



LIFE10NAT/SI/142

# LJUBLJANICA CONNECTS

Restoration of the Ljubljana River corridor and improvement of the river's flow regime



<http://ksh.fgg.uni-lj.si/ljubljanicconnects/>

Alpine River Restoration Workshop

Zvolen, 4. 9. 2014

# THE LJUBLJANICA RIVER



- Ljubljana River is 42 km long, total basin area is 1884 km<sup>2</sup> of which 1100 km<sup>2</sup> is karstic.
- It is known also as River with seven names – because of mainly karstic basin river has a large number of streams with different names.
- It is the deepest Slovenian River with a section which is 8 m deep.



The last river spring near Vrhnika



The river in the city Ljubljana



Ljubljana in Zalog – lower part

# THE INITIAL SITUATION



The heavily degraded area of the Ljubljana River corridor upstream and downstream of the Ljubljana urban area is an important habitat for the fragmented and heavily endangered fish population.

The water level upstream of the weir on the Ljubljana River is too low, therefore during low flow conditions the main Ljubljana River channel is not connected to its tributaries. This represents a great obstacle for the habitat connectivity along the river reaches which is worsened by the improperly working fish passes.

## TARGETED SPECIES:

- Danube Salmon (*Hucho hucho*)
- Danube Roach (*Rutilus pigus*)
- Striped Chub (*Leuciscus souffia*)



# THE PROJECT OBJECTIVES



- Restoration of biodiversity of Ljubljana River corridor
- Improving the ecological functions of the area
- Promotion of relatively simple river restoration measures for improving the ecological status of the river
- Raising the awareness of general public to consider the Ljubljana River a vital element of the environmental quality and not a threat



# Concrete Restoration Actions



## RECONSTRUCTION OF THE SILL



Before reconstruction



After reconstruction

# Concrete Restoration Actions



## RECONSTRUCTION OF THE FISH PASSES



Fish pass No.1 at the beginning of the project



Collapse of the fish pass No.1 in November 2013 due to high water discharge



Interior of the fish pass No.2



Inflow of the fish pass No.2



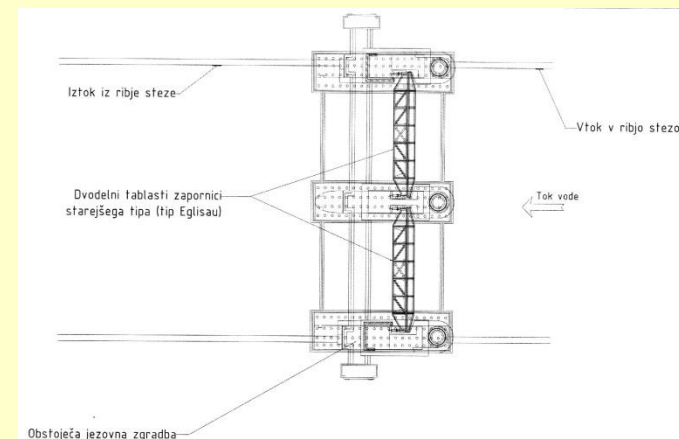
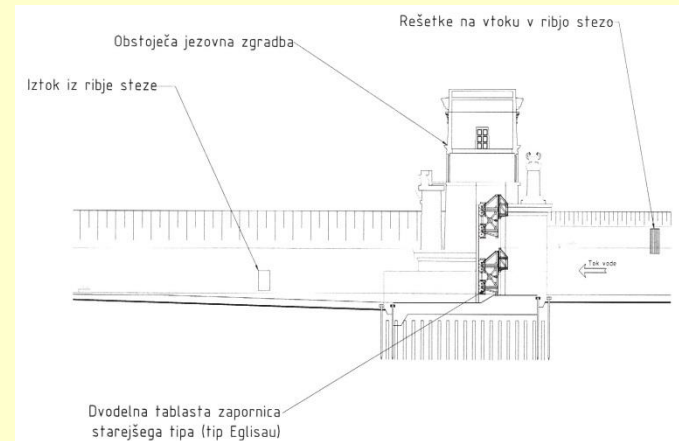
# Concrete Restoration Actions



## MODERNIZATION OF BARRIER'S LIFTING SYSTEM



System of two barriers  
on the Ljubljana River

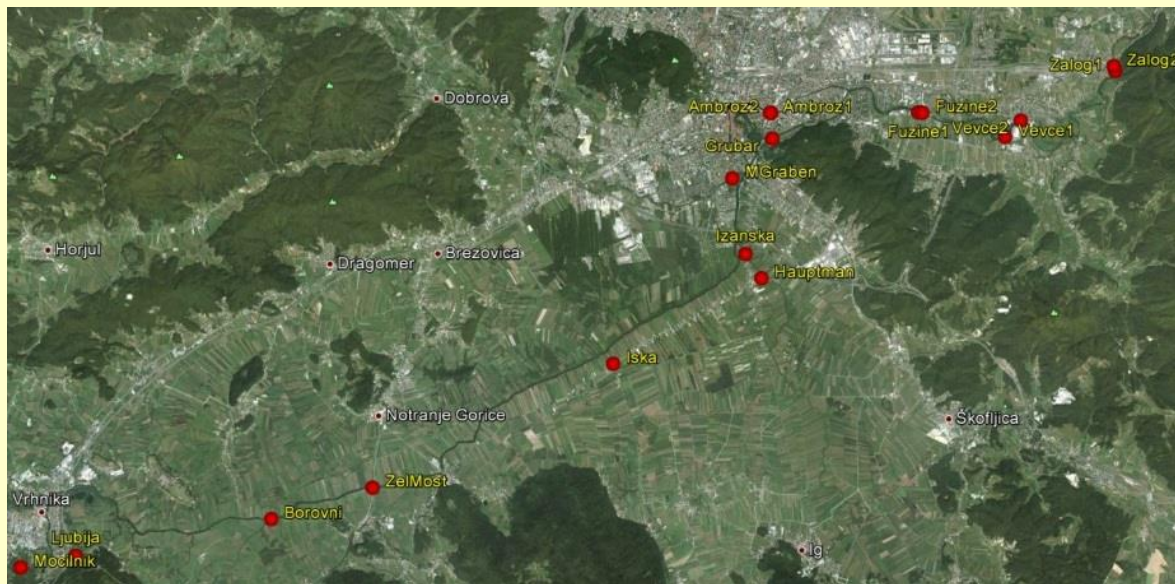


Sketches of the initial situation

# Ecohydrological Monitoring

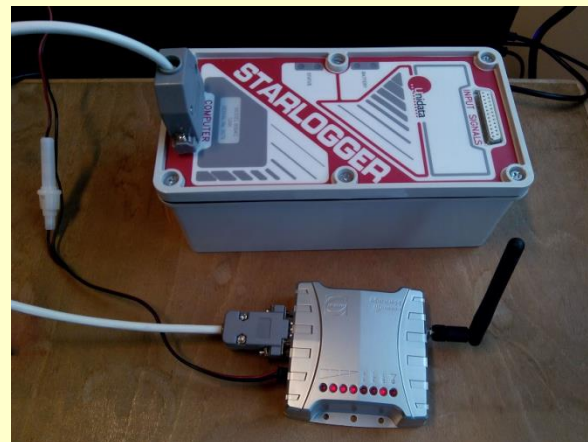
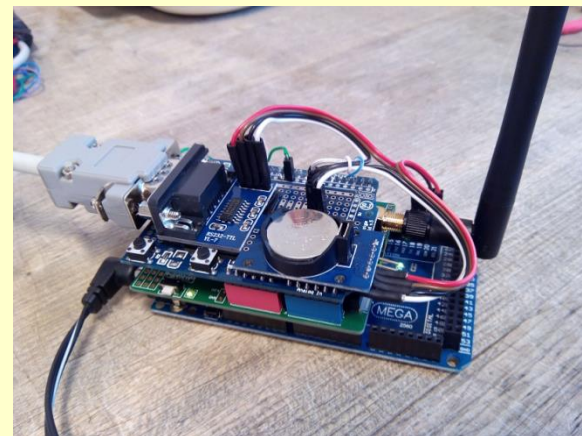


## 17 NEWLY CONSTRUCTED WATER STATIONS



Locations of measurement stations  
on 3 locations stations with online connection will be installed

Development of equipment for  
remote access to the data

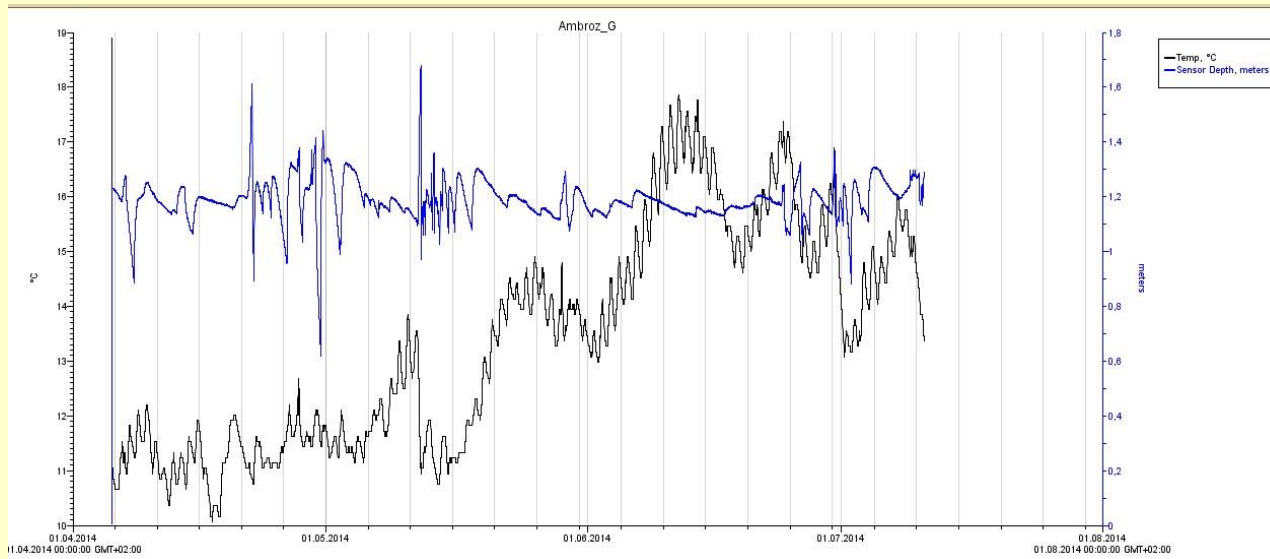




# Ecohydrological Monitoring



## DATA ANALYSIS



Fluctuations in temperature and water level on measurement station near the barrier



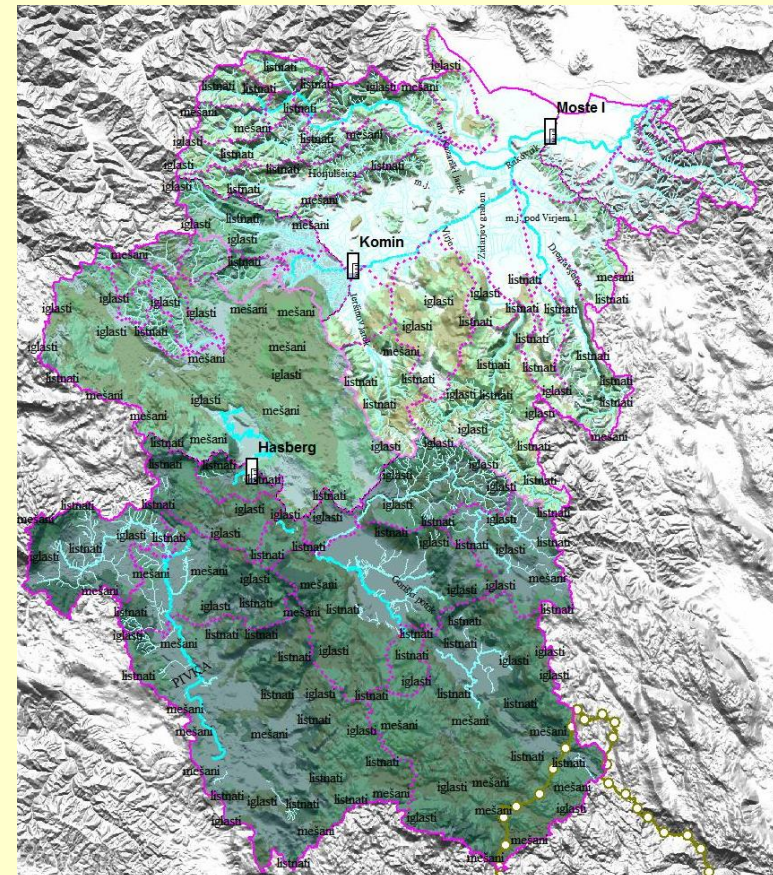
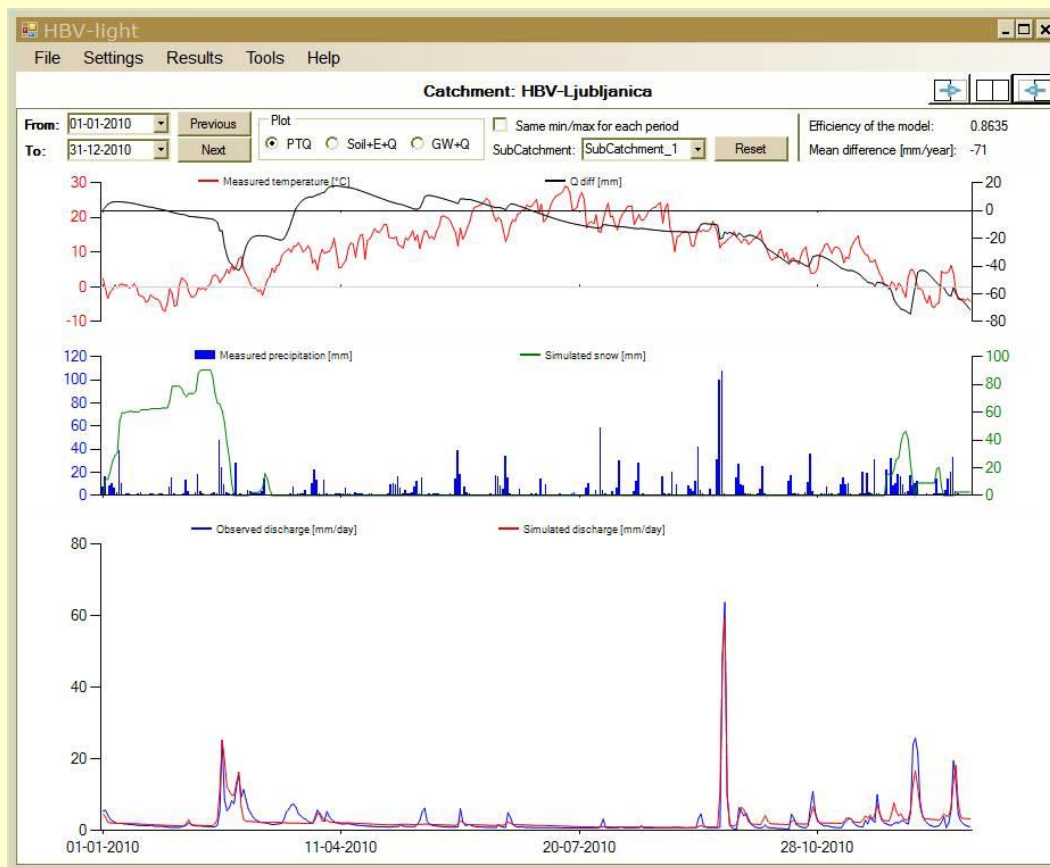
Collecting the data



# Ecohydrological Monitoring



## HYDROLOGICAL MODEL OF LJUBLJANCA RIVER





# Ecohydrological Monitoring

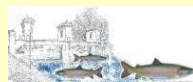


## DISCHARGE MEASUREMENTS

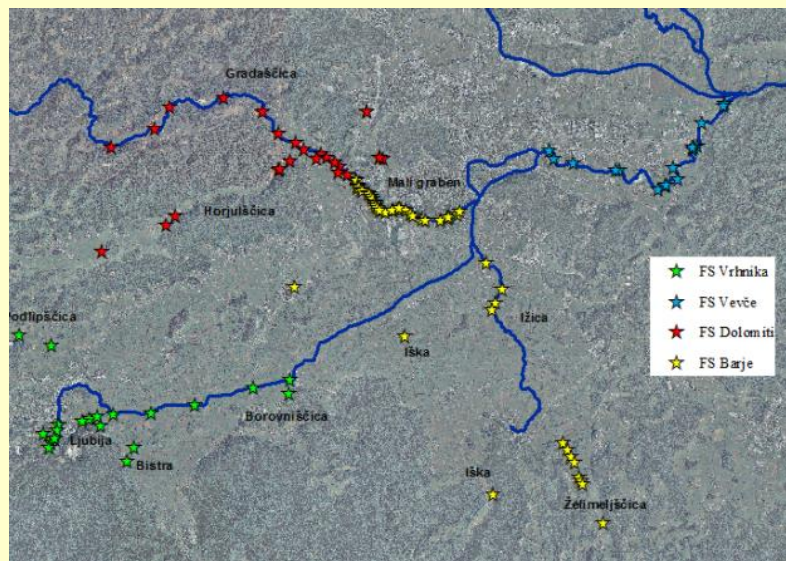




# Fish Monitoring

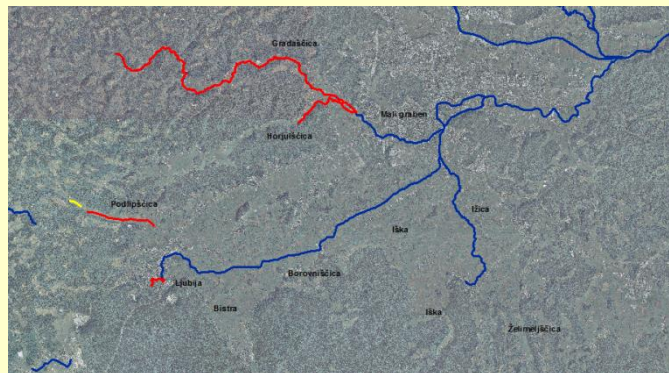


## STUDY OF THE HABITAT AND ESTIMATION OF FISH POPULATION



Catching the  
fish for  
population  
estimation

Result of habitat study: maps  
with spawning and nursery  
places of targeted species,  
their distribution by fishermen  
information and their potential  
locations



# Fish Monitoring



## MONITORING OF FISH MIGRATION



Catching the fish

Measuring the fish

Tagging of fish before releasing them into the water



# LJUBLJANICA CONNECTS WORKSHOP



TO SEE ALL THREE RESTORATIONS FINISHED ...

VISIT LJUBLJANA ☺



9. and 10. SEPTEMBER, LJUBLJANA, SLOVENIA