Flood protection combined with stream restoration in a complex context on the river Etsch (Italy)

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Introduction

- Project “Etschdialog” (2008-2010)
- Flood protection of Laas (2011-2013)
River Etsch – Reference condition

- Meandering course
- Presence of many alluvial forests
- Large and active floodplain

Historical map, 1820

Alluvial forest
River Etsch – Present state

- Single-thread, trapezoidal channel (after 1825)
- Alluvial forests disconnected from the river
- Hydroelectric exploitation

**CONSEQUENCE:** habitat degradation, poor biodiversity
Objectives of the project

- Flood protection of Laas (HQ100)
- Ecological improvement
- Enhancement of social usability

Alluvial forest

1983

1987
States of the river system

- Present condition
- Optimal condition (technically feasible)
- Reference condition
Optimal condition – Measures planned

- Reactivation of ancient river course
- River widening (L=2.2 km)
- Detention basin (V=350,000 m³)
- Protection measures
Main issues: limitations

- High groundwater level in the alluvial forest
- Site Natura 2000
- Economical use of the forest
- Fishing lakes with private rights
- Discontinuity of the ancient river course

Limited available volume for the detention basin

Unfeasible the reactivation of the ancient river course
Main issues: limitations

- Intensive land use
- Presence of water intakes

- Urbanisation in Laas
- Industrial activity

Limited extension of possible river widening

Reduced space for river banks adjustment
States of the river system

Present condition

Best achievable condition

Optimal condition (technically feasible)

Reference condition
Best achievable condition – Measures planned

- Detention basin ($V=110,000 \text{ m}^3$)
- River widening ($L=1 \text{ km}$)
- Protection measures
Compromises and technical solutions

- Detention basin \((V = 110,000 \text{m}^3)\)
  - adjustable weir to optimize the stored volume
  - pumps for periodical inundation

- Distributed widening of the river Etsch
  - 15m widening, \(L = 1\text{km}\)
  - placement of groynes and boulder clusters
  - restoration of hydromorphological units
  - reduction of hydropeaking consequences (stranding)
Compromises and technical solutions

• Protection measures in Laas
  – new walls and banks adjustment
  – water pumping installation on Eckbach
  – conservation of ecological hotspot

• Local measures
  – enlargement of existing pond
Conclusions

- Restoration projects conditioned by the complexity of the context
- Compromises necessary to reach concrete results
- Continuous cooperation of professionals – interdisciplinary team
- Fundamental communication to stakeholders (forums)
Thanks for your attention!

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