Activities and plans of LIFE Living rivers project - on migration passability of Gabčíkovo structures

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From Iron Gates to Gabčíkovo Water Structures,
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Project

Implementation of the river basin management plan in selected river-sub-basins in Slovakia

Living Rivers

Call	**LIFE Strategic Nature and Integrated Projects (SNaP/SIP)**
Acronym	**LIFE21-IPE-SK-LIFE Living Rivers**
Project code	**101 069 837**
Duration	**1.1.2023 - 31. 12. 2032**
Budget	**27 799 402,33 €**
EU contribution	**16 677 073,39 €**

Partneri projektu

Výskumný ústav vodného hospodárstva

Tatranský národný park TANAP

Štátna ochrana prírody Slovenskej republiky

Ministerstvo životného prostredia Slovenskej republiky

Fakulta rybářství a ochrany vod Faculty of Fisheries and Protection of Waters

Jihočeská univerzita v Českých Budějovicích University of South Bohemia in České Budějovice

Slovenský vodohospodársky podnik, štátny podnik

Vodohospodárska výstavba

Bratislavské regionálne ochranárske združenie BROZ

WWF

CATCH ME

Funding

Program

Programme for Environment and Climate Action (LIFE)

Strategic Integrated Project (SIP)

Sub-programme: Circular Economy and quality of life

Thematic priority: **Water**

Support the full implementation of the following plans and strategies:

River basin management plans pursuant to Annex VII to the Water Framework Directive, Flood Risk Management Plans pursuant to the Floods Directive or Marine Strategies pursuant to the Marine Strategy Framework Directive

Project partners

6 public bodies
3 NGOs
1 university
Stakeholders
International cooperation

Vúvh Výskumný ústav vodného hospodárstva

TANAP Tatranský národný park

ŠTÁTNA OCHRANA PRÍRODY SLOVENSKEJ REPUBLIKY

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SLOVENSKÝ VODOHOSPODÁRSKY PODNIK, štátny podnik

Vodohospodárska výstavba

Bratislavské regionálne ochranárske združenie BROZ

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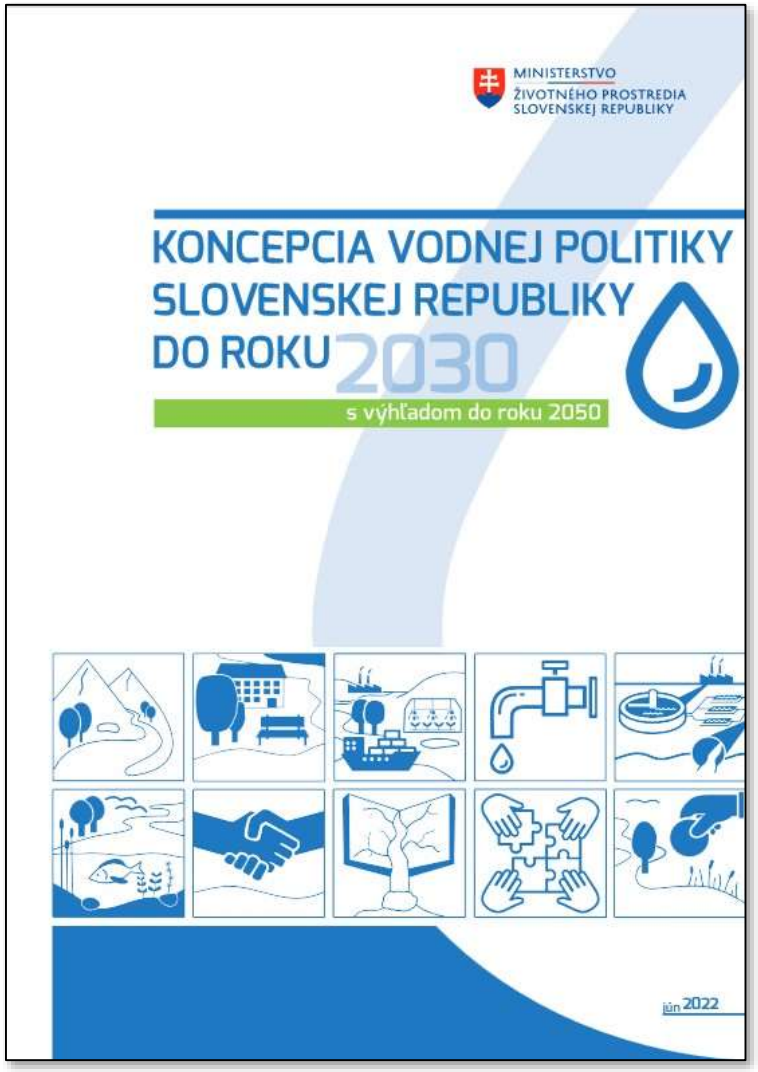
Living Rivers

Key EU documents and directives

- Water Framework directive 2000/60/EC
- EU Floods directive 2007/60/EC
- European Union Strategy for the Danube Region (EUSDR)
- The Convention on Co-operation for the Protection and Sustainable Use of the River Danube (Danube River Protection Convention - DRPC)
- EU Habitats Directive 92/43/EEC,
- EU Birds directive 2009/147/EC
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern convention),
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn convention),
- Pan-European Action Plan for Sturgeons
- Biodiversity Strategy 2030
- EU Strategy on Adaptation to Climate Change
- European Green Deal
- Nature Restoration Law – in preparation
- ...

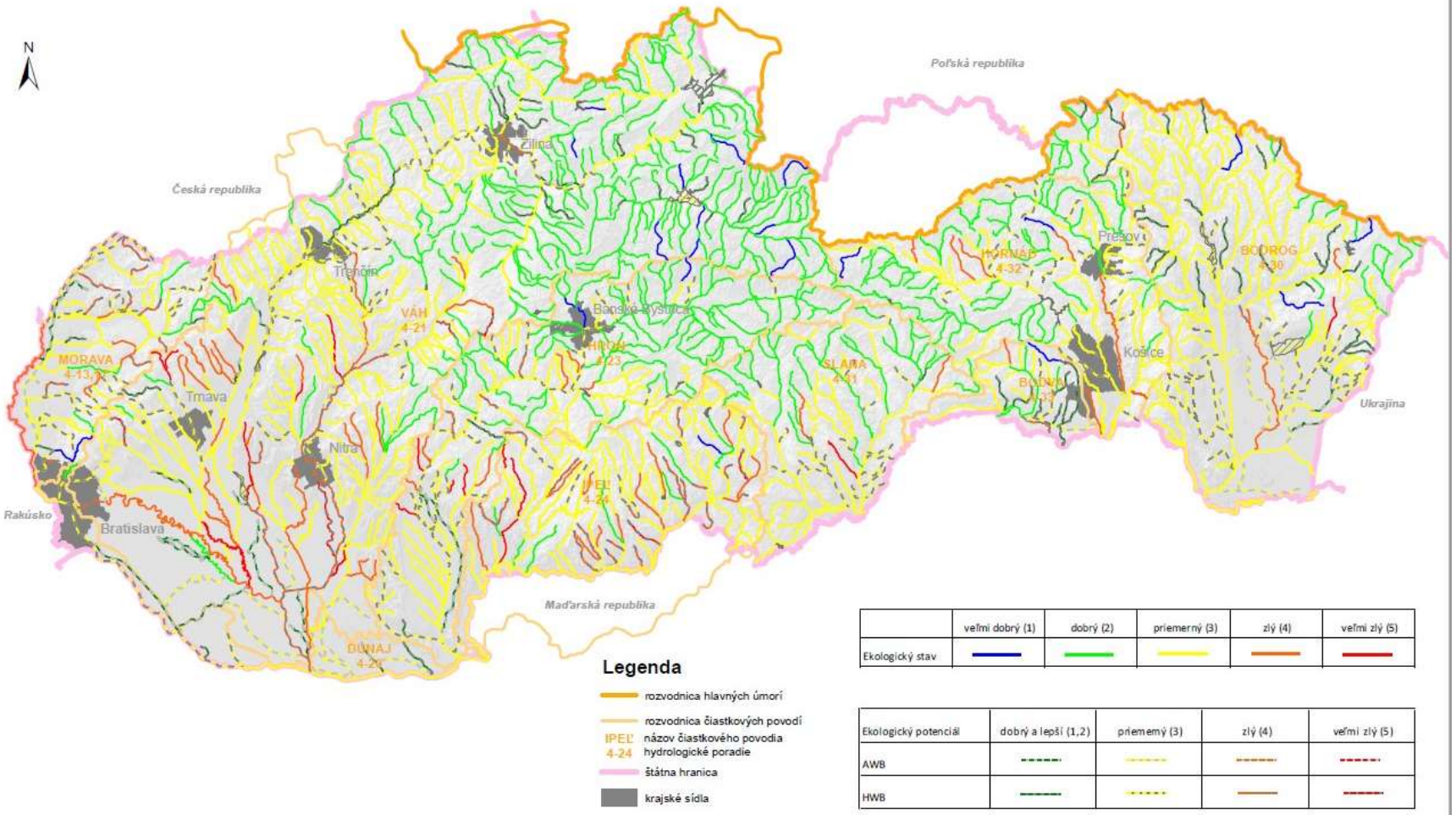
National policy

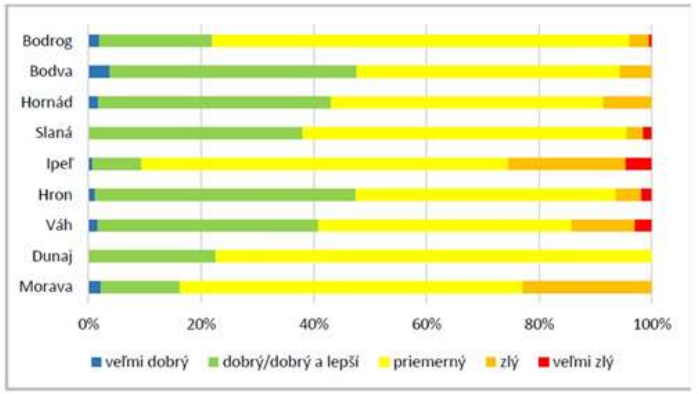


Water Policy Conception (2021-2030 with prospects till 2050) – adopted by the government 1.6.2022

The 3rd River Basin Management Plan (2021-2027) adopted by the government 11.5.2022

Ecological status of water bodies 2013-2018





59 %

Water bodies failed to reach good ecological status/ potential

Main project goal

- Implementation of the 3rd RBMP of the Danube (2021-2027) - ecological targets of the WFD to achieve good GES/GEP of surface water bodies

- Active measures (in the field) on:

10

Water bodies

344

km

Indicators

3 268 ha

biotopes

13,6 km

side-arms

15 barriers

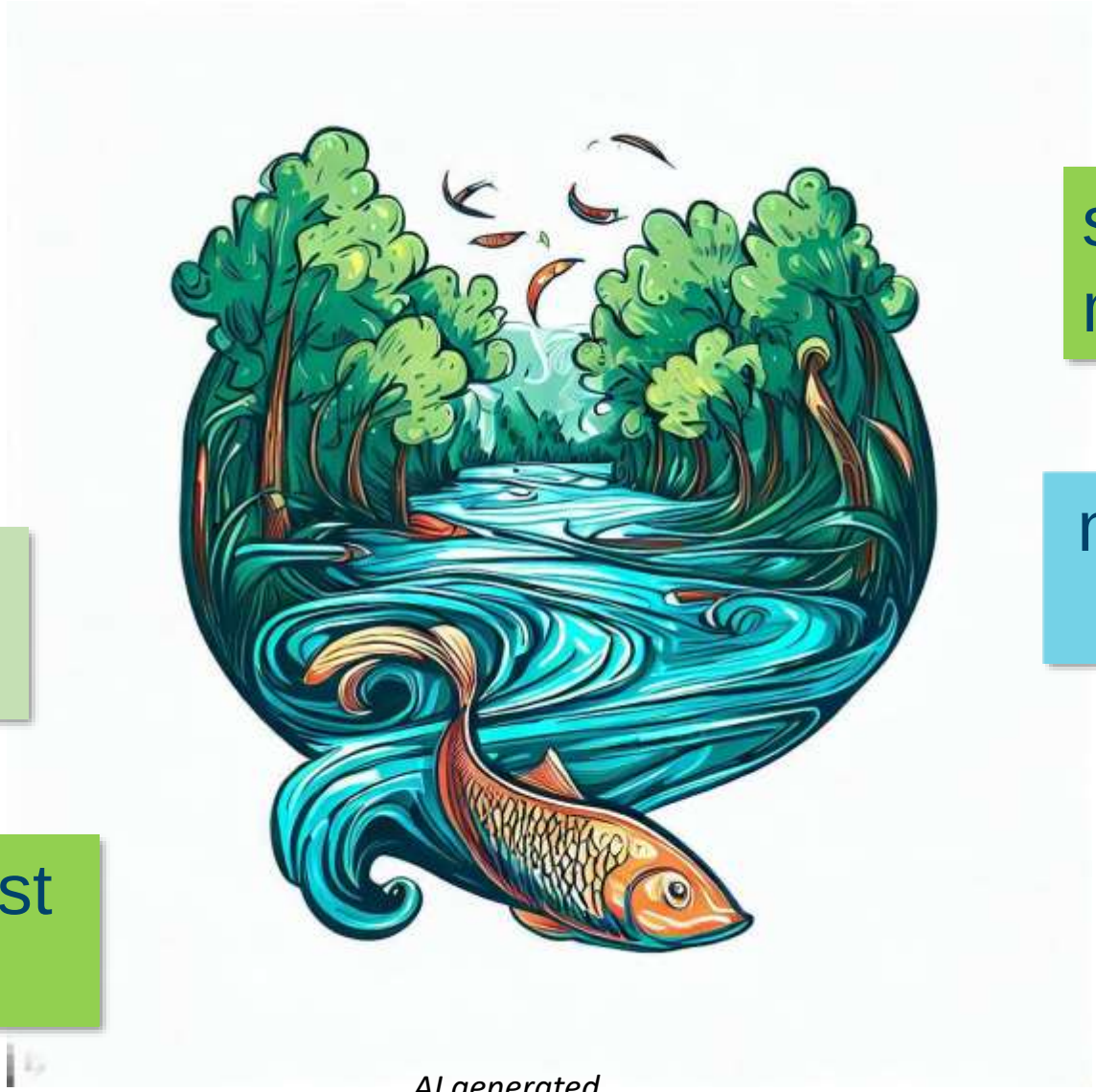
removed/modified

Key topics

HYMO measures

management of protected areas

sustainable forest management



AI generated

sustainable land managament

native fish species, sturgeons

water quality measures on local scale

How?

Planning

Monitoring

Implementation

Stakeholders

Cooperation

Capacity building

Communication

Mobilisation

Replication

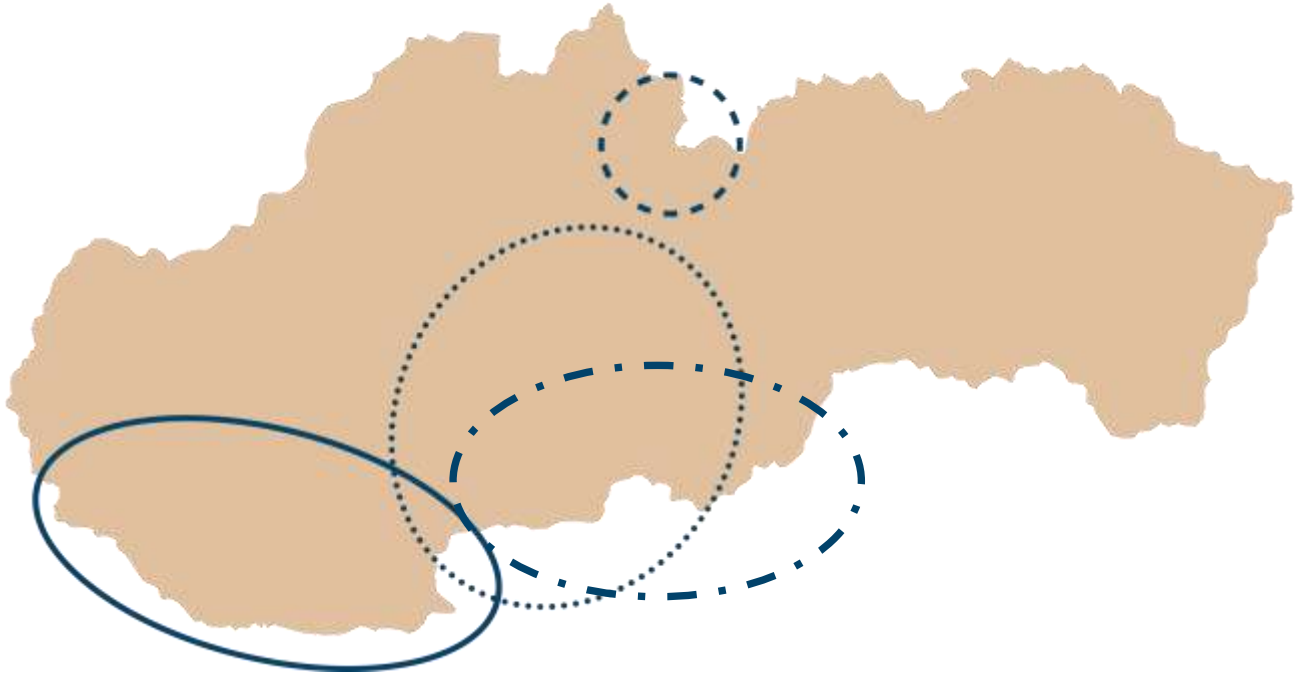
Project sub-basins

Danube

Hron

Ipeľ

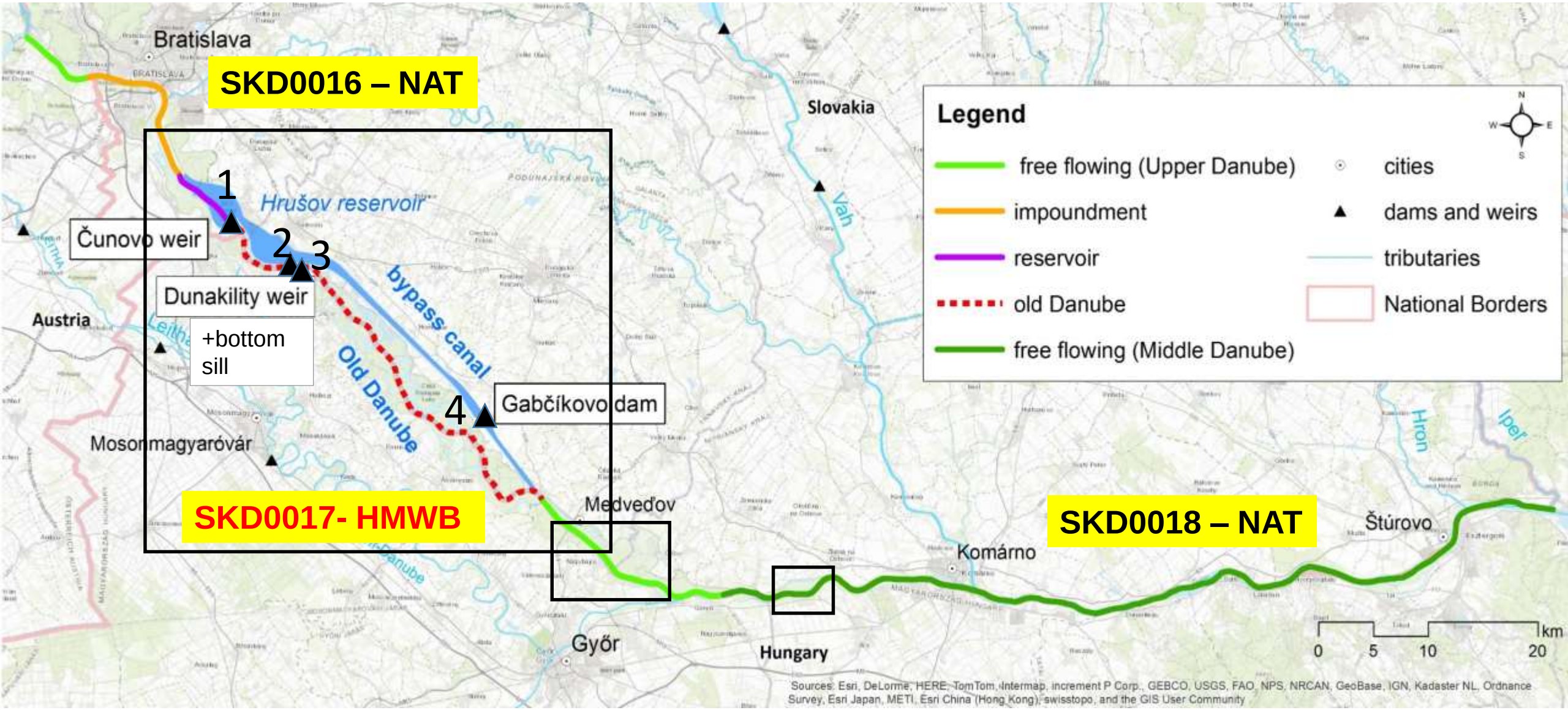
Belá



19 Natura 2000 sites

The Danube

Living Rivers



Ecological status/potential: 3 (moderate)

Slovak section of the Danube river: 172 km

Barriers on the Danube and canal

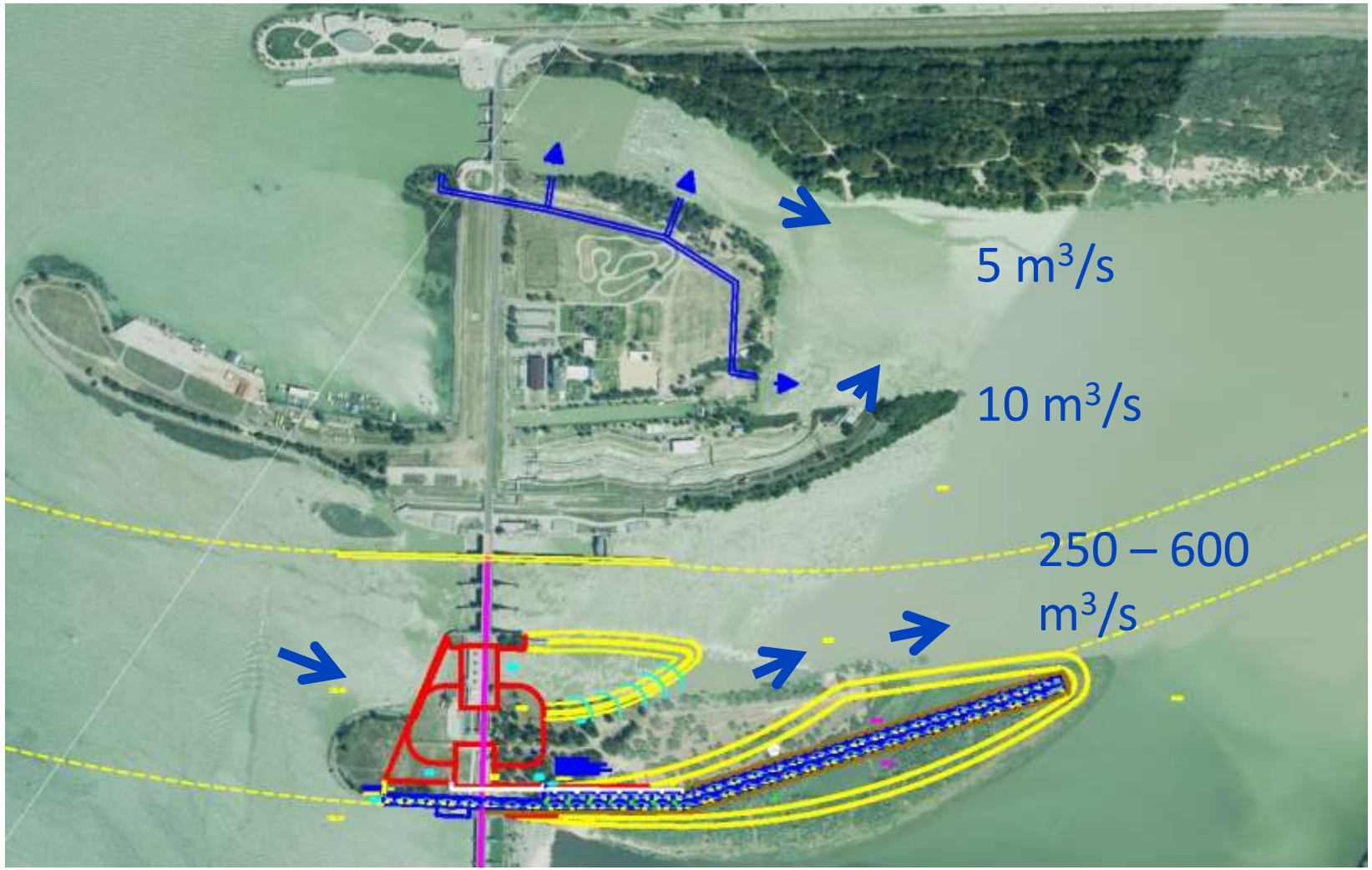
Dunakiliti dam (HU)
and bottom sill (SK/HU)

Čunovo dam

Gabčíkovo HPP

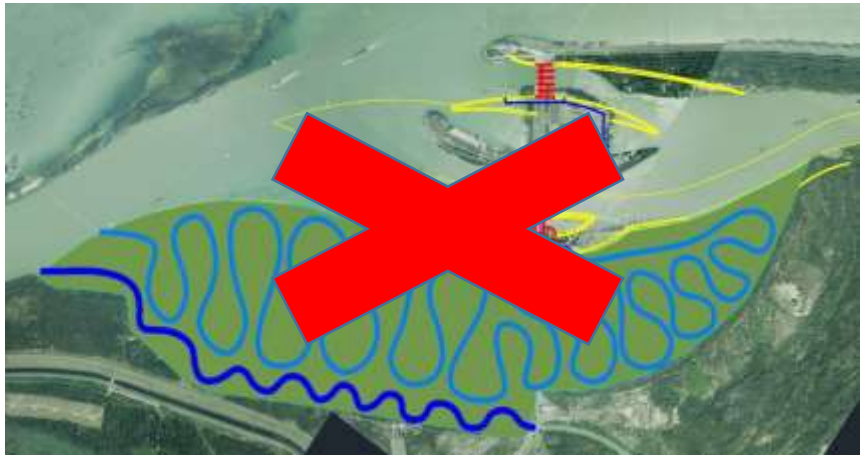
Čunovo dam

- Reconstruction of HPP – 2nd HPP being projected - ca 2028-2032 in operation
- **Main fishpass:** giant sturgeon (size 4 m), sterlet - *acipenser ruthenus, barbus barbus, aspius aspius*
- **Secondary fishpass -** slow migratory species



Reconstruction of Čunovo II. : HPP + fishpass

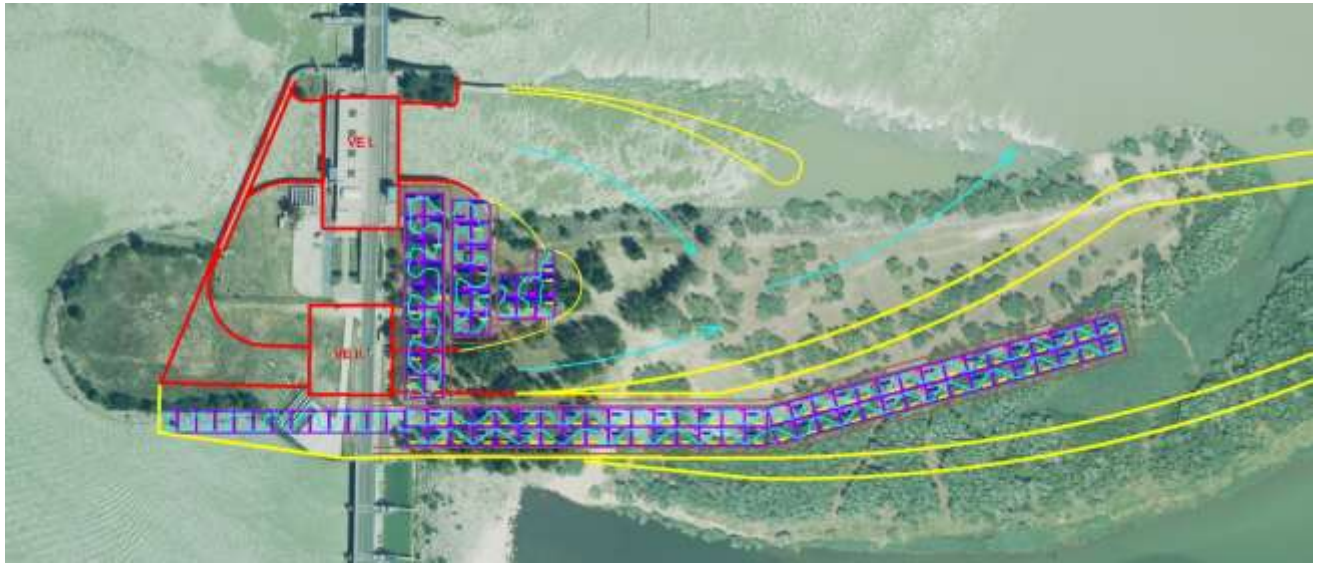
- **Expert working group** – engineers, biologists, Danube river and sturgeon experts from Slovakia (7 institutions involved)
- Document „**Complex proposal of measures and recommendations for a spectrum of target fish species“** – developed according to Decree 383/2018 Z.z., SK methodology on fishpass construction (2015/2023) and the latest scientific knowledge – given to the investor
  - **List of expected fish species** in the river reach (37 original, 9 non-original species) – will be updated according to the monitoring results (latest in 2025); plus potential fish species: *huso huso*; determination of fish zone as a basis for technical solutions
  - **All technical variants** based on the methodology **were considered** – systematically, including removal of weir, the best close to nature solution, bypass channel, in-channel ramp, pools etc. –
  - Variants rejected if inappropriate, technically not feasible, or high financial costs expected



Čunovo main fishpass

- Recommended type for the main fishpass: Type 7 **pool fishpass**, in the island, preferably with stone-gravel bottom; on the lower end fixed with concrete (flood discharges etc.)
- Fish: giant sturgeon (size 4 m), sterlet - *acipenser ruthenus, barbus barbus, aspius aspius*

- 107 pools, discharge 9,5 m^3/s, additional discharge 5 m^3/s, at the outflow 14,5 m^3/s
- 2 variants of outflow – considering operation of 2 HPPs



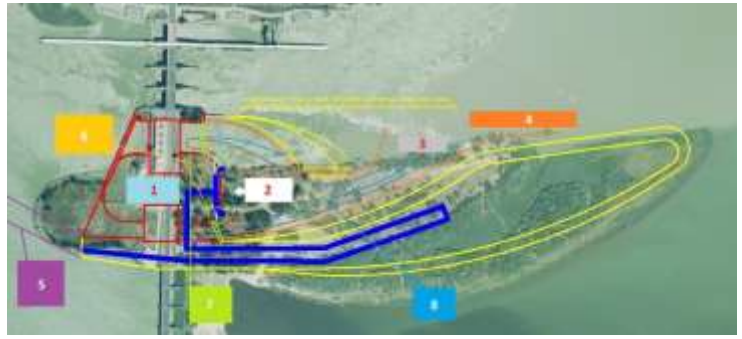
Pool fishpass parameters

Water level difference	8 cm
Max velocities in slots	1,25 m/s
Min. velocities in slots	0,75 m/s
Slot width	3,2 m (4x fish width)
Pool size	10 x 12 m (4x fish length)
Pool depth	2,50 m (3x fish height)
Depth on the outflow	4,50 m
Upper water level	130,10 - 131,10 m n.m.
Lower water level	123,80 m n.m. Q=800 m^3/s
	123,70 m n.m. Q=600 m^3/s
	123,16 m n.m. Q=400 m^3/s (minimum for giant sturgeon)
	122,50 m n.m. Q=250 m^3/s
Outflow bottom elevation	118,00 m n.m.

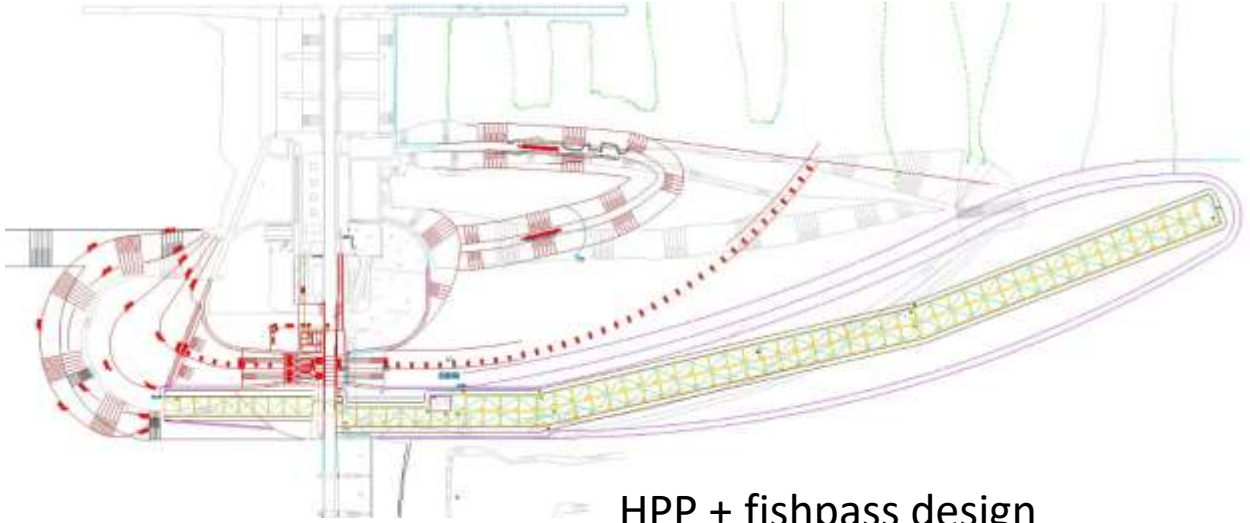
Čunovo main fishpass

List of additional requirements

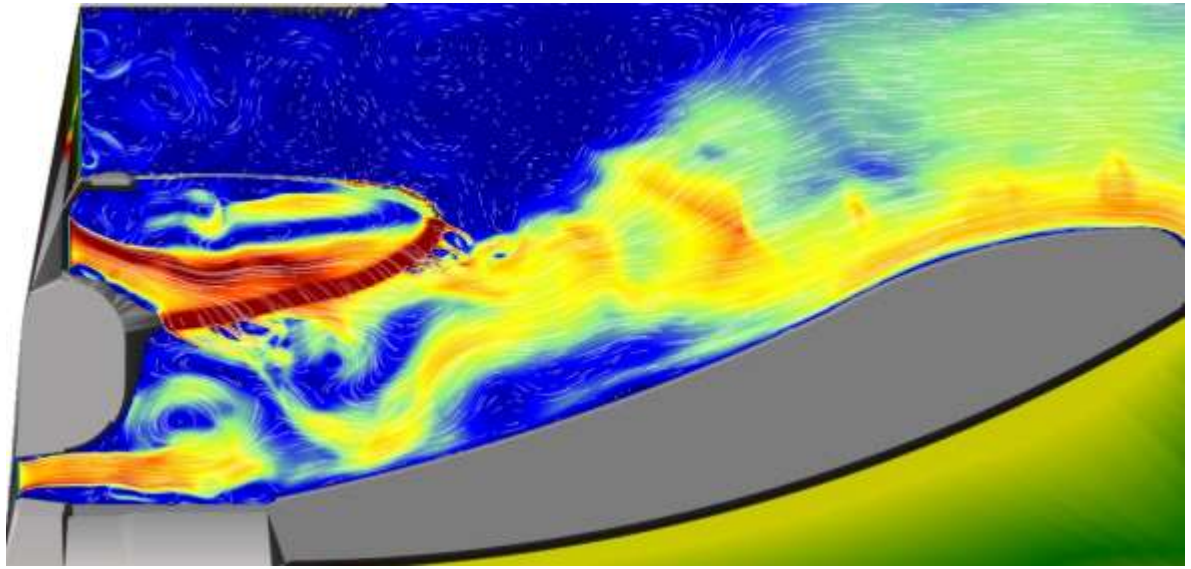
1-2. Combination of acoustic, electric and stroboscope fish deterrents near turbines
3. Rakes (with highest possible luminosity)
4. Fish friendly turbines
5. Waterfall acoustic attraction of fish on fishpass outflow (discharge 50 l/s)
6. Deepened channel (2,5 m) for fish from the outflow towards the Danube channel
7. Resting places with low velocities near the outflows
8. Resting pool with double volume
9. Shading by trees
10. Natural gravel bottom (20 cm)
11. Standing stones (15 cm)
12. Structured walls
13. Bioscanner and camera system
14. Ichtyological monitoring
15. Roads for maintenance

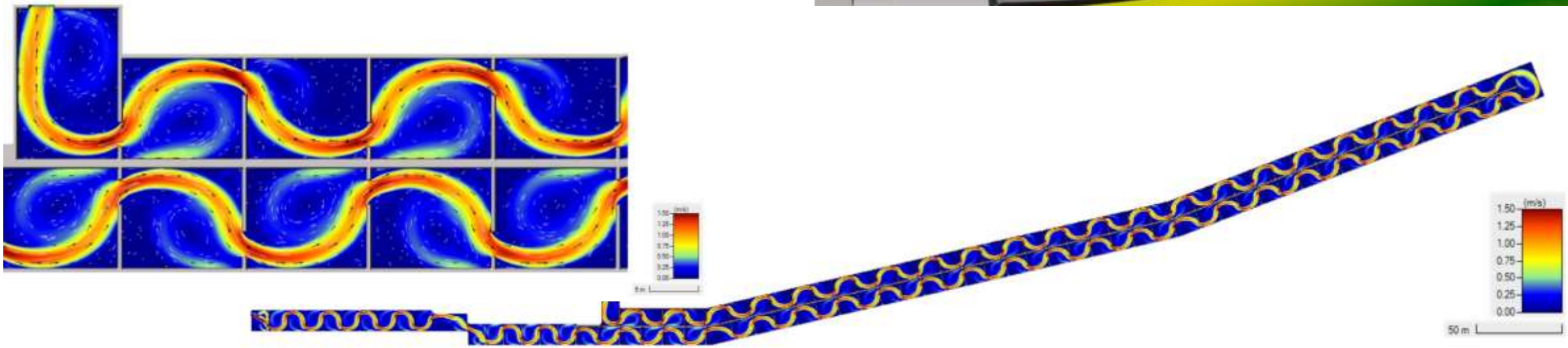


Modelling in progress

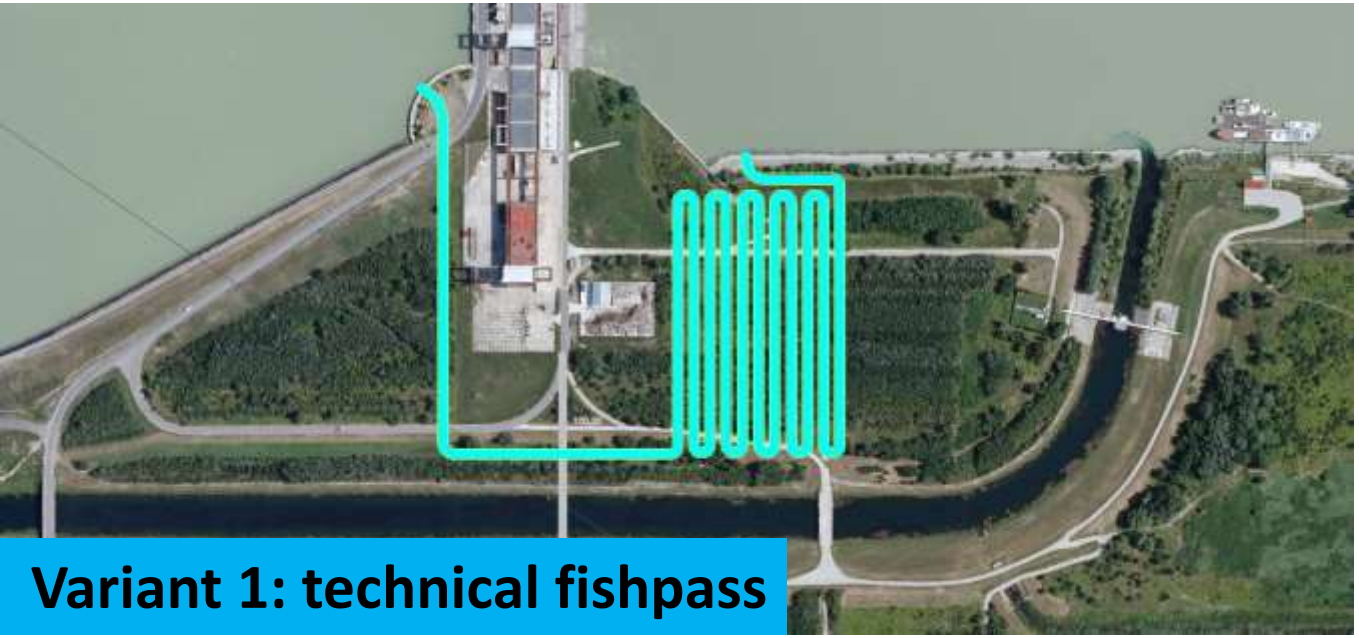


HPP + fishpass design

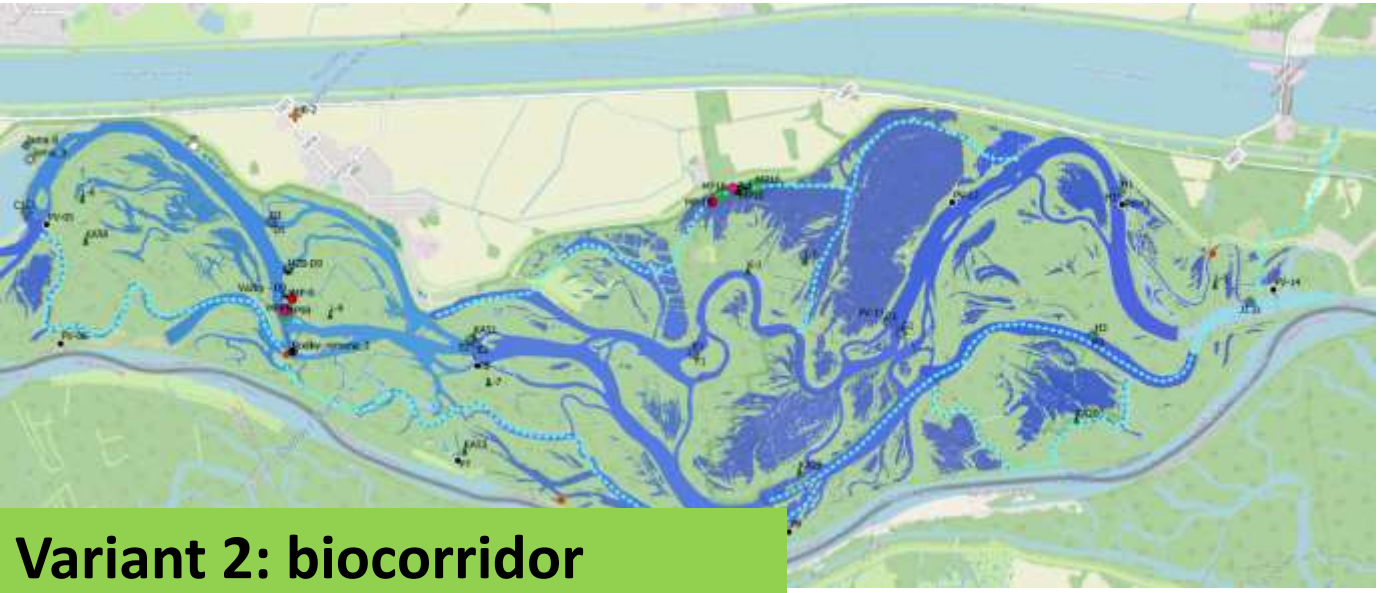




Gabčíkovo HPP - Danube sidearm system (SK side)



Variant 1: technical fishpass



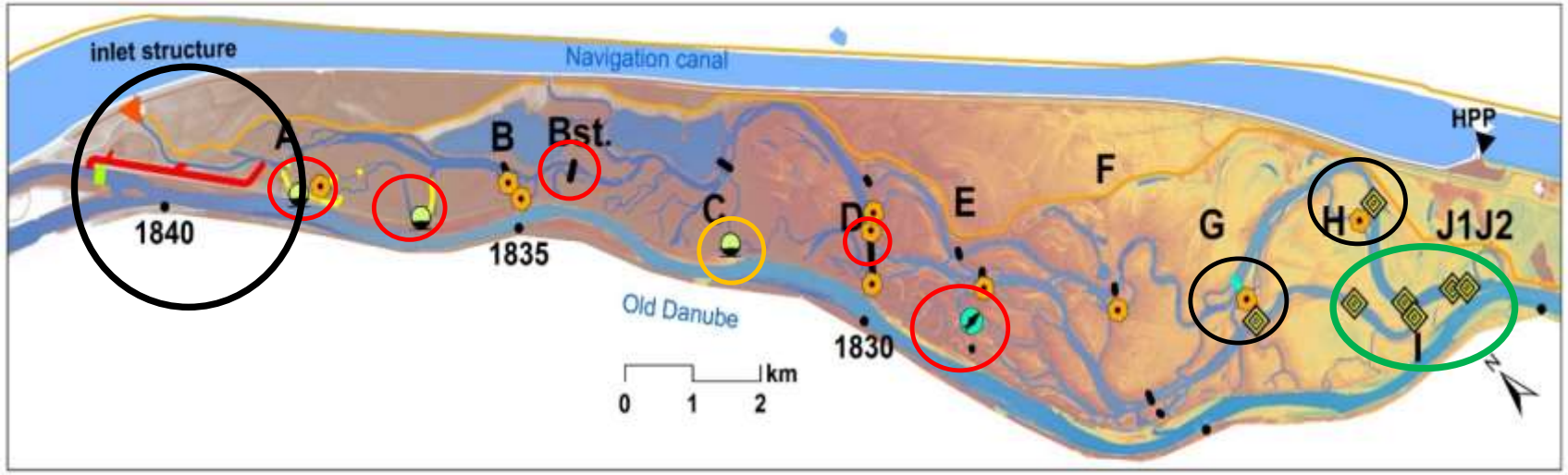
Variant 2: biocorridor

Biocorridor via side-arm system + old channel

- **free flowing, without impoundments, gravel bed**

Planning ongoing, updating 2D models;

8,2 km free-flowing branch via C1 – D3 – E3 – F3, discharge 10-15 m^3/s.
5,8 km free flowing reach F3 – outflow - removal of weirs G3, H3, I2, J1, J2, discharge 30 - 50 m^3/s.
Upper part of the side-arm system – used as pools with existing weir, for simulated floods



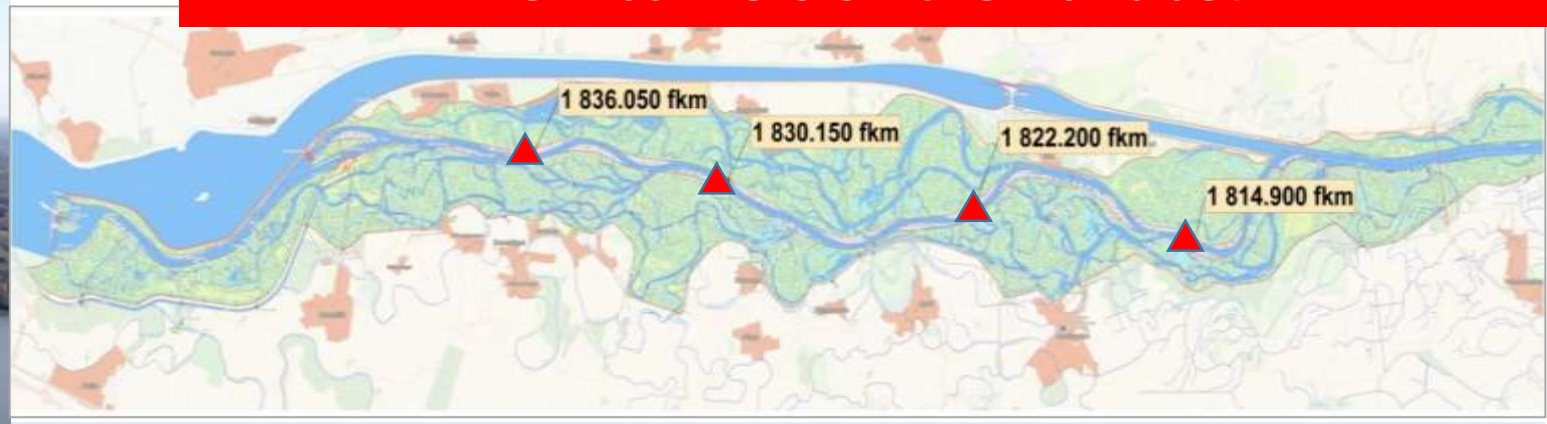
Legend

Proposal of restoration measures

- culvert construction (no longitudinal connection at present)
- increase the number of existing culverts
- culvert structure enlardgement
- fishpass reconstruction
- bottom sill to impound water in the Old Danube
- inflow channel from the Danube
- sediment removal (side-arms reconnection)
- barrier altitude increase

LIFE14 NAT/SK/001306

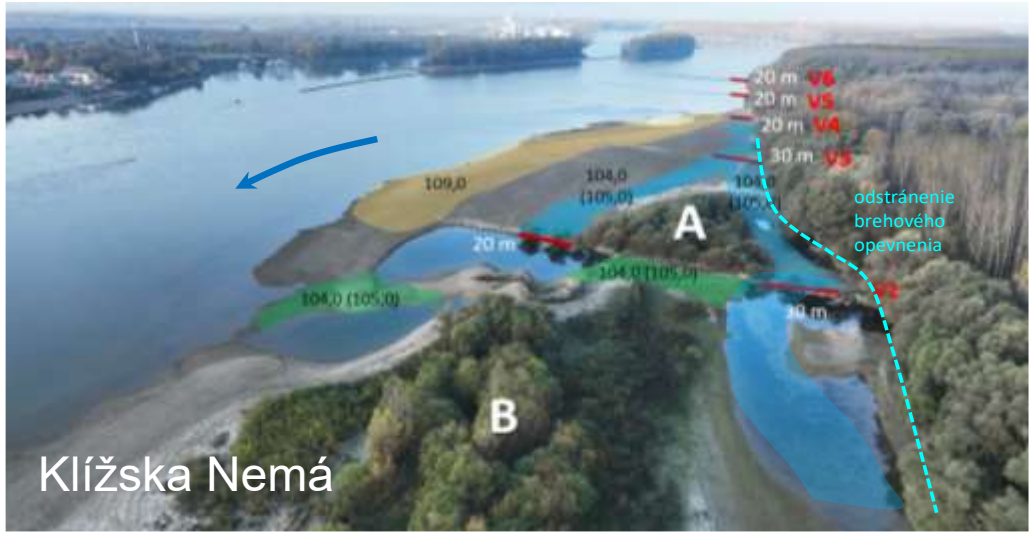
New barriers on the Danube?

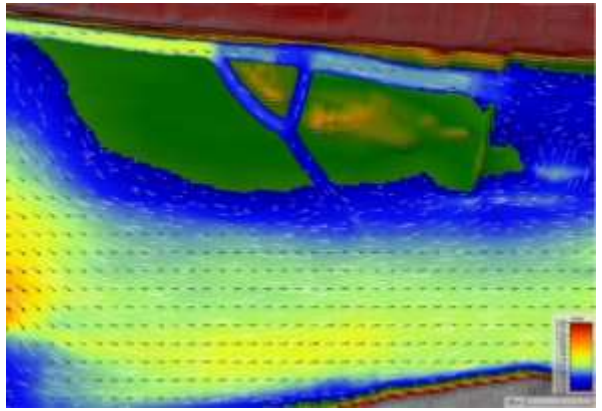


Insula magna – Hungarian project - need bilateral cooperation and harmonisation of plans

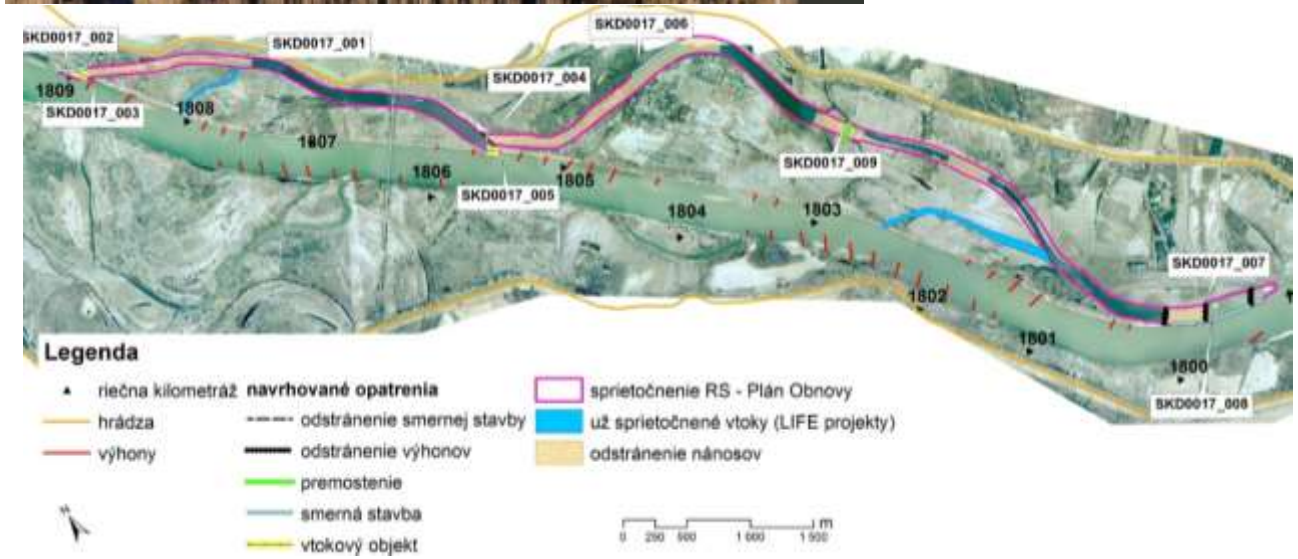
Complementary projects

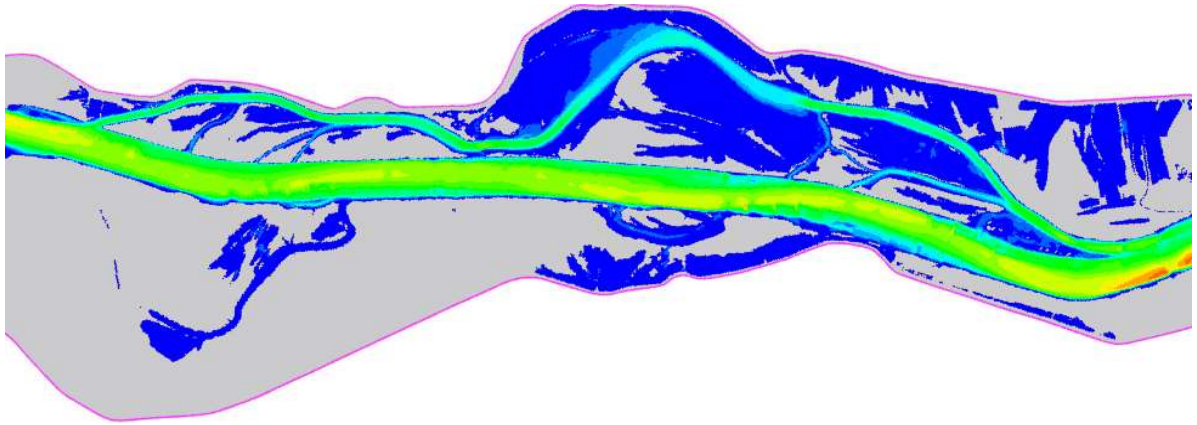
Side-arms reconnections, Groin reconstructions





Velocities at low flow 1000 m3/s – scenario 2





Source: VÚVH studies

2023

- 20 000 sterlet individuals marked and stocked at 3 sites on the Danube
- Initial works for telemetric monitoring and ichtyological surveys

Thanks for attention

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