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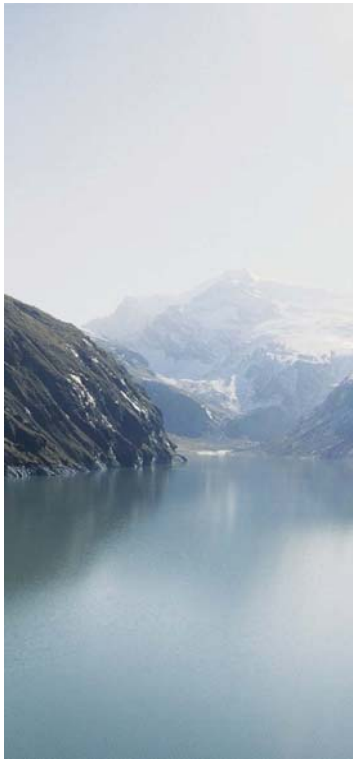
Workshop Hydropower and Fish

Existing hydropower facilities: Strategic planning for ecological restoration



Verbund Hydro Power Gmbh,
Gerd Frik, Brussels, 30.05.2017

Energy production and environmental protection

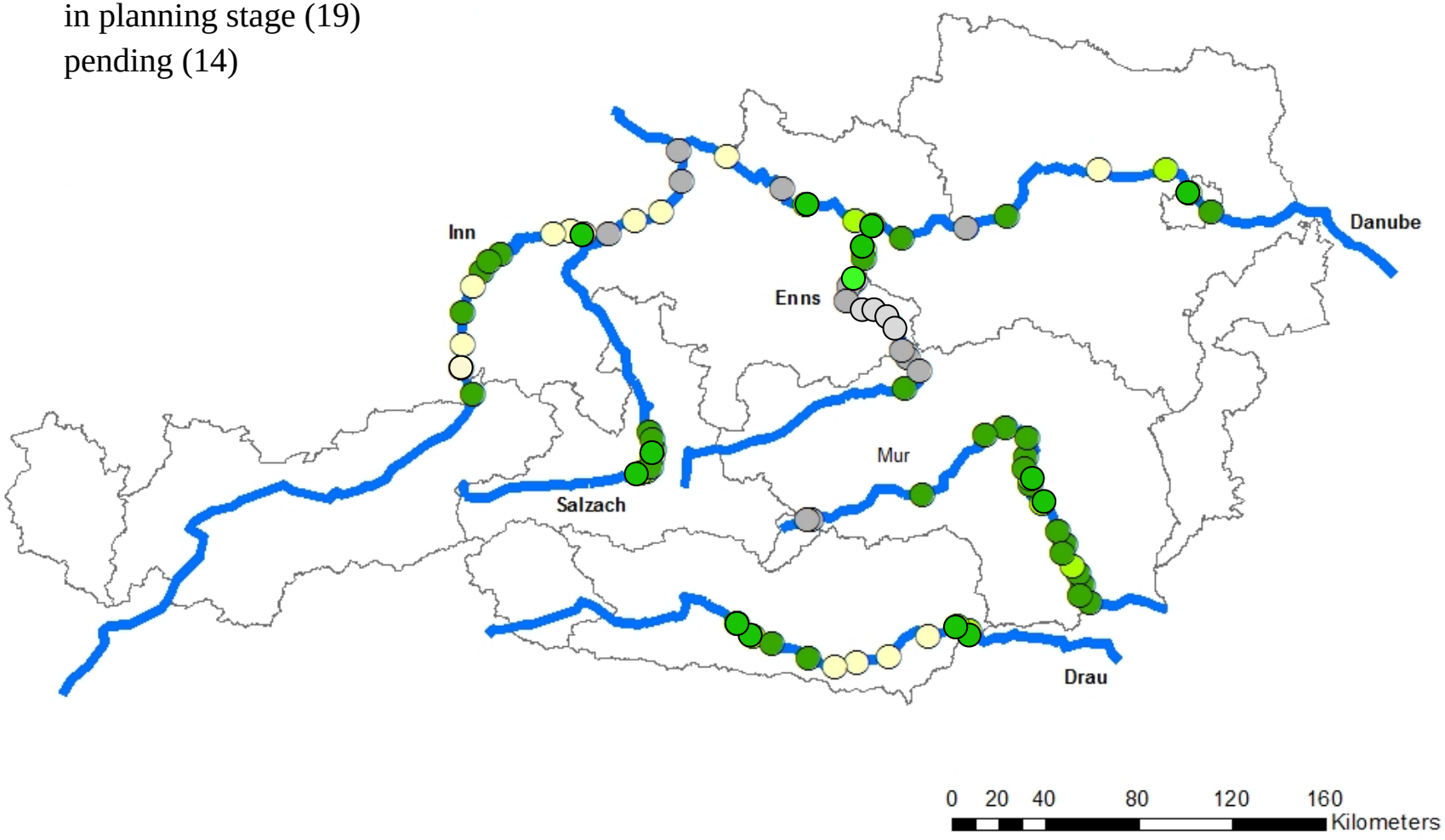
- VERBUND target is on sustainable energy production (water:127 HPP, wind)
- 30% of the HPP sites have been nominated nature conservation areas following construction of the power plant.
- Main focus is on the improvement of the (fish-) ecological conditions at the Hydro Power Plants (Donau, Inn, Salzach, 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.

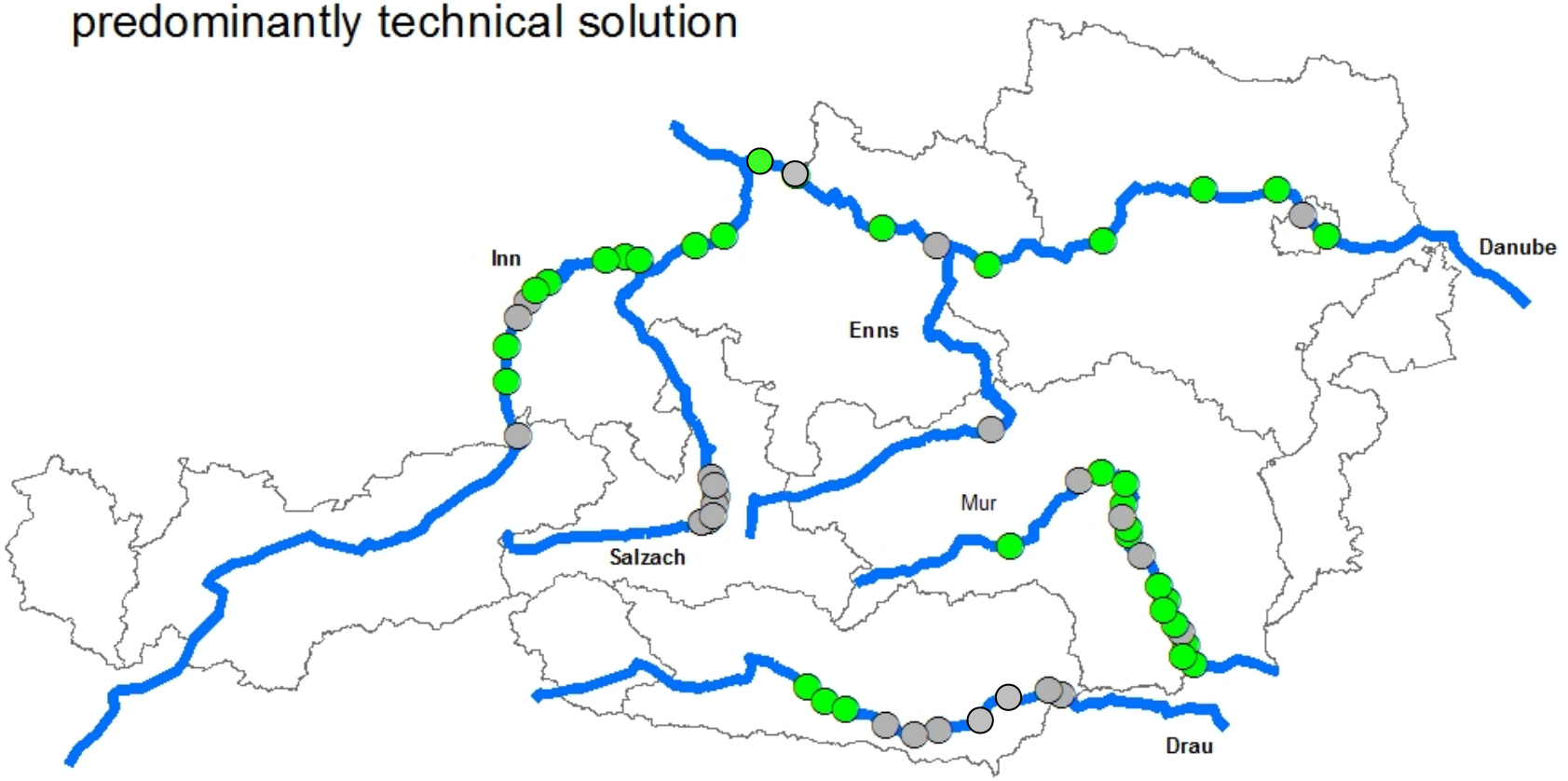
Fish passage facilities – status of implementation

- 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

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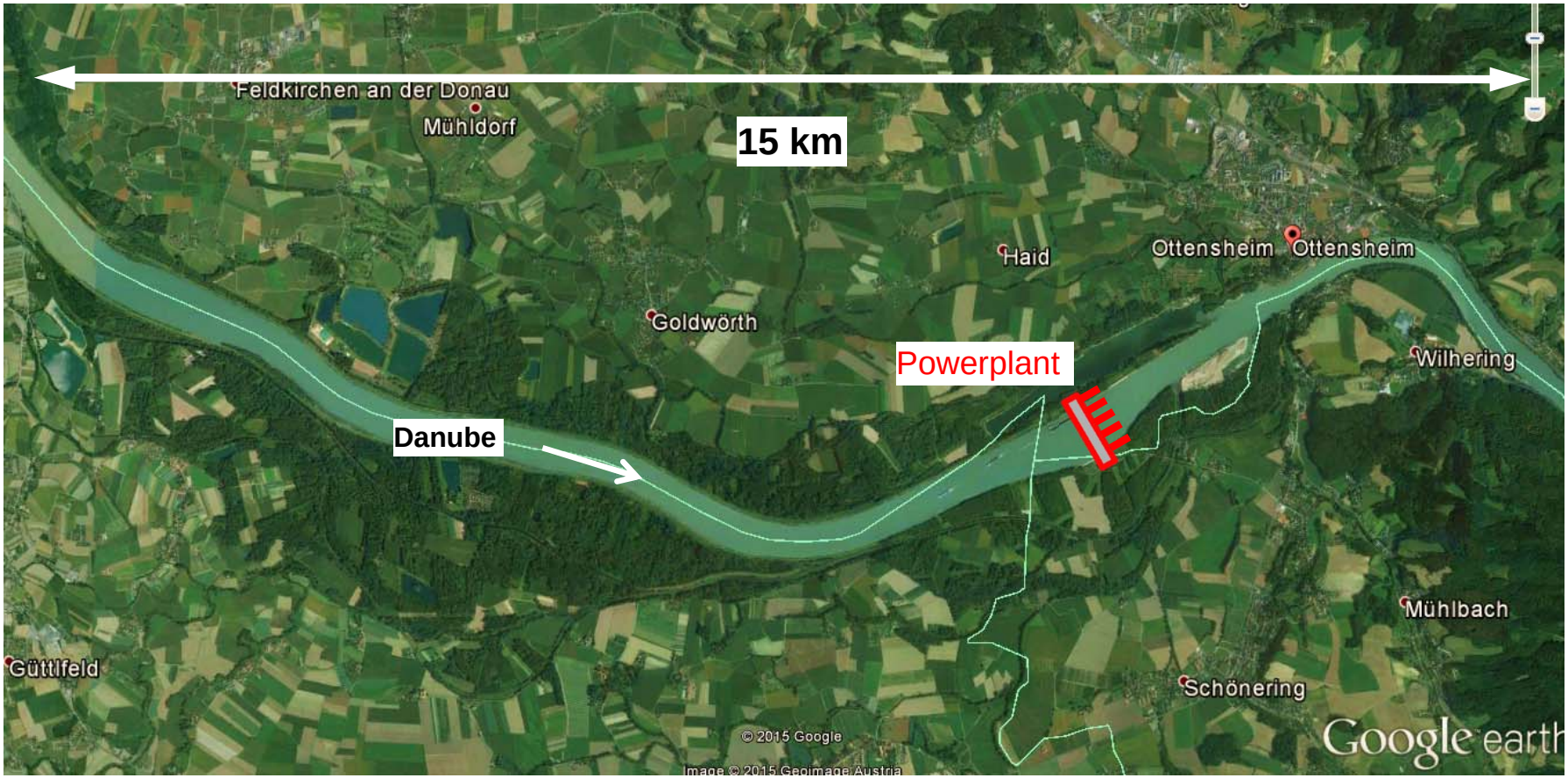
Example nature like fishway – Ottensheim-Wilhering Danube



Heavily modified stretch at the power plant „Ottensheim-Wilhering“

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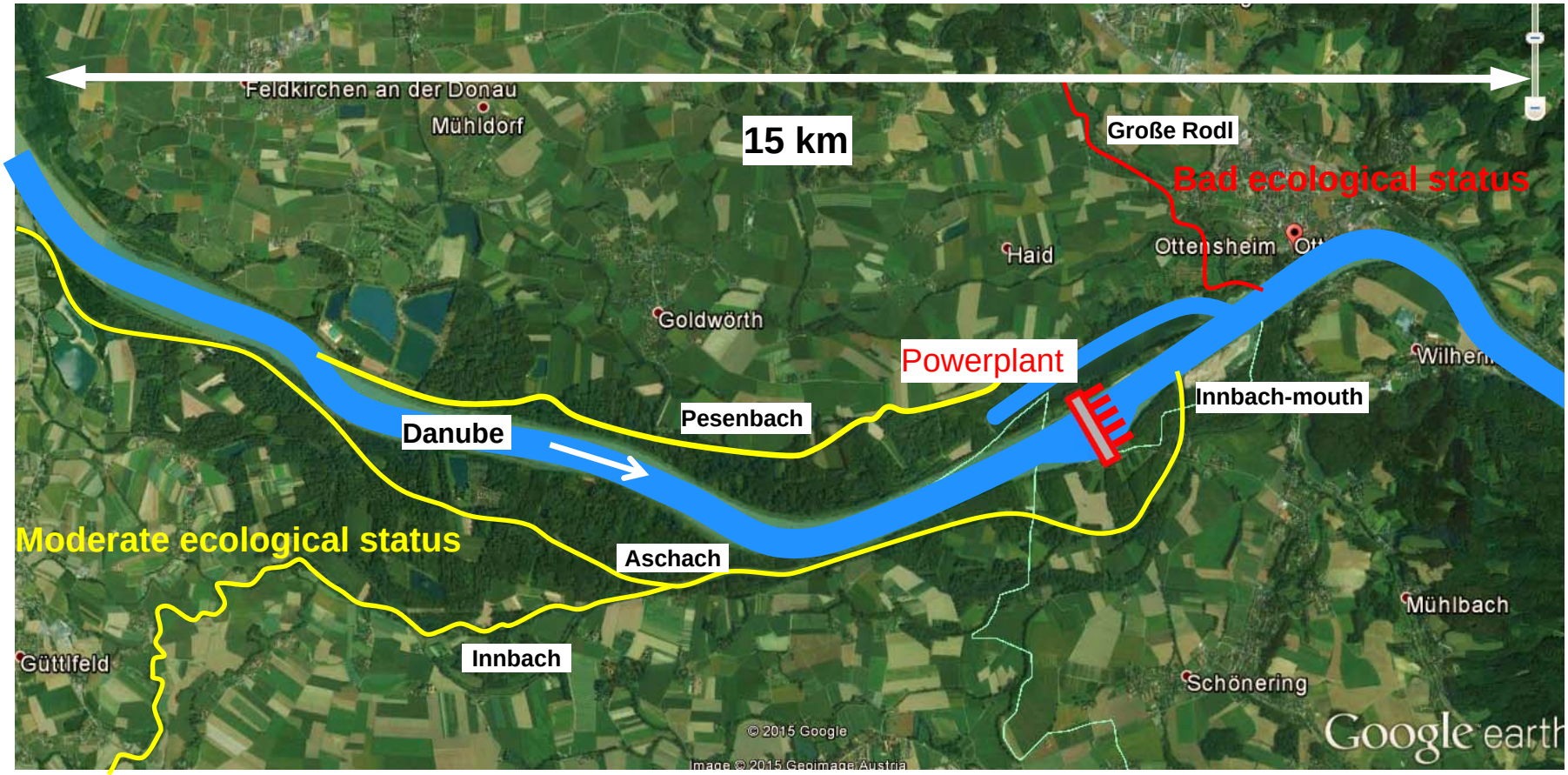
Example nature like fishway – Ottensheim-Wilhering Danube



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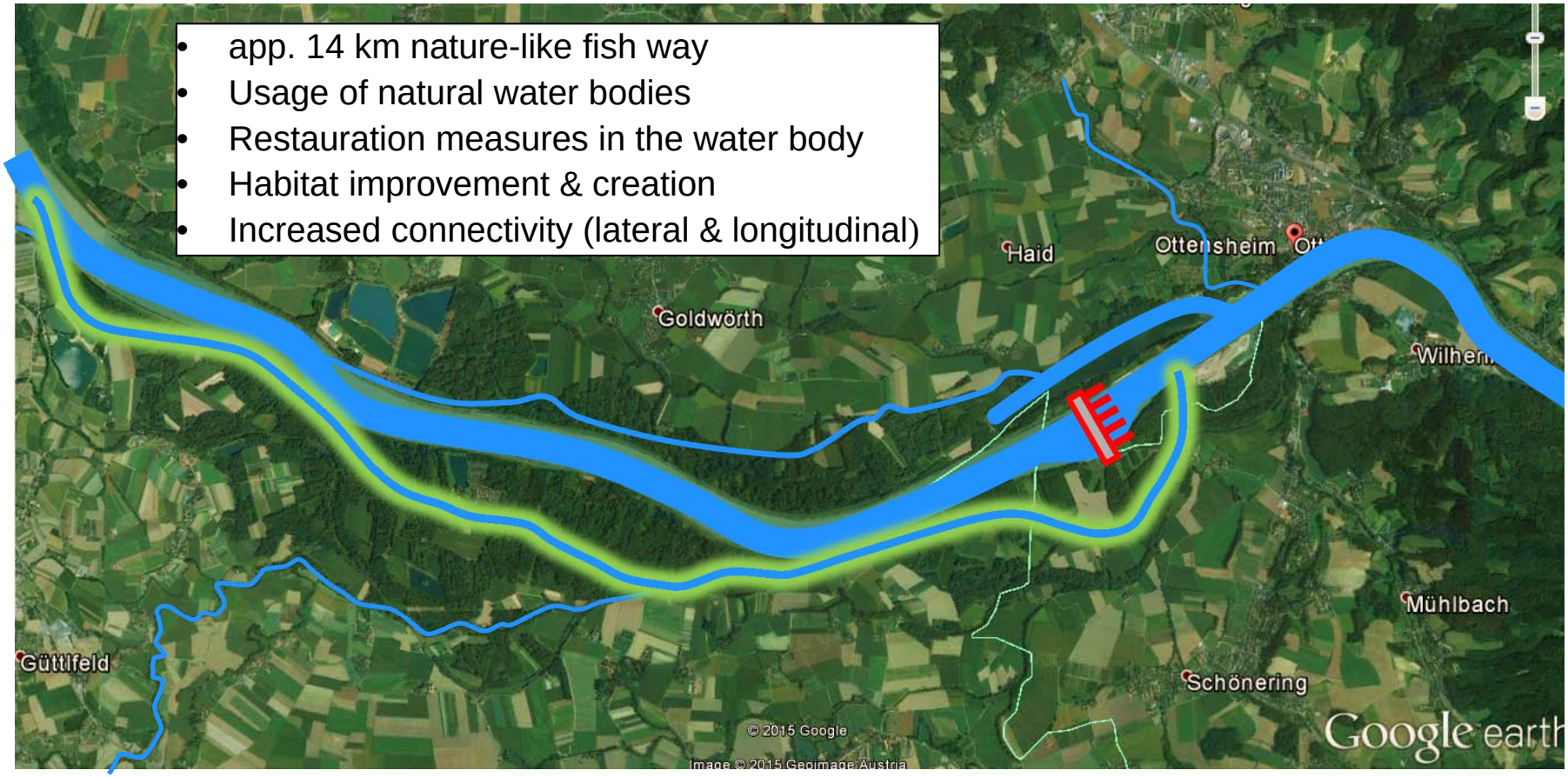

FMF Ottensheim-Wilhering

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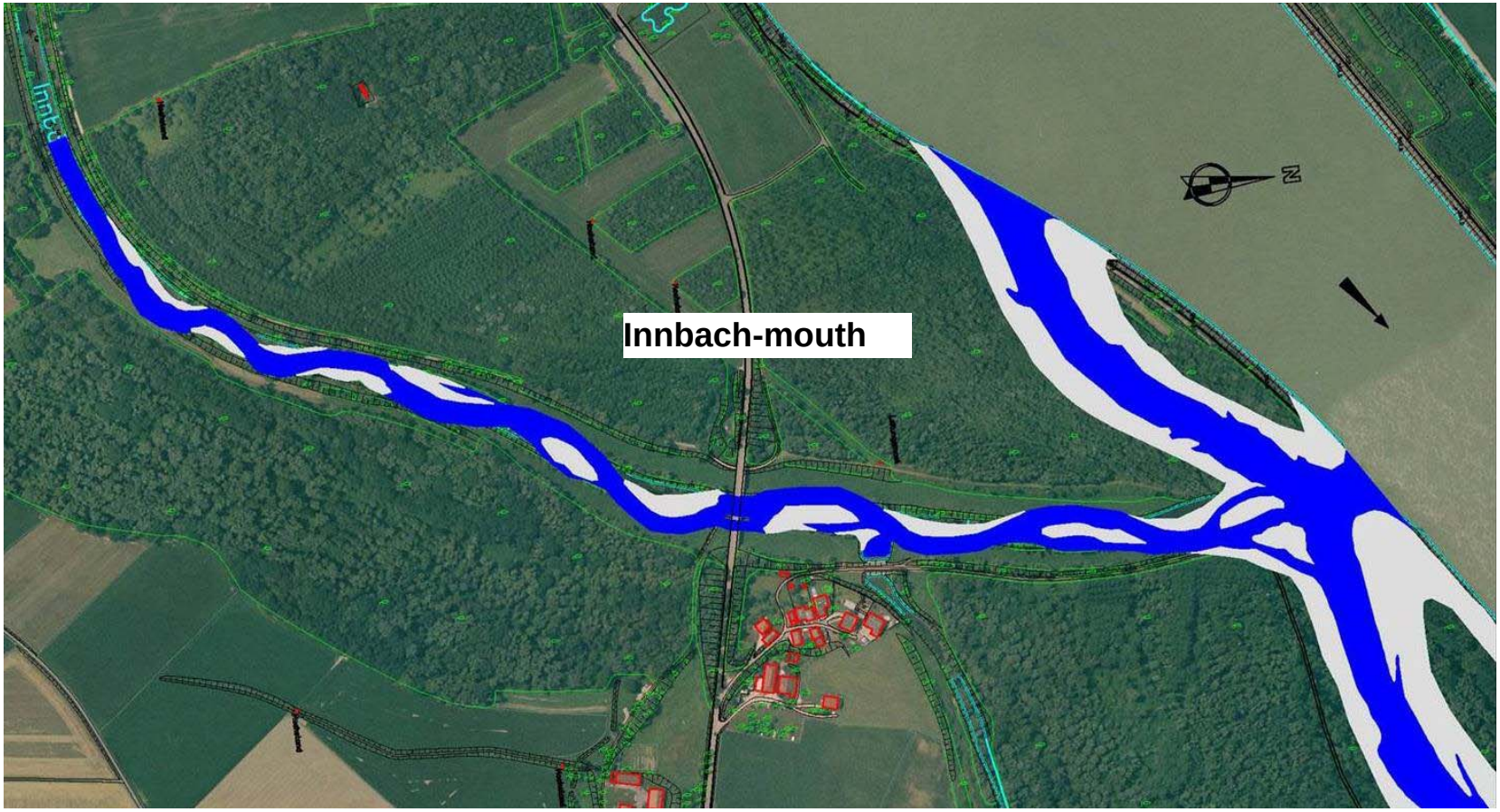
Example nature like fishway – Ottensheim-Wilhering Danube

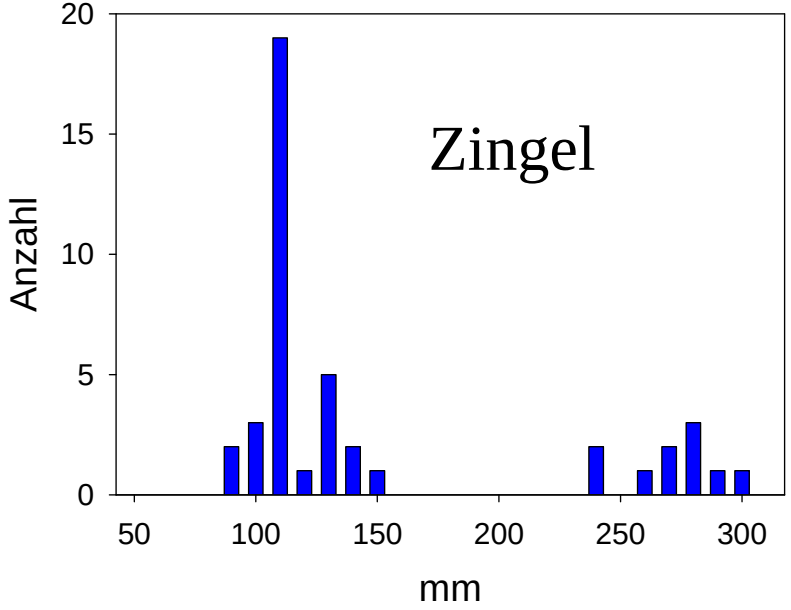


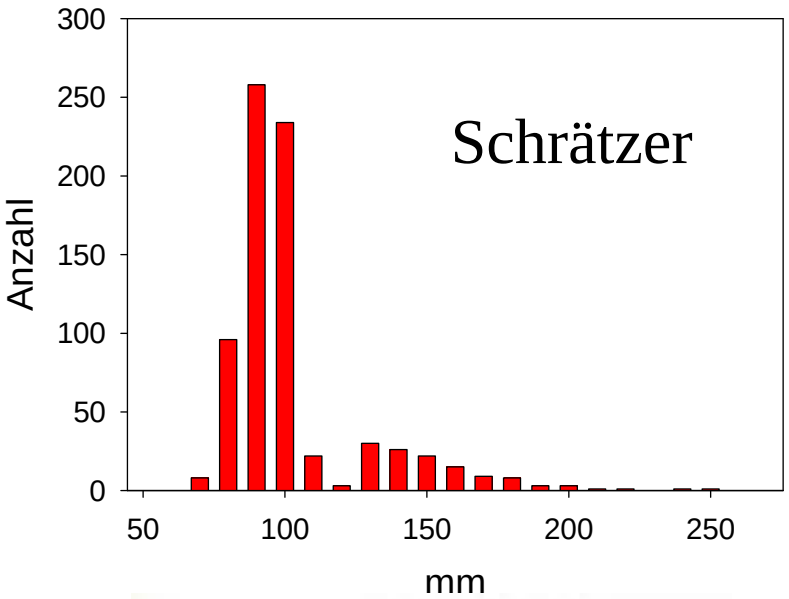
Detail of the mouth of the fishway to ensure fish migration – expected development

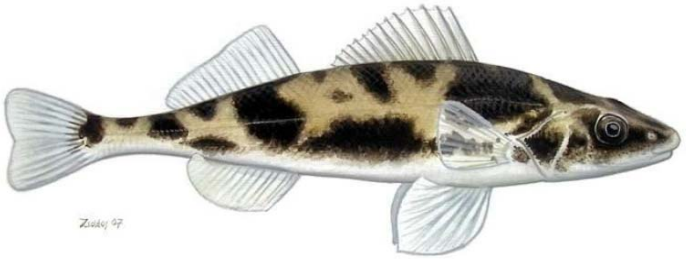
FMF Ottensheim-Wilhering

FMF Ottensheim-Wilhering – first results

A large number of juvenile autochthonous Danube percids (Zingel, Striped Ruffe) entered the Danube in autumn 2016







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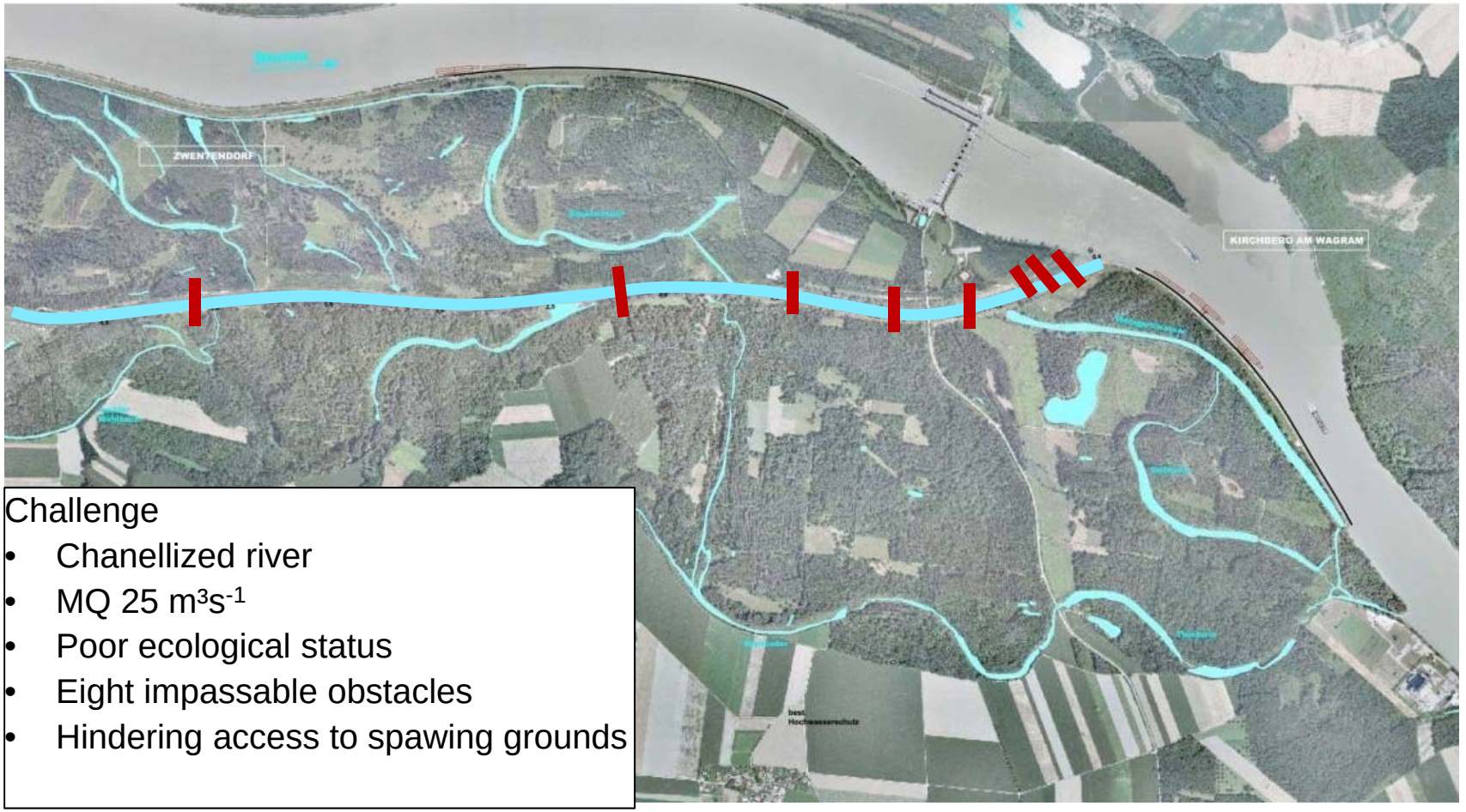
Example Traisen River



Challenge

- Chanellized river
- MQ 25 m^3s^{-1}
- Poor ecological status
- Eight impassable obstacles
- Hindering access to spawing grounds

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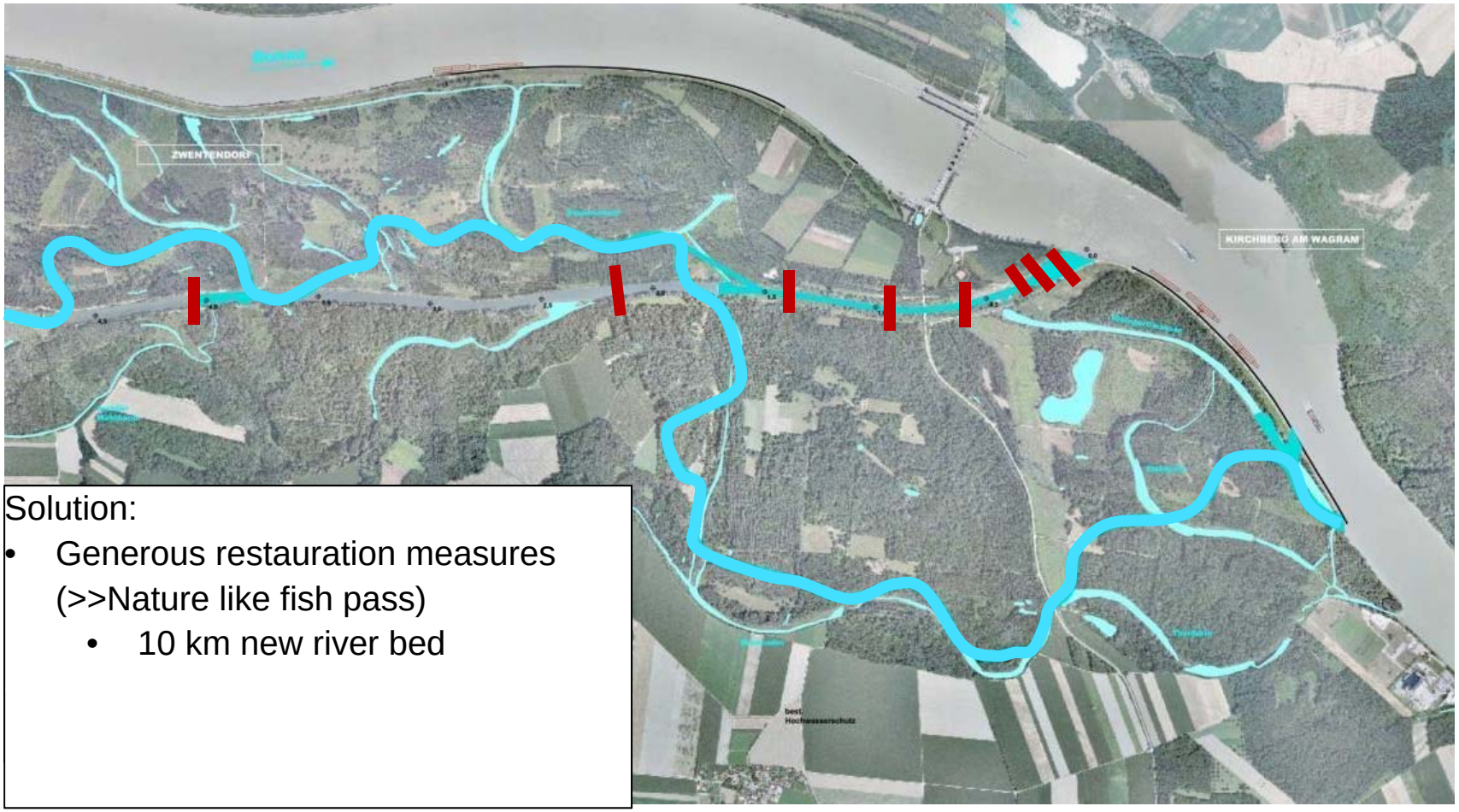
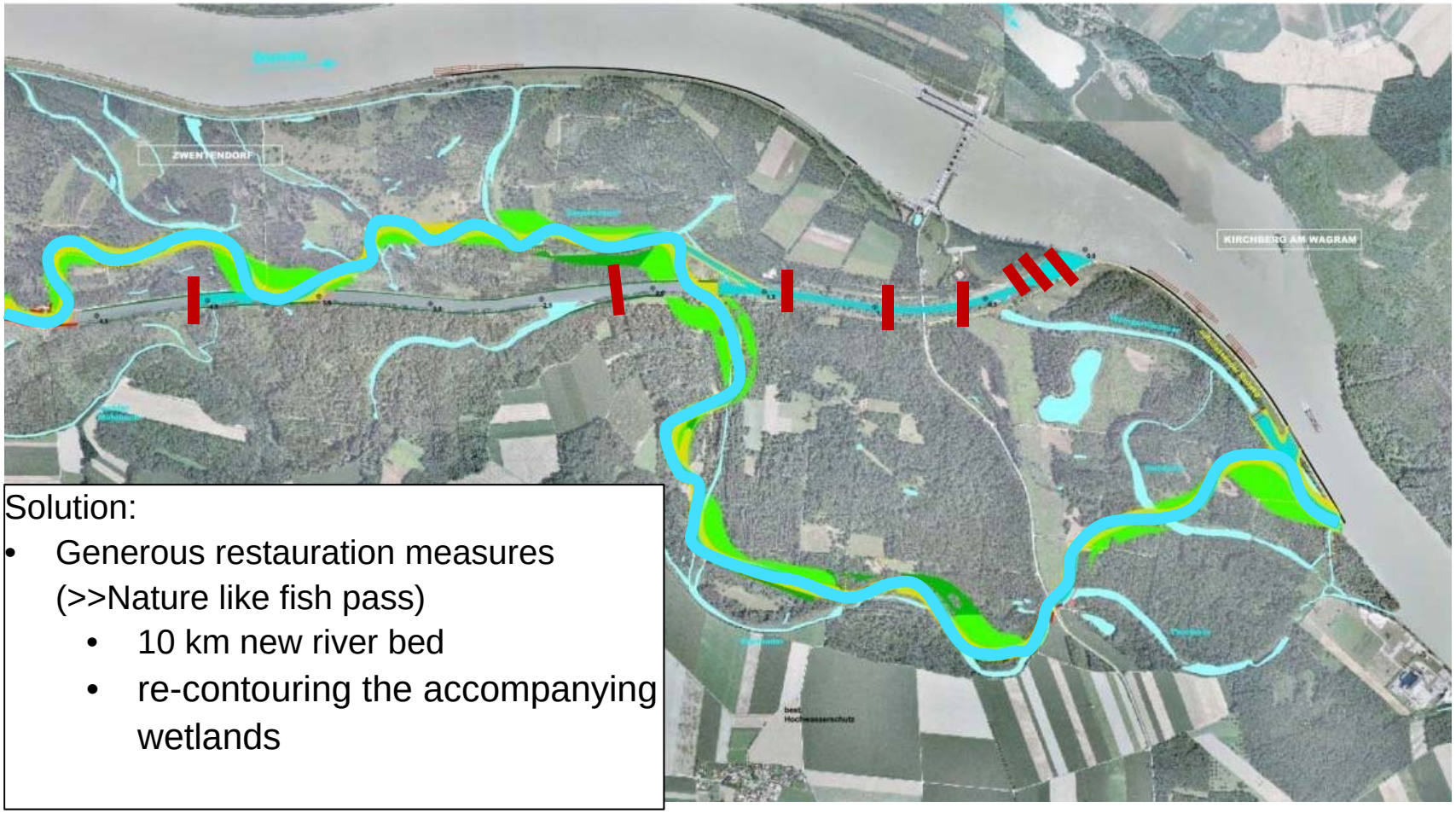
Example Traisen River



Solution:

- Generous restauration measures (>>Nature like fish pass)
  - 10 km new river bed

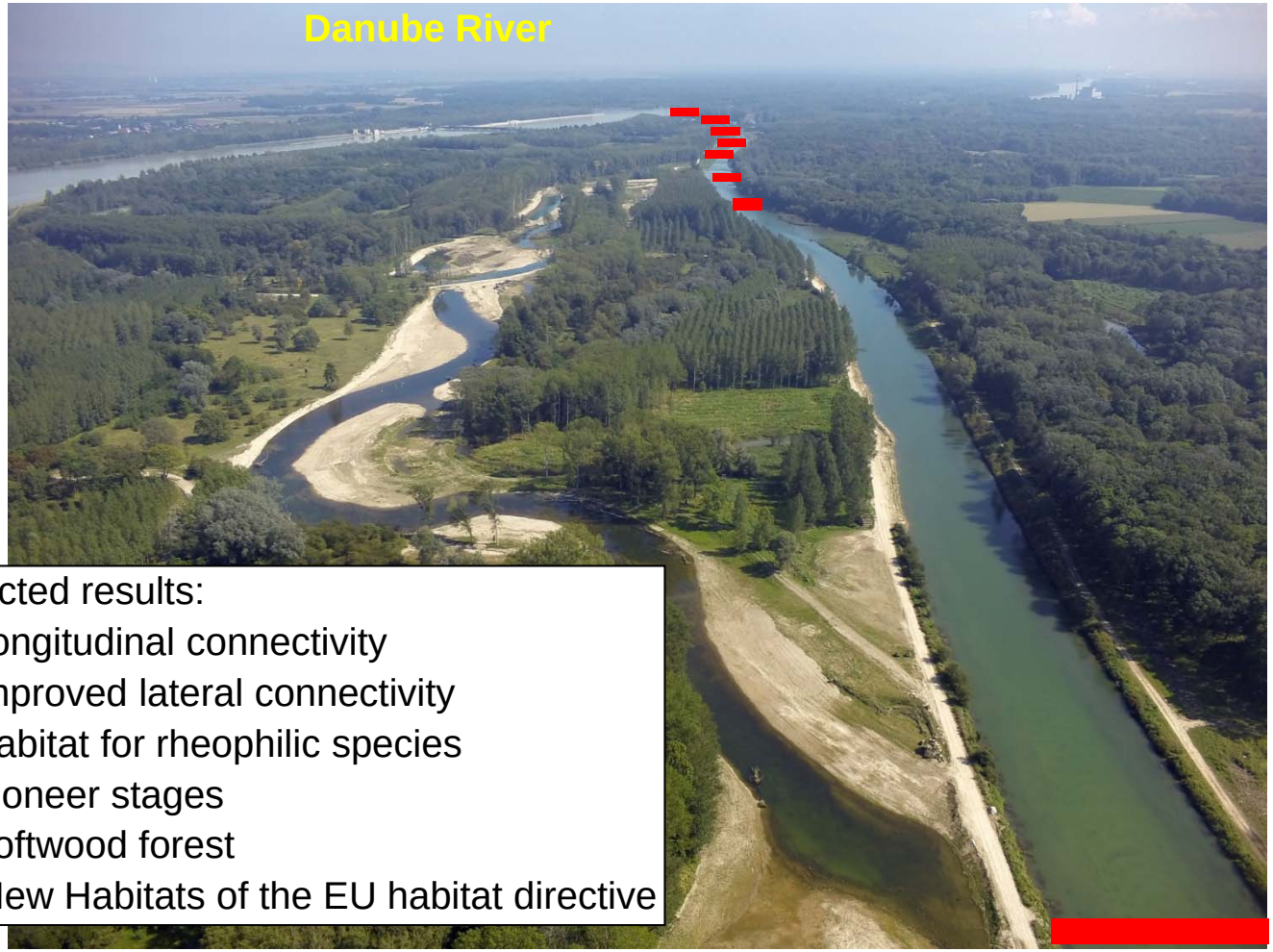
Example Traisen River



Solution:

- Generous restauration measures (>>Nature like fish pass)
  - 10 km new river bed
  - re-contouring the accompanying wetlands

Example Traisen River



Expected results:

- Longitudinal connectivity
- Improved lateral connectivity
- Habitat for rheophilic species
- Pioneer stages
- Softwood forest

-> New Habitats of the EU habitat directive

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Example Traisen River

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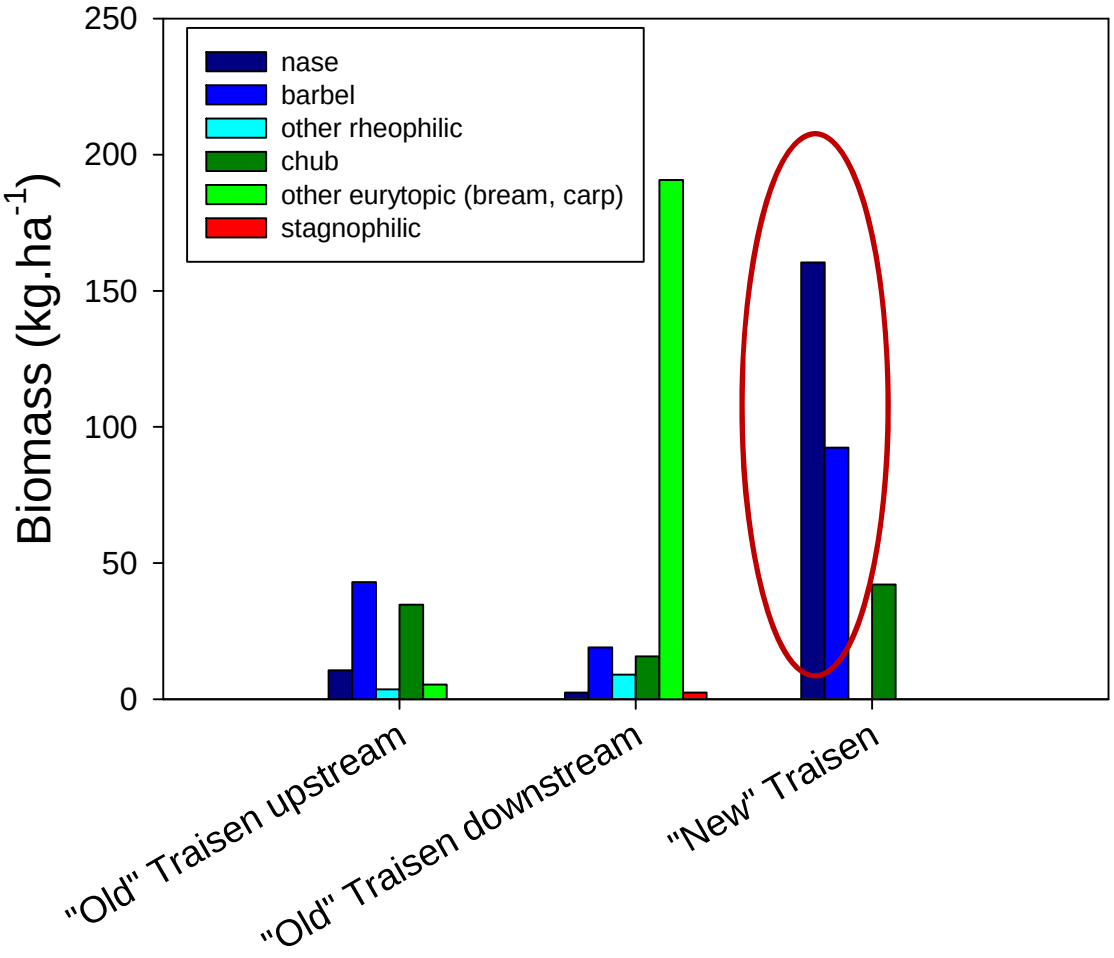
Example Traisen River

Example Traisen River

- Warfare agent - EIA 2011: bomb craters known
- Unexected 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)

Partners

NÖ LANDES FISCHEREI VERBAND

lebensministerium.at

netzwerk donau

Life

NATURA 2000

SCHLOSS GRAFENEGG FORST VERWALTUNG

wasser niederösterreich
WA3 Wasserbau

Traismauer

viadonau

alg-t

niederösterreich naturschutz

DONAU CONSULT ZOTTL & ERBER
Ziviltechnikergesellschaft m. b. H.

BOKU
Universität für Bodenkultur Wien
Department für Wasser-Atmosphäre-Umwelt

I.H.G

ezb
TB Eberstaller

DER LANDSCHAFTSFONDS

Bauer Kaufmann freiwasser

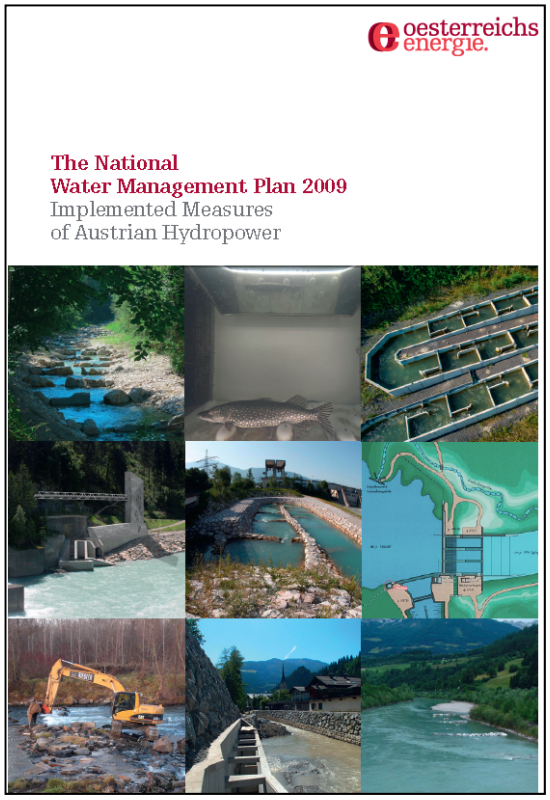
Experiences and Challenges

- 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 includ**e 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 stake holders** (local authorities, fisheries science, fishery, navigation authorities, innovative planners) –> this is not a match simply between Hydro Power and NGO’s
- **Land availibility** 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

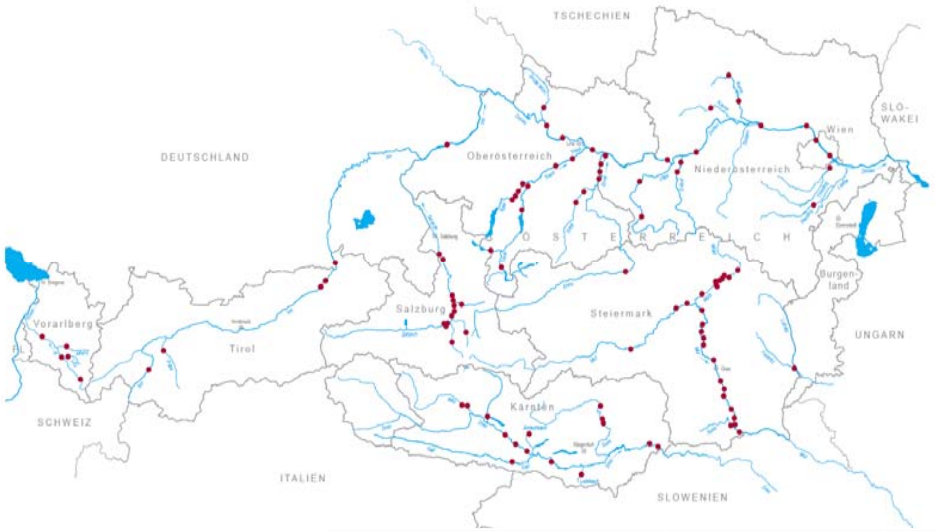
Experiences and Challenges, EIA, Natura2000, Forestry law

- **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 optimated ecological solutions without neglecting economic limits

Status of current mitigation measures in Austria



www,oesterreichsenergie.at



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 OperatingCosts	1.059.160 €	per anno
Annual Energy Losses	160.209	MWh/a
Additional CO^2 (CCTG)	16.021	to CO^2/a

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Thank You for your attention