The network for best practices of river restoration in Greater Europe

ECRR
European Centre for River Restoration

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Editorial

Harnessing the Potential of River Restoration: Inspiring Cases

This newsletter explores three remarkable examples that highlight the power of collaboration, innovation, and knowledge exchange in achieving successful outcomes for river ecosystems.

The **Australian River Restoration Centre (ARRC)**, led by Dr. Siwan Lovett, integrates social and natural systems to foster collaboration and develop practical solutions for river management, including efforts to restore the Upper Murrumbidgee River.

In Scotland, the **Forth River Trust** successfully removed the Morton Quarry Weir by hand, opening up habitats for migratory fish. This project demonstrates innovation, emphasizing adaptability and resourcefulness in restoration efforts.

The **LIFE Dordogne River Project** in France's Dordogne Valley Biosphere Reserve exemplifies international cooperation and knowledge sharing. The project focused on habitat restoration and the revival of spawning grounds for endangered species, improving the river's ecological health by leveraging experiences from rivers across Europe.

These cases show the transformative potential of river restoration through collaboration, innovation, and knowledge exchange. By embracing a holistic approach and recognizing the interconnectedness of social and natural systems, these projects have revitalized habitats, restored ecological balance, and fostered sustainable river management.

Bart Fokkens, ECRR

ARRC Australian River Restoration Centre

Catalyzing conversations: the evolution of the Australian River Restoration Centre

Author

Dr. Siwan Lovett — Managing Director, Australian River Restoration Centre

Photography

Lucy Stuart — Figure 1

Simon Lowes — Figure 2

Greta Von Gavel — Figure 3

The seed of an idea

In 1998, the International Riversymposium debuted in Brisbane, gathering experts from various fields to discuss river management. I was excited to be at the event, having just started a new role at Land & Water Australia coordinating the National Riparian Lands Research & Development Program. Over the years, connections made at the symposium, particularly with Bart Fokkens (ECRR) and Martin Janes (UKRRC), seeded the idea in my mind that one day I might establish an Australian River Restoration Centre (ARRC).

What happened?

Throughout my career in river management, I have been an 'undercover social scientist'. Starting out as a young woman in a predominantly male field, my PhD played a crucial role in establishing my credentials. I didn't challenge the prevalent misconception that my Doctorate was in environmental science, as social science was often unfairly characterized as "soft," "warm," and "fuzzy." I was fortunate to have a supportive manager, Dr. Phil Price, who trusted in my capabilities and appreciated my perspective on river management. Specifically, I emphasized the significance of social capital—people, networks, and relationships—alongside natural capital, such as rivers, wetlands, and floodplains.

With this perspective guiding me, I engaged our researchers in discussions aimed at understanding the relevance of their investigations for river managers and how their findings could be put into practical use. Together, we delved into all aspects of riparian zone functioning, sharing our insights with, and receiving feedback from, river managers and landholders. This collaborative approach allowed us to develop practical mitigation and restoration methods tailored to real-world needs.

Establishing ARRC

In 2006, anticipating Land & Water Australia's closure, I pursued a Winston Churchill Trust Fellowship to explore establishing the ARRC. I wanted the ARRC to be underpinned by scientific rigour, but managed so that the social and human aspects of river restoration were given equal status and value. In 2008, I attended the River Restoration Centre conference in Venice, with follow up visits to Italy, Germany, and the United Kingdom. This trip would never have happened if I had not met Bart and Martin all those years ago in Brisbane. By 2009, the Australian River Restoration Centre was born.

ARRC today

Now in its fifteenth year the ARRC encompasses diverse projects tailored to different stakeholders. The ARRC is a not-for-profit charity that owns no equipment or premises. The eleven people working at the ARRC all have their own businesses and sub-contract their time against specific tasks and activities. This model is used because the ARRC does not have stable core funding – a situation that we would love to change so that we could be freed up from constantly applying for short-term grants. Despite funding insecurity, we have developed signature initiatives including on-ground restoration, native fish recovery, mentoring programs, science communication and knowledge brokering. The diagram above shows these initiatives and demonstrates how each is tailored around a particular issue, audience, and funding source.

So what?

Without my trip to Europe, I would have been unlikely to establish an Australian River Restoration Centre. With funding and support from the Winston Churchill Trust I was able to meet and listen to people working in European river restoration – through conversation, windows were opened into worlds I could never have accessed from Australia. I observed that the strength of the River Restoration Centres, no matter how small, is to connect people and

ideas, create networks, share knowledge and be a voice for rivers. I also learnt that funding is insecure, the extent of degradation can be overwhelming, and the need to adapt to the vagaries of politics is constant.

Upon my return home, these insights provided a solid foundation as I navigated the intricacies of establishing the ARRC and strategized ways to sustain it in a resource-constrained setting. Although securing funding is a constant quest, the ARRC is a valued entity in our river restoration institutional landscape.

Advocacy Case study: the Forgotten River

The ARRC's visibility has increased in recent years as we entered the world of advocacy to be a voice for the Upper Murrumbidgee River. As a small organisation with limited funds, I had always been reluctant to be 'political', however, in 2019 the Upper Murrumbidgee River ran dry at Tharwa in the Australian Capital Territory. This river is the third largest in Australia, however, its upper reaches are tightly constrained due to the location of Tantangara Dam, part of the Snowy Hydroelectric Scheme. Since 1969, when the dam was completed, Tantangara has captured more than 90% of the Upper Bidgee's headwaters, and as much as 99% in dry years.

This 320 km stretch of river used to be magnificent, with deep pools, waterfalls, and diverse populations of native fish, birds, and vegetation. First Nations connections to the river were strong, with the waterway being an important pathway and home to many sites of significance. The name 'Murrumbidgee' means 'big water' in the Wiradjuri language – something the upper reaches of the river has not been for a very long time.

The Upper Murrumbidgee is part of the Murray-Darling Basin; however, Snowy Hydroelectric operations are currently outside the requirements of the Murray-Darling Basin Plan that was introduced in 2012 along with other regulatory instruments to redress the negative impacts of extracting water without regard for environmental and cultural needs. Although a small group of organisations have continued to restore parts of the Upper Murrumbidgee by focusing on fish habitat and weed removal, without flows we are continuing to document its decline.

FIGURE 1 *Tantangara Dam, part of the Snowy Hydroelectric Scheme and capturing over 90% of the Upper Murrumbidgee' headwaters.*

FIGURE 2 *Upper Murrumbidgee River at Tharwa in 2019 running dry due to no releases from Tantangara Dam.*

Our advocacy approach for the Upper Murrumbidgee River focused on collaboration and connection, rather than blaming and shaming. We fostered dialogue on collective restoration efforts for the Upper Murrumbidgee, emphasising the importance of working together. Establishing trust-based relationships with key politicians proved pivotal, as they spearheaded advocacy efforts at National, State, and Territory levels. To amplify our message, we launched the 'Forgotten River' website to disseminate knowledge, and conducted a community survey, receiving 1064 responses from individuals eager to contribute their ideas about how the Upper Murrumbidgee should be managed.

FIGURE 3 *Siwan paddling in the beautiful Bredbo Gorge on the Upper Murrumbidgee, a reminder of how the river used to be.*

In November 2023, a $50 million package for the Upper Murrumbidgee was announced, with $30 million designated for purchasing water to ensure its continuous flow in dry years, and $20 million allocated for on-ground actions, monitoring, and a review of the regulatory documents governing Snowy Hydro operations. The ARRC is now providing advice to the Commonwealth government about how to restore priority areas in the Upper Murrumbidgee, but we have no guarantee we will be recipients of any funding.

What next?

The ARRC's journey to date shows the pivotal role of conversations and human connections in catalysing action. It has been through networking and conversation that the ARRC was conceived, showing how interactions at events like the International Riversymposium sparked innovative ideas and collaborations. The recent advocacy campaign for the Upper Murrumbidgee River exemplifies the transformative impact of conversation and relationship building in effective change.

Looking ahead, the ARRC will continue to mature, seeking stable funding and exploring alternative models, while maintaining its core mission of being 'a charity restoring rivers and empowering others to do the same'. Ultimately, like all worldwide river restoration endeavours, the ARRC thrives on human connection and the shared goal of protecting and restoring rivers. We warmly invite individuals and organisations passionate about river protection and restoration to get in touch with the ARRC, as it is only by working together, that we can create a brighter future for our rivers and the diverse communities, both human and ecological, that rely upon them.

Removing the two-metre-tall Morton Quarry weir by hand!

Author

Jonathan Louis — Forth River Trust

Photography

Forth River Trust — Figures 1, 2, 3, 4, 5

Project overview

Morton Quarry Weir, situated on the Linhouse Water, a tributary of the River Almond in West Lothian, Scotland, stopped migratory fish from reaching 5 km of pristine habitat within the catchment. The catchment has a history of problems, ranging from barriers to fish migration due to industry, degraded habitat from urbanisation and development, and pollution that often follows this kind of pressure. Finding good quality habitat in the river Almond is a challenge.

Over the past 8 years, the main stem barriers have been eased through various methods such as rock ramps, technical fish passes and weir removal by partners which include the Forth Rivers Trust, West Lothian and Edinburgh Council's and SEPA. The next logical step was to tackle barriers on the tributaries, and knowing that the Linhouse is the ideal place to try and get species such as the endangered Atlantic salmon, sea trout, brown trout and eel in to start repopulating the catchment was a priority for the Forth Rivers Trust.

FIGURE 1 *A view of Morton Quarry Weir pre removal.*

Morton Quarry Weir sat halfway up the river's accessible reach, blocking 5 km of pristine habitat. Due to the rural nature of the catchment, it has not had the same impact from urbanisation and industrialisation as other parts of the catchment. However, this weir was ins-

talled in the late 1800s to power water pumps for the nearby oil shale mine.

This weir was challenging. It was situated in an area with steep sides and mature woodland. During the project's development phase, a railway bridge upstream also needed to be considered. At roughly 2.2 metres tall, 10 metres wide, and 6 metres long, it was impassable to fish and in a deteriorating condition.

Planning and funding

Staff at the Trust started to hatch a plan, trying to work out the best way to remove this weir, giving migratory fish the best opportunity within the catchment. Due to the location, using heavy machinery was immediately ruled out. There was no way of gaining access to the site without causing enormous environmental damage to the surrounding woodland, and it cost a lot of money to build the necessary access tracks down to the structure. This would have made the project unviable if we had to deliver the project in this way. After reviewing what could be done, it was decided the only viable way was to remove the weir by hand.

This then opened the door to more issues to overcome such as how to dismantle the weir in a safe and environmentally friendly manner. Once we knew what we wanted to do, we applied to the European Open Rivers Programme for development and delivery funding to undertake the necessary activities required during weir removal. Everything from structural surveys, habitat and geomorphological surveys, protected species surveys and assessing the impact on the river upstream was necessary to submit the required license applications and ensure the railway bridge upstream was not impacted by the removal of the weir. Thankfully after a thorough review of the data, it was deemed that the weir could be removed safely without impacting infrastructure and the river upstream. We were then able to start deconstructing the weir!

Execution

Day one started off nice and easy. Setting up the site to ensure all of our pre-identified risks through our risk assessment method statement had measures in place to protect staff working on site. Areas were cordoned off, safety ropes anchored, and overhangs on the weir were clearly marked out to ensure everyone was kept safe on the project. Staff then set to work on using a range of tools to remove the top layer of concrete from the weir, using sledgehammers and angle grinders.

FIGURE 2 *Scot Muir using a sledge hammer to remove coping stones from the weir.*

FIGURE 3 *Scot and Alan behind a stone they have winched out of the centre of the weir.*

Days two, three and four were much the same but progress was steady. On day four, we broke through the crest of the weir. The inside of the

structure was made up of river rock and slabs. Some were estimated to be hundreds of kilos, potentially a tonne in weight. As we progressed, the internals of the weir were removed, with the rock distributed downstream of the structure.

On day six, Mother Nature helped us. A flood occurred during the night, meaning the river level rose, stopping work the next day. This was fortunate, and we had hoped it would happen to help move some of the rock away and help with the dismantling process. When the waters subsided, the weir was reassessed for structural integrity, and work proceeded.

The flood helped scour much of the rock within the heart of the weir. Large slabs were exposed that were held upright by a wooden beam running through the centre of the weir. The wooden beam was cut and removed, and the large slabs winched out to expose more of the structure's internals.

On day eight, another flood occurred. As we had removed the wooden beam and slabs of rock, the river helped move more of the weir's internals downstream. The water subsided again, and on day ten, we decided to call it a day and let the river do the rest of the work. Roughly 2000 m^3 of gravel stored upstream of the weir would shift now that the structure had been dismantled.

FIGURE 4 *Weir removed and gravels washed down after autumn storms. Now fully accessible.*

Results and impact

Over the coming weeks, further floods occurred, scouring away more of the remaining structure and distributing the gravel downstream. Fish were seen during the dismantling process trying to ascend the river, but they would have no problem now. it was amazing seeing this river return to its natural form, restoring natural processes and uncovering some very exciting finds, in particular, the 300-360 million-year-old fossils found in the rock face under the weir.

FIGURE 5 *A fossil found under the weir. This is a Lepidodendron fossil, a primitive vascular plant from around 300-360 million years ago!*

All in all, this weir was removed for roughly £25,000 and took 8 months to plan and 10 days to remove by hand. It highlights the possibilities and that even the weirs that seem impossible to remove, can be removed with a bit of innovation and thought. The European Open Rivers Fund enabled the Trust to deliver this project, helping migratory fish in what is a heavily impacted catchment.

Future goals

This positive experience has inspired us to continue tackling barriers across the Forth, of which there are many.

For more information, please get in touch with the Forth Rivers Trust by emailing trust@forthriverstrust.org.

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CENTRO IBÉRICO DE RESTAURACIÓN FLUVIAL

The network for best practices of river restoration in Greater Europe
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LIFE Dordogne River project: Developing a river restoration approach by exchanging river restoration information, knowledge, and experiences

Author

Camila Kuncar — Iberian Centre for River Restoration

Photography

CIREF — Figures 1, 2, 3

LIFE Dordogne River Project

The Dordogne River, located in the central part of the UNESCO Dordogne Valley Biosphere Reserve (Man and Biosphere Programme) in France, has seen a significant decrease in the surface area of its natural alluvial habitats on the riverbanks over the past few decades due to various factors. The main objective of the LIFE Dordogne River project is to increase the surface area of several alluvial habitats and restore the spawning habitats for salmon, lamprey, and shad along 280 km of the Dordogne River, which is included in three Natura 2000 Network sites in the region.

EPIDOR is the coordinating beneficiary of the projects, as it is an association of six local authorities implementing sustainable water management and managing the conservation and restoration of the Dordogne catchment area of 24,000 km², including the 260 km long Dordogne River. The project runs from 2020 to 2027. The European Centre for River Restoration (ECRR) is one of the beneficiaries of the LIFE Project. Its task is to contribute to the project to develop a river restoration approach by exchanging river restoration knowledge and experience and disseminating good practices with other European river basins, supported notably by the international network of Biosphere Reserves.

Research and collaboration

In this context, the ECRR collaborated with one of its members, the Iberian Centre for River Restoration (CIREF). They formed a work team led by the University of the Basque Country, with participation from the University of Zaragoza and the University of Santiago de

Compostela. The team's approach was to collect case studies of rivers at the European level that had similar characteristics to the Dordogne River and with interesting river restoration projects.

This initial long list included 98 projects across Europe, focusing on case studies with similar problems and challenges to those of the Dordogne. It was compiled by searching databases of LIFE, Interreg, and RiverWiki projects, as well as national river restoration websites. One of the main characteristics of the studied rivers was that they had similar hydro-morphological conditions to the Dordogne and interesting sediment management experiences that could be replicable.

Sediment management is key for the Dordogne as there are large hydro dams (even on this UNESCO Biosphere reserve) that impact sediment movement, and the previous use of sediment has impacted the alluvial gravel forests alongside the river. This is why the rivers needed to have some degree of gravel management or gravel problems to be most relevant to the work of EPIDOR and the French Office for Biodiversity (OFB) on the Dordogne.

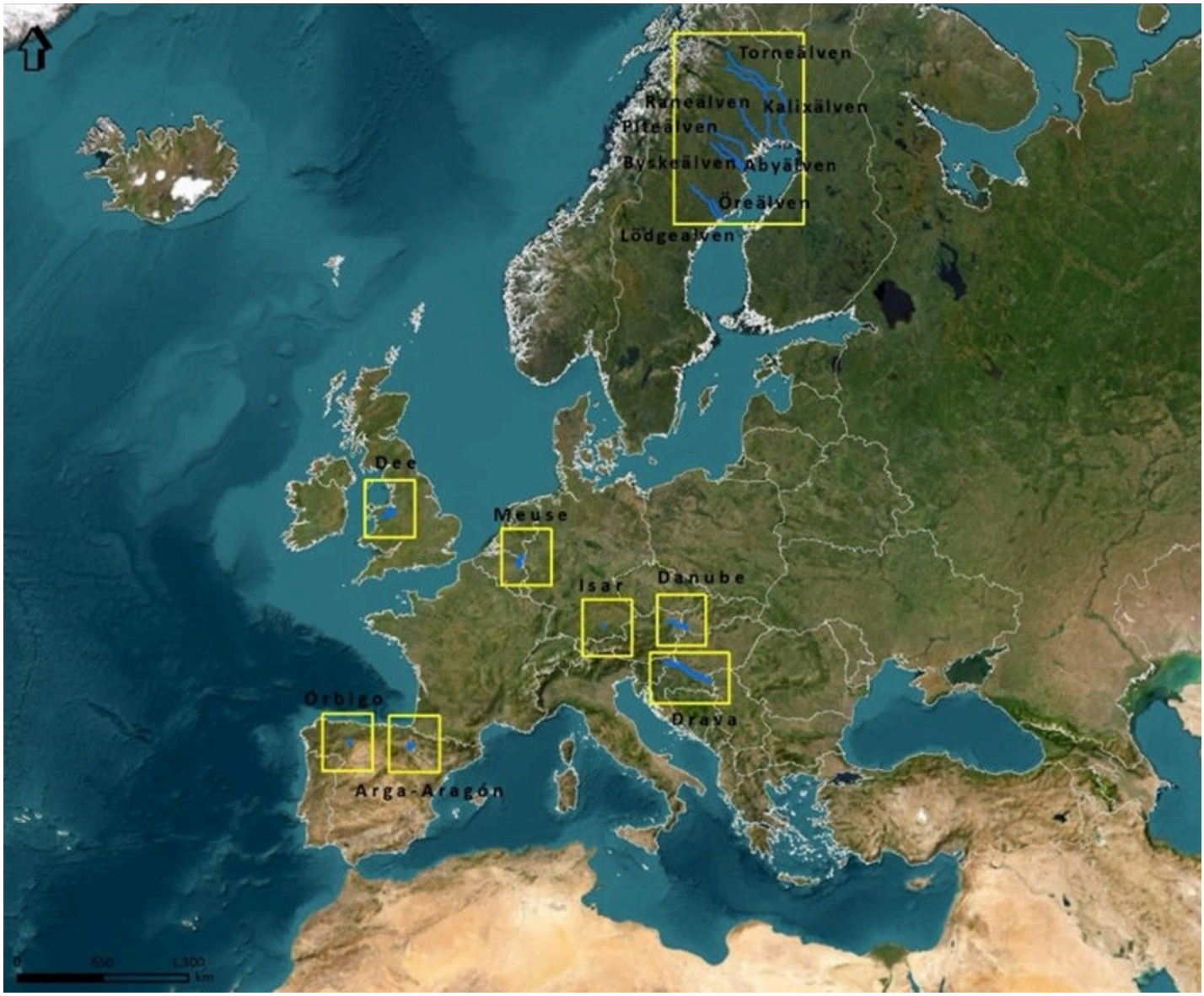

FIGURE 1 *Location of the selected eight projects.*

Case study selection

From this long list, a selection of eight rivers (Figure 1) with corresponding restoration projects was made by the Dordogne and CIREF teams together, emphasizing geographical diversity and useful experiences. Those chosen were: Arga-Aragon in Spain (LIFE + Mink Territory projects); Danube in eastern Austria; Dee in Wales (LIFE); Drava in Croatia (Drava LIFE project); Isar in Germany (Isar River Plan project); Meuse on the border between Belgium and the Netherlands (River Park Meuse Catchment project); Órbigo in Spain; and a set of several Swedish rivers from the ReBorN LIFE and Ecostreams for LIFE projects.

The next phase consisted of developing summary sheets for the different rivers. Each sheet included the name of the river and the linked project(s), the organization in charge, the start and end dates, the river typology, the target species, the Q mean, and the contact of the main manager. The sheet also included an extensive description of the characteristics indicating the location and context of the river, pressures and impacts, species and habitats, restoration actions, project monitoring, achievements, governance structure and social impacts, budget, website and other communication materials, and the bibliography used. The summary sheets are available at the end of this document via hyperlinks.

Knowledge exchange

Subsequently, a workshop was held in October 2023 with the eight project managers of the selected rivers in Périgord, on the banks of the Dordogne, in France. The workshop was organized in collaboration with another ECRR member, the Italian River Restoration Centre (CIRF), and aimed to learn together about the restoration experiences developed on the rivers, good practices, and lessons learned, to be able to integrate them into the projects being carried out on the Dordogne river within the framework of the LIFE project. Five key issues were agreed upon as needing more attention in this type of work, such as land acquisition, long-term monitoring, the role of stakeholders in the success of the project, river (processes) restoration versus habitat and species conservation, and morphological restoration and its impacts on water quality.

FIGURE 2 *Workshop with the eight European river managers.*

FIGURE 3 *Technical visit in Veyrignac and Gaule.*

In addition, two technical visits were made: one in Veyrignac and Gaule, where two examples of river restoration were visited, and another in Mauzac, to see a benchmark in sediment management.

Workshop results

The workshop results will be used to develop a practical guide on sediment management at the watershed scale that will enable managers and stakeholders to develop suitable strategies by identifying the most significant problems, specifying the main types of possible actions, and defining the modalities for their implementation. Moreover, during the workshop, some great ideas were generated for the future development of the Dordogne river management.

Summary sheets of the rivers

- Arga-Aragón (Spain)
- Meuse (Belgium)
- Isar (Germany)
- Sweden rivers
- Órbigo (Spain)
- Drava (Croatia)
- Danube (Austria)
- Dee (Wales)

Advice for the Dordogne River LIFE project	Perspectives for further collaborations	Ideas for the study tour
Co-working with stakeholders	Regular information and discussion sessions (online Jour-fix, shared cloud storage, e-newsletter)	Itinerant canoeing study tour with outdoor activities (walking, fishing, birdwatching...)
Give information about the results and the positive impacts on biodiversity and water quality	Prepare an inter-basin project (LIFE?)	Meetings and discussion with stakeholders, scientists, local people
Have a holistic vision and keep the catchment focus	Visits of the 8 case studies sites and of other similar projects with similar problems	Participation to monitoring actions
Don't forget the social aspects and use creativity to connect with people (cinema activities, night tours, poetry, etc.)		

Colophon

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Target audience

River restoration practitioners in greater Europe

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Encourages and supports ecological river restoration
Connecting people and organisations
Supporting development of best practices of river restoration