



Restoration of rivers and floodplains in Bavaria

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ABSTRACT: The floods in 1999 and 2002 hit many countries in middle Europe and also parts of Bavaria. The state of Bavaria developed 2003 the "Action program 2020, flood control in Bavaria". The program covers

- natural flood retention
- technical flood protection (by dams, dikes, etc.)
- flood prevention (like flood warning, etc...).

The program will spend more than 2 billions € till 2020 to reduce the risks by flooding. An important part of the "action program 2020" is the natural flood retention. This includes

- (1) protection, sustainable development and / or restoration of rivers and streams where ever this is still possible today,
- (2) mapping of the flood endangered areas to inform the public via internet about the risks of flooding along rivers and streams and
- (3) the Bavarian alluvial flood plain program (Auenprogramm Bayern) to preserve or to restore the natural conditions of the flood plains as inundation areas, wherever this is possible.

KEYWORDS: river, floodplains, restoration, action program, flood control, Bavaria

River restoration program

Many rivers and streams were channelled in the past and floodplains were drained to improve shipping, agriculture and flood control for housing or industrial use. Rivers were dammed to win hydropower. They results today are straightened and dammed river systems. This changes of the river systems from natural systems to man made systems are documented in the "Gewässerstrukturkarte Deutschland 2001". The map is a result of a state wide monitoring of the hydromorphological structures of rivers. It shows that only 1/3 of the rivers are more or less still natural and for 2/3 are more or less channelled and need restoration. This is a job for the state of Bavaria, responsible for larger rivers and as well for the communities, responsible for the smaller rivers.

The river restoration program demands river restoration concepts for all sizes of rivers and streams to improve flood control, to protect and restore rivers and streams with their flood plains. The objectives of this restoration program is also covered by the European Water Framework Directive which demands: to reach the good ecological status for natural water bodies and the good ecological potential for artificial and heavily modified water bodies. Reference status for river restoration concepts is to reinstall the are natural hydromorphological processes like

- natural discharge (floods and low flow)
- migration of the river channel within the alluvial plain
- longitudinal and lateral connectivity of the river.

The steps for river restoration are

- (1) to review the status quo
- (2) to put up the reference conditions
- (3) to analyse the deficits
- (4) to plan the mitigating measurements
- (5) to discuss the plan concept with its mitigation measurements with stakeholders, nature conservation experts, etc... .
- (6) to do the restoration work.

In Bavaria there are various restoration projects and the way.

Two projects will be presented:

The Isarplan München

Within the city of Munich parts of the Isar are under restoration since 1998. The project which will be finished 2006, contains:

- (1) to improve flood control
- (2) to improve the ecological functions of the river
- (3) to improve recreation.

For this the river channel was widened, the banks and flood plains lowered and the dike system improved. For more information see www.wasserwirtschaftsamt-muenchen.de

Mittlere Isar between München and Landshut

In the beginning of the 20th Century the Isar was still a natural system with a braided riverbed within a wide alluvial forest. Water construction and the discharge of water from the river in a hydropower channel system reduced the value of this river section, compared to the reference status, the once braided system.

The water management office in Freising put up a project to improve the flood control along the Isar. Part of the project is to relocate the dikes and enlarge the existing floodplain of 1600 ha to 2600 ha. The widening of the flood corridor offers the changes to take out bank protection and allow again the migration of the river channel. This project will be done in the next 10 years, partly financed by the EU. The demands of flood control, to achieve a good ecological status and the demands of the European Network "Natura 2000" were carefully negotiated between the different groups of interest like nature conservation, forest, fishery, canoeing and others.

The new Isar will be not anymore the same like before 100 years. But it will be again a river showing its alpine character, hosting plants and animals like in earlier days and offers recreation facilities for the people living in the circle of Munich.

The main objectives of river restoration projects are giving space back to the river and changing the intensive use of the flood plain. For this it is necessary to find solutions with stakeholders, and all, interested in the future of their river. This needs a "new deal" for our river-landscapes.



Fig. 1: Isar – Reference status



Fig. 2: Isar before restoration in the city of Munich



Fig. 3: Isar after restoration in the city of Munich

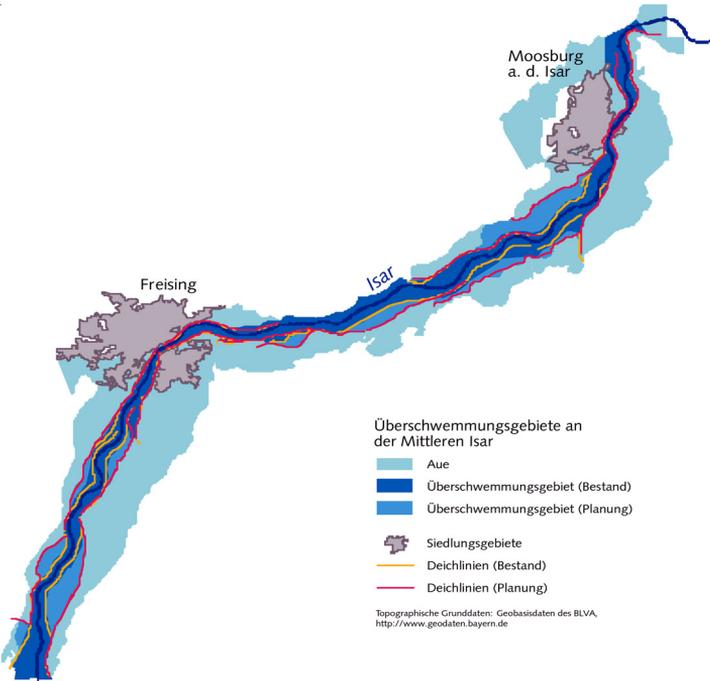


Fig. 4: Isar between Munich and Landshut – floodplains yesterday, today and tomorrow



Fig. 5: Isar-Restoration in progress after taking out the bank protection, near Freising

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