

Mitigation measures in relation to hydropower generation in the Danube basin

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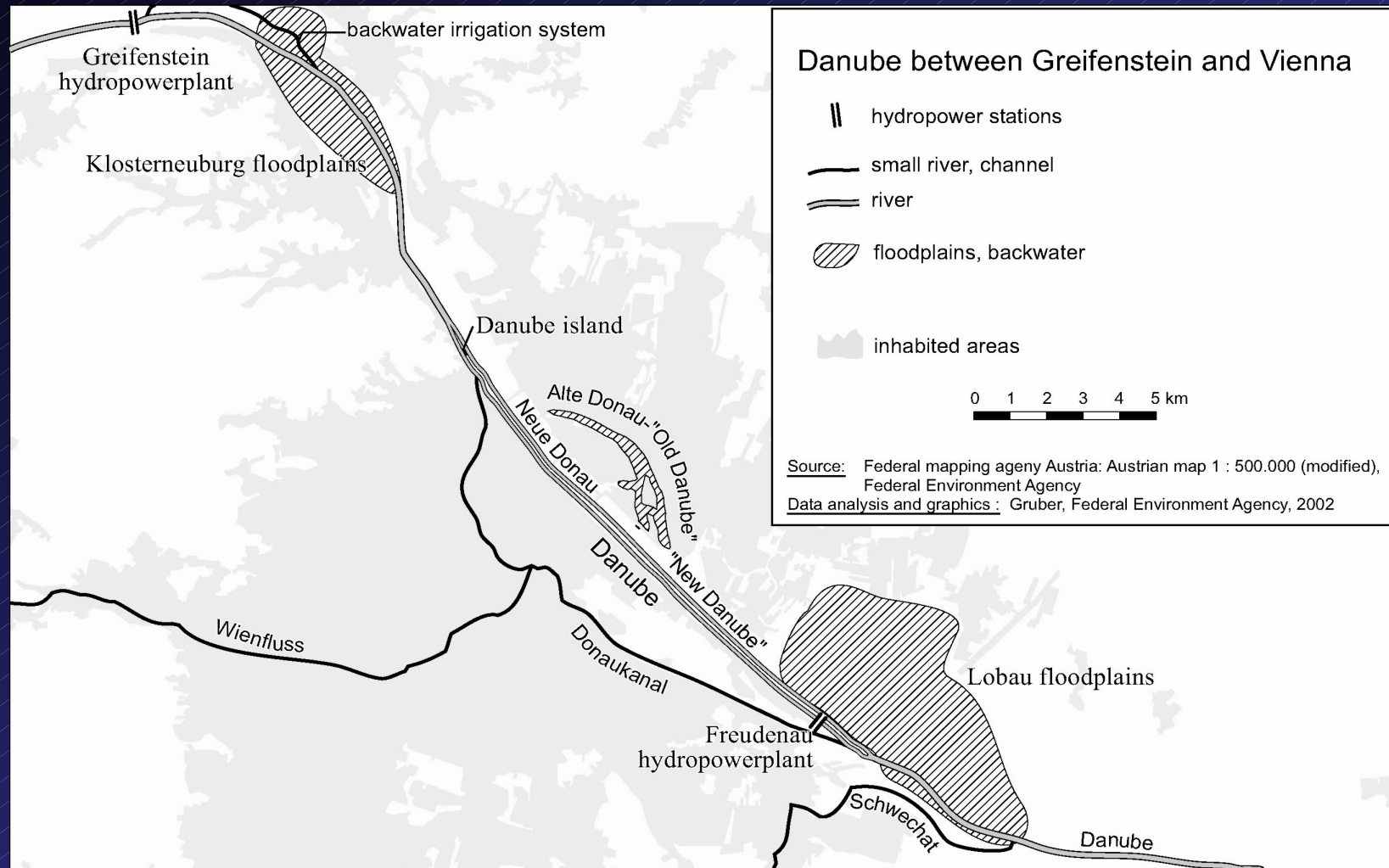
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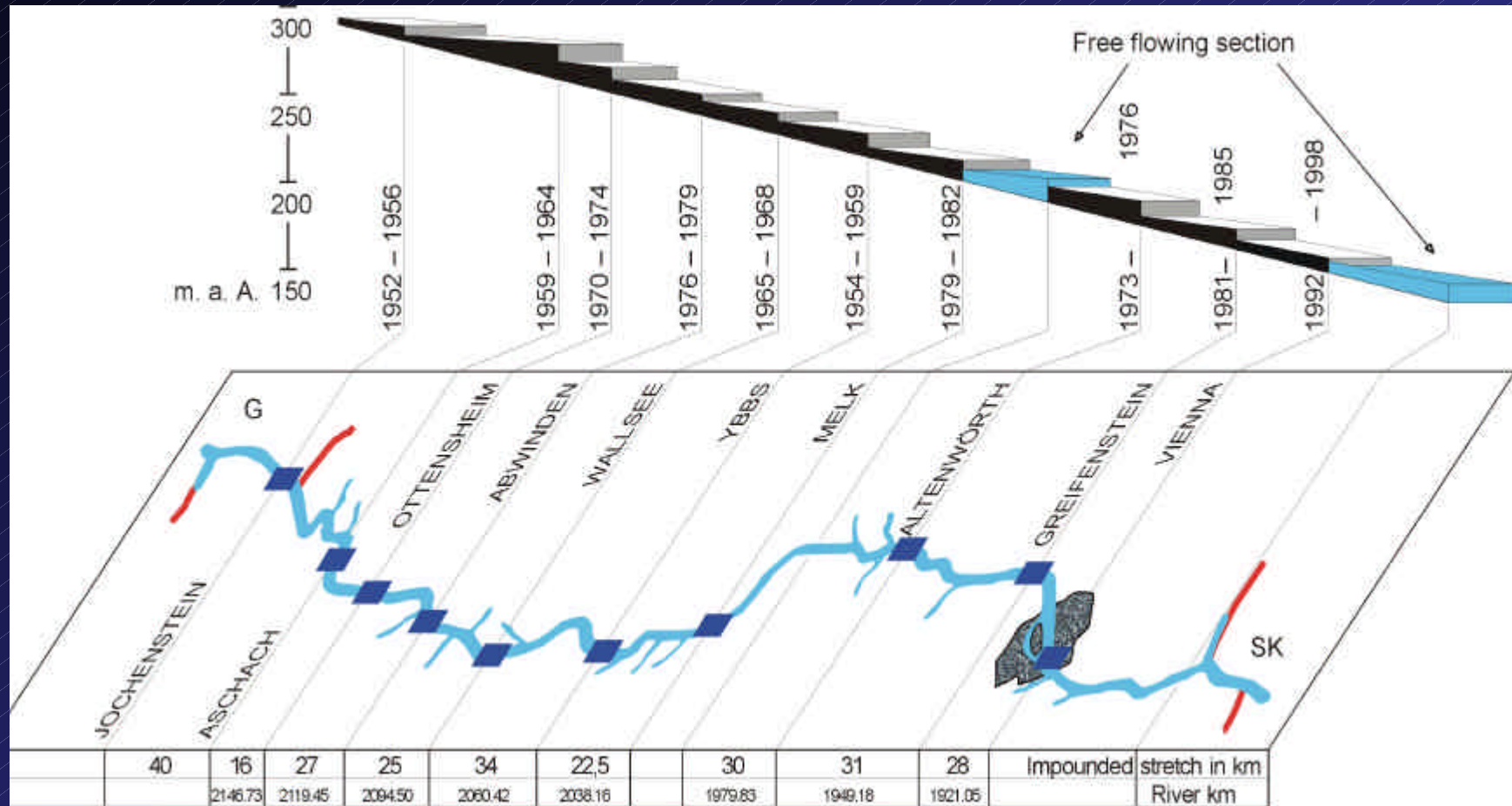
Case study Danube



Study area



Impoundments at the Danube in Austria



Pressures and uses

- Hydropower generation
- Flood protection
- Navigation
- Urbanisation



Hydropower Plant Freudenuau

Main physical alterations

- Change in river profile
- Disruption of the river continuum
- Disruption of the sediment transport
- Channelisation / longitudinal straightening
- Bank reinforcement
- Detach ox-bow lakes / wetlands

Resulting effects Danube

Changes of the hydromorphological characteristics

- Reduced fluvial dynamics
- Reduced longitudinal and lateral connectivity
- Large deviation from a type-specific reference condition

Measures

- Backwater irrigation system
- Artificial shoreline structures in the impounded area
- Gravel bank structuring
- Fish bypass



Ecological status

Assessment results

- Significant changes in the composition and abundance of the invertebrate coenosis
- Loss of type-specific fish species and significant changes of the rheophilic fish community – “Potamalisation”

Ecological assessment of the Danube between Greifenstein and Freudenau

MZB

3

Odonata

3

Fishfauna

3

Ecological status

3 - moderate

Mitigation measures

- Creating dynamic floodplains along the upper most, free flowing section of the impoundment
- Reconstructing the mouth of the irrigation system into the Danube
- Re-establishment of longitudinal and lateral connectivity

Mitigation measures

Good ecological potential has widely been achieved due to:

- Creation of dynamic gravel bars and sand habitats in the upper most part of the impoundment
- Connections to riparian floodplains and lateral water bodies

Mitigation measures

Good ecological potential has widely been achieved due to:

- Structuring of the impoundment with riparian side arms and bay
- Establishment of a fish bypass

Mitigation measures - questions

- Chain of hydropower plants – continuum for all of them?
- No salmon and eel migration in the Austrian Danube
- Impact of hydromorphological changes on biology