manage invasive species
- Manage natural obstructions in the channel
- Manage vegetation appropriately
- Manage water levels appropriately
- Minimise disturbance to channel bed and banks
- Retain and improve existing edge and bank habitats
- Sensitive timing of vegetation management
- Sensitive techniques for managing vegetation

ContentPane

Environmental improvements & ca…

River Basin Management Plans (RBMPs) identify which enviro… improvements need to be undertaken in specific water bodies. … environmental improvements are grouped into similar activities…

There are at least 3 case study examples for each environmen… improvement, which demonstrate how it could be implemented… studies can be found by clicking links to the **left** or by viewing e… environmental improvement by group (**below**).

When you click on each of the environmental improvements lis… there will also be an explanation of what the environmental imp… involves, including:

- Case study examples on the **right** of the page
- An assessment of the mutliple benefits provided by each case study
- An indication of cost

Edit Text Settings

Habitat creation

Creating new compensatory habitat to mitigate for the impacts on habitats of FCERM schemes undertaken elswhere within a region/catchment. This group has one environmental improvement:

CASE STUDY

Improve channel geomorphology to create habitat

Project Summary

Title: River Quaggy enhancement scheme at Chinbrook Meadows
Location: River Quaggy, London Borough of Lewisham, England
Technique: Structure removal, channel realignment and natural enhancement
Cost of technique: ££££
Overall cost of scheme: ££££
Benefits: ££
Dates: 2002

Mitigation Measure(s)

Use of green engineering techniques instead of hard bank protection
Improve channel geomorphology to create habitat

How it was delivered

Delivered by: Environment Agency
Partners: Quaggy Waterways Action Group; Lewisham Council

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WFD Terminology

Throughout this section of the RESTORE webpage the term '**environmental improvement**' is used instead of WFD 'mitigation measures'. The names of some mitigation measures are different in England, Scotland and Northern Ireland.

Designed & Built By

UK examples,

64 techniques,

37 projects,

2 to 25 years old,

€ 7M total cost

theRRC.co.uk

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