



# Reconnecting European streams *by removing obsolete barriers*

Monistrol de Calders on river Riera de Calders, Catalonia, Spain, Catalanian Water Agency

Prague, October 22 2025

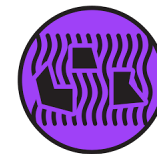


# Content

How it started and what is the magnitude of the problem?

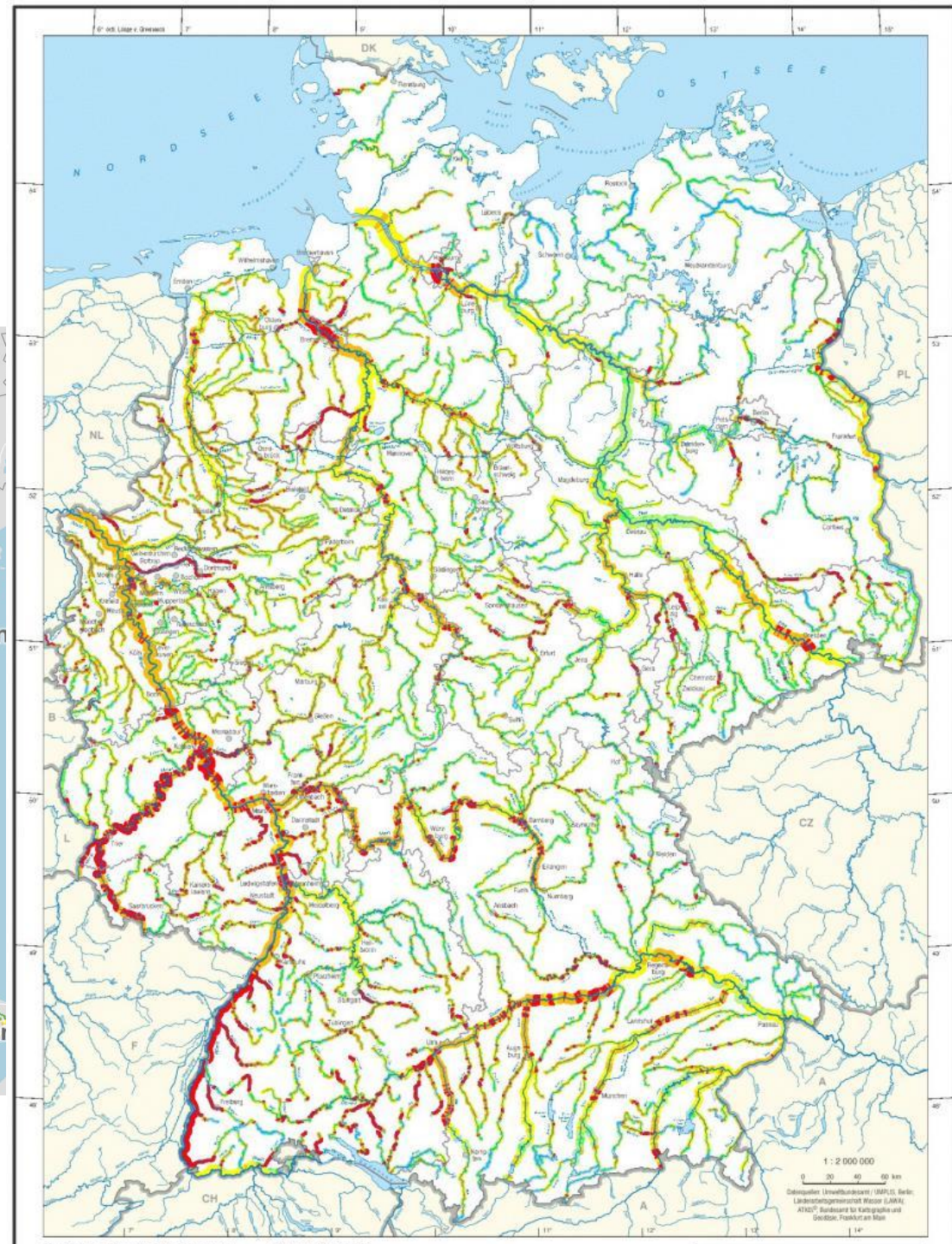
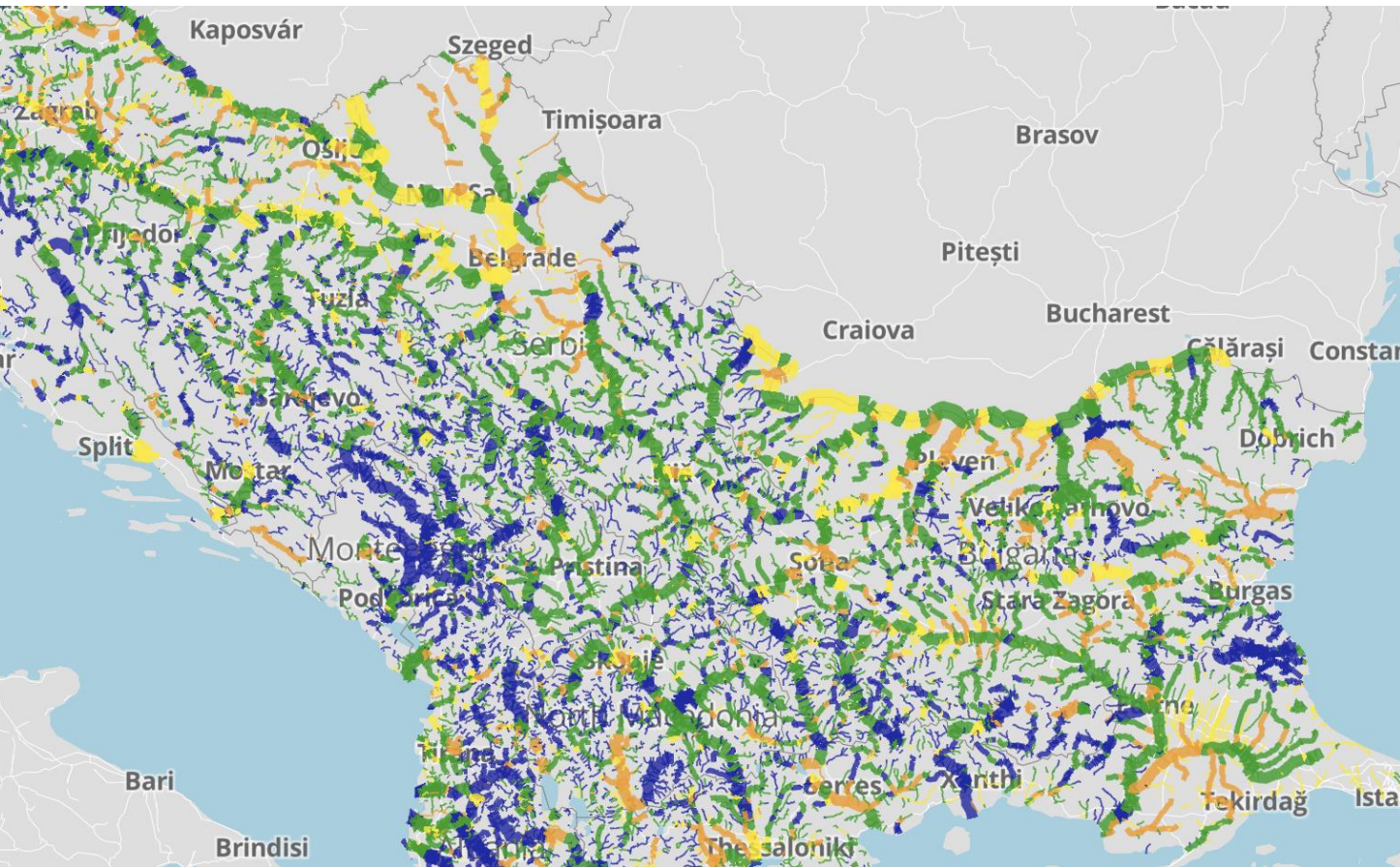
Barriers can and are being removed - examples from around Europe

How to start removing barriers in rivers?





# Rivers and me

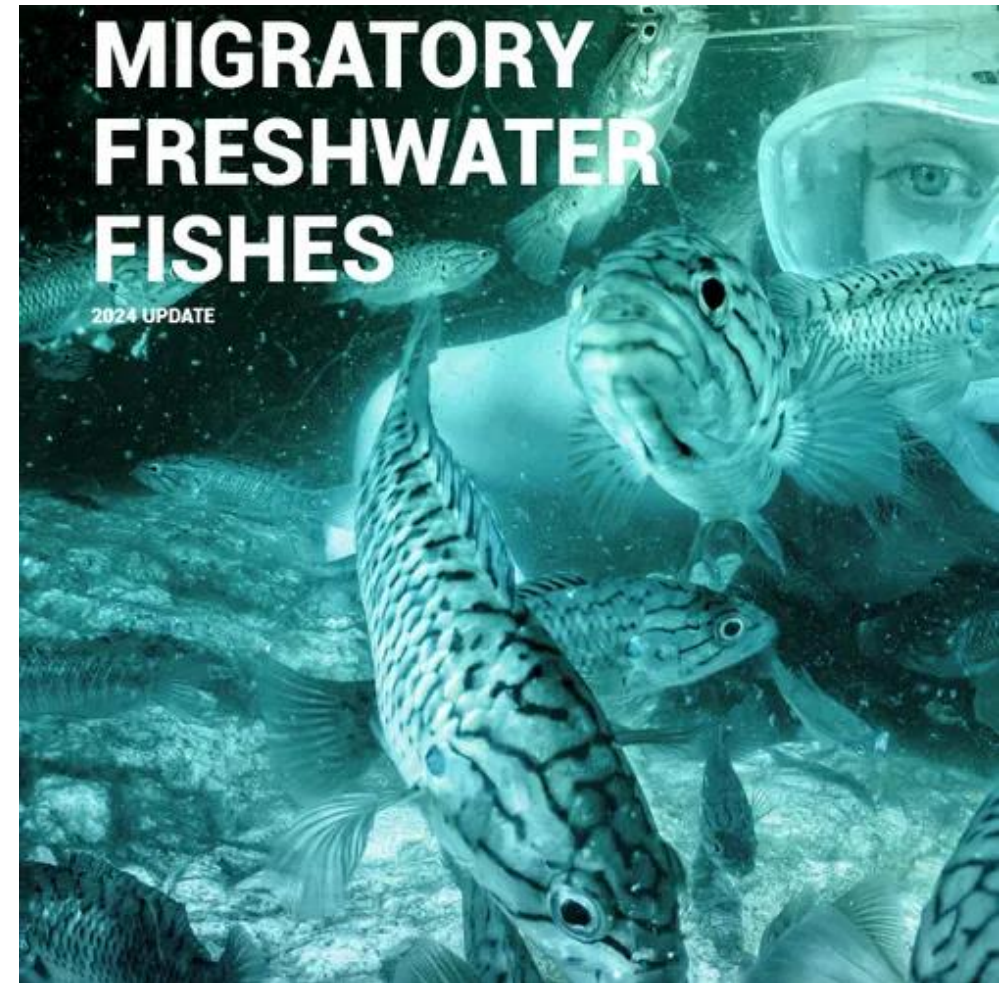




# Decline of freshwater fish species

## 2024 Living Planet Index Update for Migratory Freshwater Fishes

- **in Europe a 75%** decline in  
monitored populations of  
freshwater migratory fishes from  
1970 to 2020



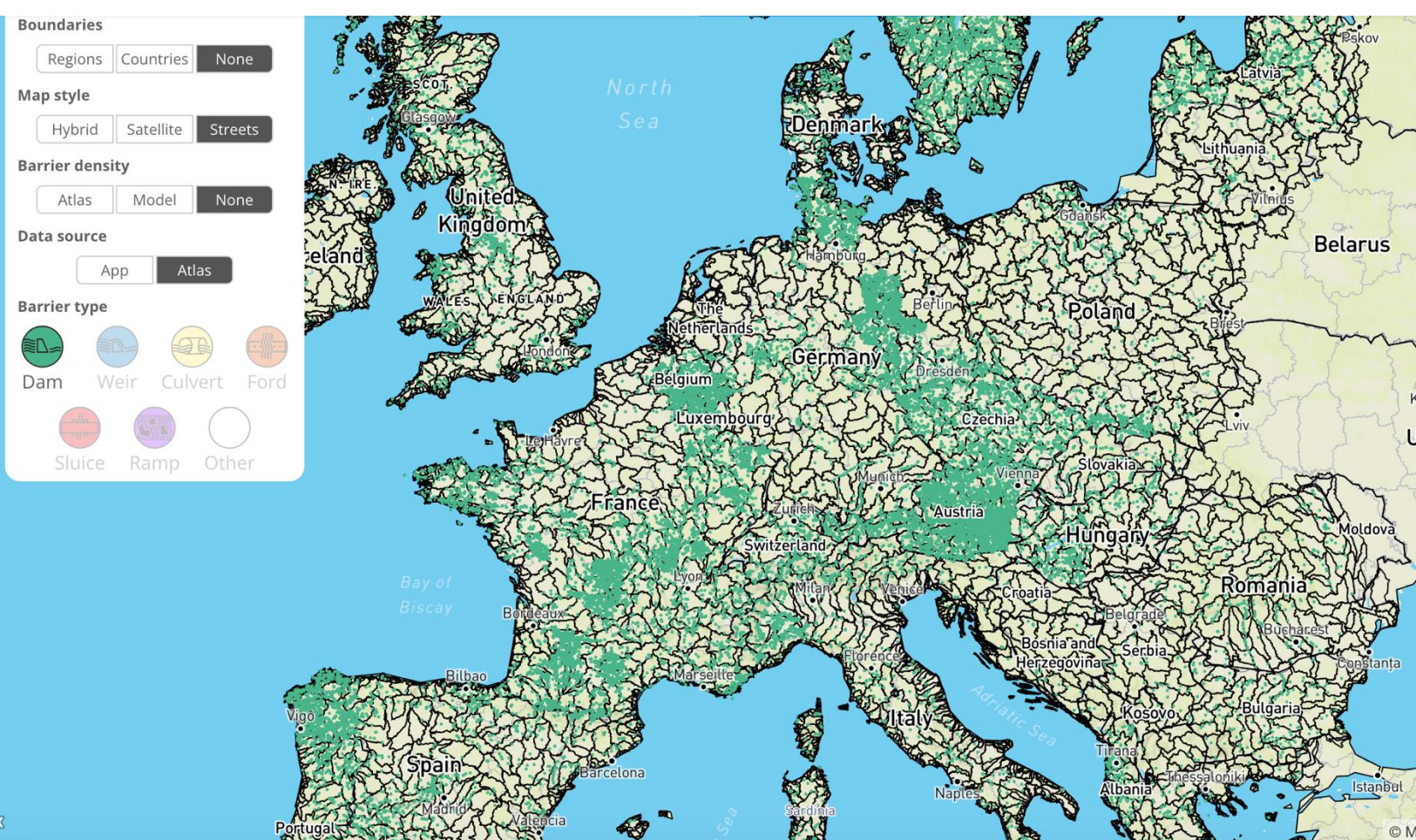


# Is fragmentation of habitats the issue?

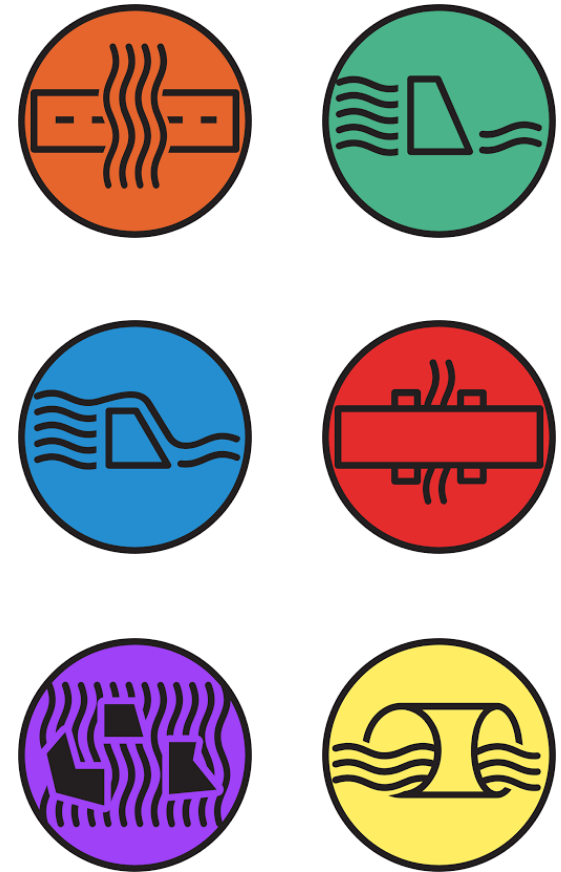
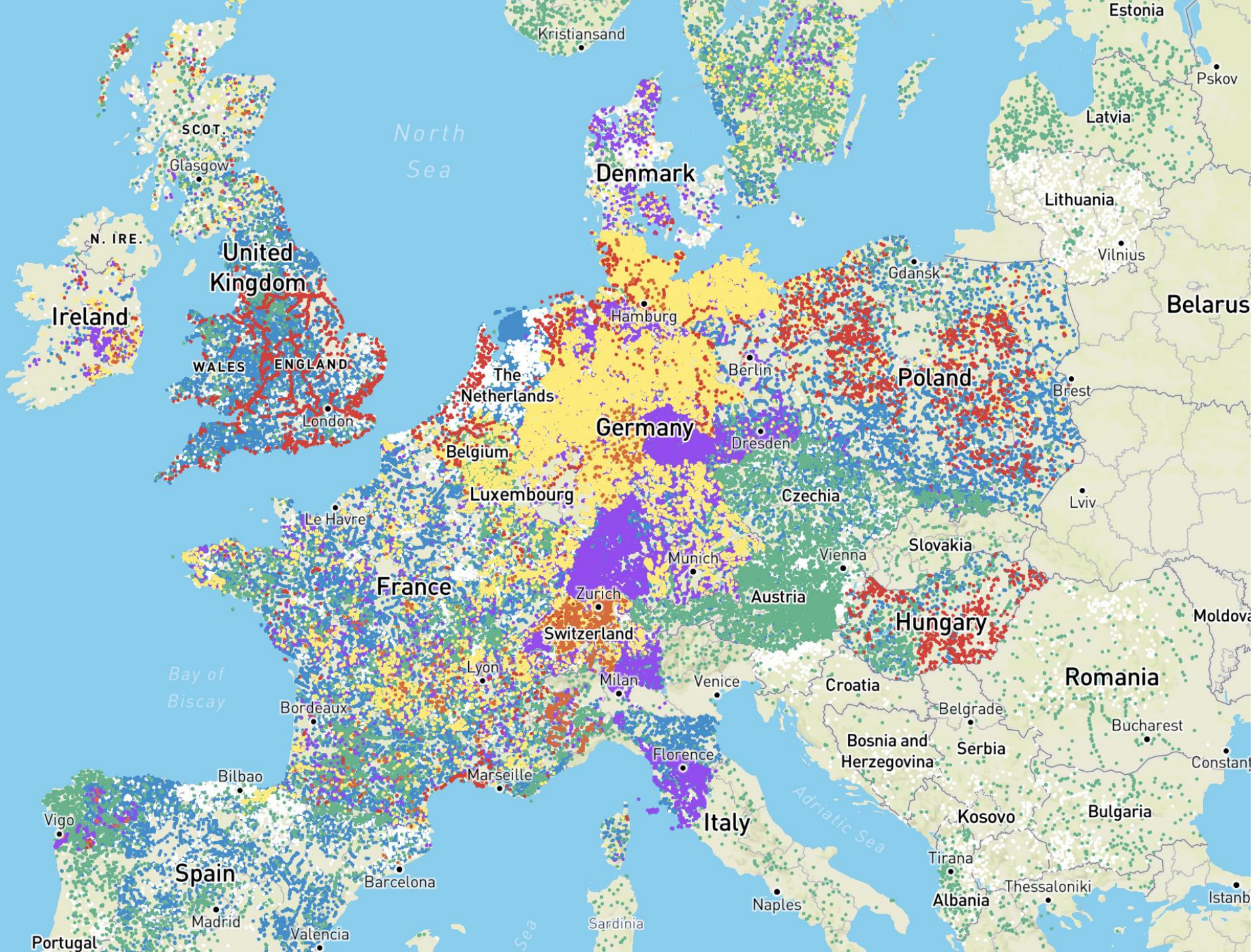




# Horizon research project AMBER









# Fragmentation of European rivers

It is not only large operational hydropower and water storage dams, but also other hydrotechnical infrastructure like weirs, culverts, dams, sluices, fords, ramps, other (eg. melioration systems).

**National, regional inventories + citizen science data collection.**

AmberBarrier Atlas = 630,000 unique entries, of that **156,000 obsolete** barriers

**Expert estimate = 1,2mio barriers**





# Action is needed - legislative support

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Water Framework Directive

EU Biodiversity strategy for 2023

- Target restoring 25.000km of free-flowing rivers

Definition of free-flowing river?

Nature Restoration Law -> National plans



©Arthur de Bruin, Valsan\_Romania\_Asprete\_Romanichthys valsanicola





Weir on Jasenica stream, Hronská Breznica, SK

Ongoing field research across Europe

improving barrier inventories in river basins  
(NRL & free-flowing river definition, ORP funded projects, LIFE projects)

Existing inventories are missing significant % of actual barriers in rivers!





# Common misconceptions

All barriers have a function;

Infrastructure is safe and maintained;

All dams are flood control;

Removing a weir will dry up the river;

All fishways work and are win-win solution;

All dams can be refurbished with economically feasible (mini)HPP;

Sediment transport in rivers is just one big problem,...



# Reasons to remove barriers in rivers?

1. **Economic** (loss of original purpose, maintenance costs, loss of economic value)
2. **Safety** (aging dam structure, reservoir sedimentation, failure, liability,...)
3. **Environment** (habitat connectivity, restoration of natural flow, fish passage requirement,...)







Sindi dam after removal, Pärnu river, Estonia



# The Removals

Annually around 500 barriers are removed from European rivers.



**All-time record in removed barriers**

The removal works of Tormal Dam at Caga River, Spain in autumn of 2023  
© Pao Fernandez Galindo

**INTRODUCTION**

European rivers have been fragmented for centuries by more than 1.2 million in-stream barriers (Belletti et al. 2020), classified in different categories (dams, weirs, culverts, fords, ramps). These barriers cause habitat degradation and biodiversity loss, and they alter the natural nutrient flow. They also modify the natural sedimentation, and thus amplify the erosive power of water downstream. Barriers also modify the water level and impact the recharge of the aquifer. Low-head barriers (e.g. weirs) also pose a threat to human lives and are thus known as drowning machines (of page 11), while barriers that have sufficed their useful lives and now remain obsolete are at risk of structural failure.

Lately, the tide is turning and barrier removal is recognized as an effective and useful river restoration tool in Europe. The number of barrier removals increases year after year (Table 1) and new European countries are starting to implement this practice to restore river connectivity and ecological continuity. Most barrier removals occur in western and northern Europe, where barrier density is highest, but the restoration tool is gaining attention in other European regions too, like the Balkans. Mainstreaming barrier removal in regions and countries with relatively unfragmented rivers is imperative and timely, to hamper the accelerating pressure for hydropower development. Dam Removal Europe (DRE) coalition publishes a progress report on an annual basis to evaluate the advancement in the implementation of EU policies and to analyse the progress and impact of dam removal utilization as a river restoration

The significance of river connectivity has been recently recognized in the most official way, as it is a central topic of the EU Nature Restoration Law, which includes an obligation to remove man-made barriers to contribute to restore the free-flowing condition of at least 25000 km of rivers in Europe by 2030. On the 27th of February 2024, the European Parliament approved the Nature Restoration Law, following the provisional agreement reached by European member states in November 2023. It now must be adopted by the Council, before being published in the EU Official Journal and entering into force 20 days later. According to the EU Nature Restoration Law, ecosystems will have to be restored in all member states, contributing to the EU's climate and biodiversity objectives and enhanced food security. To achieve these goals, member states must put in place restoration measures in at least 30% of habitats that are now in poor condition and are covered by the new law.

**DAM REMOVAL EUROPE**

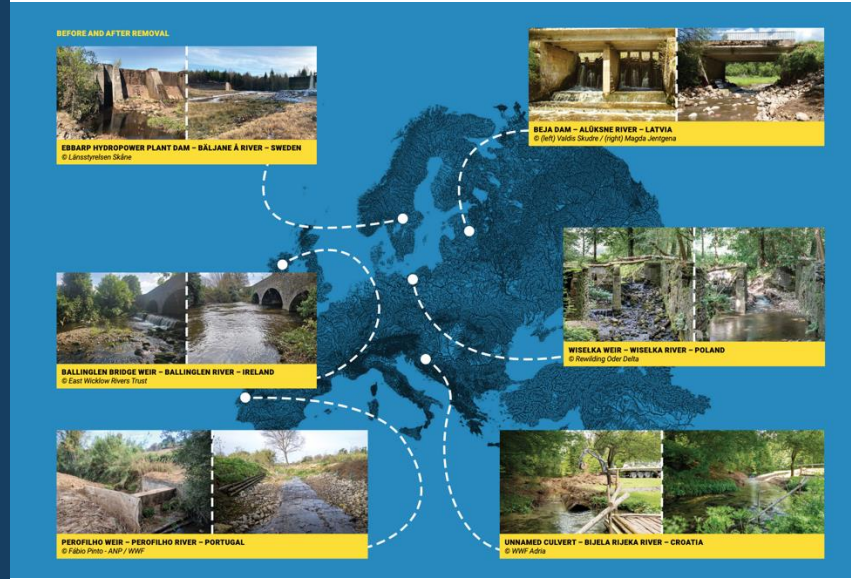
Dam Removal Europe (DRE) is a coalition of seven organizations: the World Wildlife Fund, The Rivers Trust, The Nature Conservancy, the European Rivers Network, Rebuilding Europe, Wetlands International Europe, and the World Fish Migration Foundation. The overall ambition of DRE is to restore the free-flowing state of rivers and streams in Europe. In that respect, DRE aims to establish barrier removal as a restoration tool and to mainstream this practice. Through a bottom-up process DRE has created a continuously growing European network and it is working towards a holistic approach to remove barriers.



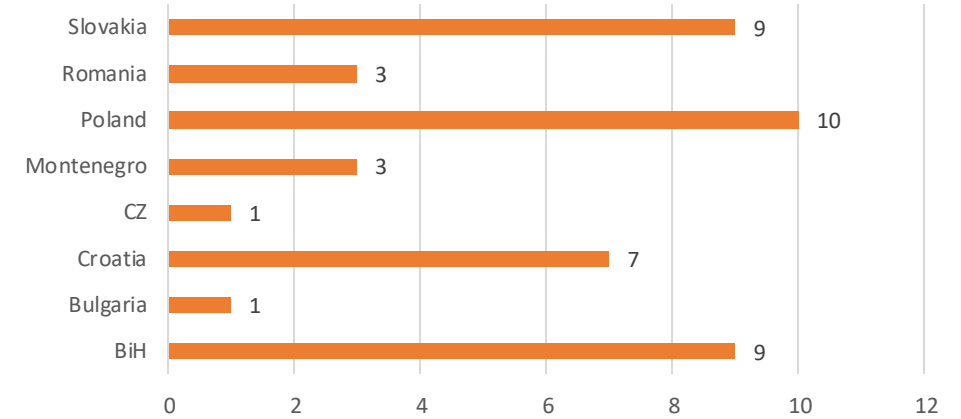
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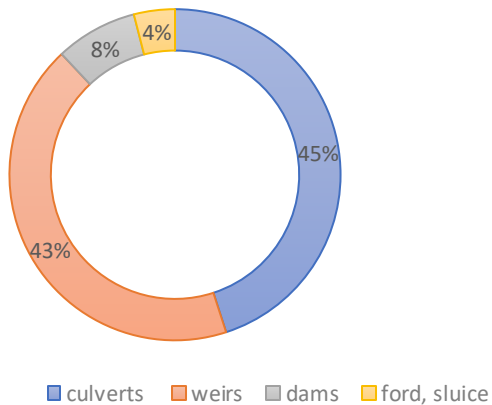
# DAM REMOVAL PROGRESS 2024



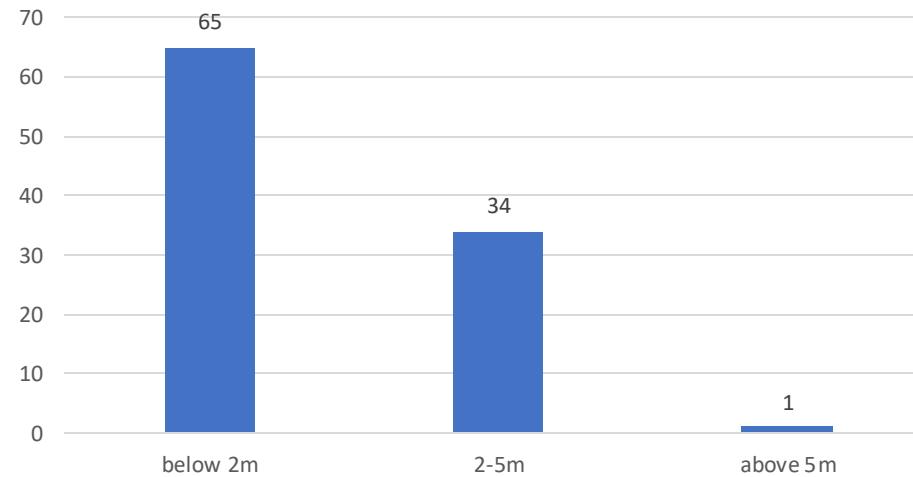
Barriers removed per country (SEE region, total numbers)



barriers per type / 2024



% barriers per height / 2024





# Free-flowing rivers

Building resilience in changing climate



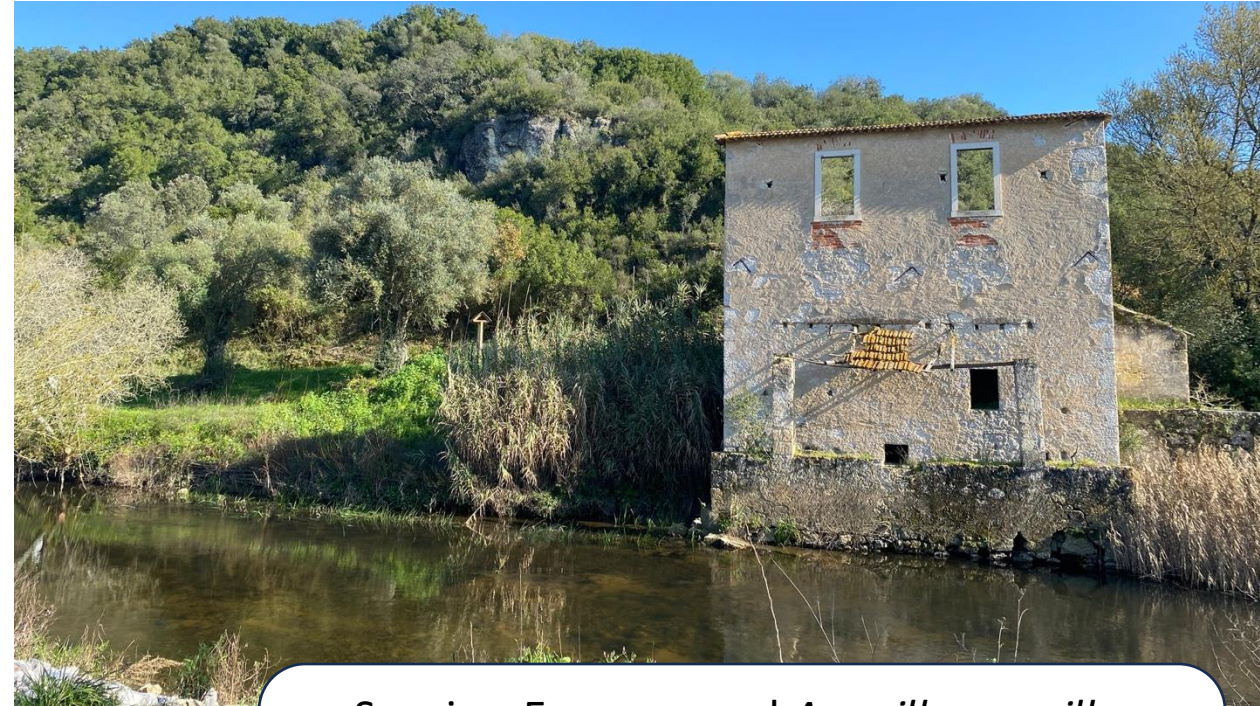
WWF Adria



# Alviela (Portugal)



Vaqueiros weir  
Height: 1.1m  
Length: 14m  
Use: water diversion, obsolete



Species: European eel *Anguilla anguilla*,  
Portuguese-Boga *Iberochondrostoma*  
*lusitanicum*, Southern squalius (*Squalius*  
*pyrenaicus*)



# Wiera (Germany)



Height: 1m

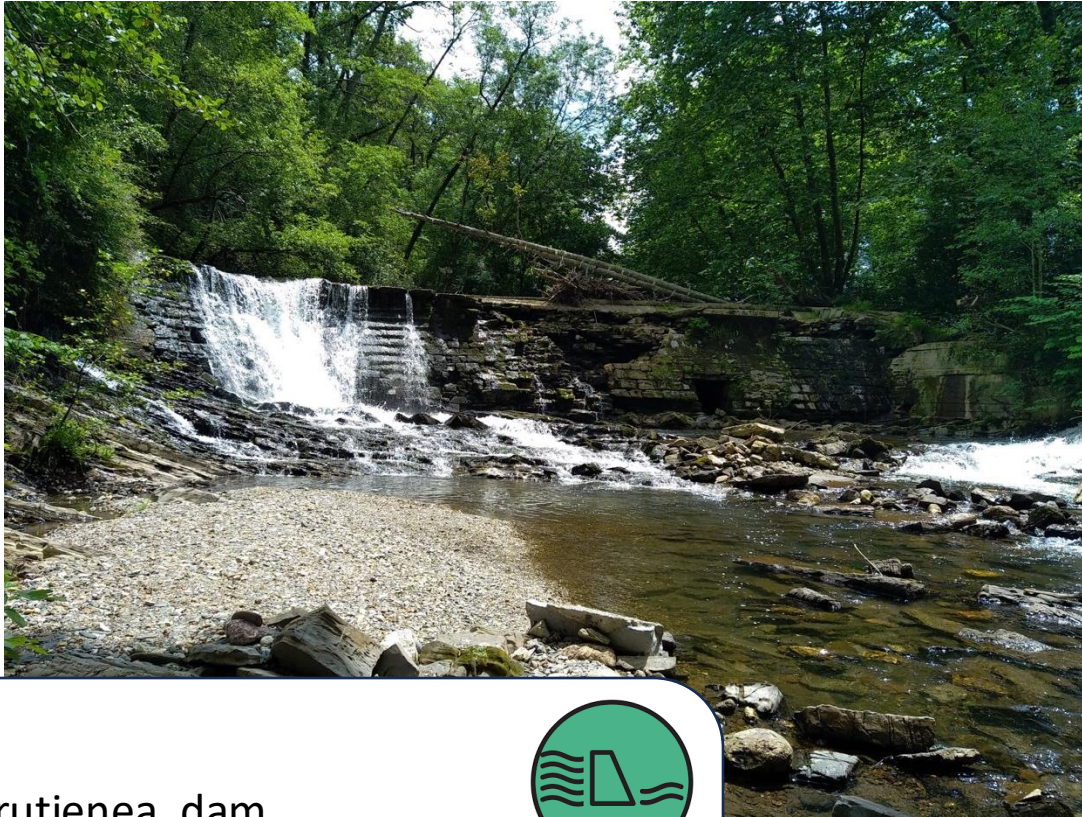
Length: 1m

Use: straightening the stream,  
railway crossing





# Nivelle (France)



Urrutienea dam

Height: 5m

Length: 20m

Use: obsolete for the last 10 years



Species: Atlantic salmon *Salmo salar*, European eel *Anguilla anguilla*, Allis shad *Alosa alosa*, Twaite shad *Alosa fallax*, three lamprey species, freshwater pearl mussel *Margaritifera margaritifera*, endemic Pyrenean desman *Galemys pyrenaicus*, European otter *Lutra lutra*, White-clawed crayfish *Austropotamobius pallipes*



# Vascão (Portugal)

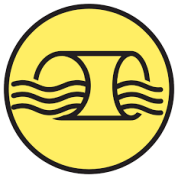


Algarve multi culvert

Height: 1.1m

Length: 14m

Use: replacement of old ford





# Levern Water (Scotland)



Crossmill weir  
Height: 1.9m  
Length: 10.5m  
Use: cotton and paper mill,  
obsolete



Species: atlantic salmon *Salmo salar*





# Petreusse (Luxembourg)

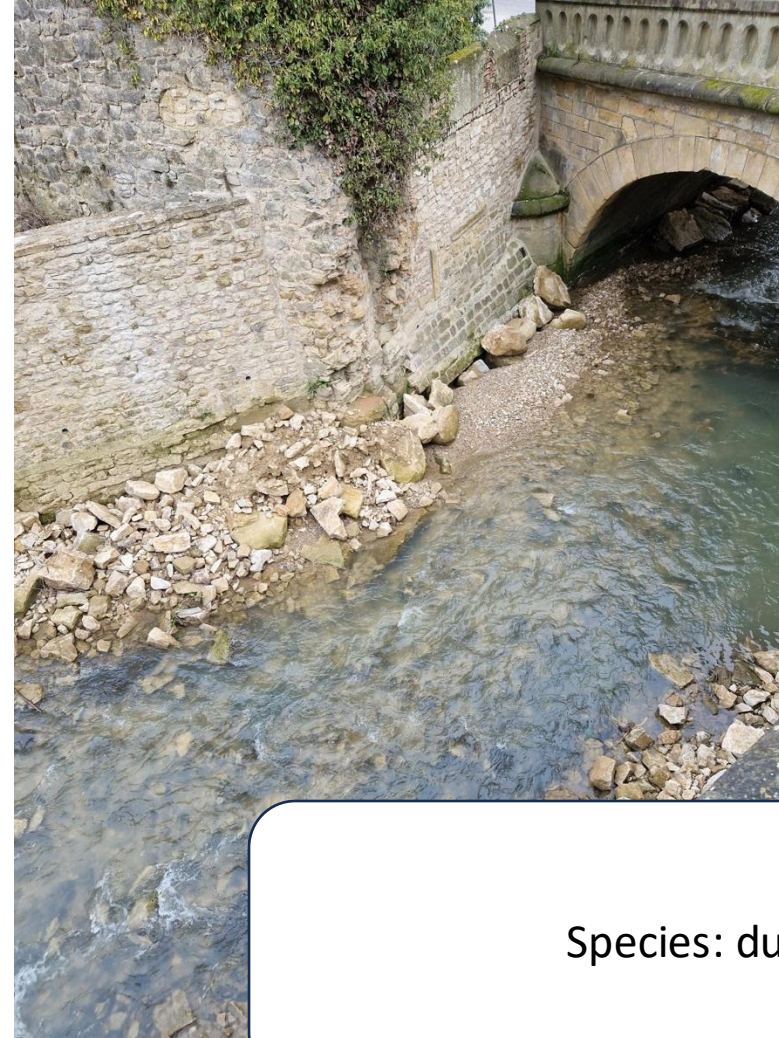


Petreusse valley, city of  
Luxembourg

Height: 1m

Length: 5m

Use: straightening the river



Species: ducks 😊



# Hučava (Slovakia)

Species: Brown trout *Salmo trutta*, Alpine bullhead *Cottus poecilopus*, Stone loach *Barbatula barbatula*

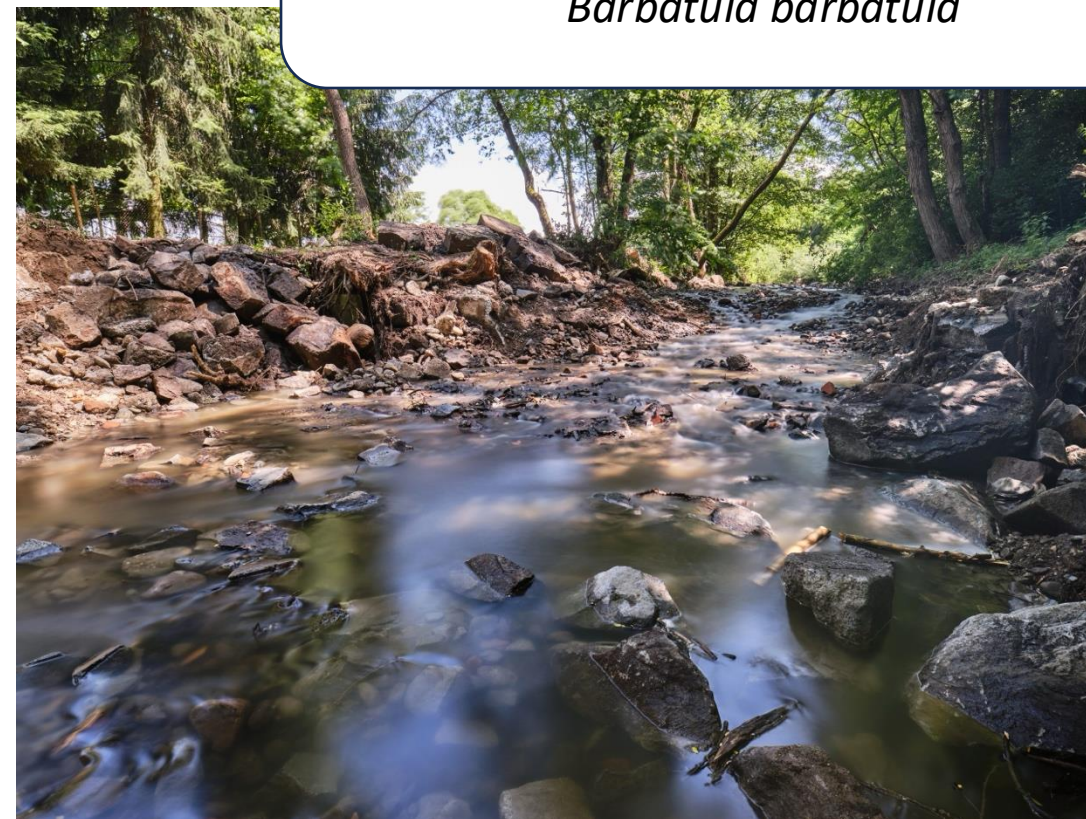


Hučava weir

Height: 1.9m

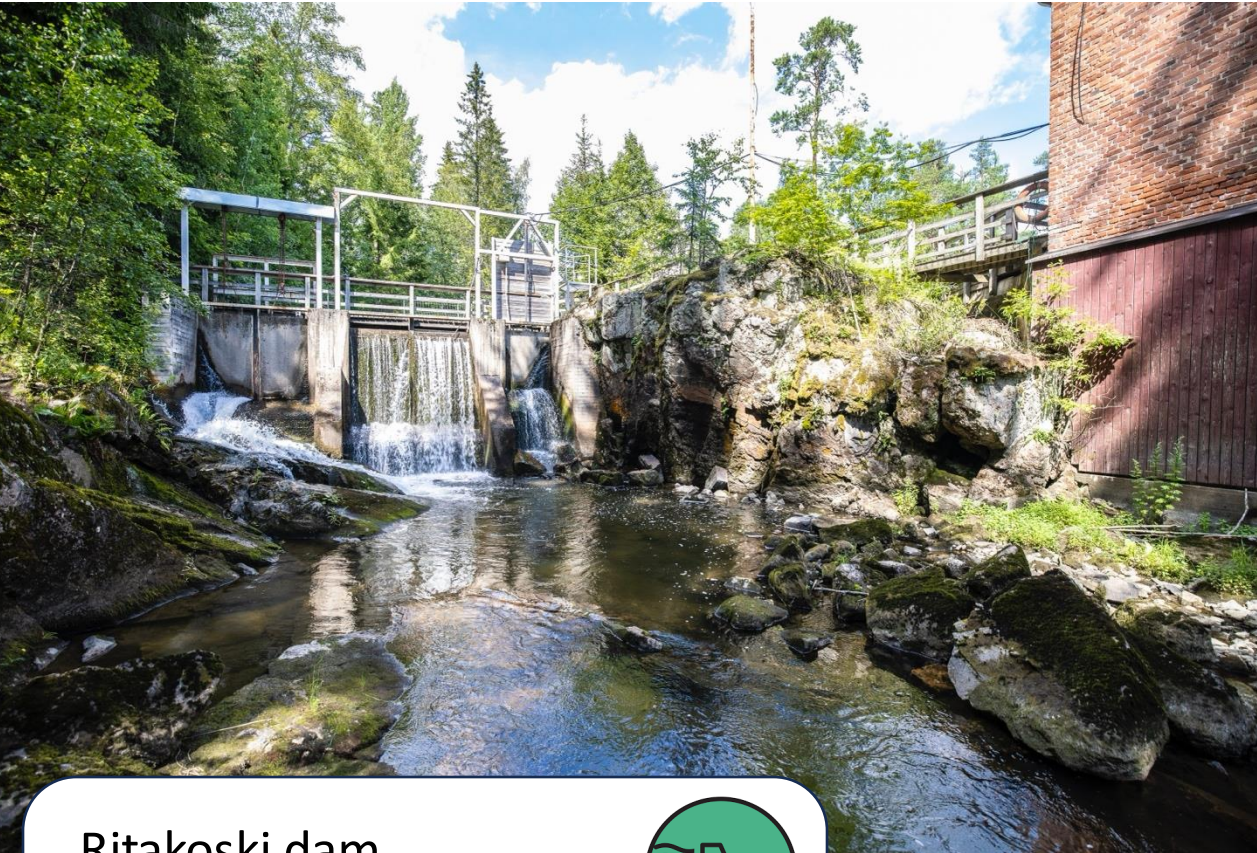
Length: 10m

Use: water diversion, never used





# Hiitolanjoki (Finland)



Ritakoski dam

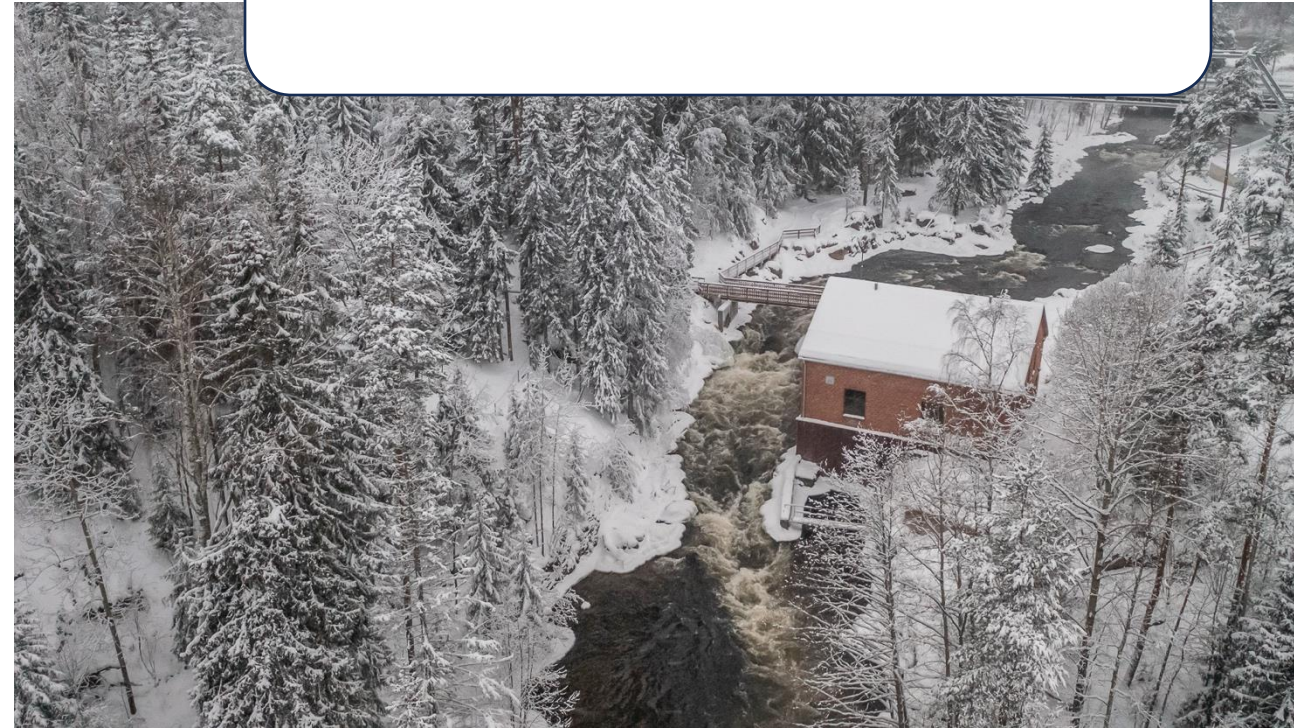
Height: 4m

Length: 15m

Use: hydropower (operational)



Species: landlocked salmon



<https://www.luke.fi/en/research/adaptive-and-resilient-bioeconomy/impact-of-dam-removal-on-bioeconomy>

<https://kalahavainnot.luke.fi/en/vesivoimalaskuri>

<https://damremoval.eu/portfolio/ritakoski-dam-river-hiitolanjoki-finland/>



# Riera de Calders (Spain)



Monistrol de Calders

Height: 5.6m

Length: 50m

Use: paper mill, hydropower

Obsolete, reservoir filled with  
sediments





# Riera de Calders (Spain)

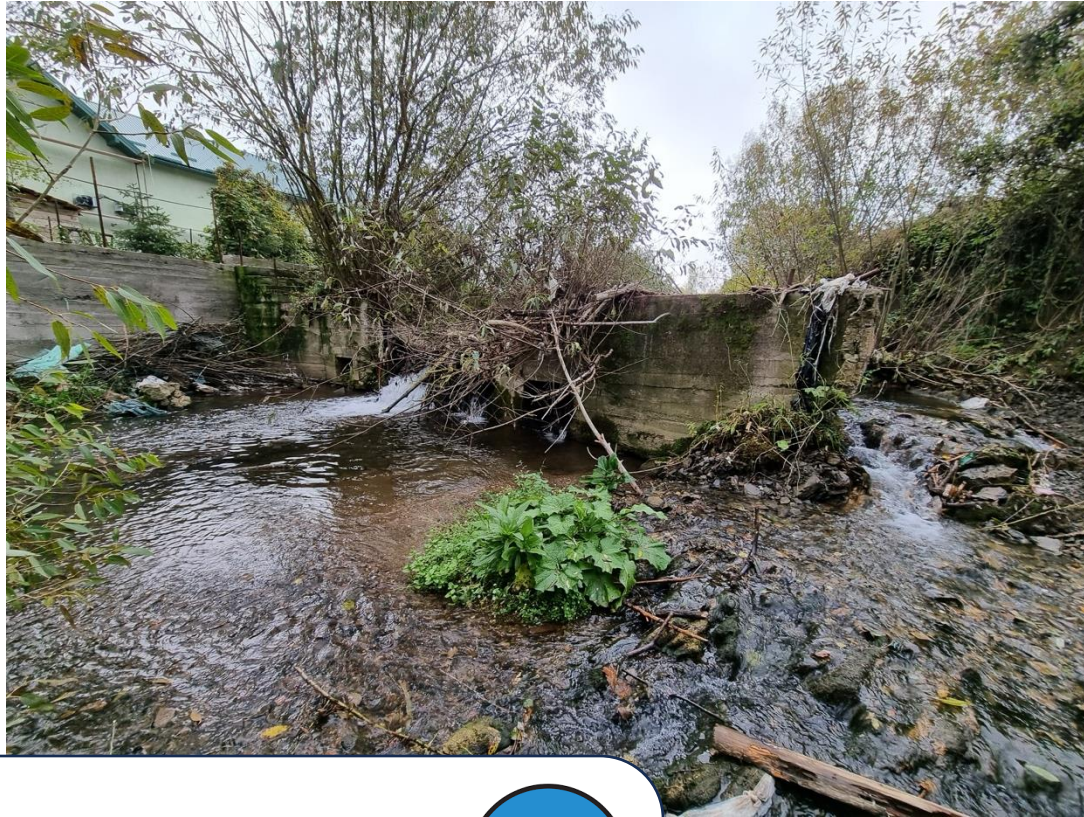
<https://www.ceab.csic.es/en/una-recerca-que-avalua-limpacte-climatic-de-les-preses/>

Focus on methane (CH<sub>4</sub>) emissions  
from the reservoir and climate  
impact of the removal





# Vezišnica (Montenegro)

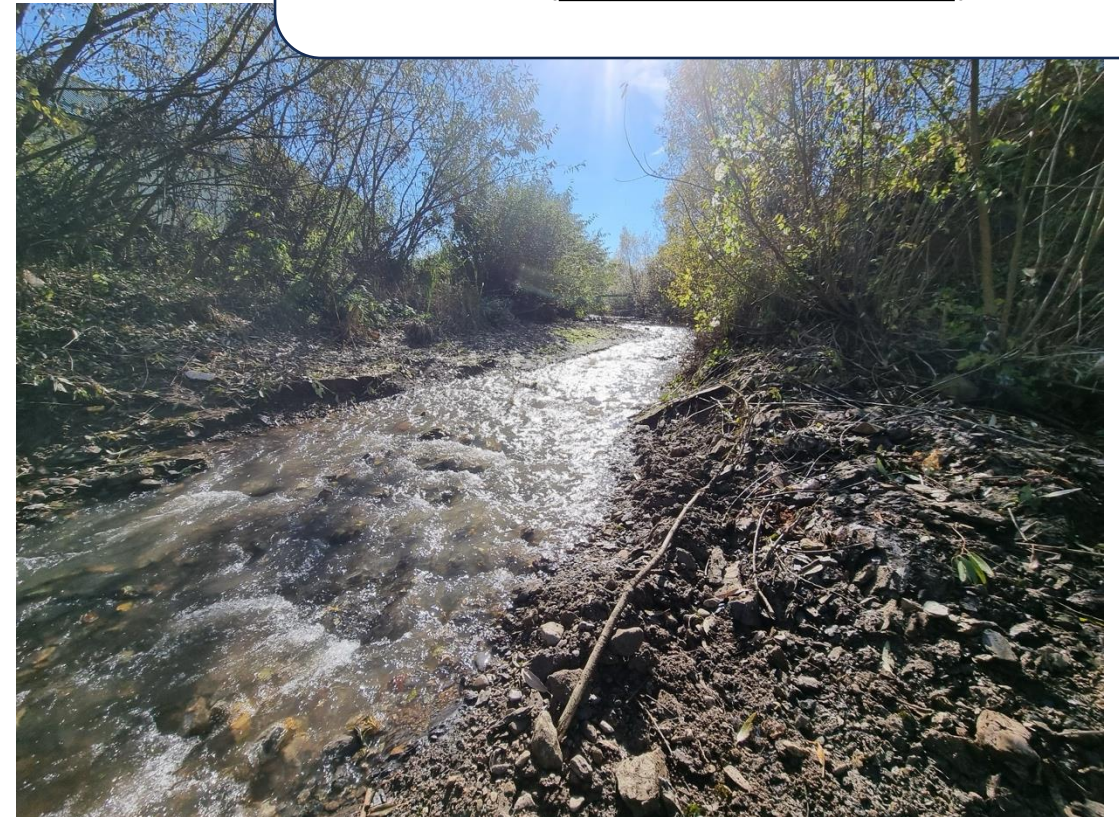


3 illegal weirs  
Height: 2-2.5m  
Length: 3-7m

Use: water diversion to fishponds,  
never used



Species: Brown trout (*Salmo trutta*), Danube salmon (*Hucho hucho*), European grayling (*Thymallus thymallus*)





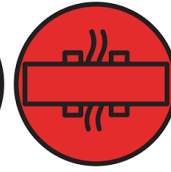
# Bijela (Croatia)

8 obsolete barriers

Use: obsolete

Species: Brown trout

*Salmo trutta*





# Kriva (North Macedonia)

Kriva weir  
Height: 3m  
Length: 10m  
Use: dysfunctional, obsolete



Species: *Barbus balcanicus*, *Sabanejewia balcanica*, *Gobio balcanicus*, *Barbatula barbatula*, *Oxynoemacheilus bureschi*, *Alburnoides thessalicus*, *Chondrostoma vardarensense*, *Squalius vardarensis*, *Rhodeus meridionalis*, *Vimba melanops*



# Where to start?

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Likorachi Dam\_upstream\_@George Minos

1. Defining the terms
2. Identify barriers
3. Pick easy wins
4. Plan well
5. Include stakeholders
6. Communicate
7. Execute removal
8. Monitor
9. Celebrate
10. Repeat



# Defining the terms

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Why are we removing barriers?

What words are we using?  
Barriers? Hydrotechnical  
structures?

What about the procedure?  
Legislation? What if(s)...there is  
no owner for example?

How to finance a removal?



# Identify the barriers & prioritise!

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What is our priority?

Only migratory fish species?

All aquatic organisms?

Sediment?

Public safety?

Flood risk management?





Include stakeholders  
early in the process  
and communicate well!



# But will all the barriers be removed?



No, and for a various reasons -

- active use/function;
- infrastructure;
- invasive species;
- public opposition;
- heritage;
- ...





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# Support for ORP proposals

Free service provided to support and review of your Open Rivers Programme applications.

## Important dates & online events:

Series of webinars and workshops each round!

You can submit your written application for review and advice from the helpdesk.

ORP deadline: 31 October

### WINTER 2026 CALL

|                                       |                     |
|---------------------------------------|---------------------|
| Open call for applications            | 16th February, 2026 |
| Q&A webinar with the Programme's team | 25th February, 2026 |
| Deadline to submit applications       | 13th March, 2026    |
| Application outcome                   | End of June, 2026   |
| Expected project start date           | Early July, 2026    |

For more information contact [kbrink@wwf.nl](mailto:kbrink@wwf.nl)





# together possible™

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