Workshop Hydropower and Fish
Existing hydropower facilities: Strategic planning for ecological restoration

Verbund Hydro Power GmbH,
Gerd Frik, Brussels, 30.05.2017
Energy production and environmental protection

- VERBUND target is on sustainable energy production (water: 127 HPP, wind)
- 30% of the HPP sites have been nominated nature conservation areas following construction of the power plant.
- Main focus is on the improvement of the (fish-) ecological conditions at the Hydro Power Plants (Donau, Inn, Salzach, Enns, Mur, Drau)
  - Structure of the rivers: MQ 100m³/s (Mur) – 2000m³/s (Donau)
  - width between 35 and 300 m
- Goal: good ecological potential at all run of river HPP's
- A detailed timeframe has been established between the Ministry, the regional governments, the electricity companies and other stakeholders along rivers
- Work is ongoing since 2005 (years before begin of 1. national water management plan).
Approach

- It became clear that for many water bodies fish passage “per se” is insufficient to achieve the ultimate goal of the “good ecological status” or “good ecological potential” required by the Water Framework Directive (WFD).
- One possibility to combine the goals of connectivity and habitat improvement are large nature-like fish passes. Such measures may be narrowed by space limitation or dam height.
- In order to achieve the objectives the improvement of aquatic habitat conditions is required to increase the fish biomass and diversity considerably.
- One of the key habitat types are permanently connected side arms providing spawning grounds and shelter from ship-induced waves along the river Danube.
- It is also important to co-ordinate all actions with the different types of usage of the Danube (energy, navigation, flood protection...) and the responsible stake holders. This successful approach will also be taken in the future.
- The strategy of VERBUND regarding the requirements of the EU-WFD and the NGP is a systematic approach which prioritizes the creation and connection of habitats before the implementation of pure fish passage.
Fish passage facilities – status of implementation

- implemented (48)
- under construction (6)
- in planning stage (19)
- pending (14)
Fishway Type

- predominantly nature like
- predominantly technical solution

Wherever possible nature like fish passes have been implemented

Limitations: space, dam height
Example nature like fishway – Ottensheim-Wilhering Danube

Heavily modified stretch at the power plant „Ottensheim-Wilhering“
Example nature like fishway – Ottensheim-Wilhering
Danube

Moderate ecological status

Bad ecological status

15 km

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Example nature like fishway – Ottensheim-Wilhering Danube

- app. 14 km nature-like fish way
- Usage of natural water bodies
- Restauration measures in the water body
- Habitat improvement & creation
- Increased connectivity (lateral & longitudinal)
Example nature like fishway – Ottensheim-Wilhering Danube

Detail of the mouth of the fishway to ensure fish migration – expected development
A large number of juvenile autochthonous Danube percids (Zingel, Striped Ruffe) entered the Danube in autumn 2016.
Example Traisen River

Challenge
- Chanellized river
- MQ 25 m³s⁻¹
- Poor ecological status
- Eight impassable obstacles
- Hindering access to spawing grounds
Solution:
- Generous restauration measures
  (>>Nature like fish pass)
  - 10 km new river bed
Example Traisen River

Solution:
- Generous restauration measures
  (>>Nature like fish pass)
  - 10 km new river bed
  - re-contouring the accompanying wetlands
Expected results:
- Longitudinal connectivity
- Improved lateral connectivity
- Habitat for rheophilic species
- Pioneer stages
- Softwood forest

-> New Habitats of the EU habitat directive
Example Traisen River
Example Traisen River
Example Traisen River

- Warfare agent - EIA 2011: bomb craters known
- Unexpected findings of warfare agents due to heavy ground combat
- Additional costs of 1,65 Mio €
Example Traisen - Monitoring results

- Quick reaction of the fish community
- Increased biomass
- Habitat for rheophilic species
- Promote a “Leitbild”-like community
Example Traisen - Monitoring results

Natural rejuvenation in re-contoured wetlands
New Habitats of the EU habitat directive - Softwood forest

White willow (Salix alba)  Black poplar (Populus nigra)
Existing hydropower facilities:
Strategic planning for ecological restoration
Experiences and Challenges

• In most water bodies Fish Passage alone is insufficient to achieve the good ecological status or potential

• Where possible, the design of fish passage facilities should include other elements such as large scale connectivity measures and habitat improvements/creation

• First results are promising: even small scale “nature like” fish ways are used as spawning habitat. Monitoring results enhance knowledge of river ecology.

• Integrative planning should including all stakeholders (local authorities, fisheries science, fishery, navigation authorities, innovative planners) → this is not a match simply between Hydro Power and NGO’s

• Land availability to realize habitat creation or large scale connectivity measures

• Going public

• Further financial funding is necessary

• Good solutions need time
  • Especially “difficult sites”
  • Learning from implemented measures (monitoring)
  • Development of new solutions
Experiences and Challenges, EIA, Natura2000, Forestry law

- **Extensive approval process under the EIA Act**
  - Increased and expensive efforts during project preparation
  - Example Traisen: Time required for EIA preparations and EIA procedures > 2 years, additional costs app. 1.2 Mio € for environmental measures

- **Natura 2000**: Degree of significance assessment obligatory
  - Also for measures which are proposed in the Natura 2000 management plans
  - The legal requirement to minimize impact may lead to sub-optimal restoration projects

- **Forestry laws**
  - Minimizing impacts on forestry often contradicts optimal ecological solutions

- **Best practical environmental option instead of overregulation** -> listen to the Stake Holders

- **Dialogue with ministry and federal government**: Establishing a basis of confidence leads to a climate of highly constructive dialogue with optimised ecological solutions without neglecting economic limits
Status of current mitigation measures in Austria

The National Water Management Plan 2009
Implemented Measures of Austrian Hydropower

Existing hydropower facilities:
Strategic planning for ecological restoration

Number of Measures: 133
Continuity: 68%
Morphology: 19%
Residual Water: 13%
Total Investment: 189.469.497 €
Total Subsidies: 37.801.790 €
Costs of Monitoring: 10.104.621 €
Annual Operating Costs: 1.059.160 € per anno
Annual Energy Losses: 160.209 MWh/a
Additional CO² (CCTG): 16.021 to CO²/a

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Thank You for your attention