

WORLD FISH MIGRATION  
**FOUNDATION**

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# Connecting fish, rivers and people

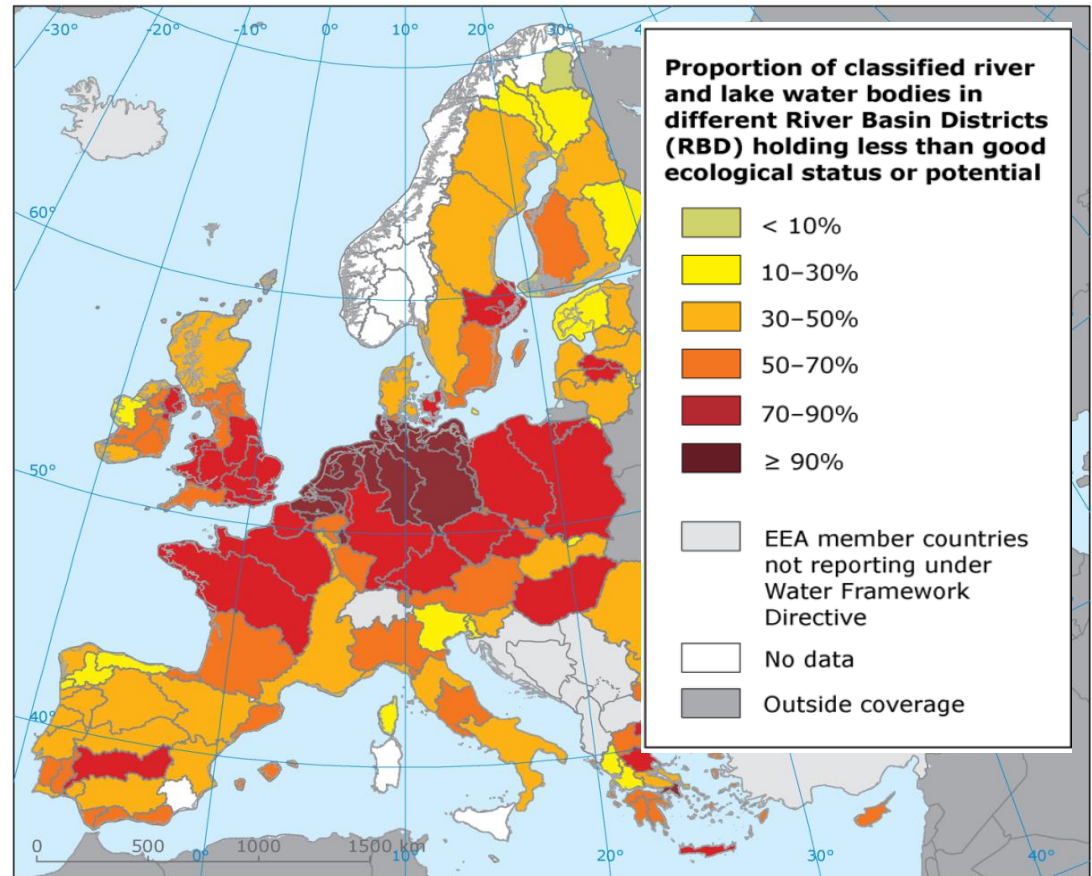
- Contribute to the **protection and development of migratory fish populations** in river systems worldwide
- **Facilitate communication** between the worldwide fish migration expert community and key-decision makers & policy makers
- Organize and stimulate the **dissemination of knowledge** around free flowing rivers and dam removal concepts.



# Only half the surface waters of Europe have met the WFD target for 2015 of good ecological status

**Most failures due to fragmentation & habitat loss**

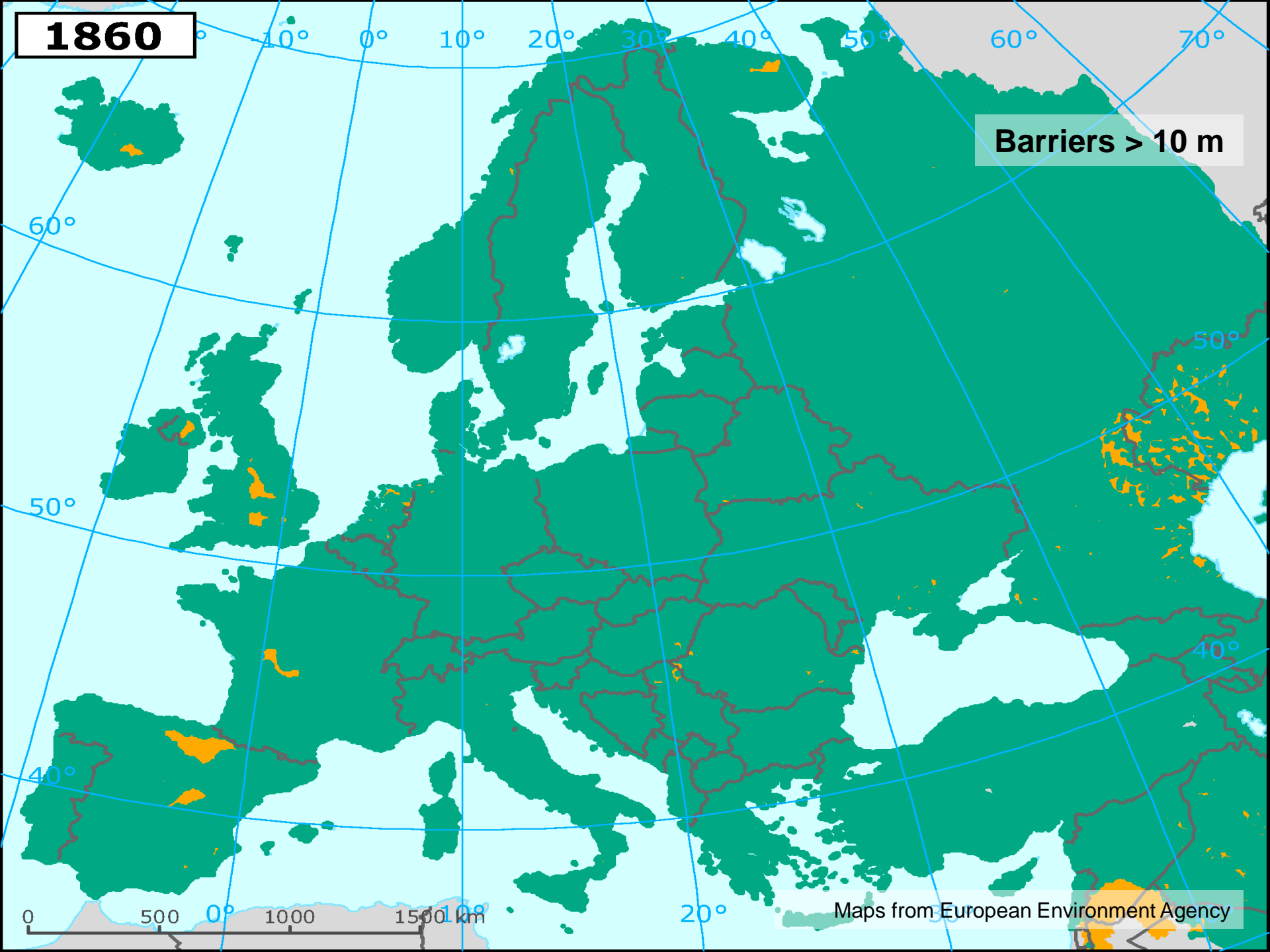
Proportion of classified river and lake water bodies in different River Basin Districts (RBD) holding less than good ecological status or potential



Source: European Environment Agency 2015

**1860**

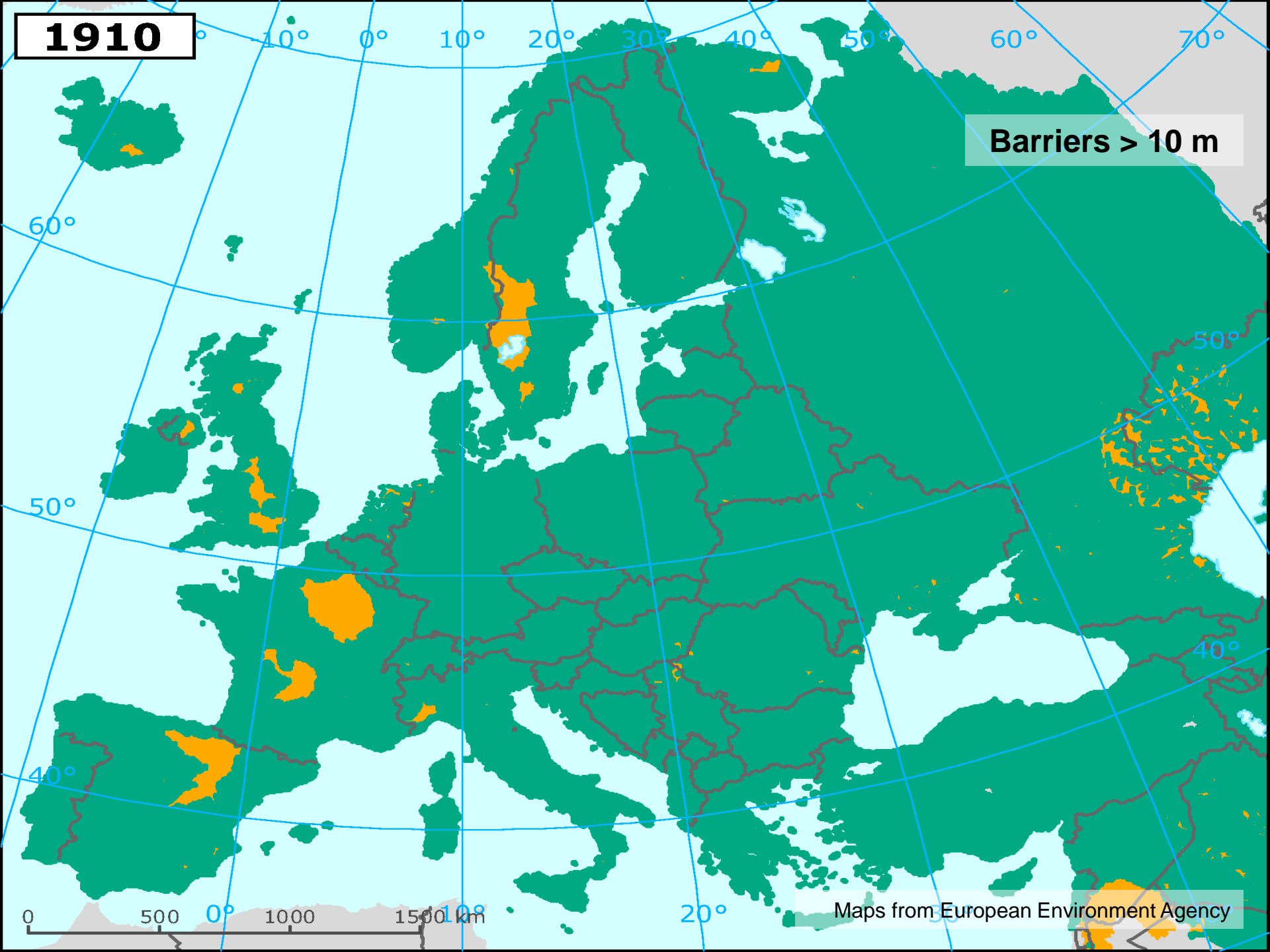
**Barriers > 10 m**



Maps from European Environment Agency

**1910**

**Barriers > 10 m**

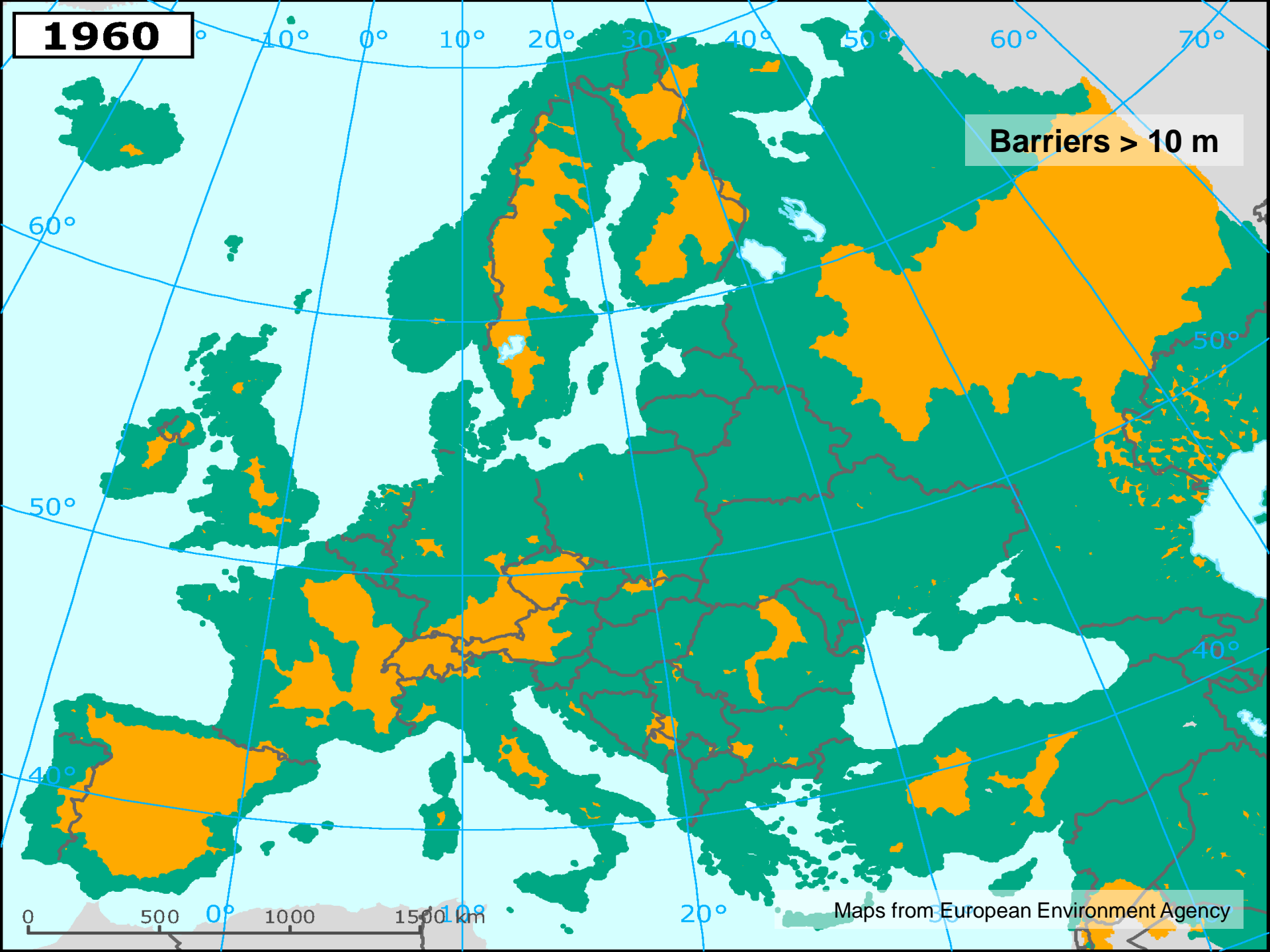


Maps from European Environment Agency



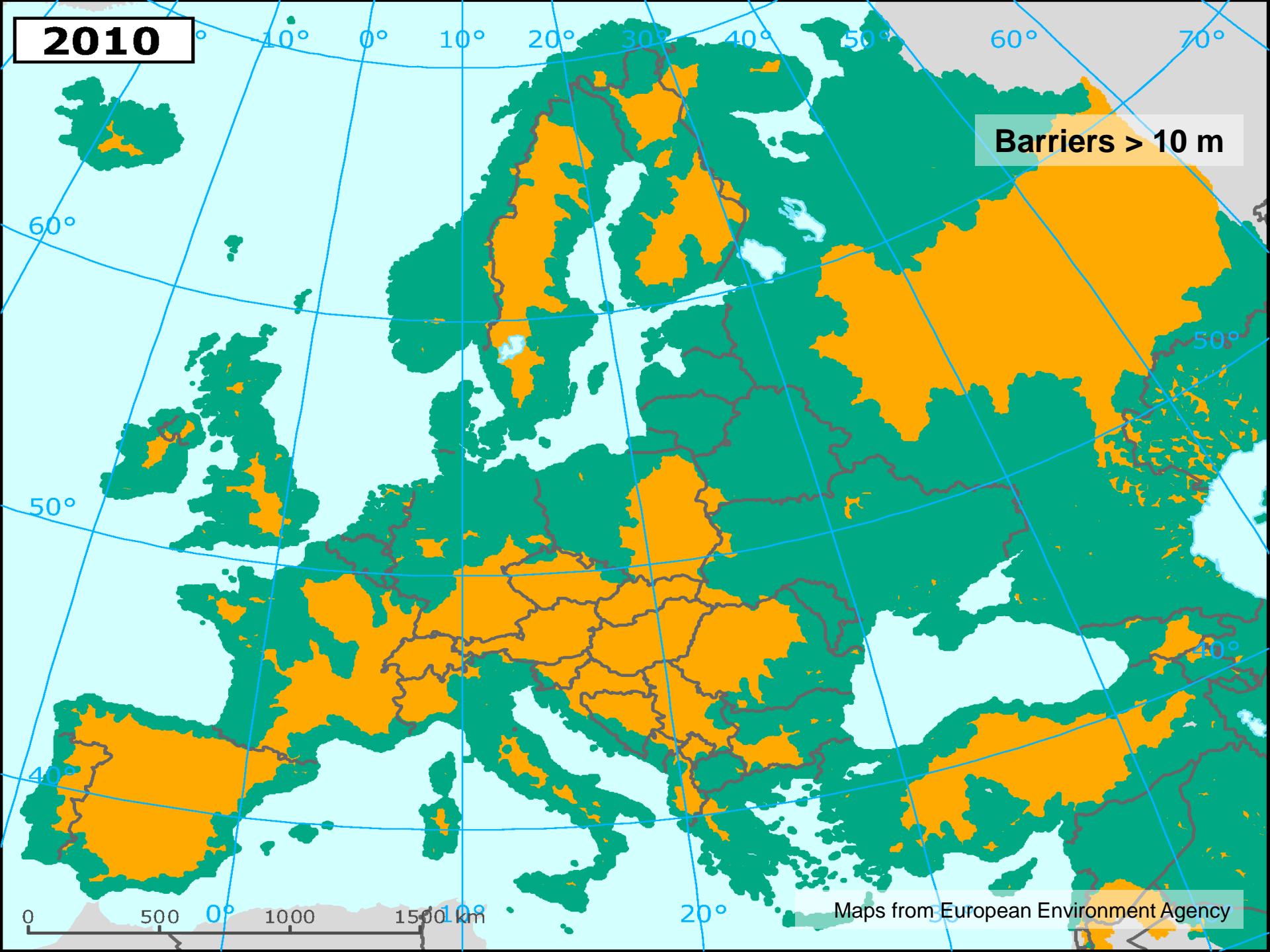
**1960**

**Barriers > 10 m**



**2010**

**Barriers > 10 m**



Maps from European Environment Agency

2010

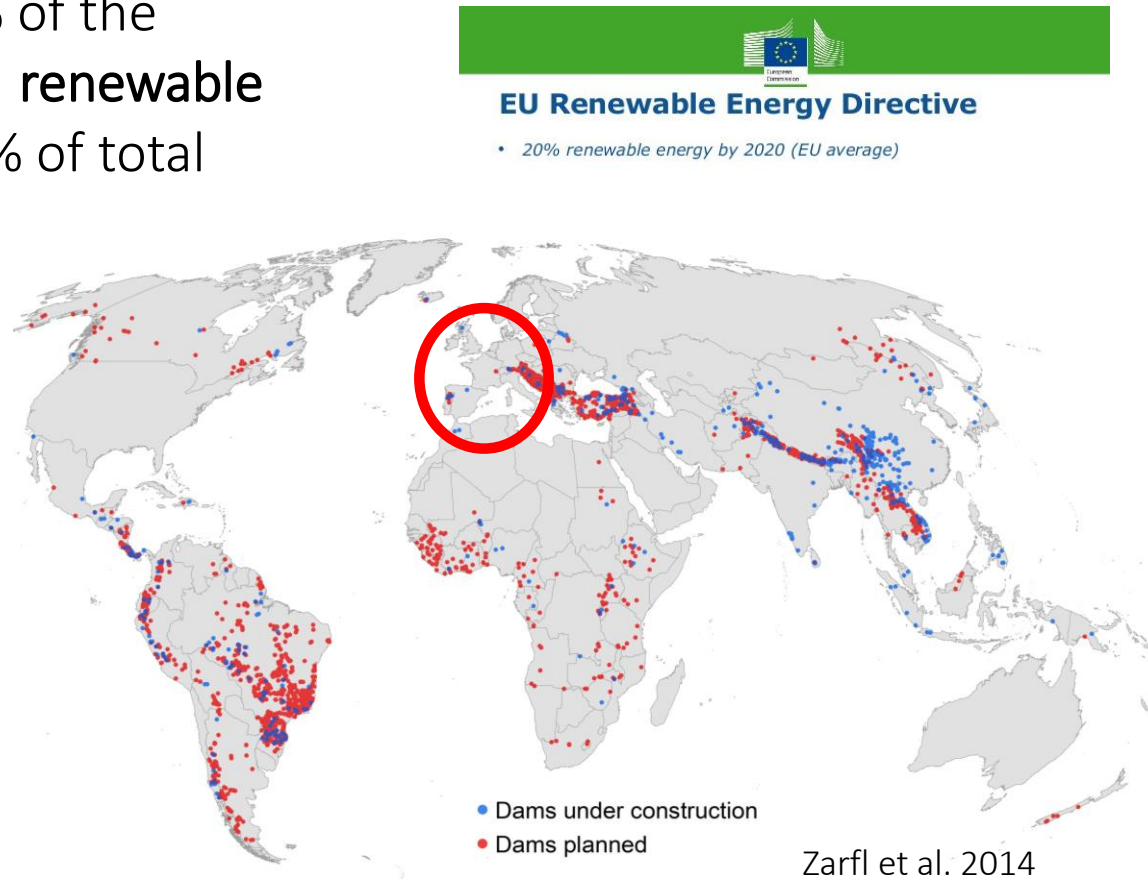
Barriers > 10 m

*Globally, Europe is the continent with the smallest number of completely unfragmented Large River Systems - just three rivers in northwestern Russia*

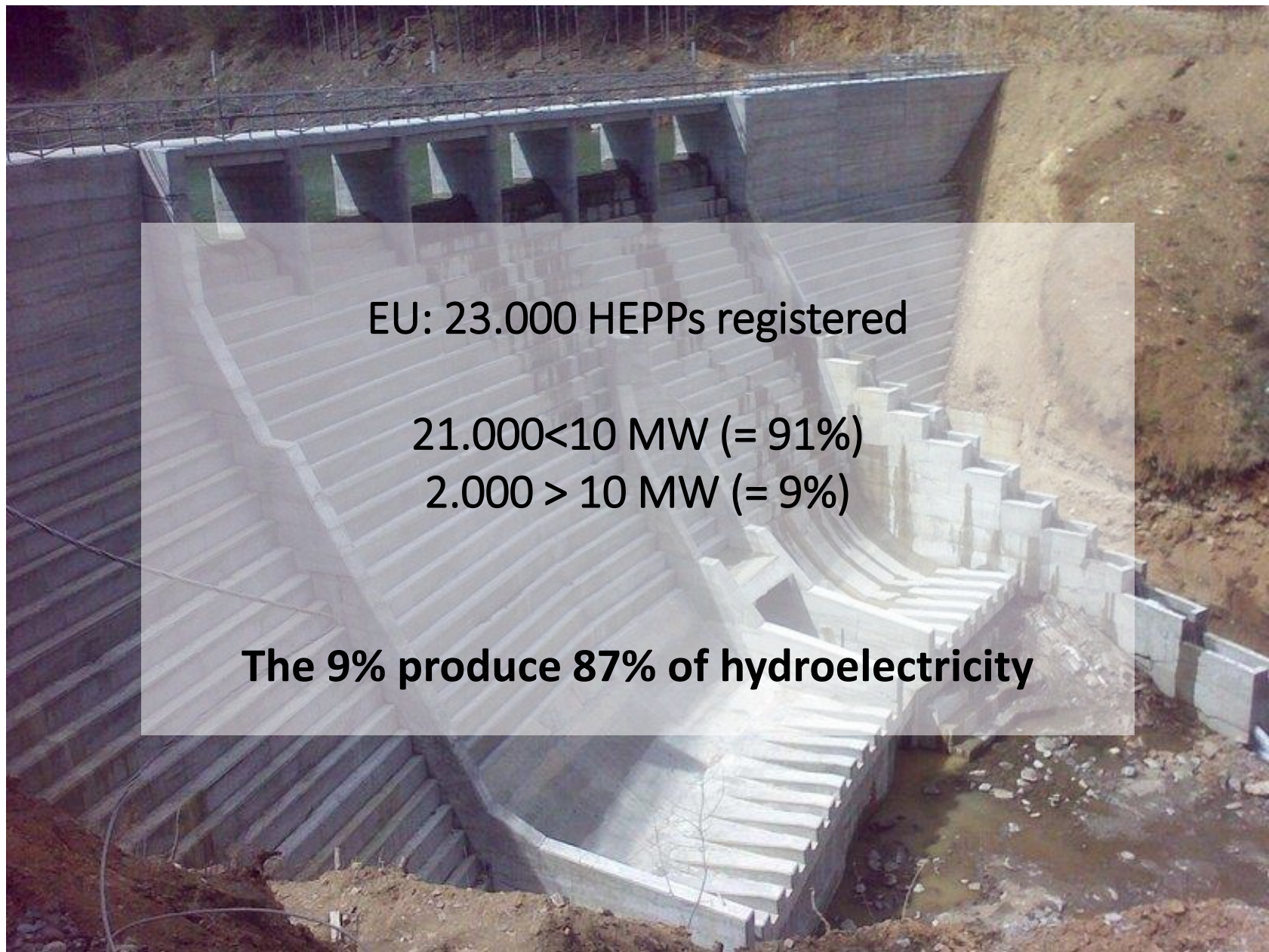
(Nilson, 2005)



- Much of Europe's **drinking water** , irrigation or **flood control** relies on dams
- Hydropower supplies 80% of the electricity generated from **renewable sources** in Europe and 10% of total electricity consumption
- Expected boom in hydropower



Zarfl et al. 2014



**EU: 23.000 HEPPs registered**

**21.000 < 10 MW (= 91%)**

**2.000 > 10 MW (= 9%)**

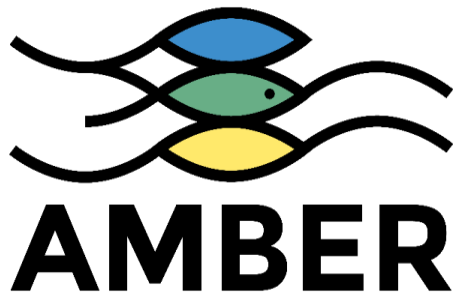
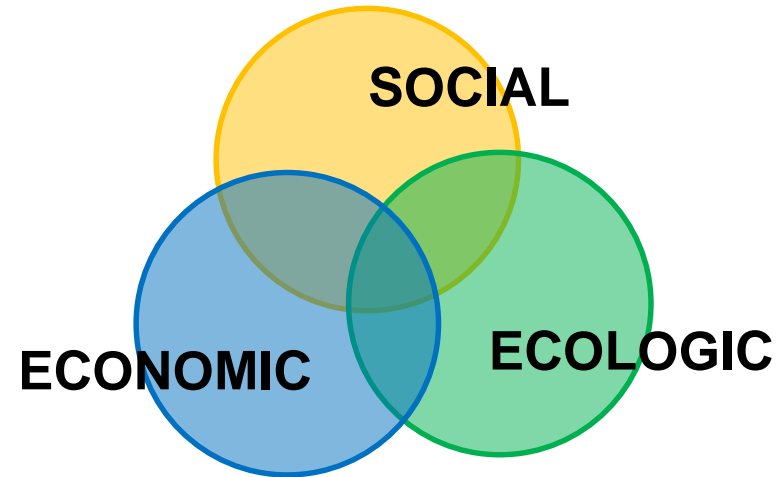
**The 9% produce 87% of hydroelectricity**

COUNTRY	Nº BARRIERS
DENMARK	3037
FRANCE	68034
GERMANY	
IRELAND	1585
ITALY	524
NETHERLANDS	2489
POLAND	461
SPAIN	17826
SWEDEN	18228
SWITZERLAND	83368
UK-England	17527
UK-N. Ireland	1938
UK-Scotland	2028
UK-Wales	5278
ANDORRA	41
AUSTRIA	
BELGIUM	5031
FINLAND	792
ICELAND	
LUXEMBURG	
NORWAY	
PORTUGAL	
ALBANIA	618
BOSNIA AND HERZEGOVINA	
CROATIA	
CYPRUS	
GREECE	
MACEDONIA	
MONTENEGRO	
SERBIA	
ESTONIA	172
LATVIA	
LITHUANIA	
BULGARIA	998
HUNGARY	2765
ROMANIA	
SLOVAKIA	
SLOVENIA	
CZECH REPUBLIC	5398
MOLDAVIA	

SPAIN	17826
AMBER_SPAIN_Cantabrico_dams	58
AMBER_SPAIN_Cantabrico_fishways	15
AMBER_SPAIN_Cantabrico_weirs	2279
AMBER_SPAIN_Catalonia	961
AMBER_SPAIN_Duero	2188
AMBER_SPAIN_Ebro_reservoir	54
AMBER_SPAIN_Ebro_weirs	2091
AMBER_SPAIN_Euskadi	903
AMBER_SPAIN_Guadalquivir	2313
AMBER_SPAIN_Guadiana_dams	60
AMBER_SPAIN_Guadiana_weirs	81
AMBER_SPAIN_Jucar_dams	52
AMBER_SPAIN_Jucar_weirs	1190
AMBER_SPAIN_Minosil	4500
AMBER_SPAIN_Segura_obstacles	165
AMBER_SPAIN_Segura_reservoirs	33
AMBER_SPAIN_Tajo	883

- November 2017
- TOTAL: 261.595 barriers

More effective restoration of river connectivity in Europe requires a shift towards **adaptive management of river barriers**, one that maximizes benefits and minimizes impacts



Funded by the Horizon 2020  
Framework Programme of the  
European Union





# Rivers are important to the world





Reconnecting European rivers, the smart way

# LET IT FLOW





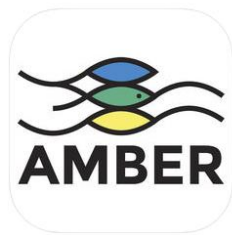


# Barrier Tracker



## App Store Preview

This app is only available on the App Store for iOS devices.



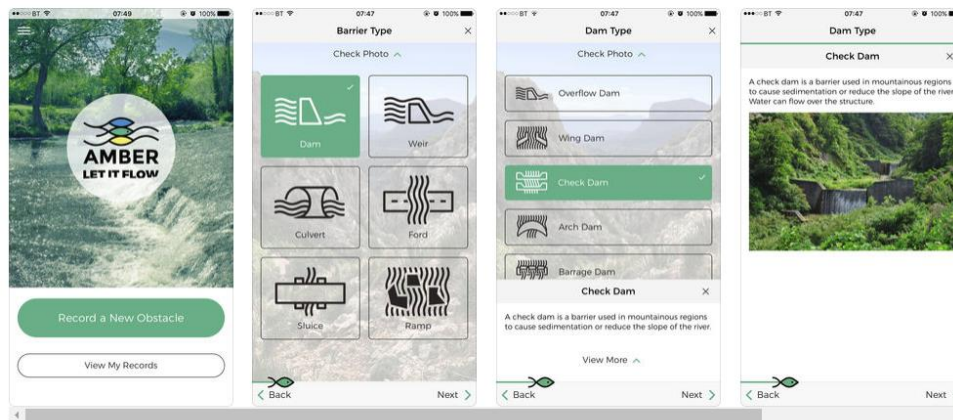
### Barrier Tracker

Natural Aptitude

Free

## Screenshots

iPhone iPad





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# Adaptive Management of Barriers in European Rivers

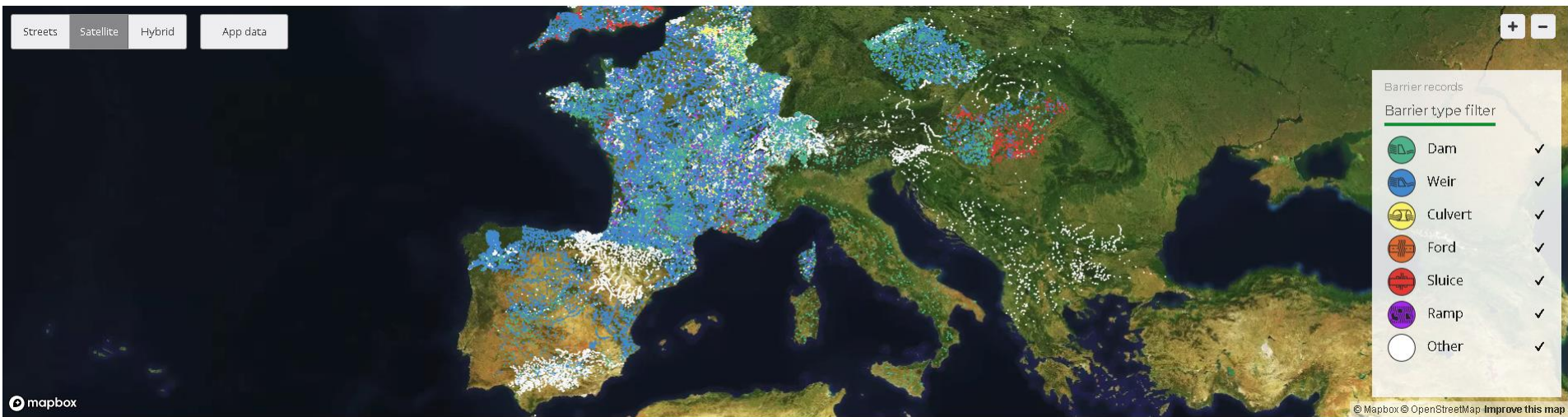
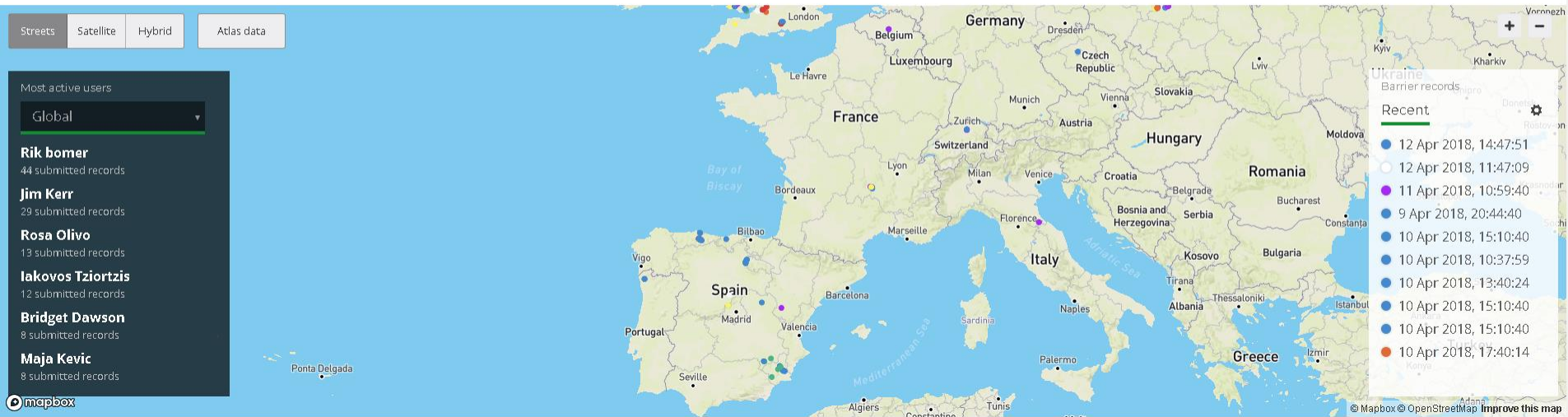
AMBER will apply adaptive barrier management to help reconnect European rivers, the smart way.



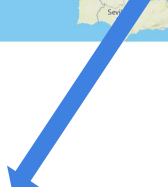


# Tracked Barrier Map

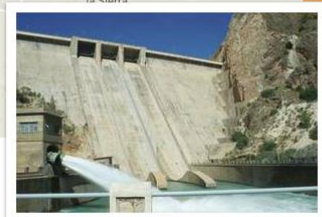
Click on pins to see details of the barriers gathered with the AMBER Barrier Tracker app and filter by top contributors per country.



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Recorded February 19th, 2018



Coordinates	38.5087, -1.8645
Type	Dam
Barrier Height	Greater than 10.0m
Barrier Usefulness	Yes
Barrier Extension	Full



## The Barrier Atlas

The real magnitude of river fragmentation at the pan-European scale is almost unknown. In many regions throughout Europe there is only a limited overview of existing barriers and complicating the situation is the fact that barriers are managed by many different organisations. This lack of information is an obstacle to well informed decisions. It is therefore important to create an inventory of barriers in European rivers, a European Barrier Atlas. Your contribution helps to supplement existing databases with new data.

[Barrier Atlas](#)

## Barrier ID-Guide

There are many different types of barriers and even barriers within one type come in many different shapes and sizes. Therefore identifying the right type of barrier isn't always easy. Do you want to know more about the different barrier types you can encounter? We have compiled the most common barriers with their characteristics and photo examples into a page what we call the Barrier ID-Guide. You can use this page to learn more about barriers and to be able to identify them yourself.

[View Barrier Guide](#)

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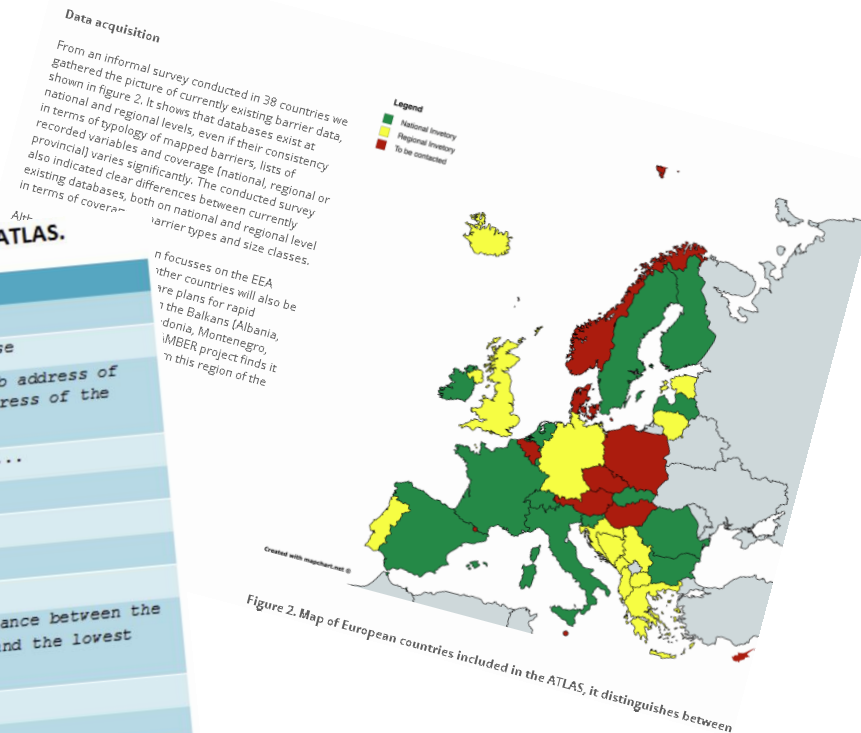
Table 1. Key parameters that we propose to be compiled for the ATLAS.

Key parameters	Definition
ATLAS_ID	New ID defined within AMBER
Source_ID	ID of the source (national, regional) database
URL	Link to data source. It can be, e.g.: the web address of the owner institution, the available web address of the national/regional DB
Country	EU country or EU area, e.g. Balkans, Danube...
X_coord	Latitude
Y_coord	Longitude
River	Name of the river
Basin	Name of river basin
Height	Barrier height (m), i.e. the vertical distance between the lowest point on the crest of the barrier and the lowest point in the original streambed
Type	Dam, weir, spillway, etc.
Year	Date of building (end)

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## Dam



A dam is a barrier that blocks or constrains the flow of water, raising the water level, forming a reservoir. Dams are often used for the generation of electricity, the supply of water.



## Weir



A weir is a barrier aimed at regulating flow conditions and water levels or at intercepting sediment or at reducing the channel slope for stabilizing the channel bed of a river or stream. Water often flows freely over the top of a weir. Weirs come in many shapes and sizes but often have a height of less than 5 meters.



## Culvert



A culvert is a structure which allows a stream or river to flow through/under an obstruction. Culverts are often embedded in soil and come in many shapes and sizes, varying from round and elliptical to box-shaped.



## Ford



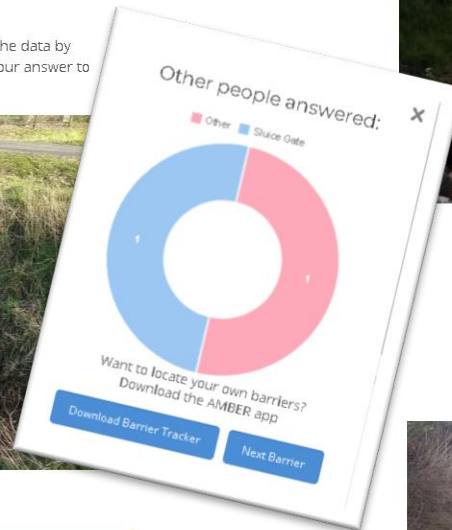
A ford is a structure in a river or stream which creates a shallow place for crossing by vehicle or on foot.



# Photo Classification Tool

965 classifications submitted

Want to see what others have recorded? Help us increase the reliability of the data by answering a few questions about some recorded barriers. You can compare your answer to that of others.



What type of barrier is this?



Report

Is there a fish pass present?

Yes

No

Unsure



Report

Does the barrier extend across the entire watercourse?

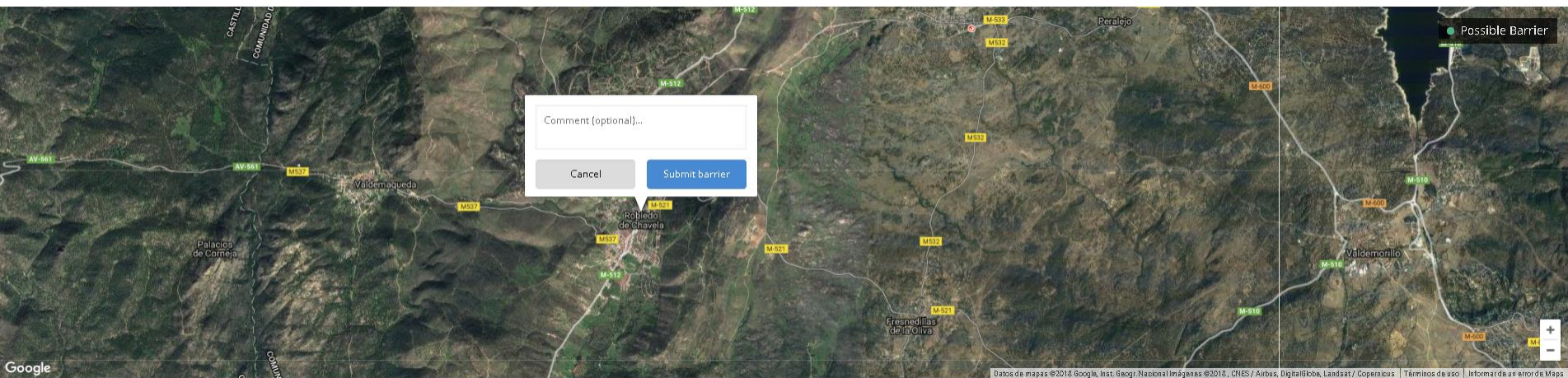
Yes

No



## Locate a Barrier

There are hundreds of barriers all around European Rivers which are not yet mapped and are waiting to be recorded. You can search through satellite images and identify likely barrier locations on the map. Barriers are often found in places where infrastructures like roads etc cross streams and rivers.



# Newsletter

The AMBER team is joining forces with citizens to map and study the barriers in European rivers. Regular updates on progress are published via various channels. Follow AMBER on Twitter and Facebook or sign up for the newsletter to stay up to date on the latest progress!

[Subscribe to the newsletter](#)



## Seen any barriers near you?

Go out and use the Barrier Tracker app!



Activar Windows  
Ve a Configuración para activar Windows.

The Barrier Tracker Application is supported by the following organizations







<http://www.amber.international>



<https://www.facebook.com/AMBERtools>



<https://twitter.com/ambertools>

**@AMBERtools**



River Connectivity Network

2.608 miembros

# ¡Muchas gracias!



Rosa Olivo del Amo

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