Field excursion 4: ERRC2014 – SEE River Final Project Event

Fish migration and river restoration at Danube tributaries

The field trip will focus on fish passes and river restoration projects in the province of Lower Austria near the city of Melk (one hour from Vienna). We will visit two mid-sized tributaries to the Danube, the pre-Alpine rivers Pielach and Melk. These tributaries resemble crucial habitats for the Danube fish fauna and provide them suitable spawning and juvenile habitats.

The trip presents the concepts and experiences gained in the course of restoration projects executed over the last 20 years, where blocked or deteriorated migration routes as well as morphological structures were gradually improved in the rivers **Pielach** and **Melk**.

Different types of fish passes will be presented and discussed concerning their functionality and effect, as they were monitored over years after construction. Moreover, different sites with varying morphological conditions will be visited: reference sites - heavily regulated sections - local restoration measures.

During the trip some further information will be given about LIFE Project at the river **Traisen** where the lower section is currently being completely reworked. In this EU-LIFE project, the Traisen will get a fully new formed river bed at a length of 9.4 km. Constructions started in 2013 and will last until 2019.

Tentative timing: 8:30 Start at from Tech Gate Vienna (conference venue);
Lunch at typical restaurant near Melk (*included!*);
18:30 Arrival at Tech Gate Vienna;

Field trip hosts and guides:
Government of Lower Austria - Department for Water Engineering;
Institute of Water Management, Hydrology and Hydraulic Engineering BOKU University of Natural Resources and Applied Life Sciences;
Freiwasser Consultants for Ecology, Engineering and Water Management.
EZB Technical Bureau for River Ecology, Fisheries and Water Management

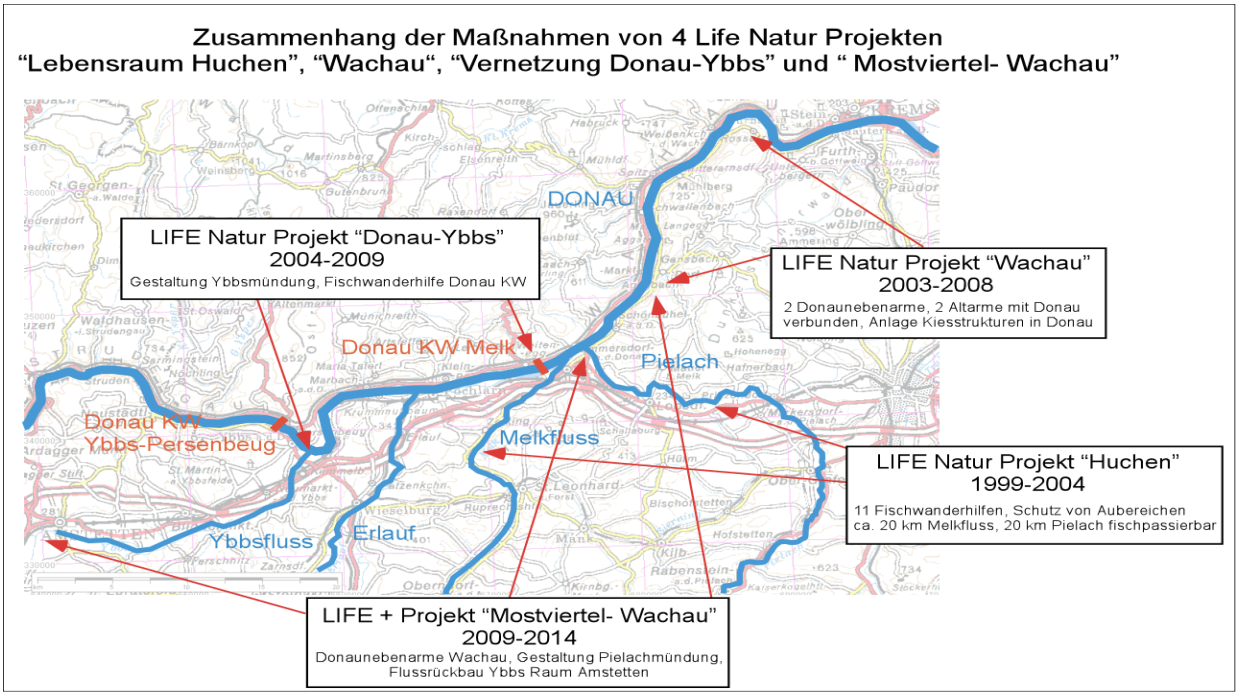
LIFE Project “Danube salmon” 1999-2004

The project aimed to improve river habitats and populations of threatened fish species which are protected under the conservational obligation of Directive 92/43/EWG in the Rivers Pielach, Melk and Mank. The actions took place in the Natura 2000 site “Niederösterreichische Alpenvorlandflüsse“ (Lower Austrian Pre-alpine Rivers), where reduction and disturbances of riverine habitats, river morphology and floodplain areas with floodplain forests was caused by human activities over the last decades. Due to these river engineering projects many obstacles like weirs of hydro-electric plants or ramps in the rivers have been established which disrupted fish migration.

Hence, the LIFE project “Danube salmon” constructed 11 fish migration facilities, with the aim to establish the protection of two natural river sections in River Pielach and various stretches of the Rivers Melk and Mank with in sum 2.6 km length due to restoration works.

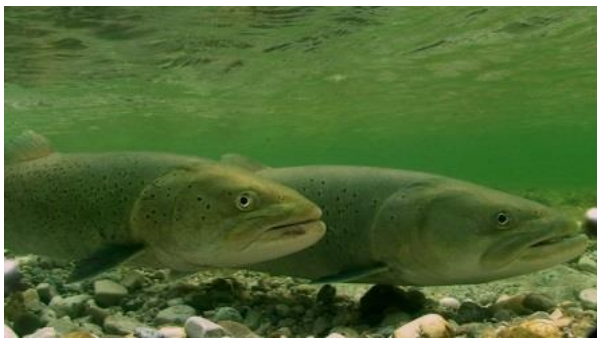
Here, the Danube salmon is the flagship species representative for a lot of fish species which live in the rivers of the Natura 2000 site. Individuals of fish species (e.g. nase) inhabiting River Danube migrate every year to the spawning sites upstream in the tributaries.

The LIFE Project “Danube salmon” was the first of a strategic set of LIFE projects within the last 14 years, aiming to improve habitat conditions in the tributaries of river Danube.



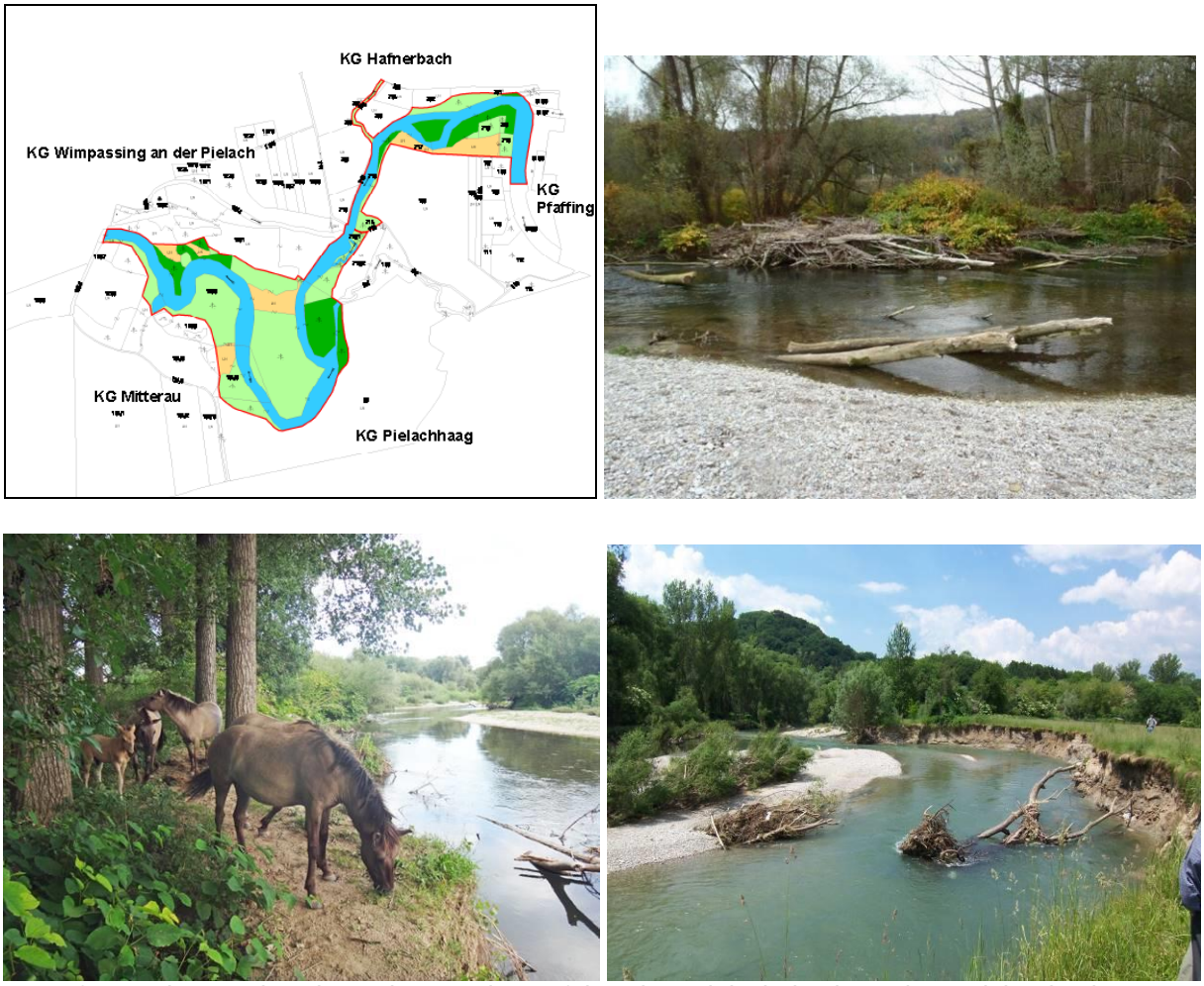
Strategic set of LIFE Projects within 14 years in the Rivers of Natura 200 site © *Freiwasser*


Common nase © *IHG*


Danube salmon at spawning site © *IHG*

Neubach floodplain and alluvial forest (River Pielach; LIFE Danube salmon)

In the lower section of River Pielach there are only few natural stretches left. One of them is the alluvial zone called “Neubacher Au”. The LIFE project “Danube salmon” incorporated parts of the floodplain forest (acquisition) and established a protected nature site. This action ensured self-forming dynamic river processes in the future. Moreover, at the banks and in the floodplain forest a grazing project with Konik horses was implemented to reduce invasive alien species of plants. Thus, this section of River Pielach has to be seen as a good reference for river restoration work along the right hand side tributaries of the Danube.



Map of natural protection site and some views of the River Pielach, its dynamics and the riverine morphological structures. © *Freiwasser*

- ***Guides:*** *Christoph Hauer (BOKU university) und Johann Nesweda (Government of Lower Austria, Dept. Water Engineering)*

Fish pass at Spielberg weir (River Pielach; LIFE Danube salmon)

The weir is the first obstacle for fish migration from the River Danube into the River Pielach. It is located app. 1.2 km upstream the mouth of River Pielach. A new nature-like bypass channel of 220 m long overcomes the weir height of 2.8 m. The fish pass is charged with 500 l/s or more at higher discharges. The fish pass was monitored using electric fishing and fish traps. In order to assess the efficiency of the connectivity rehabilitation measures, pre- and post-project data combining electric fishing and trap catch data were analysed.

Spielberg weir Ramp of River Melk before (left side) and after construction of fish migration facility (right side) © *Freiwasser*

- ***Guides:*** *Martin Mühlbauer und Christoph Hauer*

Fish pass at Melk ramp (River Melk; LIFE Danube salmon)

The ramp at the outflow of River Melk into the Danube was established during the construction of the Danube Hydroelectric Power Station "Melk". The Danube bed was then lowered which caused a height difference of the water bodies of 4.3 m at low water levels. The ramp was evidently an obstacle for fish migration, although no fish ecological data existed at the start of the LIFE Project.

Trying to get additional space in the overbank area for a long bypass channel failed and thus the project had to design a solution at the given area along the banks near the ship piers. The very rough construction of the bypass is 105 m long and it is dynamically charged with water. The fish ecological monitoring one year after the end of construction work proved the migration of 33 fish species and 2.096 individuals during March and June.

Ramp of River Melk before (left side) and after construction of fish migration facility (right side) © *Freiwasser*

- **Guides:** *Thomas Kaufmann, Christoph Hauer und Martin Mühlbauer*

Restoration of the mouth of River Pielach (LIFE Mostviertel- Wachau)

- Improvement of the fish passage from River Danube into River Pielach by extending the Pielach section at the mouth. Creation of an approximately 200 m long, new river bed to bypass the former outflow situation of River Pielach where a ramp at Danube banks is situated. The River Pielach is the most important tributary of the Danube section “Wachau”:where several fish species migrate into the River Pielach every year to their spawning areas. The most important species is the Danube salmon (*Hucho hucho*).

- Establishment of an approximately 120 m long, natural river bed between the “Lateiner” arm and the new mouth of River Pielach with the aim to enable fish passage. The Lateiner, a former side branch of River Danube, was cut off from other water bodies by constructing the Danube hydro-power dam at Melk.

- Re-design of the river banks of the Danube at the mouth of the River Pielach. Removal of the stone-blocks and deposition of gravel, which was digged out during the construction works.

- **Guide:** *Thomas Kaufmann*

Aerial view of new mouth of River Pielach © *Haslinger (extremfotos.com)*

Restoration of River Melk at village St. Leonhard a. Forst (LIFE Danube salmon)

The River Melk was heavily modified by river regulation in the late 1960's. After first approaches of river restoration done by the University (BOKU) in the 1980's, the LIFE Project "Danube salmon" did further restoration work at the Melk and its tributary, the River Mank.

In sum 2.6 km of River sections were re-structured but it was only possible to carry out the work between the flood protection dikes. Additional land at the river banks to achieve reference conditions (compare to Pielach river) could not be bought. Nevertheless, a fish ecological monitoring proved an enhancement of fish species and biomass, and the nase and barbel spawned on the new gravel banks. New reproduction areas and habitats for juvenile fish turned out as successful morphological structures for improving the entire fish populations.

Restoration of River Melk between the flood protection dikes © *Gerhard Pock*

Restoraqtion of River Melk (left side at start and right side after action) © *Freiwasser*

- **Guides:** *Christoph Hauer, Martin Mühlbauer*

Trip guides and contacts

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Handout LIFE+ “River Traisen” 2009-2019

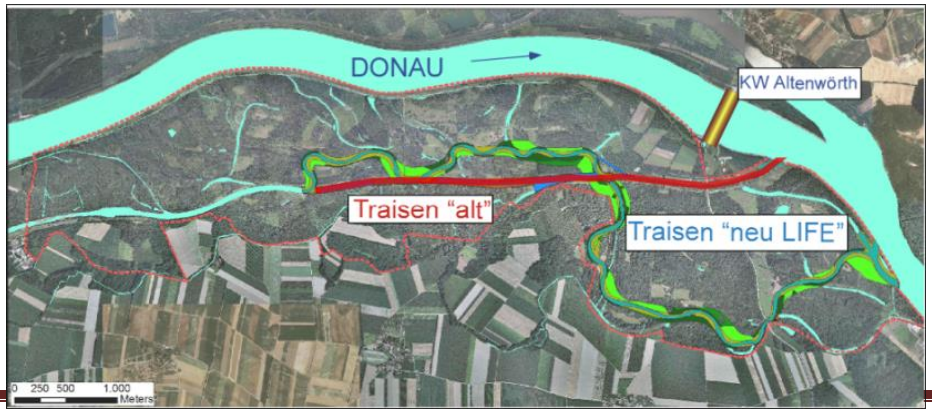
River Traisen, one of the largest Danube tributaries in Lower Austria, runs today 7.5 kilometers long as a regulated, straight-line channel through the Natura 2000 site "Tullnerfelder Donau- Auen". This site is the largest alluvial forest in a body in Austria.

The regulated river is missing aquatic and terrestrial habitats and the connection to the Danube as well as to the surrounding riparian forests and existing floodplain waters. High waters of the regulated Traisen hardly reach the surrounding habitats because of the flood protection dikes. In the surrounding floodplain there is a lack of willow wood zones.
Fish migration from the Danube into the water habitats of the floodplain area as well as into the river Traisen is prevented by obstacles. The main goal of the project is the improvement of the habitat situation at the Nature 2000 site.

There is only one big action in the interdisciplinary project. It led to the construction of a 9.4 km long meandering river with dynamic riparian development perspectives. During construction the linkage of existing waters of the floodplain and the ecological connection with the Danube will be established. All water habitats will be connected with the new river Traisen. The construction work will create new floodplains along the river bed which will be situated at a lower level. These zones are the new places where willow-dominated woods (91E0 habitat) can stock and flooding will take place more often than today.

Expected results:

- Greatest possible protection and improvement of the habitat conditions of existing protected objects and habitats by refinement of the specified planning corridor and extensive examination of the nature compatibility of the large project.
- 9.4 km long new, meandering river Traisen with dynamic banks and natural riparian areas between water and land.
- New running water habitat at mean-flow of about 49 hectares. Dynamic riparian development can take place. Creation of various natural river-structures in the riparian area between water and land.
- Creation of 53.8 hectares of frequently flooded areas, which are suitable for a development of the priority habitat type of white willow woods (part of 91E0). Establishment of this habitat type by initial work.
- Creation of stagnant water zones for enrichment of the water variety of the floodplain to the extent of 13 hectares.
- Fish-passable cross-linking of the floodplain area and various existing waters with the new river Traisen and the Danube, permanent fish migration possibility without obstacles in the new river Traisen. Thus the fish fauna of the Danube, the river Traisen as well as of the floodplain waters will be sustainably improved. At least 40 fish species will benefit from it. Among them are 15 Annex II species of the area.



LIFE+ Projekt Traisen

Die Durchführung erfolgt durch VERBUND Hydro Power AG.

www.life-traisen.at

Verbund

Dieses Projekt wird vom Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, dem Land NÖ und der Europäischen Union unterstützt.

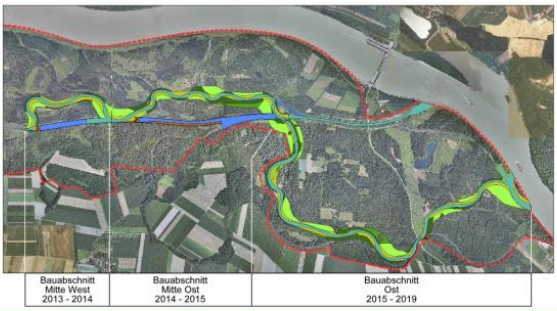
Dauer: 2009 - 2019
Baudurchführung in 3 Bauabschnitten

Baukosten: 26,5 Mio. €

Förderungen: 9,42 Mio. €
Das Projekt wird durch EU LIFE+ (5,3 Mio. €), Mittel des Bundes und des Landes NÖ (UFG 4,12 Mio. €) gefördert.

Kofinanzierer: 1,11 Mio. €
via donau, Wasserbau NÖ, NÖ Landschaftsfonds und NÖ Landesfischereiverband

Ansprechpartner: Dipl.-Ing. Wimmer +43 664 8285057



Projektleitung:	VERBUND
Baukoordination:	Retter & Partner Ziviltechniker GmbH
Ausführende Baufirmen:	GLS Bau und Montage GmbH Felbermayr Holding GmbH
Planung:	DonauConsult Ingenieurbüro GmbH
Örtliche Bauaufsicht:	Geoconsult Wien ZT GmbH
Ökologische Bauaufsicht:	EZB TB Eberstaller GmbH Büro freiwasser
Forstrechtliche Bauaufsicht:	Steinwender & Partner GmbH
Geotechnische Prüfungen:	MAPAG GmbH