Restoring Europe's Rivers

RESTORE Events: Reporting

Field visit in Germany:
Restoration of River Dynamics and Continuity in Heavily Modified Rivers

DATE

22nd to 23rd of May 2013

LOCATION

Isar River, Munich and restoration sites within the region of Bavaria

LIFE 09INF/UK/000032

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and works in partnership with

Isar River, Bavaria, Germany

The Isar River rises in the Bavarian Alps and flows north-east, passing through the city of Munich, on its way to the Danube. Like most large rivers in middle Europe sections of the river have been dammed and canalised for hydropower and flood control. However, damaging floods in recent decades called for new approaches towards flood risk management, combined with ecosystem enhancements and improved outdoor recreation along the river. Several river restoration projects have been carried out over about 100 km of river length, including the €35m 'Isar Plan' in central Munich. The works for the Isar Plan were initiated in 2000 and completed in 2011. To enhance aquatic flora and fauna, improve flood risk management and increase recreational opportunities, several measures were taken:

- weirs were replaced by rock ramps to ease fish passage
- planting of native riparian vegetation
- flood defences were set back and banksides re-profiled
- creation of beaches and access routes for visitors

Gravel islands, pools and rapids have also increased flow dynamics and created a variety of new habitats.

There are several hydropower plants along the Isar which have had a major negative effect on hydrological dynamics. To get new concession, hydropower companies had to contribute with approximately 50% of the cost of the restoration, and south of Munich, near Icking, part of the restoration involved increasing the minimum flow from 5 m^3s^{-1} to 15 m^3s^{-1}. By increasing the flow and removing bank protection, a more natural hydro-dynamic has been restored. A bypass channel has also been constructed at the weir in Icking.

Similar restoration measures have been taken along the Isar north of Munich. Minimum discharge has been increased and obstructions removed/replaced to partly restore the old braided river and connection with the alluvial forest on the floodplain.

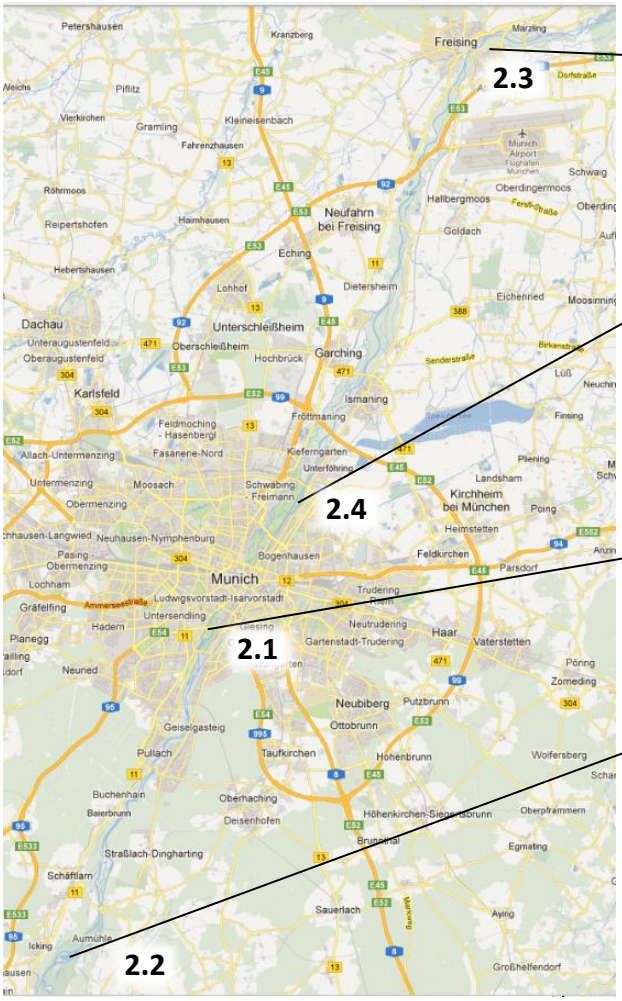
1. Introduction to field visit

During the first part of the excursion field visit delegates visited the River Isar in Munich to see how the Isar Plan has enhanced ecological and fluvial processes through the city, and improved fish passage whilst at the same time providing new recreation areas along the banks. We also visited areas upstream and downstream of Munich where alluvial forests and the natural floodplain have been re-connected. The channel has been allowed to migrate across the valley floor.

2. Project sites visited

Figure 1 shows the locations of the sites visited:

- Site A - Moosbach (a tributary of the River Isar near Freising) with alluvial forests
- Site B - Fish pass constructed on the River Isar at Oberföhring
- Sites C - River Isar through Munich (Isar Plan)
- Site D - Isar at Icking, improved flow dynamics



Alluvial forests along **River Isar** during a flood in 2005. The forests are important for the retention of water during floods, nature conversation and outdoor recreation. From "Case Studies: Isar, Germany" by Walter Binder

Fish pass constructed at the Isar past the barrier at Oberföhring. However, the pass has not shown to be very effective for fish passage.

Restoration of **River Isar** in Munich - enhanced ecological and fluvial processes, and increased recreational opportunities.
http://www.werkstatt-stadt.de/en/projects/68/

River Isar near **Icking** before and after restoration.
From "Case Studies: Isar, Germany" by Walter Binder
http://www.zaragoza.es/contenidos/medioambiente/cajaAzul/10B-S3-P2-Klaus%20ArzetACC.pdf

Figure 1. Overview map of restoration sites visited

2.1 River Isar restoration, central Munich

Additional project specific resources:

- Case study in the RESTORE 'Rivers by Design' publication (page 38-39)
  http://www.restorerivers.eu/LinkClick.aspx?fileticket=Ct9u3qHmcKA%3d&tabid=2624
- RESTORE project River WIKI case study
  http://riverwiki.restorerivers.eu/wiki/index.php?title=Case_study%3AIsar-Plan

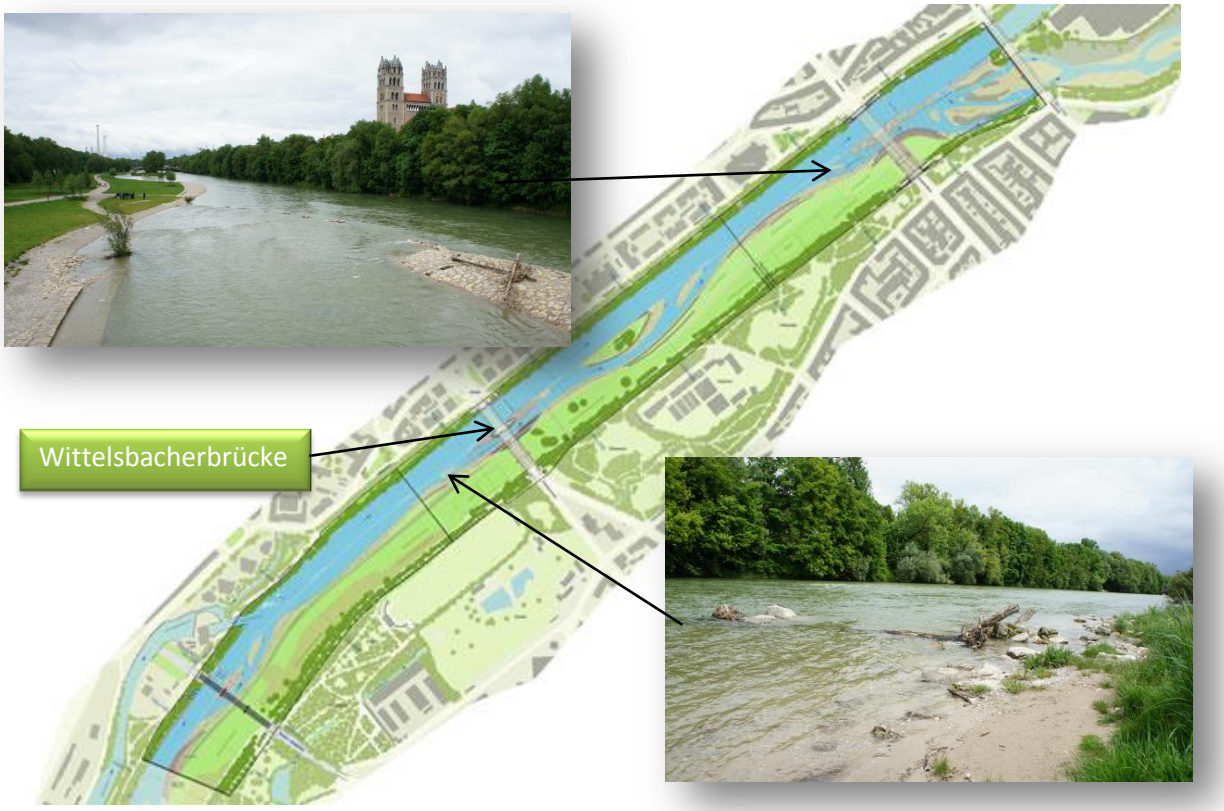


Figure 2. Map showing 2km of the restoration of the River Isar (Isar Plan) through central Munich where flood defences have been set back, the banks re-profiled and recreational space created along the river.

Figure 3. Before and after restoration close to Wittelsbacherbrücke on the River Isar, central Munich

Figure 4. Naturalistic bypass channel at Flauchersteg on the River Isar, central Munich

2.2 River Isar at Icking

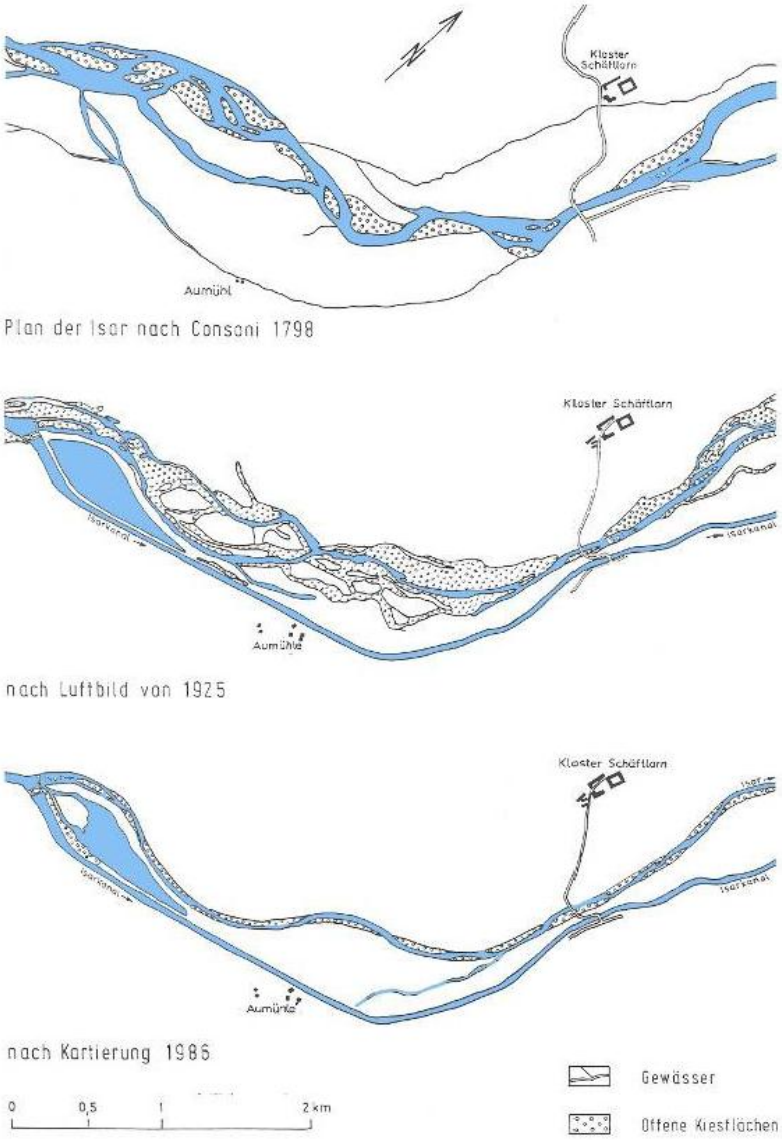


Figure 5. The Isar near Icking: the maps from 1798, 1925 and 1986 showing the changes of the river system and gravel banks due to decreased flow and impoundments (W. Binder - Case studies: Isar; Germany)

Figure 6. Restoration of natural processes and flow dynamics through regulations of minimal flow and river-floodplain reconnection at Icking.

2.3 Tributary of the Isar near Freising

Figure 7. Restoration of the Moosbach tributary and river-floodplain reconnection at the Isar River near Freising

2.4 River Isar at Oberföhring

Figure 8. The fish pass at Oberföhring

This newly constructed fish pass at Oberföhring was not performing satisfactory, but the exact reasons have not yet been determined. The gravel bed within the pass has been dislocated, transported down and washed out from the structure, and changed the flow dynamics in the pass. Additionally, when fish have negotiated the pass they reach a side channel to the Isar, rather than the main river. Another barrier then needs to be navigated and it is believed that many fish do not find their way into the Isar.

3. Outcomes

The field visit provided the participants with much information on both wider perspectives of river restoration and practical solutions to particular issues. From seeing the successful Isar project, participant's confidence about restoring large rivers was boosted. Our knowledgeable and inspiring guides showed some best practice examples of both urban restoration, focussing on integrated flood

risk management and social benefits, and rural river-floodplain reconnection working with natural processes.

The group shared knowledge on best practice, multiple-benefits and funding opportunities. We learned how hydropower companies in Germany are required to contribute to river restoration in order to re-negotiate expiring abstraction licences, and discussed how this system might be applied in other countries.

The field visit gained much positive feedback from the participants, who especially commented on how much they leaned about constructing better and more natural functioning fish ways, bypass channels and fish habitats, particularly on large rivers.

> *"[I gained] lots of new information how to restore large rivers like Isar, new cases, recreation possibilities, new methods: natural fish by-pass channels, nature-like bypass, and fish-ways and fish ladders. Helped us to understand how to build bypasses and fish-ways."*

> *"In our own countries we should build more and better fish bypasses that are more nature-like"*

Over half of the participants thought that the field visit positively changed their attitude concerning river restoration:

> *"Event gave more support and more arguments related with approaches for river restoration."*

> *"[It gave] new dimensions about restoration measures and effects, letting river flow nature-like and giving it the possibility to have natural dynamic."*

The majority of the participants also said that they gained new river restoration contacts at the event, through which they could:

> *"Get help, advice and change experiences, cross sector support, exchanging knowledge and views about the river restoration with different experts inviting participants to own conferences."*

4. Attendance

Twenty-eight people attended the site visit with representatives from ten European countries. Representatives from the State Office for Water Management, Munich and local river restoration experts hosted the site visits. Participants had varying backgrounds and experience in river restoration.

Name	***Organisation***	***Nationality***
Toni Scarr	Environment Agency	UK
Sébastien Den Doncker	Stream and River Consult	Belgium
Sebastian Bentley	JBA Consulting	UK
Bernard De Le Court	Public Services of Wallonia	Belgium
Aude Hamed	Technical University of Munich	France
Bernd Schneider	State Office for Environment, Water and Trade Control	Germany
Igor Wawrzyniak	Ministry of Agriculture and Rural Development	Poland
Martin Pusch	Leibniz Institute of Freshwater Ecology and Inland Fisheries	Germany
Gabriela Costea	Natural Sciences Museum Complex, Galati	Romania
Jakob Kadura	Student of College of Forest Sciences, Rottenburg	Germany
Martin Kesler	Estonian Marine Institute, University of Tartu	Estonia
Markus Tapaninen	Centre for Economic Development, Transport and the Enviroment for Southeast Finland	Finland
Matti Vaittinen	Centre for Economic Development, Transport and the Enviroment for Southeast Finland	Finland
Trond Taugbøl	Glommens and Laagens Brukseierforening	Finland
Geir Taugbøl	EnergyNorway	Norway
Teppo Vehanen	Finnish Game and Fisheries Research Institute	Finland
Jermi Tertsunen	Centre for Economic Development, Transport and the Enviroment for North Ostrobothnia Finland	Finland
Ari Haikonen	Fish & Water Research Ltd.	Finland
Ulrika Åberg	River Restoration Centre	Sweden
Nick Elbourne	River Restoration Centre	UK
Simon Whitton	River Restoration Centre	UK
Jukka Jormola	Finnish Environment Institute	Finland
Antton Keto	Finnish Environment Institute	Finland
Pinja Kasvio	Finnish Environment Institute	Finland
Sini Olin	Finnish Environment Institute	Finland
Walter Binder	State Office for Water Management, Munich, retired	Germany
Nivedita Mahida	State Office for Water Management, Munich	Germany
Matthias Junge	State Office for Water Management, Munich	Germany

5. Further information

Further information and photographs are available on request from the River Restoration Centre *rrc@therrc.co.uk*

The RESTORE project will be able to consolidate this information and where applicable, information will be updated on the project's website and wiki-database for all to access.