

River Restoration in

Urban Areas

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Actually measures in urban areas are often sectoral, considering only one purpose like

- Flood protection
- City development
- Natural protection
- Recreation

=> Realized measures often are in conflict with other purposes



Example: Flood Protection



Disadvantage:

Small flood and rain water retention basin in the city of Dortmund

Advantage:

- technical building preventing the houses downstream from flooding
- lake as a water element in the city
- reduced water storing capacity
- lake isn't accessible (fenced to prevent children to fall into)
- due to dikes, the lake isn't visible
- interrupted continuum of the river
- 4 midge mass development

Concept of Urban River Planing







Example: Flood Protection

Water retention during rainfall

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Example: Impact - Flooding

Best Practice in large rivers

- => Measures in the river basin:
- activated floodplains
- reservoirs
- flood retention basin
- => Local in the city
- dams, dikes and floodwalls
- high flow rescue concepts



Example: Impact - Flooding

Best Practice in small rivers

=> Measures to reduce rainwater discharge

=> Measures in the river



Measures to reduce rainwater discharge

Example: Hoppegarten





Business Park: 100 ha Rainwater discharge up to 10 m³/s

Small brook as receiving water
=> Large retention volume would
be necessa Ry/ers for the Life of Towns 2007





Measures to reduce rainwater discharge





Measures in the River

=> rehabilitating urban rivers by combining the demands of the citizens:

- safeness (flood protection)
- discharging comfort (rain water management)
- liveable urban climate
- nice urban scenery, recreation

with

the ecological demands of the aquatic fauna and flora (=> EG WFD):

- liveable water quality and hydrology
- continuity of the river
- appropriate structures of stream bed and riparian zone



<u>But:</u>

- spatial limitations inhibit rivers to be restored to natural conditions
- the knowledge on morphological minimum requirements of the aquatic community to reach GES or GEP is rather poor.

Designing structures which are able to replace natural morphological conditions can help to improve the aquatic environment with its biological communities.



Hibernation

Signal for swarming

Shading

Summer habitat for insect adults Compensatory upstream flight

Hatching, Emergence Leaf litter input

Egg deposition



Man-made structures replacing natural morphological conditions: Bow-constructions at urban rivers with spatial limitation



Cross-sectiom



Top-view





Ruhrverband **Rehabilitated urban river**

Social aspects:

Optical impression



Access to the river granted 🙁





Rehabilitated urban river

Social aspects:

Parking place instead of pedestrian zone with view points



Access to the river without plattform, dangerous in flood situations





Rehabilitated urban river

Ecological aspects:

Maximum profile



Gravel banks at the base of the walls replacing the amphibian zone



Stream bed with natural substrates





Rehabilitated urban river

Ecological aspects:

Sealed wall instead of

Conclusion: The picture looks rather nice,

 but the rehabilitated river is not really visible for the citizen

<u>and</u>

 the river does not work as pretentious aquatic habitat



banks

Wrong substrate composition, not complying with the stream type





Man-made

struc	It is not so easy to restore urban
repla	rivers appropriately You have to
natu	oonsider the human demands
morp	
cond	but you also have to learn to
	look at your measures with the
	eyes of a fish or an aquatic
???	insect!





River Restoration in Urban Areas

Thank you for your attention!

