

Nature-based solutions for fishways

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Session A5 – Large scale fish passage solutions

Verbund

- Fish bypasses at VERBUND HPPs
- Idea behind nature based solutions (NbS)
- Best practise, LIFE success stories
- Fish monitoring
- Take home messages

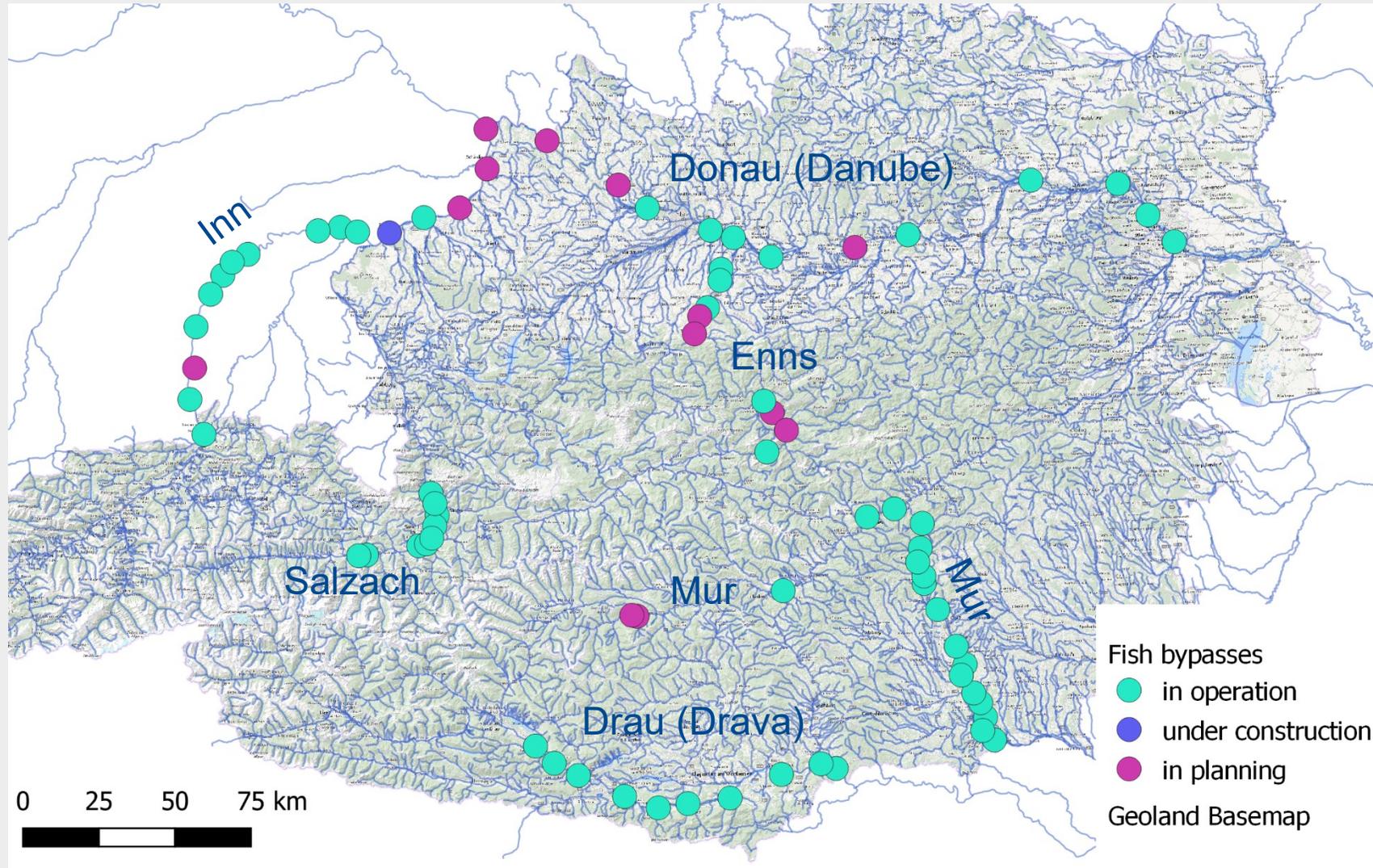
VERBUND Hydro Power

Leading energy company in Austria

One of the largest generators of electricity from hydropower
in Bavaria

- 130 hydropower plants in Austria and Bavaria
- Installed capacity: over 8,300 MW
- Generation from hydropower 2023: 30,509 GWh

HPP fish bypasses – status quo



Nature based solutions NbS

Nature based Solutions

- Special, sustainable combination of renaturation measures
- Reconciling flood protection, ecology, socio economy
- Reconciling interests of different stakeholders
- Impact not only on fish, but also on terrestrial life

- Example: fish bypasses are used in both directions when designed as a key habitat – such a bypass indirectly strengthens not only the fish population, but also birds, insects and mammals.

Important requirements:

- Flexible interpretation of guidelines
- Availability of land
- Funding

Fish bypasses and LIFE success stories

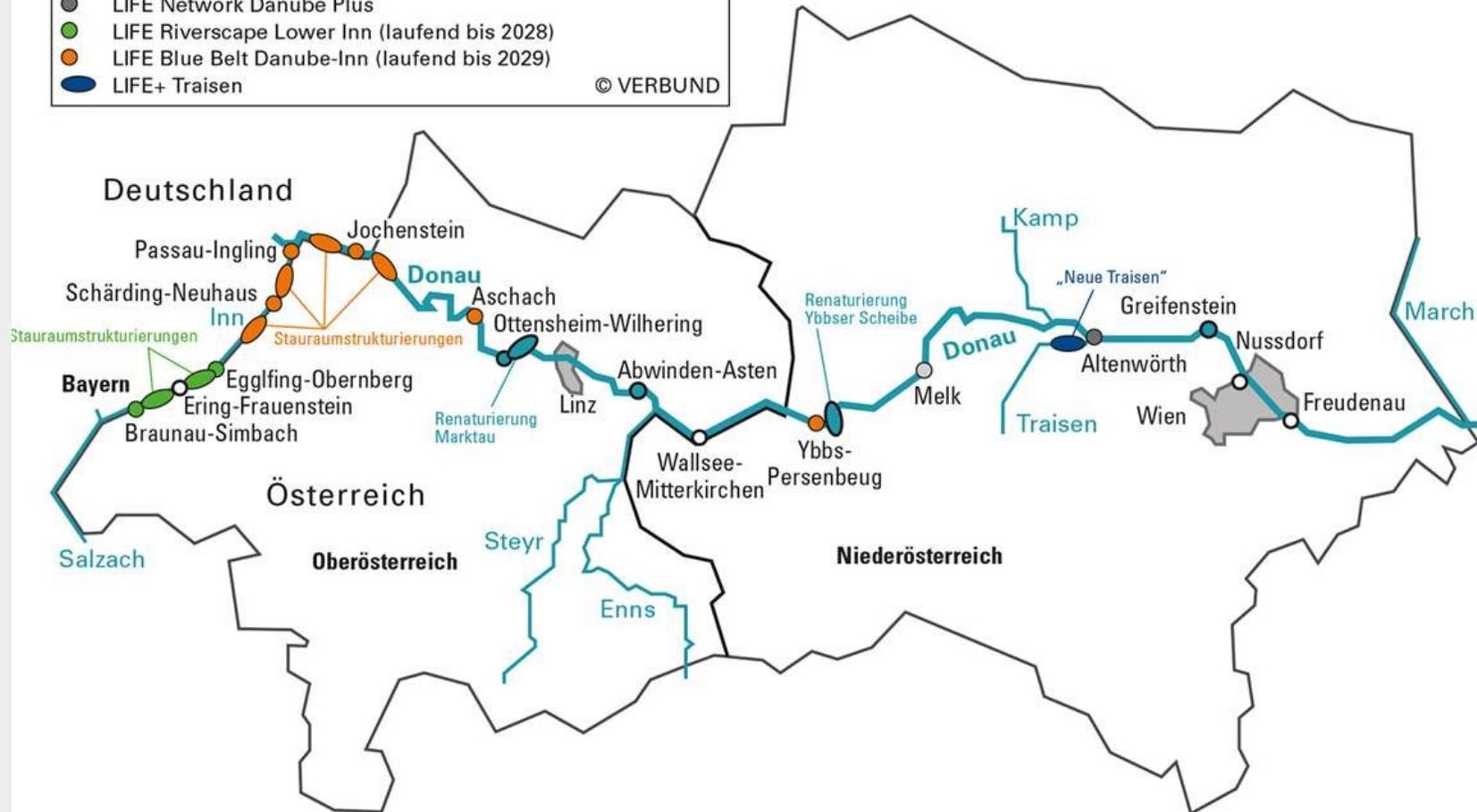
Success Story LIFE Projects



Co-funded by
the European Union



- Fischwanderhilfen und sonstige gewässerökologische Maßnahmen von VERBUND
 - im Rahmen von
 - LIFE Natur Vernetzung Donau-Ybbs
 - LIFE+ Netzwerk Donau
 - LIFE Network Danube Plus
 - LIFE Riverscape Lower Inn (laufend bis 2028)
 - LIFE Blue Belt Danube-Inn (laufend bis 2029)
 - LIFE+ Traisen
- © VERBUND



LIFE projects started
in 2004

Process is still
ongoing

Building of bypasses
together with a set of
different ecological
measures

Set of measures

De-sedimentation



River bank restoration



Bypass-river



LIFE at VERBUND LIFE+ Traisen



- 10 km new river corridor
- Riverbed 30 m
- 30 ha dry grassland (6210)
- The project created a new large natural river ecosystem with connected tributaries and adjacent floodplains typical for the Danube River.
- The results with regard to fauna, flora, and habitats exceed all expectations.

The new riverscape created within LIFE+ Traisen

<https://www.life-traisen.at>



LIFE+ Traisen



LIFE+ Traisen

High effect on fish population in the Danube (tailwater of the HPP Altenwörth)



LIFE at VERBUND LIFE Netzwerk Donau



Bypass river at the Danube in Ottensheim

- 14.2 km nature-like fish way
- Integration of natural water bodies
- Restauration measures in the water bodies
- Habitat improvement & creation
- Increased connectivity (lateral & longitudinal)



<https://www.life-netzwerk-donau.at/>



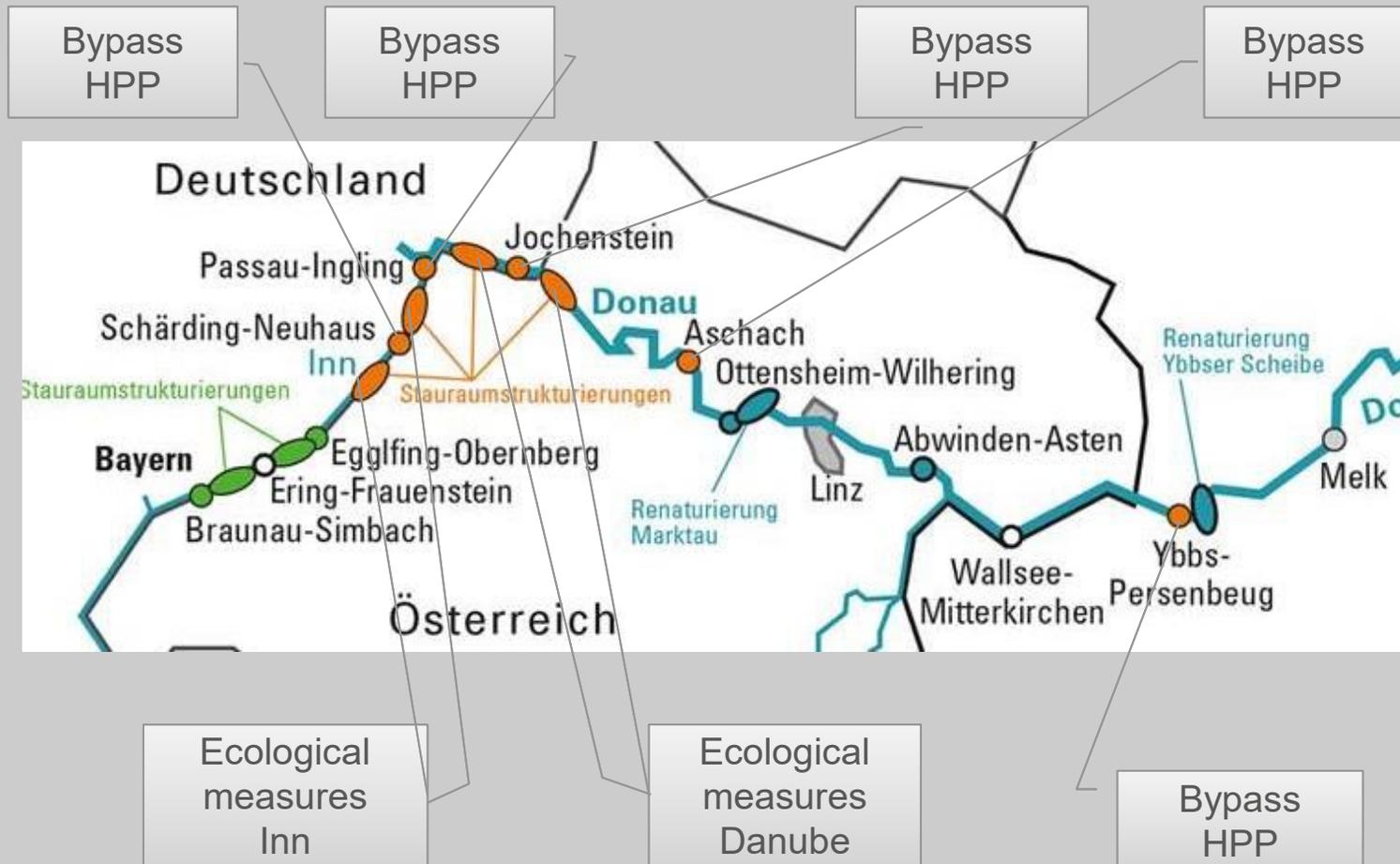
LIFE Netzwerk Donau



LIFE Netzwerk Donau



LIFE Blue Belt Danube-Inn



<https://www.life-blue-belt-danube-inn.eu/>

- Goal 1: provide high quality fluvial habitats for (semi)aquatic species with a special focus on fish
- Goal 2: support ecological connectivity by linking several Natura 2000 areas along the Danube-Inn Corridor
- 5 HPP fish bypasses (2 bypass rivers, 3 bypasses with mixed types)
- Ecological measures (creation of natural banks and de-sedimentation measures) Danube and Inn



LIFE Riverscape Lower Inn

Bypass HPP

Bypass HPP



Ecological measures Inn



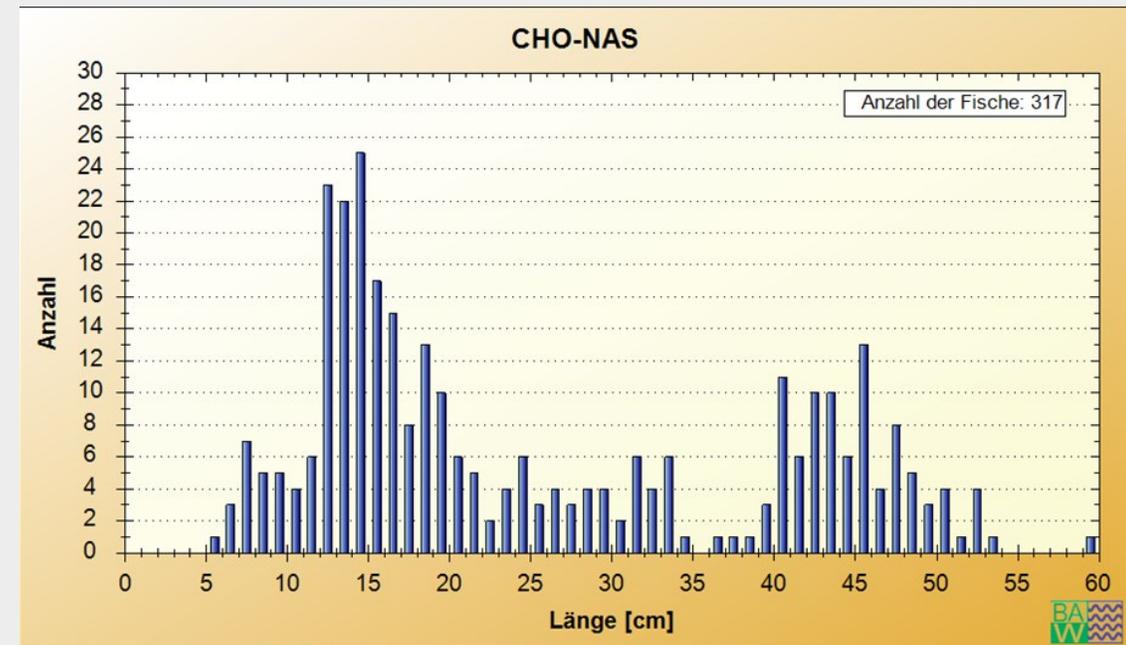
- 2 HPP fish bypass rivers
- Ecological measures
 - riverbank restoration
 - de-sedimentation measures
 - islands, backwaters, and ponds
 - tributaries
 - meadow management
 - visitor management
- Focus on
 - Fish
 - Birds (bird sanctuary)

Monitoring

Fish-monitoring

Monitoring: Electrofishing, fish trap

Highlight: Measures of LIFE-Projekt "Netzwerk Donau" show success:
very good population structure for Nase (high habitat attraction)

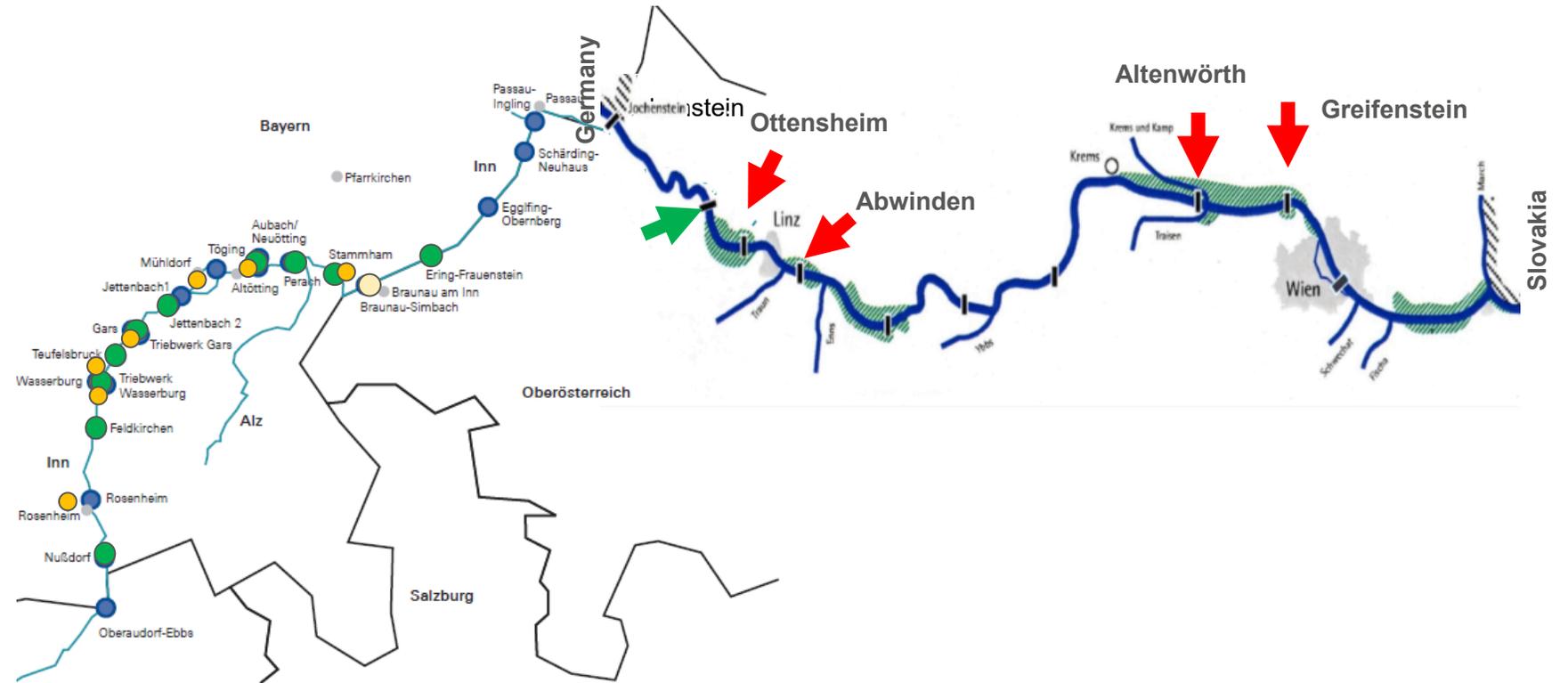


Fish-monitoring: PIT-TAG

Antennas in Danube and Inn – Status

Observations:

- Migration up- and downstream
- Long term migration through ship locks
- Also small species are migrating long distances
- homing behaviour
- Duration of stay up to several weeks



- 25 PIT TAG antennas at bypasses
- 11 antennas in floodplanes or side branches

- ↘ 14 PIT TAG antennas at 4 bypasses
- ↗ 1 PIT TAG antenna in ship lock

Antennas



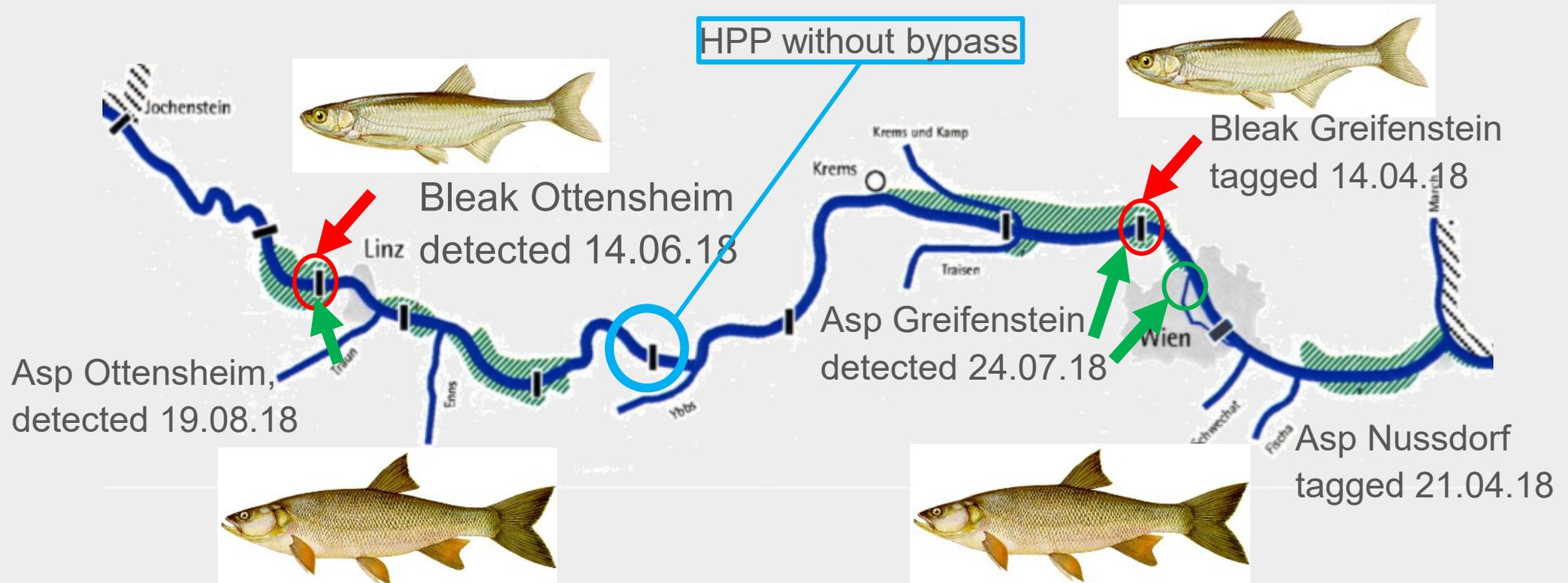
River bed



Flood channel under the lock

Results – migration distance

- Long term migration through fish locks
- Also small species (bleak, gudgeon, roach) are migrating long distances



Further fish monitoring results

Monitoring & Science: PIT Tag - Ecology of potamodromous species

- Temporal use and habitat suitability of the bypass rivers
- Fish seem to find and use every movement corridor (both directions)
- Fish locks are used by several species
- The attraction seems to depend on habitat quality
- Supplementary discharge may not always be a good solution

➤ **Input in new guidance documents – but a difficult task**

Take home messages

Take Home Messages

Large scale river restoration projects can be highly effective

- Not only for fish
- All species and habitats typical for large river-floodplain systems benefit

Challenges

- Land availability
- Natura 2000 - but also a big Chance
- Different stakeholders with different goals
- Legal & administrative framework
- Input of monitoring results in new guidelines (paradigm shift from single topic to integrated NbS)

Reckendorfer, W. et al. (2023): Naturbasierte Lösungen und Wasserkraft: Herausforderungen und Beispiele. Korrespondenz Wasserwirtschaft · 2023 (16) · Nr.10.
www.dwa.de/KW