



# THE AUSTRIAN DRAVA MANAGEMENT IN THE RELATION TO THE INTERNATIONAL RIVER CORRIDOR

**ALEXANDER ZINKE**, Environment Consultant and External Project Expert of BMLFUW  
(Federal Ministry for Agriculture, Forestry, Environment and Water Management)

**NORBERT SEREINIG**, Regional Government of Carinthia, Dept. Environment, **Water** and  
Nature Protection



TOP-DOWN  
FROM THE  
DOLOMITE  
MOUNTAINS...  
... TO THE  
PANNONIAN  
PLAIN ...



© Mario Romulic



... the Drava crosses the strong interests of many sectors.



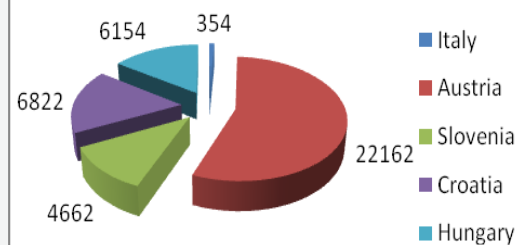
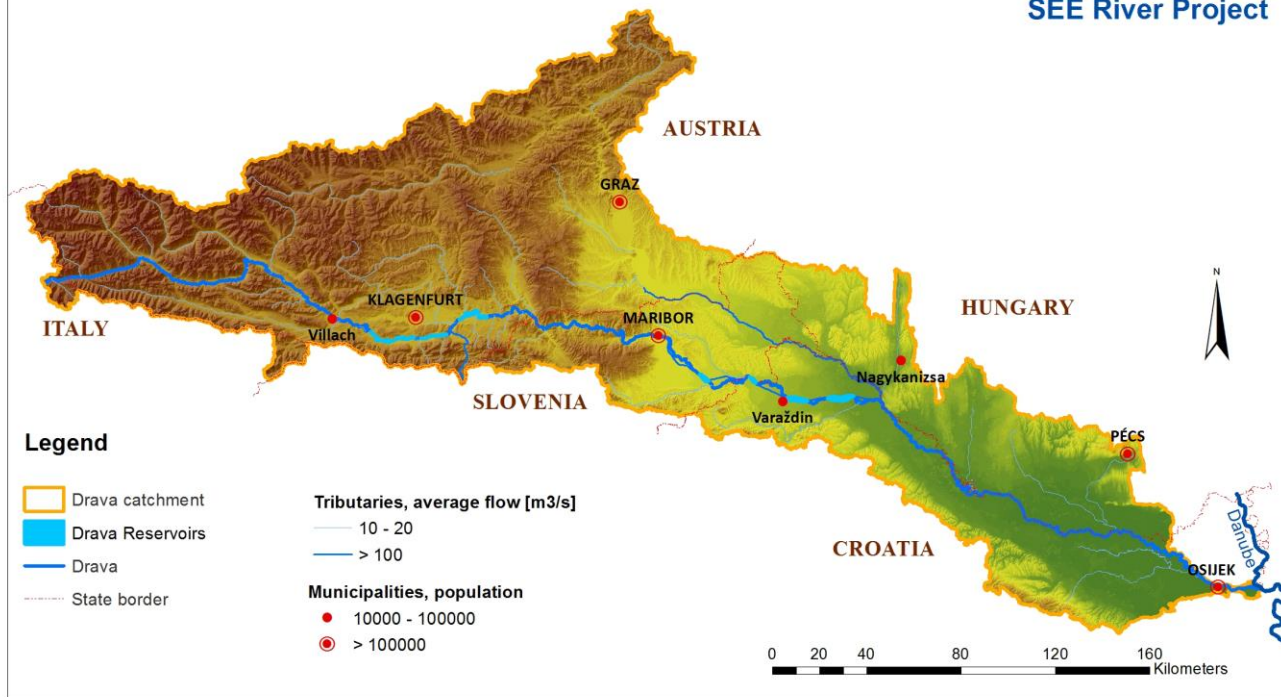
Photo: Revital

# INTERNATIONAL DRAVA BASIN



## DRAVA RIVER BASIN - OVERVIEW MAP

SEE River Project



**Basin:** 40,154 km<sup>2</sup>

(1% IT, 55% AT, 12% SI, 17% HR, 15% HU)

**Length:** 711 rkm

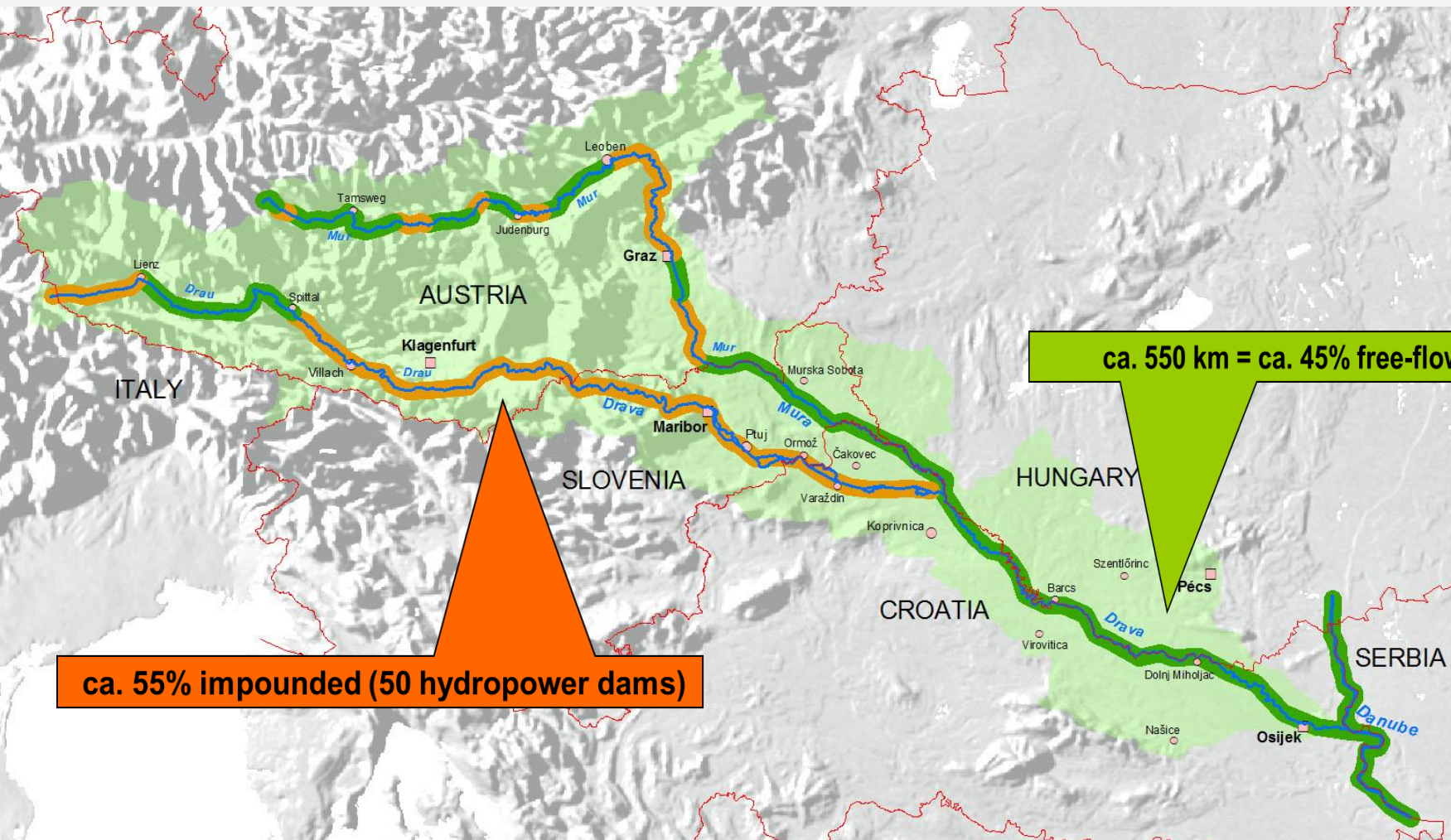
(11/IT + 259/AT + 144/SI + 325/HR + 138/HU rkm)

**Shared borders:** 165 km

(4 km AT/SI; 23 km SI/HR; 138 km HU/HR)

**5 Bilateral Commissions**

**Discharge near mouth:** 544 m<sup>3</sup>/s (160–2232 m<sup>3</sup>/s)



ca. 550 km = ca. 45% free-flowing

ca. 55% impounded (50 hydropower dams)

# HYDRO BARRIERS AND RIVER CONTINUITY ALONG THE INTERNATIONAL DRAVA RUN



Edling dam (Drava river)

*Photos: Zinke*

**24 hydrodams:** 0.1 – 126 MW

1 in Italy

12 in Austria (1 peak)

8 in Slovenia (2 peak/bypass)

3 in Croatia (3 peak/bypass)

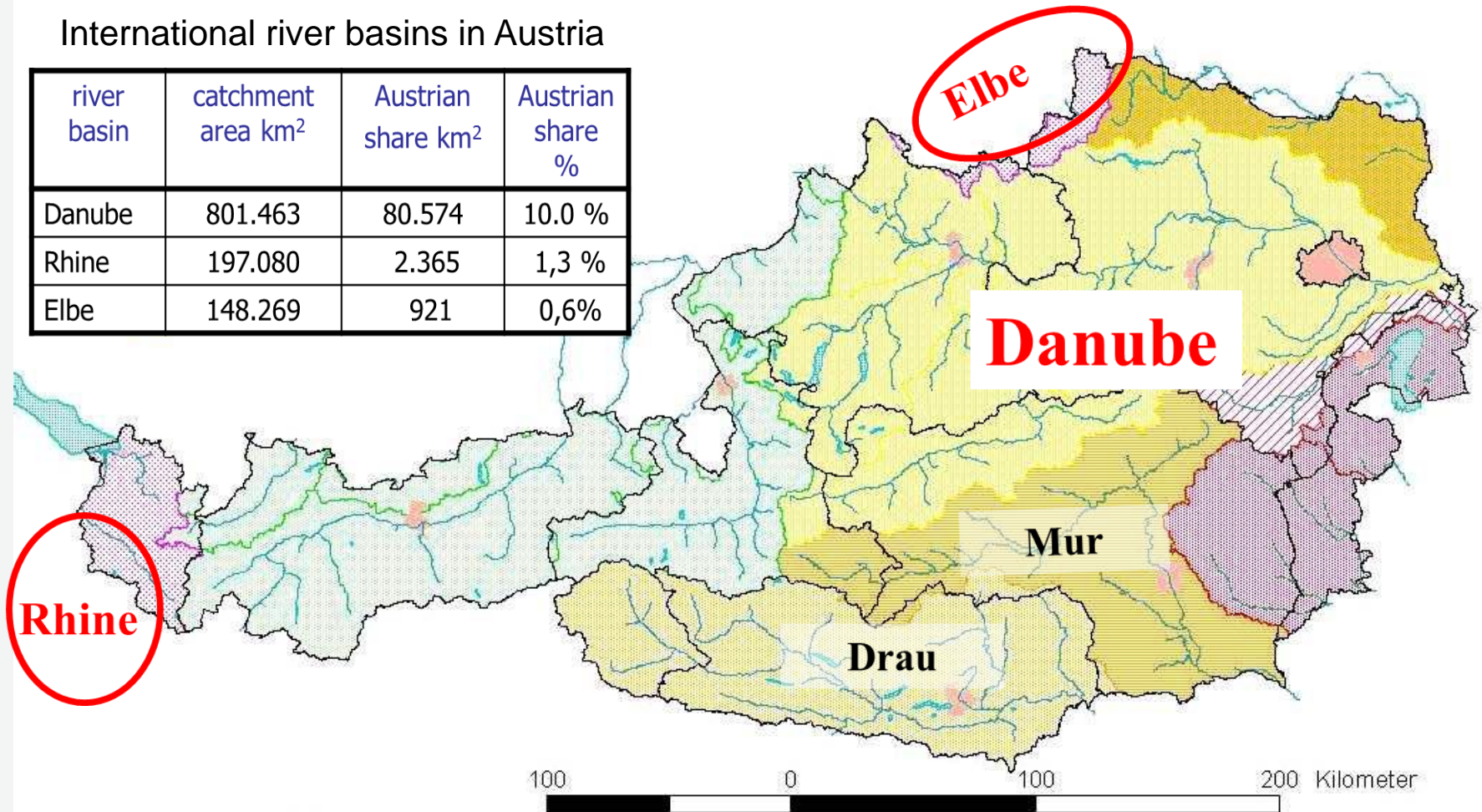
**Fish passes:** Few functional /  
operating in 2014



New fishpass: Rottau dam (Möll river)

## International river basins in Austria

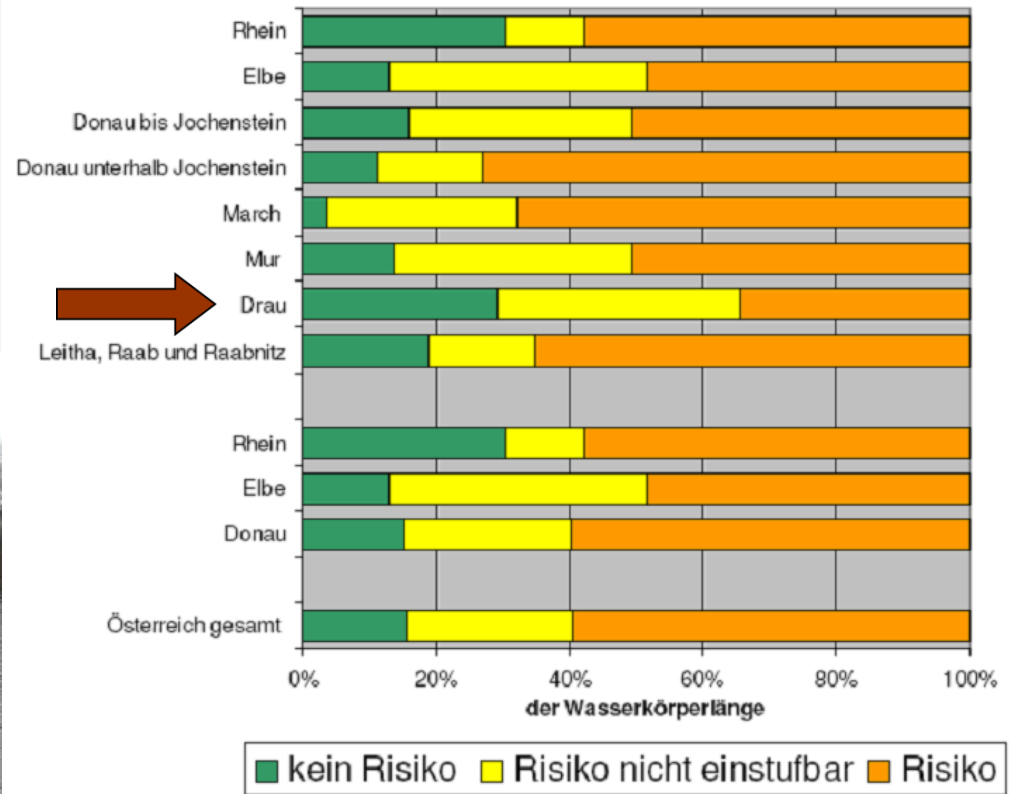
| river basin | catchment area km <sup>2</sup> | Austrian share km <sup>2</sup> | Austrian share % |
|-------------|--------------------------------|--------------------------------|------------------|
| Danube      | 801.463                        | 80.574                         | 10.0 %           |
| Rhine       | 197.080                        | 2.365                          | 1,3 %            |
| Elbe        | 148.269                        | 921                            | 0,6%             |



# WFD RISK ANALYSIS 2004



Upper Drava (Sachsenburg) Photo: Zinke; Figure: BMLFUW



# RIVER MANAGEMENT IN AUSTRIA

**Responsibilities:** Ministry of Agriculture, Forestry, Environment & Water Management for *Water Management (WFD)*, *Flood defense (FD)*;

9 Länder (Federal States) governments are acting on behalf of the Ministry

**Co-operation with the Länder:** *Nature conservation, spatial planning*

## **Legal Frame:**

- Water Act incl. Ordinances (i.e. Ecological Quality Objectives for Surface Waters)
- **National Water Management Plan 2009** incl. Programme of Measures

## ***River restoration according to ecological prioritisation:***

Larger rivers (e.g. Drava) with historical habitats of medium-distance migrators (barbel, nase, salmon)

- Restoration of river continuity by 2015
- Starting with habitat improvements
- Scientific studies: mitigation of hydropeaking, sediment balance

# NATIONAL WATER MANAGEMENT PLAN 2009

## PROGRAMME OF MEASURES

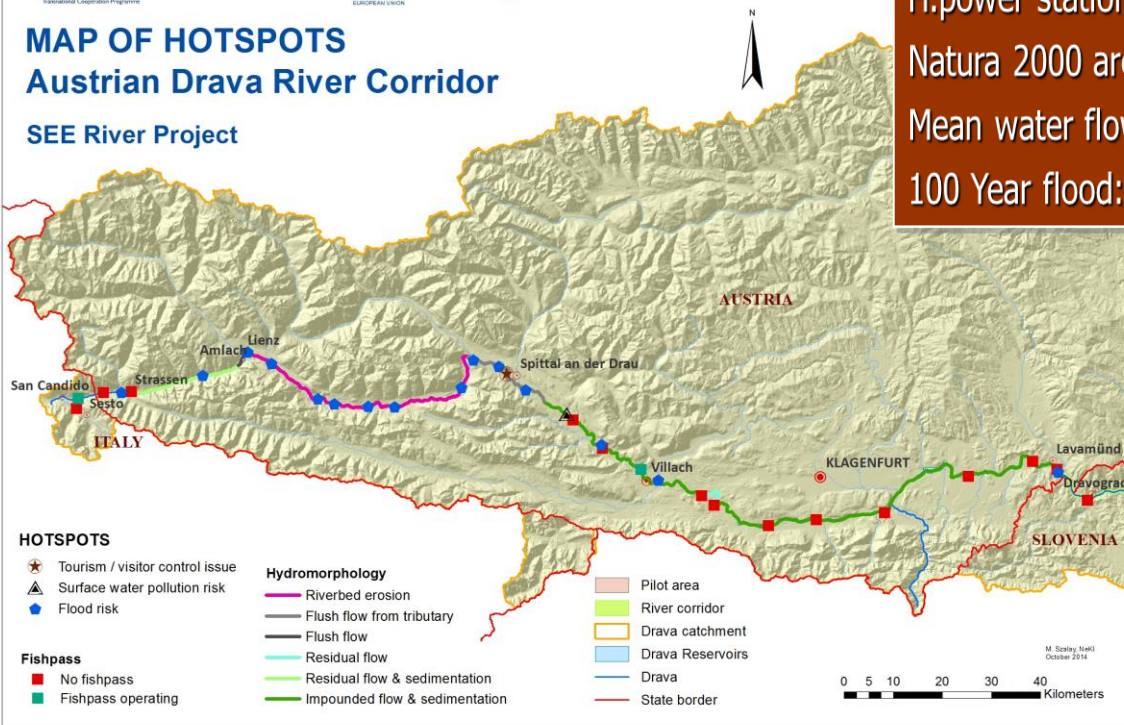
- **Strategy for flood defense:**  
aiming at „non-deterioration“ / Natural Water Retention Measures
- **Financing:**
  - National Environment Fund: investments for ecological improvements (fish passes, habitat restoration): 140 Mio € (2009-2015)
  - Synergies with measures financed by the Flood Management Fund
  - Use of EU funds: Life, Interreg/ETC, rural development
- **Public awareness raising / public involvement**
  - Campaigns: „Living Rivers“ 1996-2003, „WasSerleben - Living Waters“ 2002 - 2005 ...
  - „Water Dialogue“, Round Table „Water“
  - ...

# DRAVA IN AUSTRIA



## MAP OF HOTSPOTS Austrian Drava River Corridor

SEE River Project



|                   |  |
|-------------------|--|
| Regional states:  | Tyrol, Carinthia   |
| Catchment area:   | 9420 km <sup>2</sup>   |
| River length:     | 260 km (51 km Tyrol, 209 km Carinthia)                                 |
| Slope:            | 3‰ to 1‰   |
| H.power stations: | 10 (Paternion to Lavamünd)   |
| Natura 2000 area: | 1000 ha  |
| Mean water flow:  | 74 m <sup>3</sup> /s (Upper Dr.), 290 (Lower Dr.)                      |
| 100 Year flood:   | 1050 m <sup>3</sup> /s (Upper Dr.), 2600 m <sup>3</sup> /s (Lower Dr.) |

**Key management issues:**

- Altered flows
- Flood risk
- River bed regulation / erosion
- Altered river ecology

# Upper Austrian Drava



*Photos: Revital*



# Upper Austrian Drava



Photo: A.Auer



**DRAURADWEG**

Der Drauradweg führt vom Ursprung der Drau im Toblacher Feld in Italien 366 km entlang des gleichnamigen Flusses durch Osttirol und Kärnten bis nach Marburg in Slowenien.

Photo. AKL/Tichy





*Photo: AKL*



*Photo: VHP*



*Photo: Revital*

Flood disasters in 1965/66 resulted in further bed regulation:  
large retention areas maintained but bed erosion continued



Photos: VHP



# Lower Austrian Drava

# Pressures

**Storage power plants at the Malta (Alps) and river-run power plants along the Drava**



Photo: VHP



Figure: Austrian Hydropower (AHP)

# Impacts of river engineering and hydropower use despite restoration successes

Monotonous river courses and deficits in habitats

Populations stressed by strong hydro-peaking

Blocked longitudinal migration



Photo. AKL / Tichy

LAND  KÄRNTEN



MINISTERIUM  
FÜR EIN  
LEBENSWERTES  
ÖSTERREICH

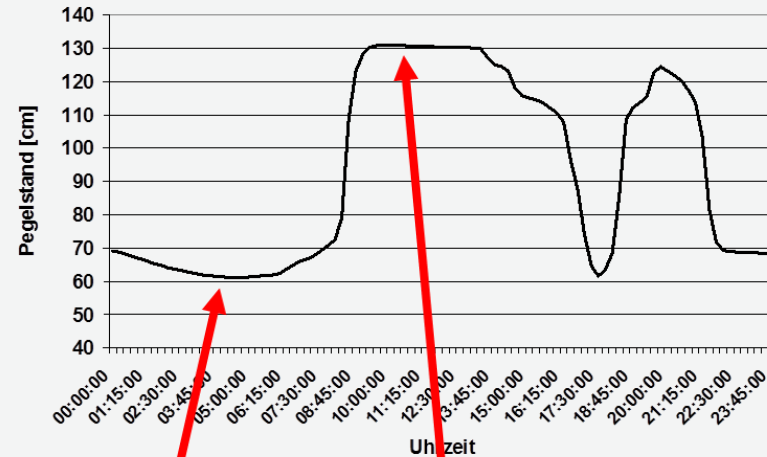


Figure: LIFE  
monitoring report

25 m<sup>3</sup>/s

110 m<sup>3</sup>/s

~ 70cm difference



# Pioneers in river restoration

1991 – 1998: First *River Development Concept* with pilot works

1999 – 2003: LIFE Project Auenverbund (*Floodplain Link*)

2006 – 2011: LIFE Project Lebensader Obere Drau (*River Vein Upper Drava*)

✓ So far, along 68.5 rkm, a total of **29.66 km (43%) have been restored**

2012 – 2014: **SEE River Project:**

Integrative evaluation of 20 years of restoration works

Discussions with experts and local stakeholders (lessons learned)

Wider scope: river corridor, WFD, B & H-D, FRD, RED

sediment balance in the catchment

flood risk at HQ300

views and needs of sectors and local communes

Updated Leitbild – Priorities – new Programme of Measures



# River widening at Obergottesfeld

## Problems

Narrowing of the river course after 1965/66 floods

Degradation of the river bed

Loss of retention areas

## Objectives

Stabilize the river bed and improve the flood protection

Preserve retention areas

Increase the bed load supply



*Photos: Revital (2), VHP, AKL/Tichy*

LIFE - PROJEKT „LEBENSADER OBERE DRAU“ FLUßAUFWEITUNG OBERGOTTESFELD



Bestandsaufnahme Flug v. 20. Okt. 2009



Bestandsaufnahme Flug v. 20. April 2011



Bestandsaufnahme Flug v. 15. Okt. 2011

*Photos: AKL/Tichy*



## Restoration at Obergottesfeld

*Photo: Revital*

Opening in 2011



Rework in 2014

*Photo. Zinke*



*Photo. AKL / Tichy*

# Drava projects have led to improved...

Flood Protection

Retention Areas

Morphological Dynamics

Aquatic Habitats

Non Aquatic Habitats

Recreation Areas

River Widening at Obergottesfeld



Photo: AKL / Tichy

Green Week  
Brussels  
2013

European  
Commission

TUESDAY, 4 JUNE 2013

THURSDAY, 6 JUNE 2013



Best EU  
LIFE Nature  
Project 2012

Photo: AKL

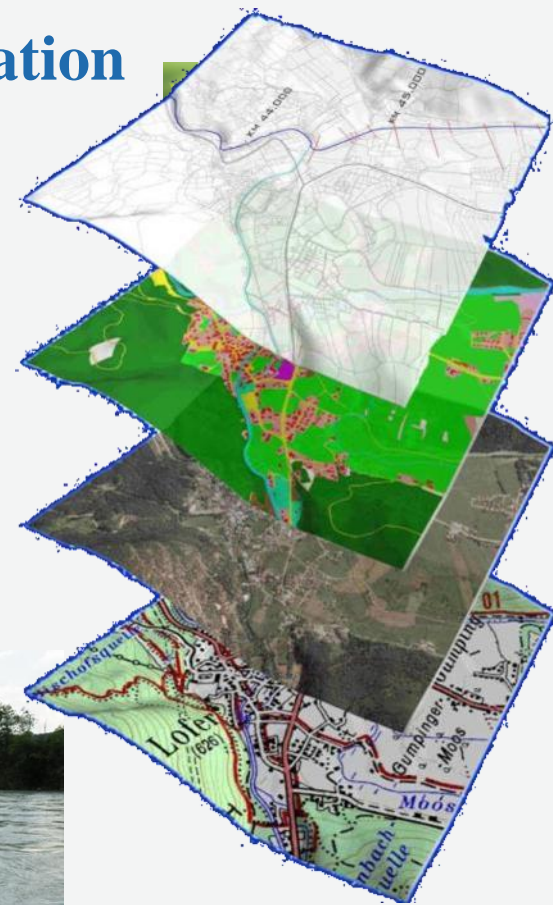


# Integrative evaluation

In-door  
brainstorming  
and outdoor  
checks



*Photos and figure: Revital*





# Agreed new River Development Concept 2014

(flood protection – ecology – recreation  
along the Upper Drava for the next 20 years)

### Legende

## Maßnahmen Hochwasserschutz

- HWS, Hochwasserschutz**

### Maßnahmen zur Sohlstabilisierung

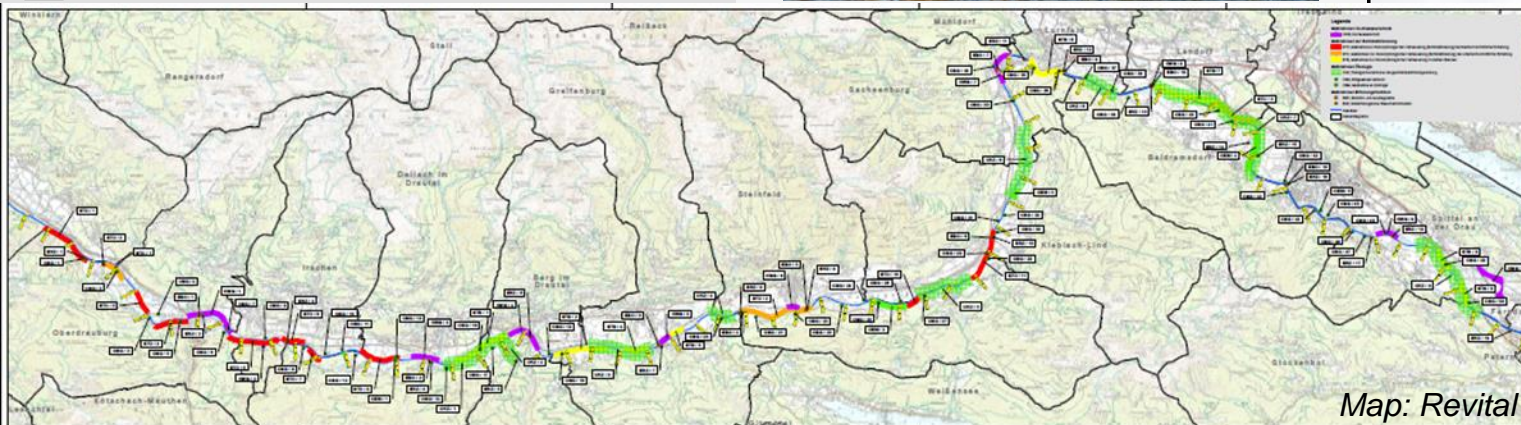
- STO, Maßnahmen zur ökomorphologischen Verbesserung (Sohlstabilisierung) bei überdurchschnittlicher Eintiefung

## Maßnahmen Ökologie

- OKZ; Ökologische Kernzone / eingeschränkte Erholungsnutzung
- OSG, Stillgewässer-Verbund
- OEM, Maßnahme an Zubringer

### Maßnahmen Erholungsfunktion

- EBO, Boot-Ein- und Ausstiegsstelle
- ENZ, Naherholungszone / Besucherinformation
- Gewässer
- Gemeindegrenze



*Map: Revital*

# Rehabilitation of impounded sections

## Example Feistritz reservoir – Rehabilitation of the dike crest



**Hanging structure with tires**



**Embedding crushed rocks**



**Binding soil layer on gravel**



**Reshaping and willow rolls**



**Vegetation growth after several seasons**

KW Paternion

KW Kellerberg

KW Villach

KW Rosegg-St. Jakob

KW Feistritz-Ludmannsdorf

KW Ferlach-Maria Rain

KW Annabrücke

KW Edling

KW Schwabeck

KW Lavamünd

## Restoration of the river continuity



## Much further work ahead

### National Water Management Plan 2015

### Flood Risk Management Plan 2015

- Continuation of continuity and habitat restoration (moving further upstream)
- hydropeaking, sediment balance: additional studies / best practices

**Cross border cooperation / Bilateral River Commissions:** dealing with the new challenges

**New projects:** ETC, ...

**River corridor & catchment management:** Continuation of intensive dialogue and successful stakeholder cooperation.

