The Isar River in Munich: lost and regained

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Lower Isar
lowland character, meander to the estuary into the Danube

Middle Isar
former braided River with gravelbars, transportation of bedload, alpine character

Upper Isar
from the Alps, high erosion, source of gravelload
The Isar River as a braided river from the Alps 100 km down to Munich until its transformation in the 20th century
Munich after 15. century

Widespread natural riverbeds

Multifunctional use of the Isar River

The Isar River was a central axis for economy (Transportation by rafts, water mills, natural resources)
Women collecting lime stone in the wide riverbed

„Kalksteinsammlerinnen“
Joseph Wenglein 1883
1870
Isar River near Munich, still in its natural shape
Munich
Flood water
catastrophy:
the bridge is gone...
Destruction of the Ludwig’s bridge in 1813
The Transformation of the Isar River

A braided river 1809

A canalized river 1961
The Isar river before taming and canalizing measures

Munich  1902
Munich  1902

The new plan for taming the river and for hydro power canals

First dams for flood protection
1906 the Isar River in Munich was tamed and most of the time nearly dry.

A canal beside the river guided the water to new hydro power plants.

After 1925 nearly the whole river became regulated and tamed.
Weirs and walls were necessary for limiting the erosion and deepening of the river.

They interrupt the river.
The Isar in Munich after 1906
The river is eroded. Walls inhibit the contact to the river.
The Vision

nature and leisure activities
The Vision

clean water and gravel banks
The Vision

animals and plants still living in the Alps
The Vision

a small relict near Munich
The Vision
Desire in Munich:

The Alps
Touch to Nature
Birds
Fish
Butterflies
Alpine Plants
Mountain Water
Stream Sound
Isar Power
Leisure Time
Vision: From an utopy to a new guiding principle

Feel free to dream in contact with the nature, even if it seems to be an utopy. Formulate your vision.
Recognize the potentials of the nature with people, even if they are far away.
Define all deficits, talk about your vision, do first steps and start networking.
Integrate people who enjoy and get touched with the nature.
Knowledge about the nature is a motor for qualified measures.
Integrate measures for nature restauration in every plan, step by step.
This relict of the Isar River in Munich served as an example for the new guiding principle of the urban Isar River
The Chance:
Necessary measures for flood protection and expiring licences for hydro power plants were a welcome opportunity. They were combined with new guiding principles.
Measures of Revitalisation with an Industrialized River

Binder et al. 1998
The Isar Revitalization

• 1988 General discussion and decision for sustainability at the Isar river.
• Activities with exhibitions, excursions and media information.
• 1994 First decision for the rural river restoration (Mühltal near Munich 10 kilometers of the river)
• 1995 Second decision for the first urban restoration in Munich with flood protection, nature and leisure areas. (Isarplan Munich beginning 1998, finishing 2011 7 kilometers in the city)
• 1996 First decision for sewage plant improvement (26 sewage plants)
• 2000 First gravel load management concept
The Isar Restauration I (Mühltal 10 km)

1992 Discussion about rules for new permissions for old hydro power plants at the Isar River

1994 First paradigmatic new permission (for the next 30 years) connected with the decision for the first rural river restoration (Isar in Mühltal near Munich)
Isar Mühltal

Aumühle um 1925
1900
The original Isar River
1925

After building a canal:

Nearly dry river

New canal to the hydropower plant

Aumühle, about 1925
Canalized river, partly revitalized
Hydro power canal

Aumühle, about 2012

www.rent-a-drone.de
First Rural Isar River Restoration Project near Munich (Mühltal)

1925:
Natural Isar with the newly constructed hydro power Canal

1988:
Tamed Isar Canal

2012:
Newly less tamed Isar Canal
The Isar Restauration II (in Munich 7 km)

1992 Discussion about new flood protection measures at the Isar River in Munich

Alternatives:
• conventional concept with new high dams and dykes for flood protection
• integral solution with a widened river bed, low alluvial zones and small additional dams for flood protection, nature restoration and leisure areas
Two alternatives for extended flood protection in Munich

Former solution: new high dams

or

Integral solution: a widened river bed, lower alluvial zones, small additional dams for flood protection, nature restoration, leisure areas
Economical, ecological and social aspects completed the Isar Plan

- New measures for flood protection in combination with river restoration and leisure areas
- New riparian gravel structures instead of linear concrete dykes
- New dynamic habitats with changing shorelines instead of hard inaccessible canalized structures
- Reshaping a new polyfunctional river with social meeting areas at the rivershores instead of a monofunctionally hydropower optimized river
Die Idee einer Isarrenaturierung zur Korrektur dieser Fehlentwicklungen in München konkretisierte sich 1995.

Planskizzen

Tamed Isar after 1906  Vision Isar Plan 1995  Isar in Munich 2011
Dialogue during remodeling of the shore  1998  

Result 2011
Isar River Restoration in Munich city:

Still canalized river near the new willow island and Deutsches Museum

2011
The new nearly finished Isar River

Only the right side was modified with dynamic gravel shores

2011
Willow Island
In the city:

The left side remained canalized, the right side was remodeled. It animates to land art activities.
Picnic at the river is the new attraction
**Facts**

<table>
<thead>
<tr>
<th>From the idea</th>
<th>Isarplan Munich</th>
<th>Isar Mühltal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>8 kilometers</td>
<td>10 kilometers</td>
</tr>
<tr>
<td>Money</td>
<td>35 000 000 €</td>
<td>3 000 000 €</td>
</tr>
<tr>
<td>Old material</td>
<td>- 700 000 m³</td>
<td>old concrete was</td>
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<tr>
<td></td>
<td></td>
<td>shredded and added</td>
</tr>
<tr>
<td></td>
<td></td>
<td>again to the river</td>
</tr>
<tr>
<td>New stones</td>
<td>+ 385 000 t</td>
<td>recycling of old stones</td>
</tr>
<tr>
<td></td>
<td>urban measures, flood</td>
<td></td>
</tr>
<tr>
<td></td>
<td>protection, leisure, nature</td>
<td>no flood protection</td>
</tr>
</tbody>
</table>
The quality of restorations is dependant of scientific knowledge and the dialogue between all disciplines:

- Measures for flood management
- Water quality and sewage plants
- New habitats for animals and plants
- Water management (hydropower, flood, and dry periods)
- Gravel load and sediment management
- Reactivation of the connection of the river to the groundwater exchange
- Agriculture measures (avoiding fertilizers in the river)
- Leisure activities (area management, information, regulations)
- Urban biomanagement
- Urban rainwater management and retention
## Citizen Involvement

### Increasing level of public impact

- **Passive**
- **Active**

<table>
<thead>
<tr>
<th>Title</th>
<th>INFORM</th>
<th>CONSULT</th>
<th>INVOLVE</th>
<th>COLLABORATE</th>
<th>EMPOWER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PARTICIPATION GOAL</strong></td>
<td>To provide the public with objective information</td>
<td>To obtain public feedback</td>
<td>To work directly with the public throughout the process</td>
<td>To partner with the public in each aspect of the decision</td>
<td>To place final decision-making in the hands of the public</td>
</tr>
<tr>
<td><strong>ORGANIZED STAKE-HOLDER GROUPS</strong></td>
<td>■ Fact sheets ■ Newspaper articles ■ Web sites ■ Exhibition</td>
<td>■ Town meetings ■ Public comments</td>
<td>■ Panel of experts ■ Workshops</td>
<td>■ Competition for urban section ■ Mediation</td>
<td></td>
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<tr>
<td><strong>INDIVIDUAL CITIZENS</strong></td>
<td>■ Fact sheets ■ Newspaper articles ■ Web sites ■ Exhibition</td>
<td>■ Town meetings</td>
<td>■ (Panel of experts)</td>
<td></td>
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</tbody>
</table>
Gravelload
Near the source:

origin of gravel load

North Alps, Austria, Tyrol
Sylvenstein dam lake: end for the bedload

Bedload barrier 100 000 m³/a

Floodprotection

Hydropower

Water addition in dry periods (sewage plants)
Missing of bedload below the dam led to imbalance: Erosion of the river sole – the Isar River dropped between two and eight metres.

First photo: 1 kilometre down the Sylvenstein dam
Second photo: 35 kilometres down the Sylvenstein dam

The Isar River has dropped about 3 metres and is reduced to one gorge.
Third photo: 70 kilometres down the Sylvenstein dam the Isar River has dropped about 8 metres and is reduced to one gorge.

Isar in the north of Munich near Freising
45 kilometres down the Sylvenstein dam:

the barrage Ickinger Wehr locally prevents further dropping down in the upper course

near the barrage the river is technically formed like a canal

Isar river is a patchwork of canal and nature
Gravel load concept

Here the gravelload is transported by lorry

At other places at small dam lakes it is flushed down
Measures for gravel load transport
After a flood period the river shore is covered with new fine gravel from the Alps
Water quality

Landart
Usually bathing water quality after optimizing 27 sewage plants
Public Land art events at the new Isar river shores  Title: How to make the wind visible
People start to be creative at new river shores
A new step 2013

This Isar River tangential street for two weekends was modified to a boulevard for pedestrians
Urban sporting activities at the Isar River during a flood event
Urban sporting activities in a Isar side canal; during flood the water is grey
Thank You for your attention
Nico Döring, Die Umweltakademie München