#### Isar-Plan Munich

# Possibilities and restrictions of river Restoration within urban areas

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Catchment area of the Upper Isar Average low water discharge Average medium discharge	2.814 40 90	km m³/sec m³/sec
Flood discharges: • 1940 (before the construction of Sylvenstein Reservoir) • 1999 (May) • One-year-flood • Average maximum dischage	1.440 870 350 420	m <sup>3</sup> /sec m <sup>3</sup> /sec m <sup>3</sup> /sec m <sup>3</sup> /sec
Design flood	1.100	m <sup>3</sup> /sec
Legally defined minimum discharge, which to has to remain in the parent stream while an ta amount of 70 to 80 m <sup>3</sup> /sec is diverted into the 6 km long power canal called "Werkkanal".	oday orget	5 m3/sec 12 m3/sec



Once there was a canalized water course . . .





### **Principal Aims and Measures**







#### **Flood Protection**

#### **River Restoration**

#### Recreation









#### River slopes . . .



# **River bottom ramps**





Gravel banks, riffles and pools
Natural river slopes
River bottom rock ramps / slides
Fish by-passes
New habitats for flora and fauna
Attractive recreation spaces for people

today there is a (restored) river



## **Measures in Detail**

- Raising and reinforcement of river dikes
- Removement of concrete embankments
- Widening of the river cross section
- Increase of capacity in river run off
- Natural river bottom rock ramps or slides with riffles and pools instead of linear low weirs
- Initialization of dynamic river bed processes, development of natural river structures
- Longitudinal river continuity in order to enable river organisms i.e. fish to wander stream upwards
- Establishment of typical river habitats

#### **Dynamic river bed processes**

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# Improving hygienic water quality to enable seasonal swimming



Reduction of bacterial loads by UV-radiation of sewage plant outflow





