

# Stream fragmentation from Europe to Wales

---

Josh Jones, Swansea University  
AMBER consortium

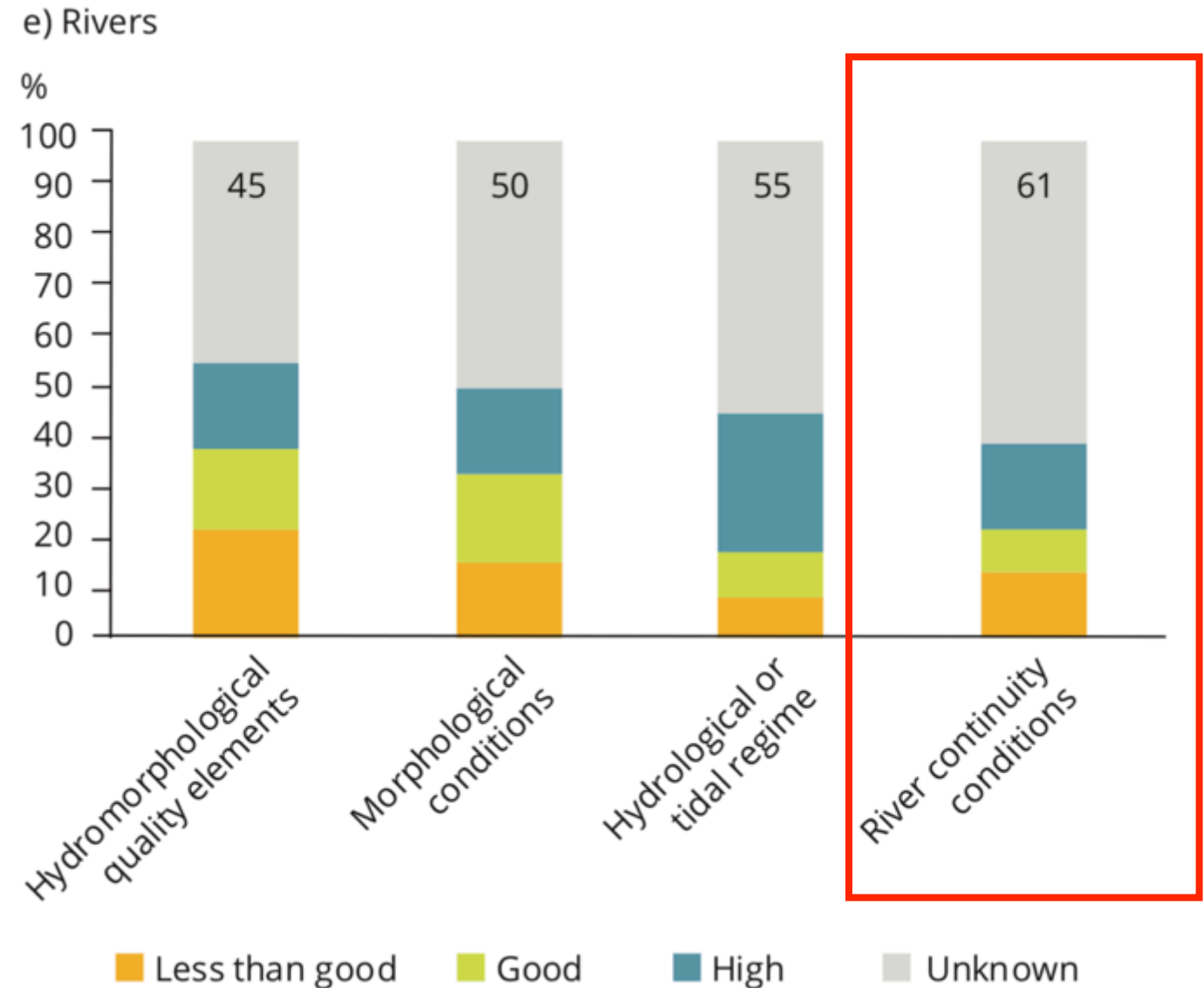




# EU Biodiversity Strategy 2030

**“At least 25,000 km of rivers will be restored into free-flowing rivers by 2030 through the removal of primarily obsolete barriers and the restoration of floodplains and wetlands.”**

# EU Water Framework Directive reporting: continuity conditions unknown in 61% of river water bodies





629,955  
barriers



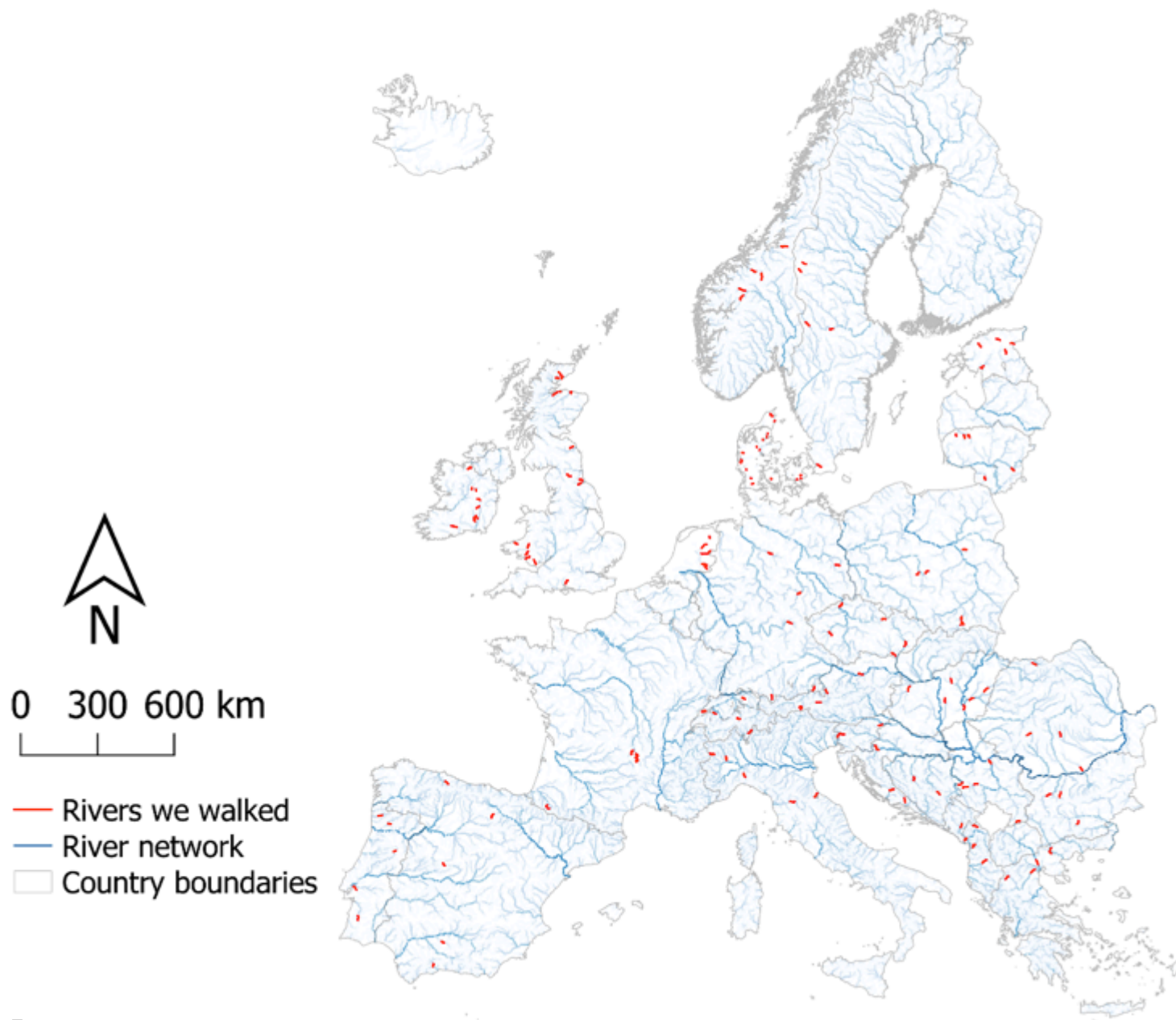
120 source databases

4 global

52 national

65 local/regional

36 countries



2,715 km of river

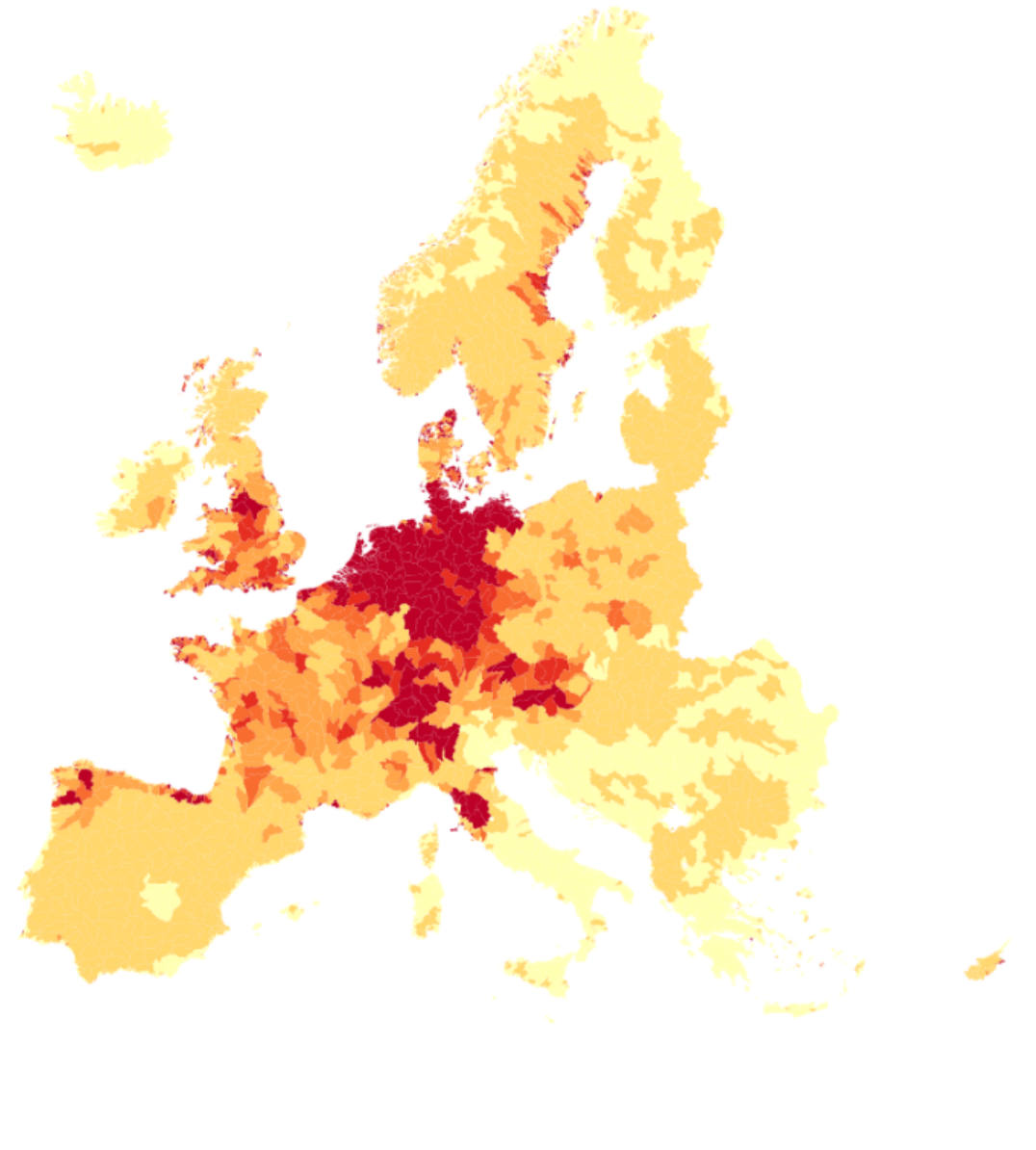
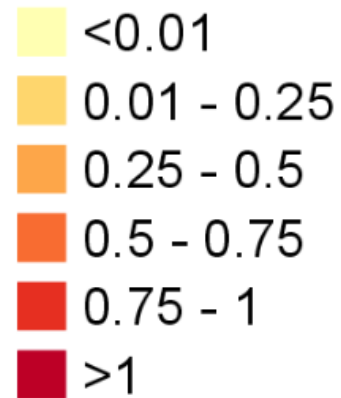
147 rivers in 26  
countries

1,583 barriers of which  
960 were new records



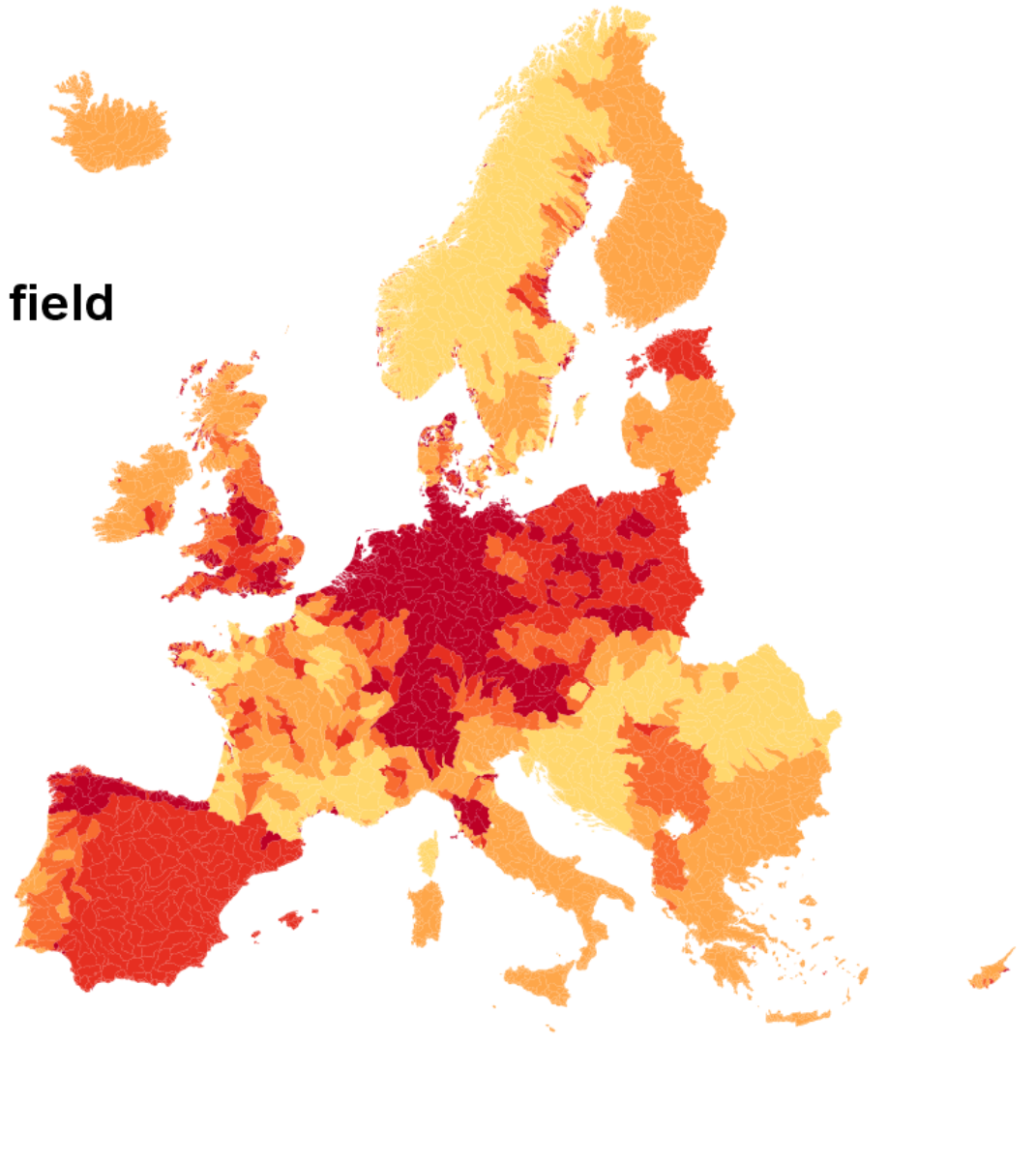
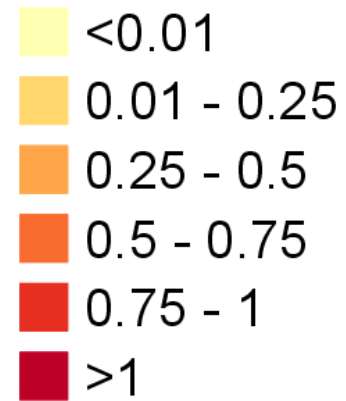
# Estimating fragmentation

Atlas  
barrier  
density  
(barrier/km)



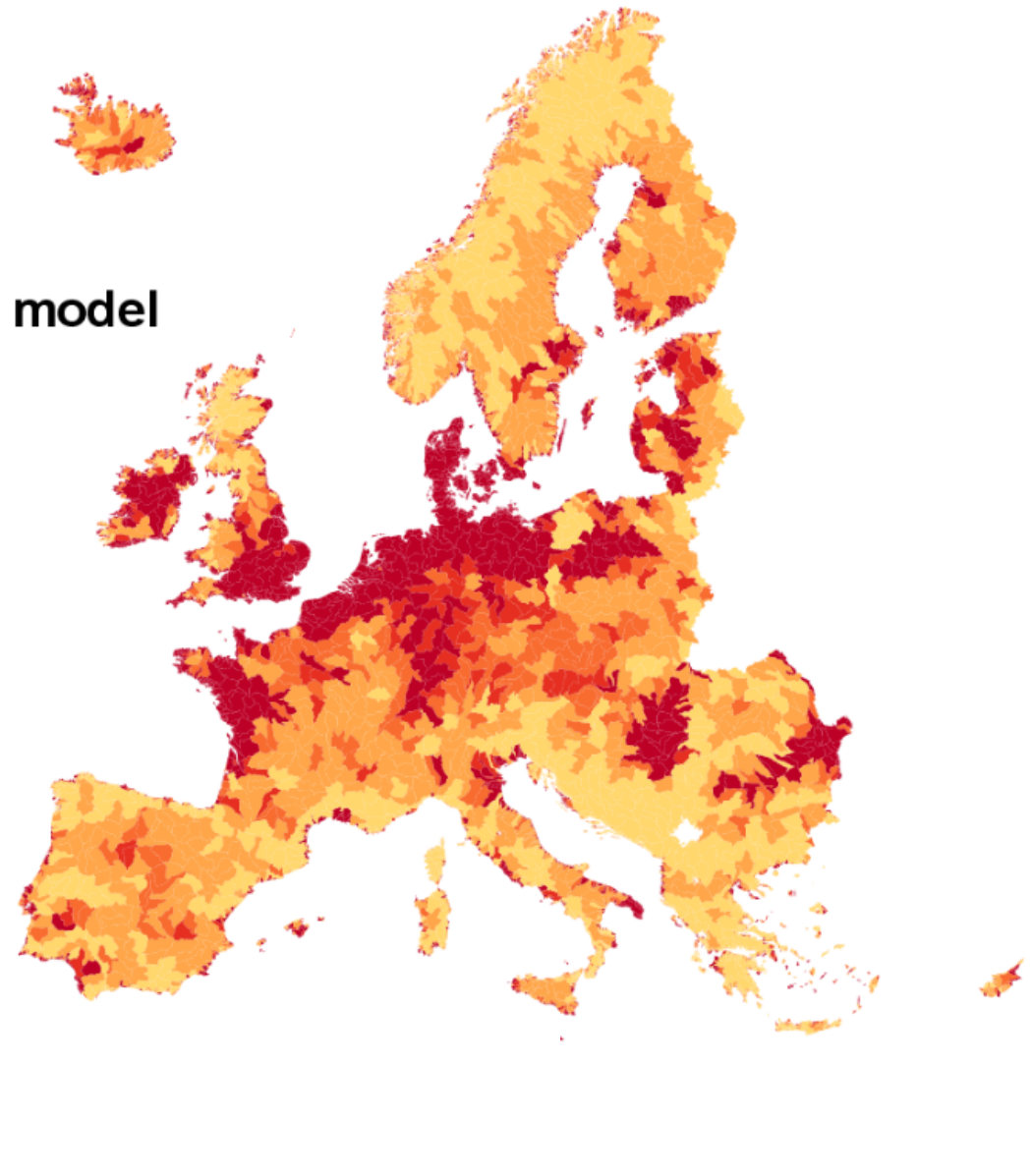
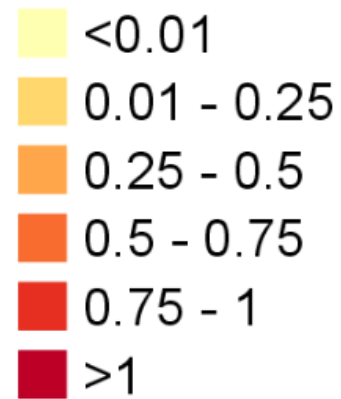
# Barrier density estimated using field validation

Estimated  
barrier  
density  
(barrier/km) - field



# Barrier density estimated from modelling

Estimated  
barrier  
density  
(barrier/km) - model

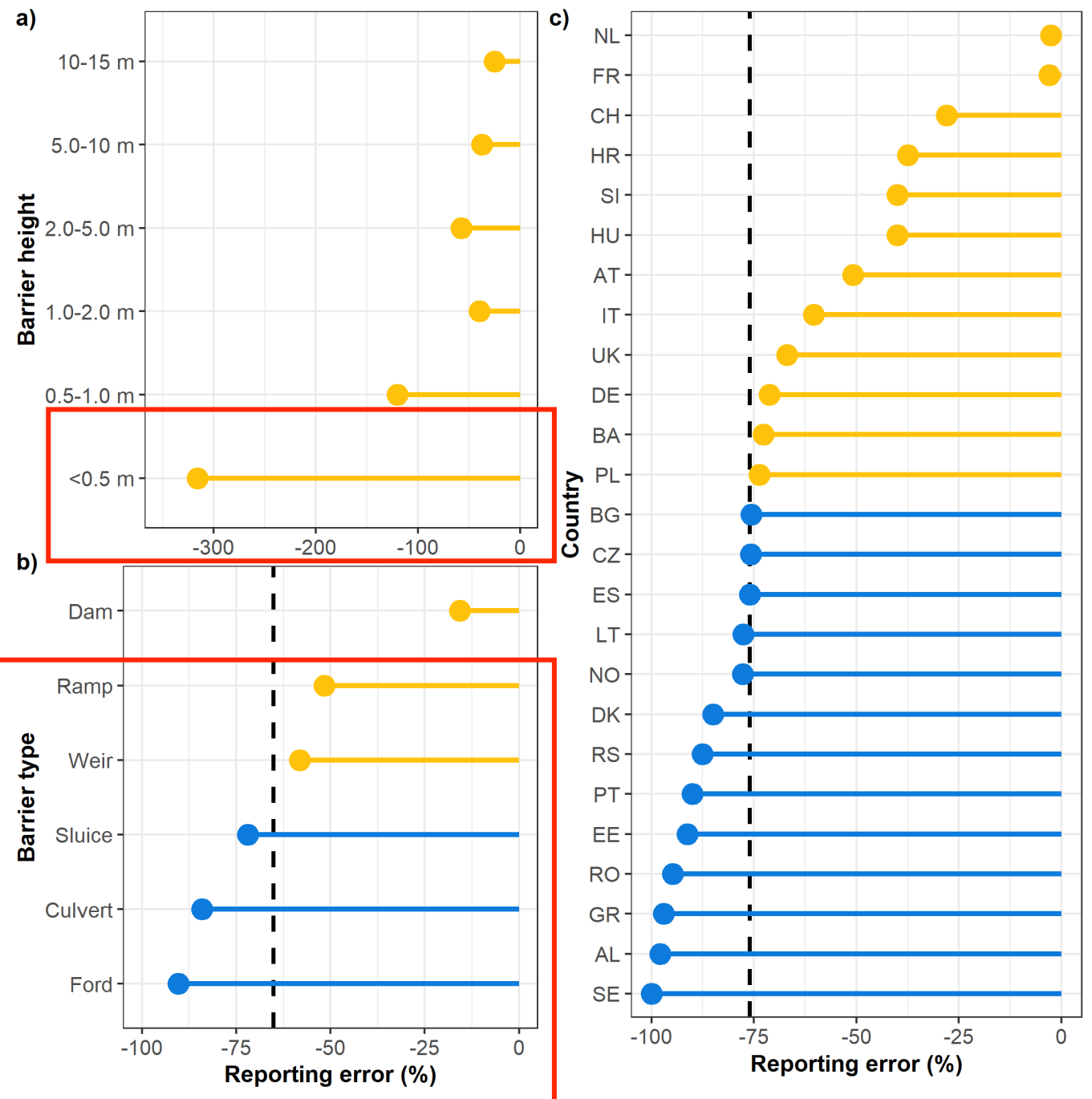




Under  
reporting of  
barriers  
confirmed by  
both  
approaches

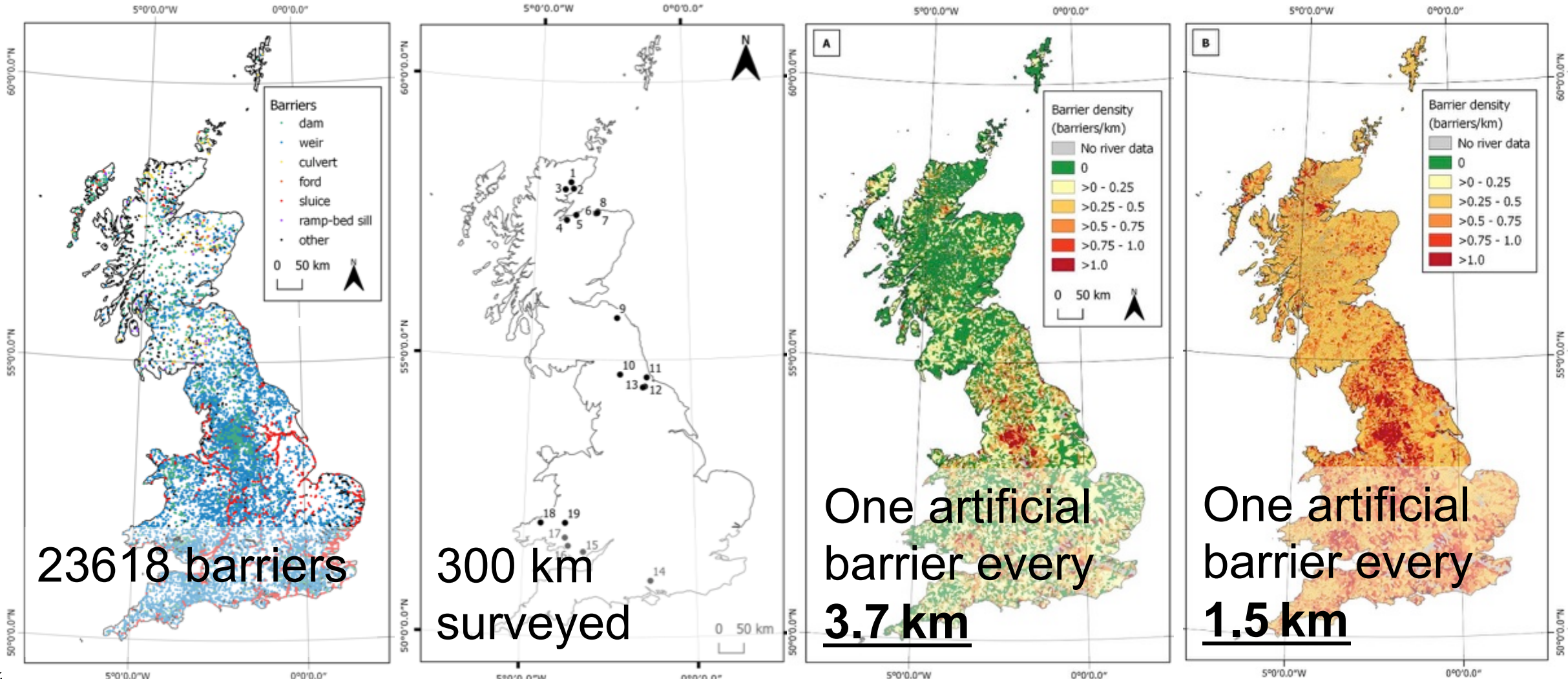
	Number of barriers	Barrier density (barriers/km)
AMBER Atlas	629,955	0.38
Field corrected	1,200,000	0.74
Modelled	991,300	0.6

# Where are the small barriers?





# Stream fragmentation in Great Britain



Jones et al. (2019) *STOTEN*, 673, pp.756-762.

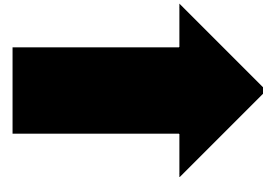
Q: How fragmented is the river?

A: How much habitat is available?

Measured in km as barrier free length

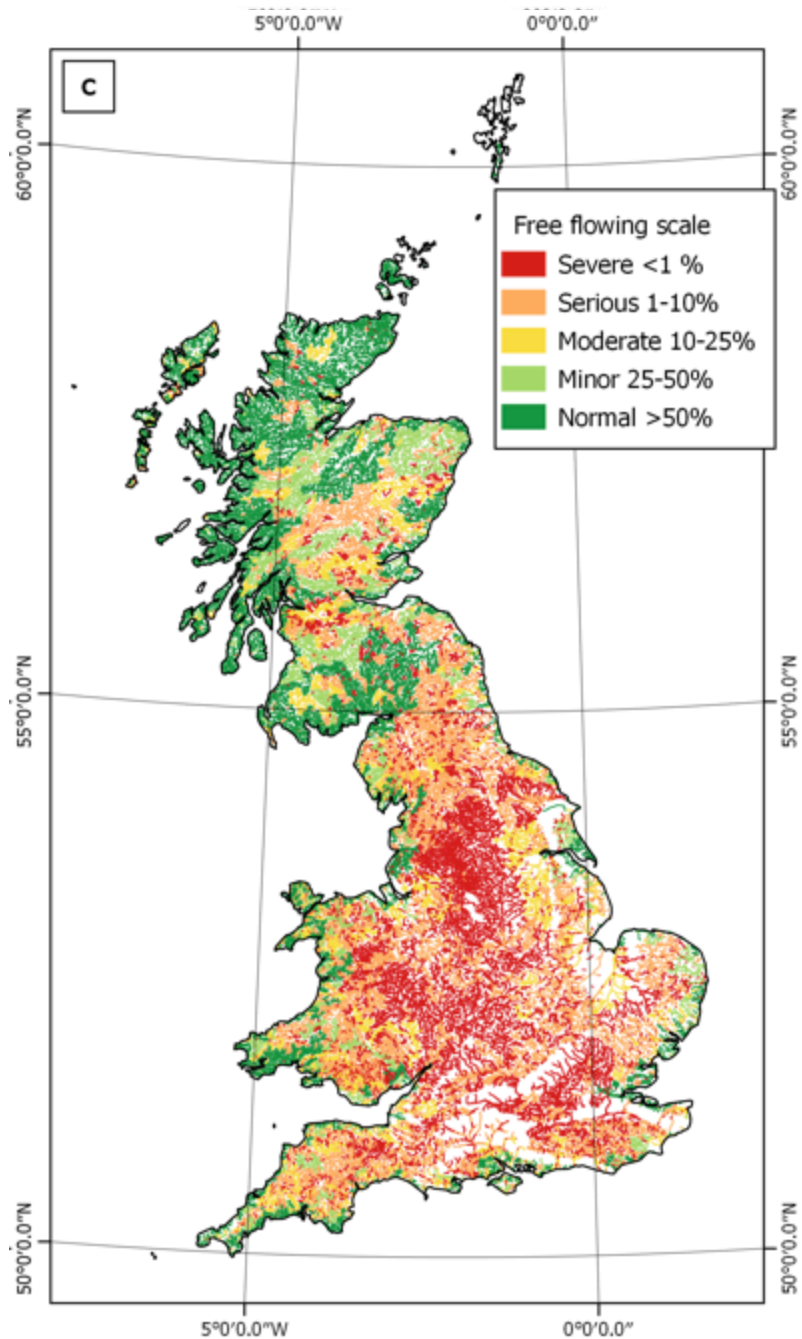


Unfragmented river  
= 10 km



Fragment 1 = 3 km  
Fragment 2 = 7 km





Only 3.3% of the total river network of Great Britain is fully connected.

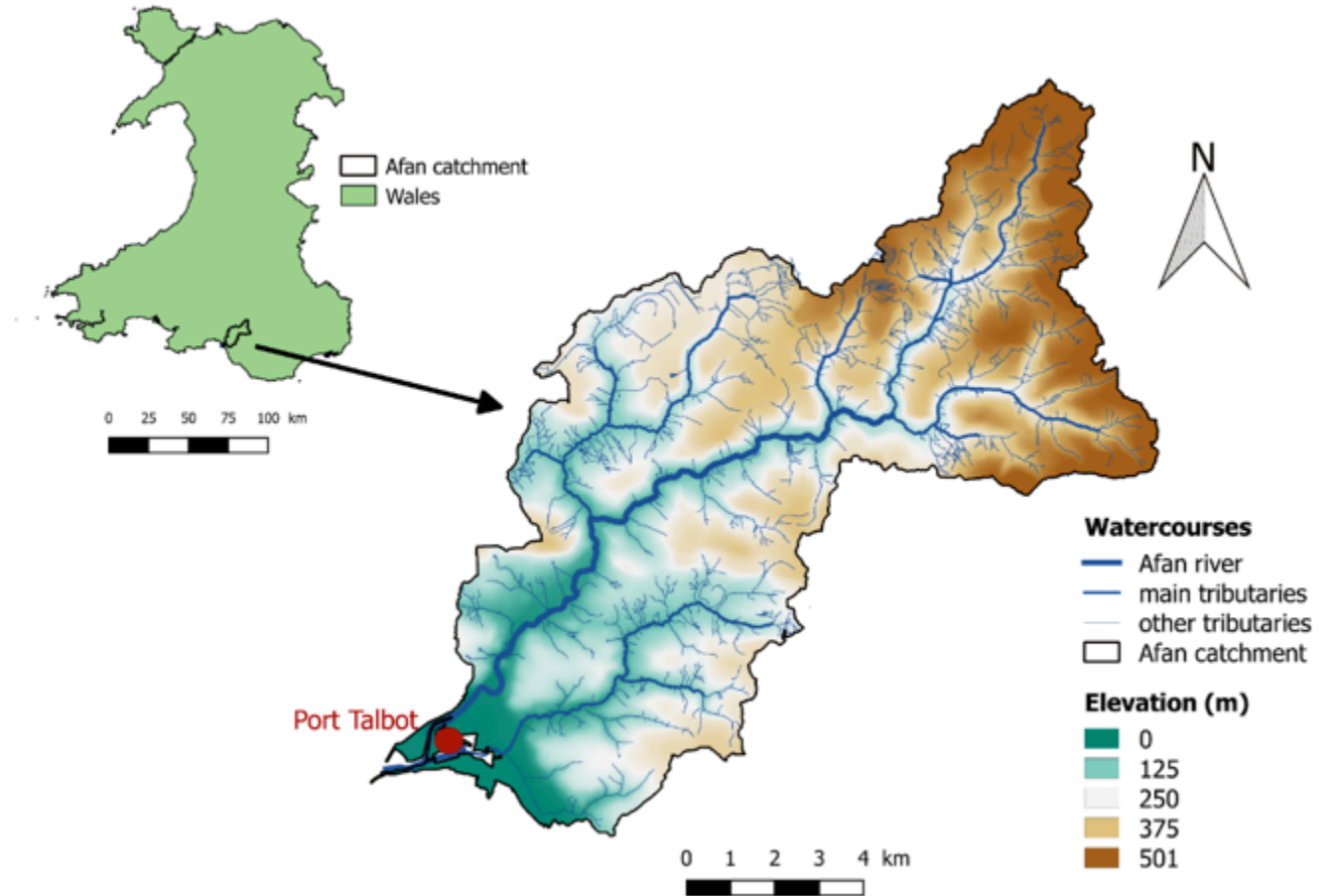
# Reconnecting Our River





# Surveying an entire catchment

- Walkover of river Afan
  - Entire stream network – 171 km
- Map all barriers
  - including natural falls
- Use AMBER 'Barrier Tracker' app



Contains surveys of OS OpenData 2019  
By Ricordel.C., 2019 via QGIS

Reconnect

LET

smart way

OW



RECORD A NEW OBSTACLE

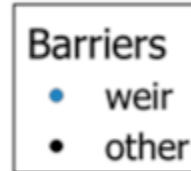
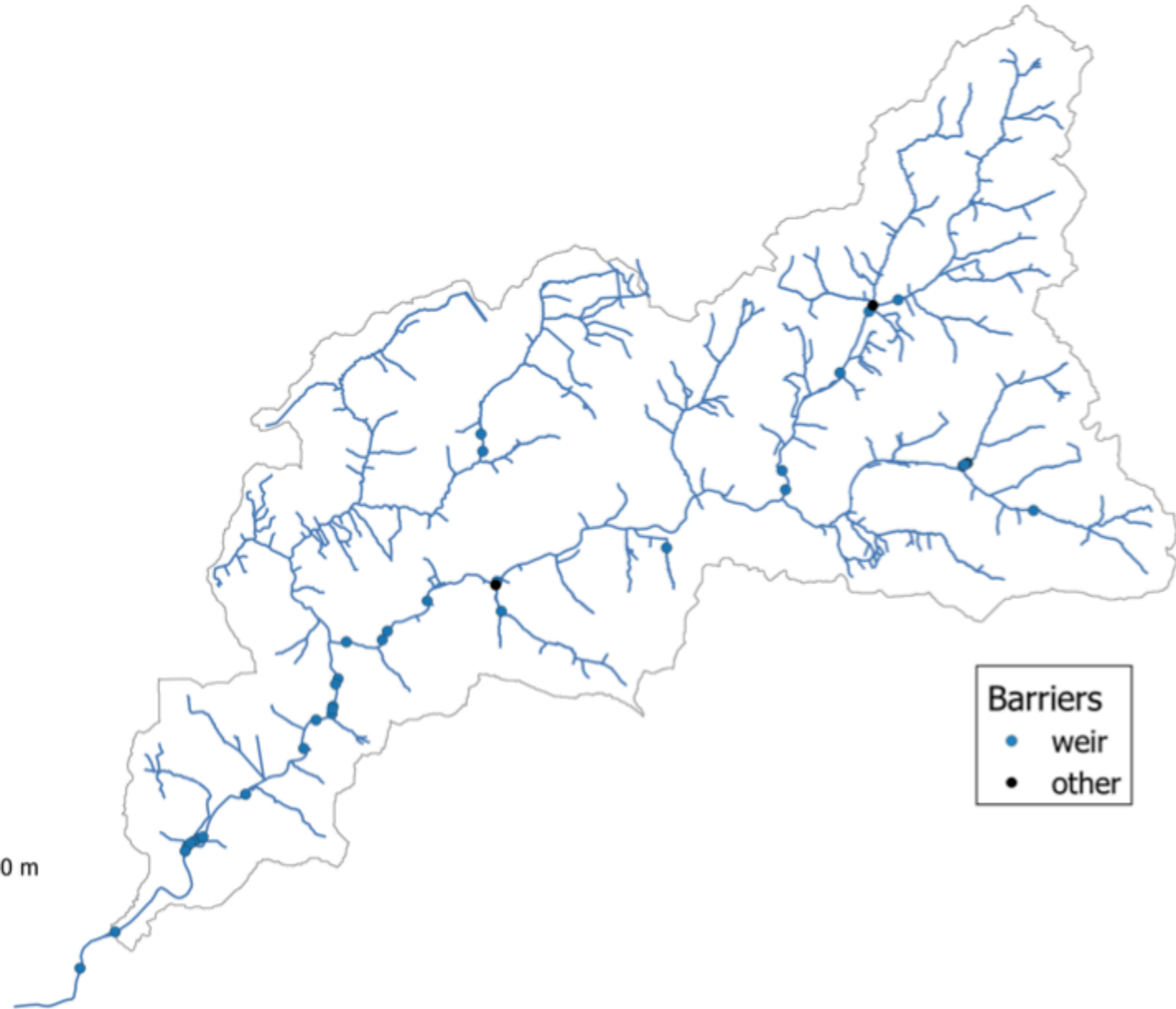
VIEW MY RECORDS



# BEFORE SURVEY

33 artificial barriers

0.2 barriers/km





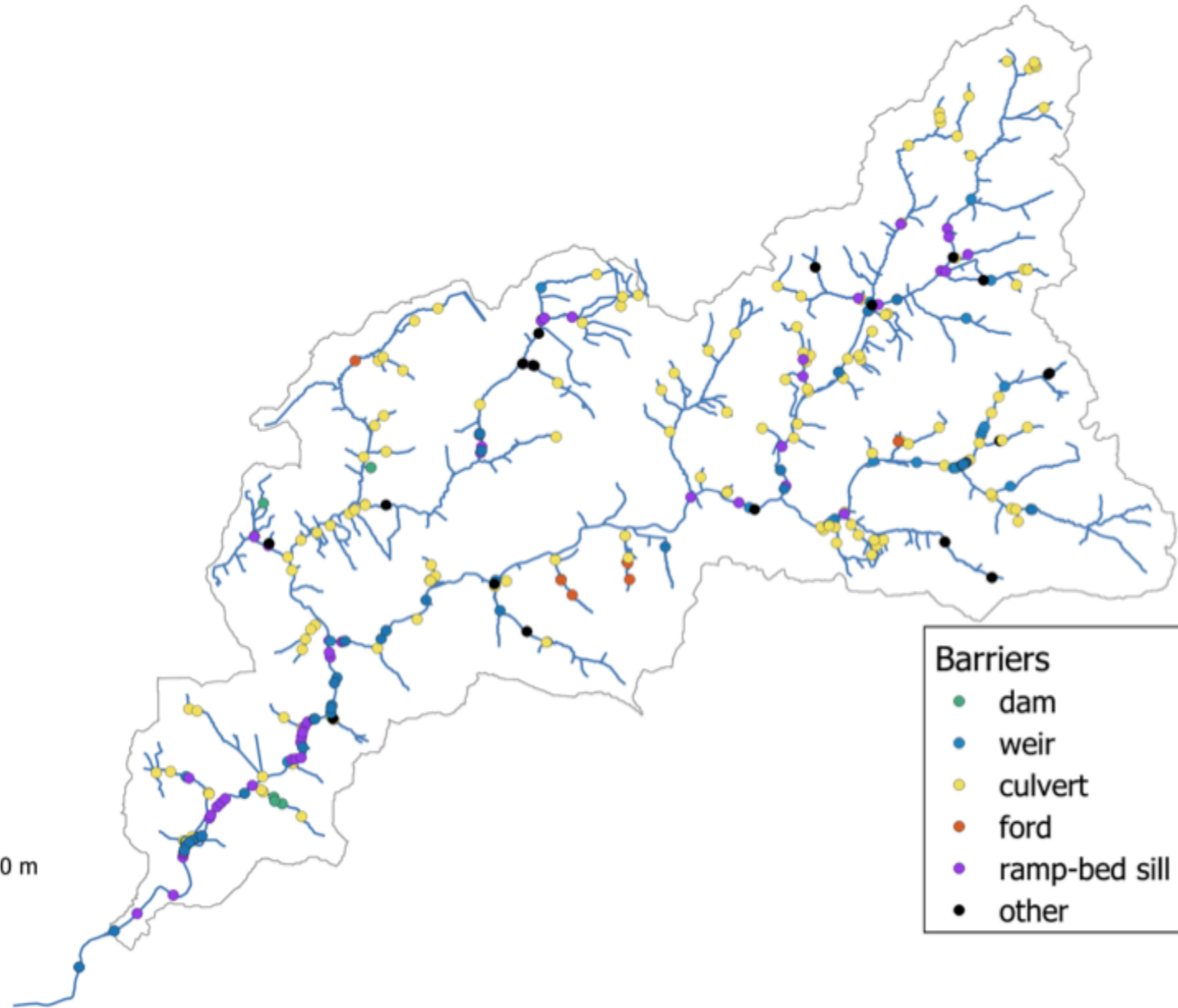
How many artificial barriers are there really?

- a) you didn't find any more, still 33
- b) 143
- c) 295
- d) 386

# AFTER SURVEY

295 artificial barriers

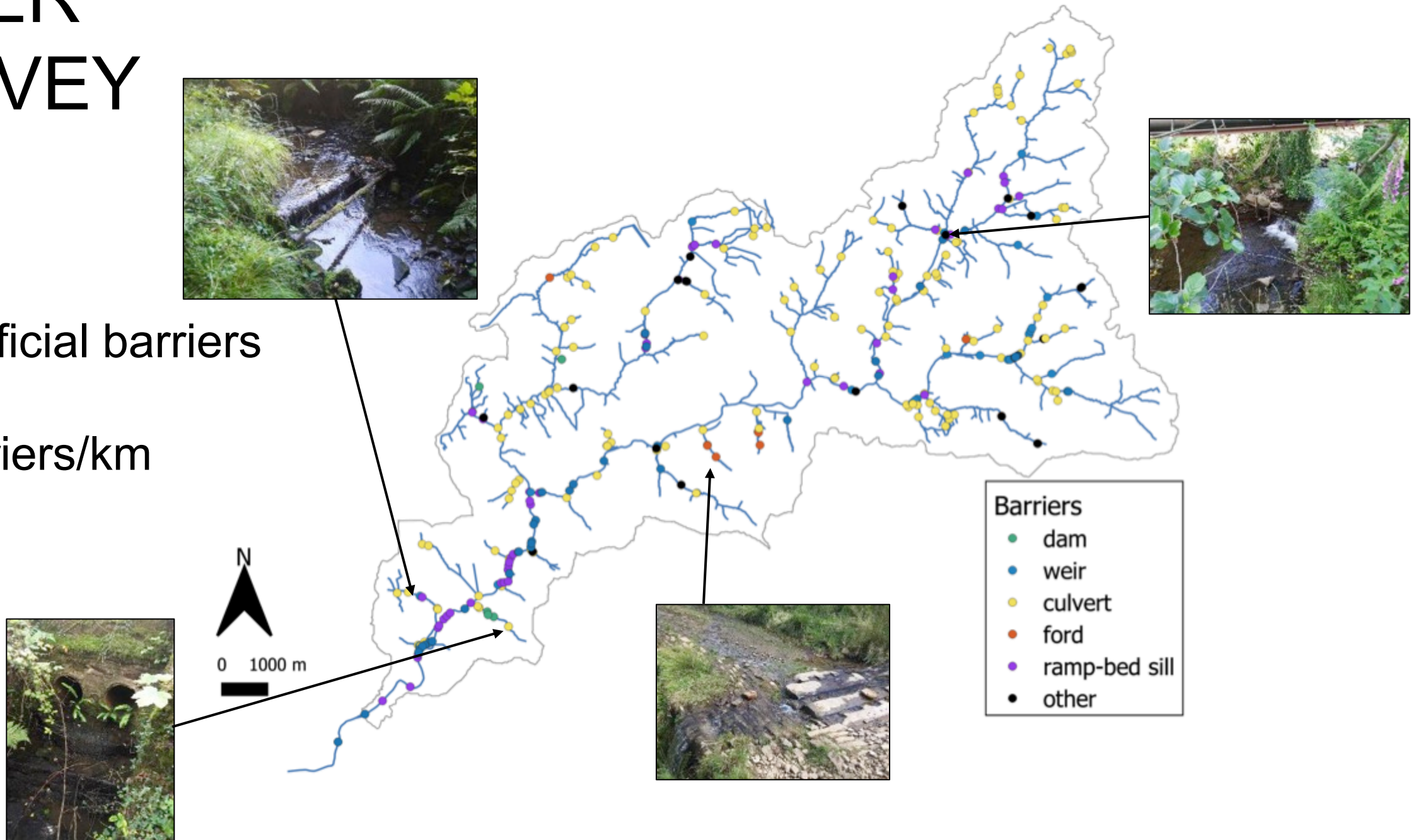
1.7 barriers/km



# AFTER SURVEY

295 artificial barriers

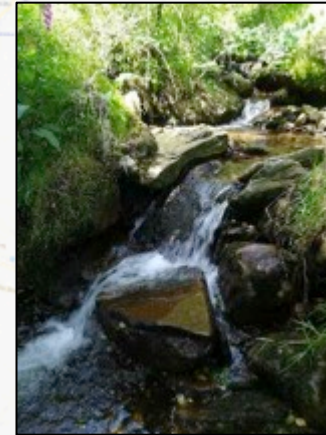
1.7 barriers/km





# 326 natural barriers

# 295 artificial barriers

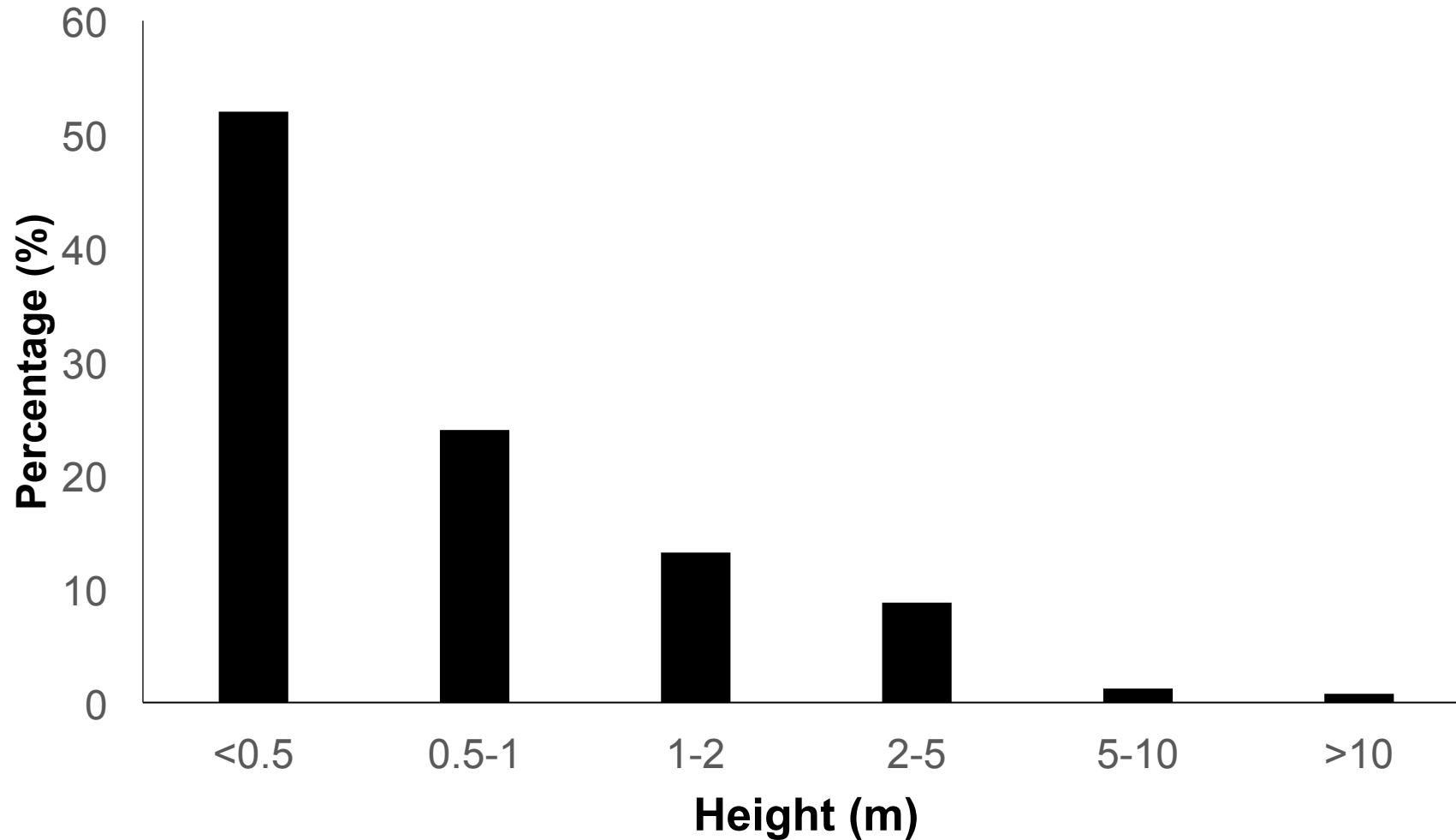


0 1000 m



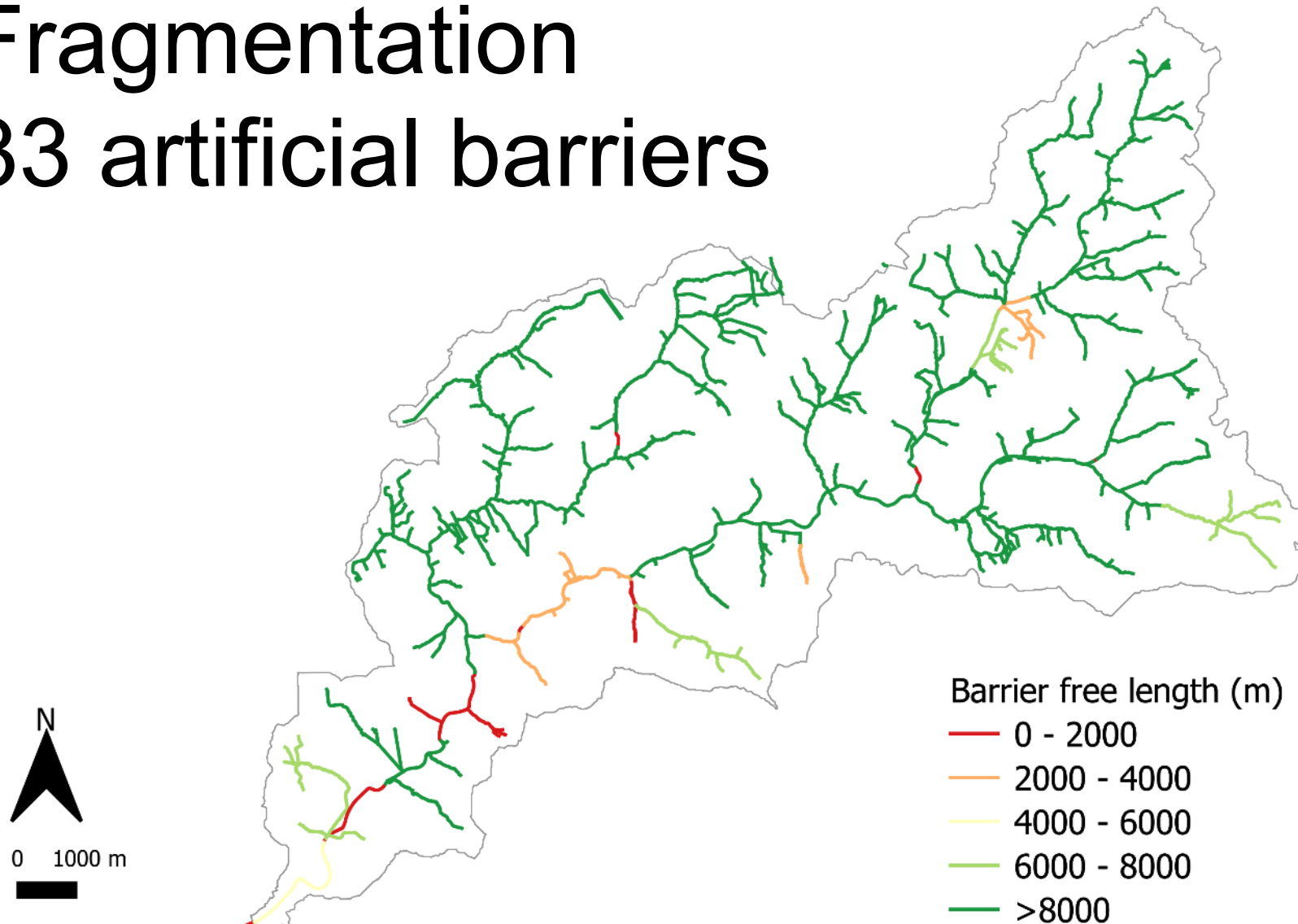
- artificial barrier
- natural barrier

# Over 50% of barriers <0.5 m high



# Fragmentation

## 33 artificial barriers

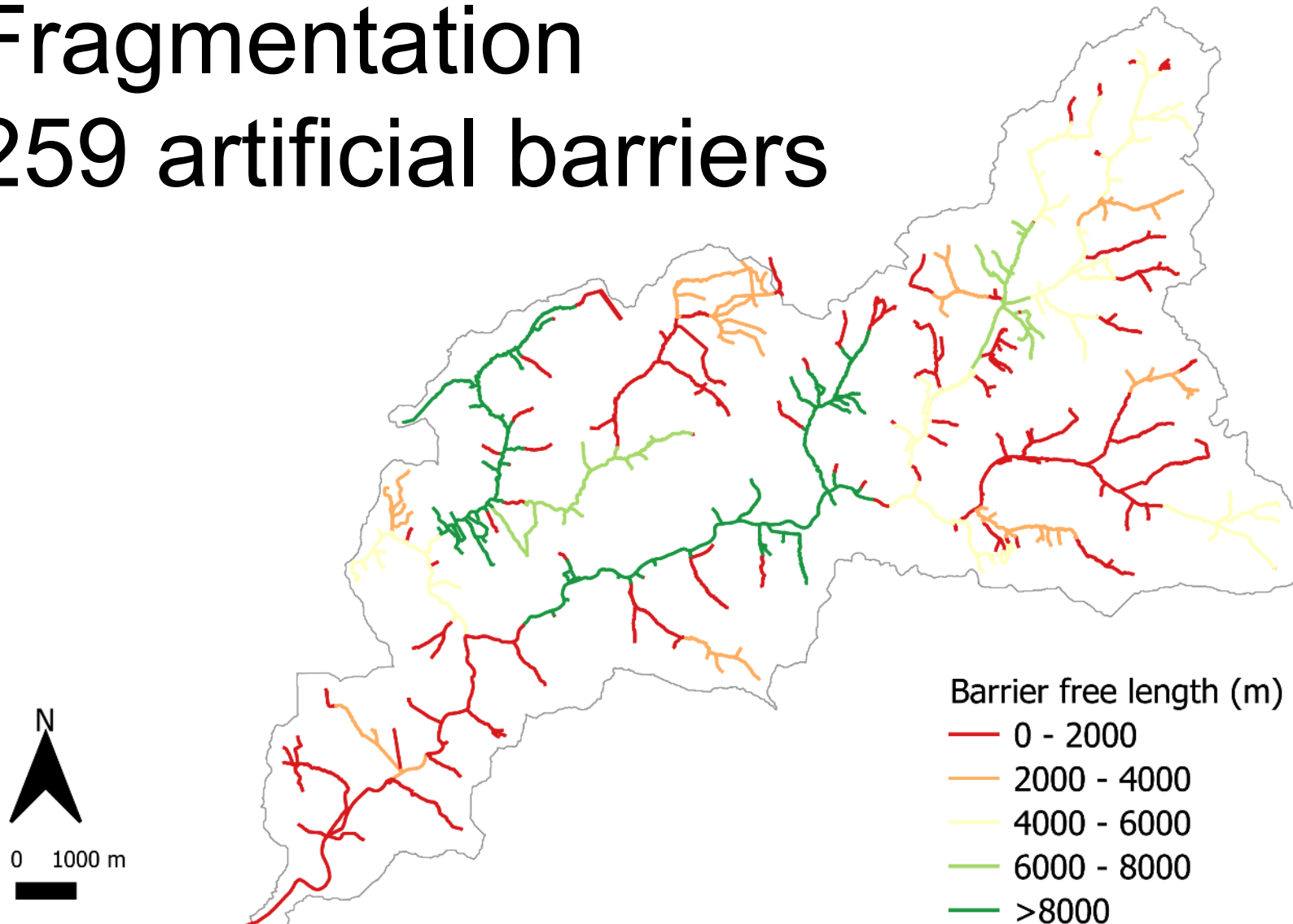


Mean barrier free  
length = 57 km



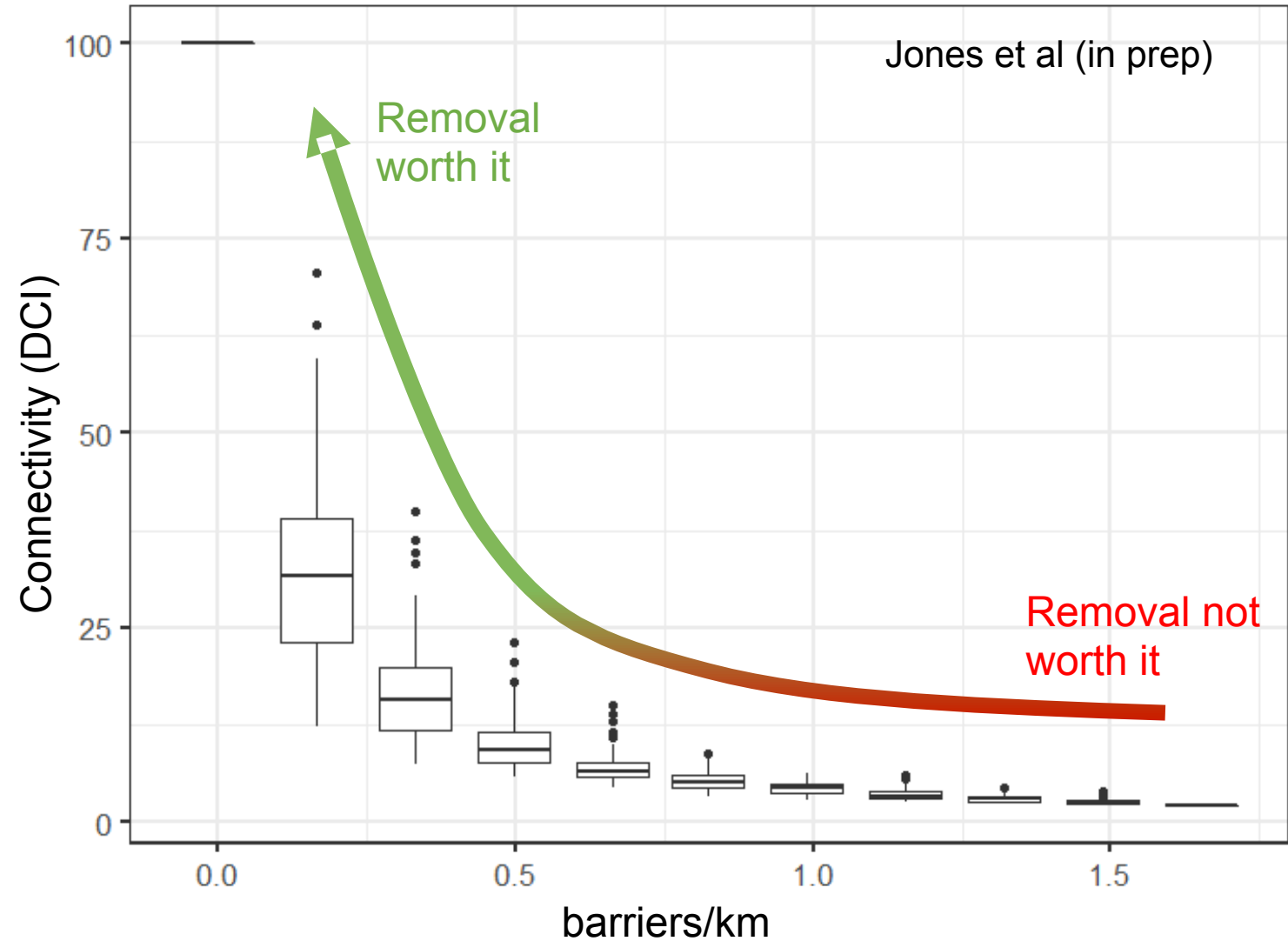
# Fragmentation

## 259 artificial barriers



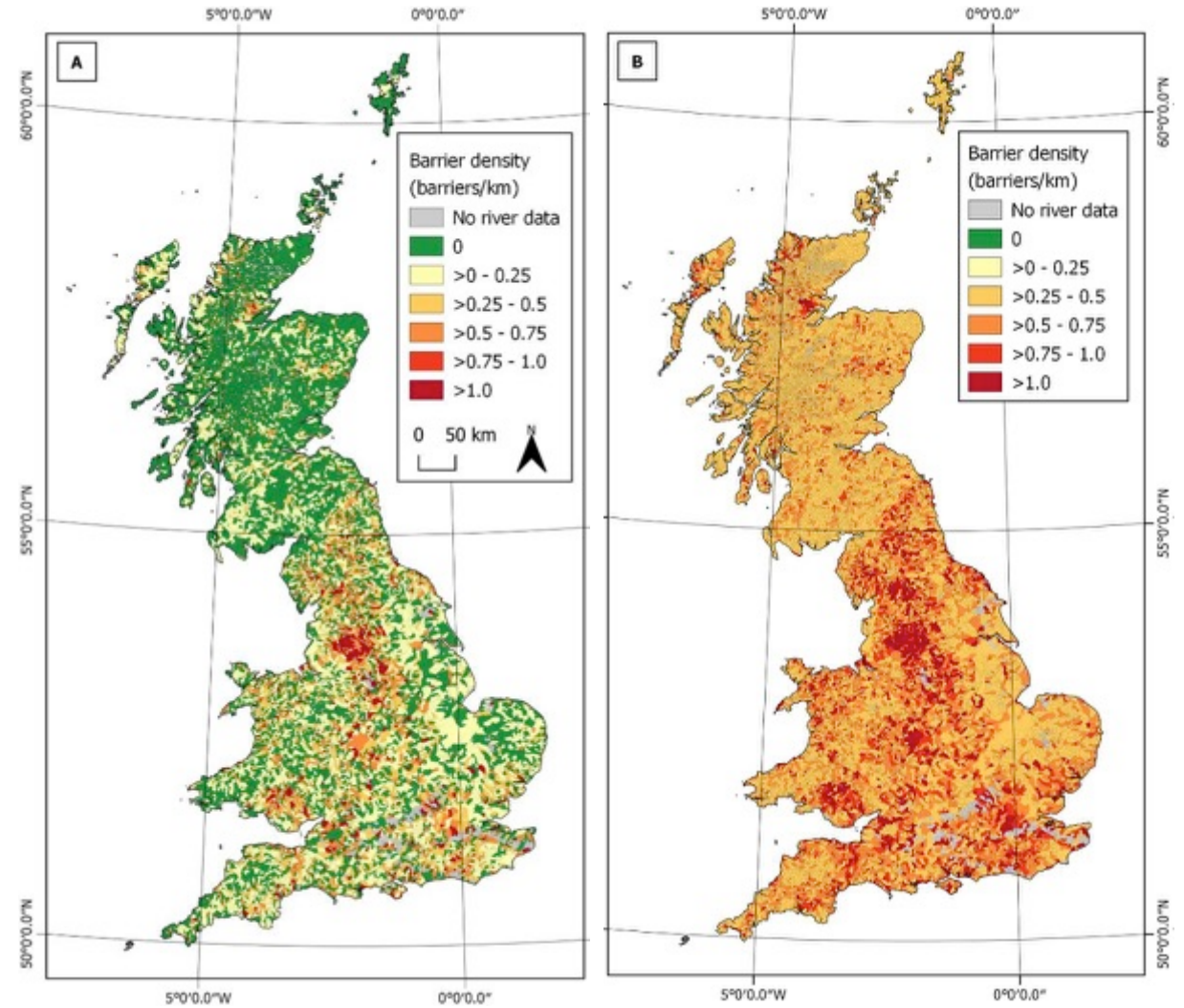
Mean barrier free  
length = 4 km

What does  
this mean for  
barrier  
mitigation?



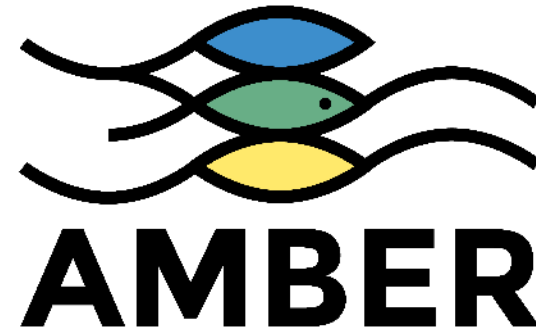
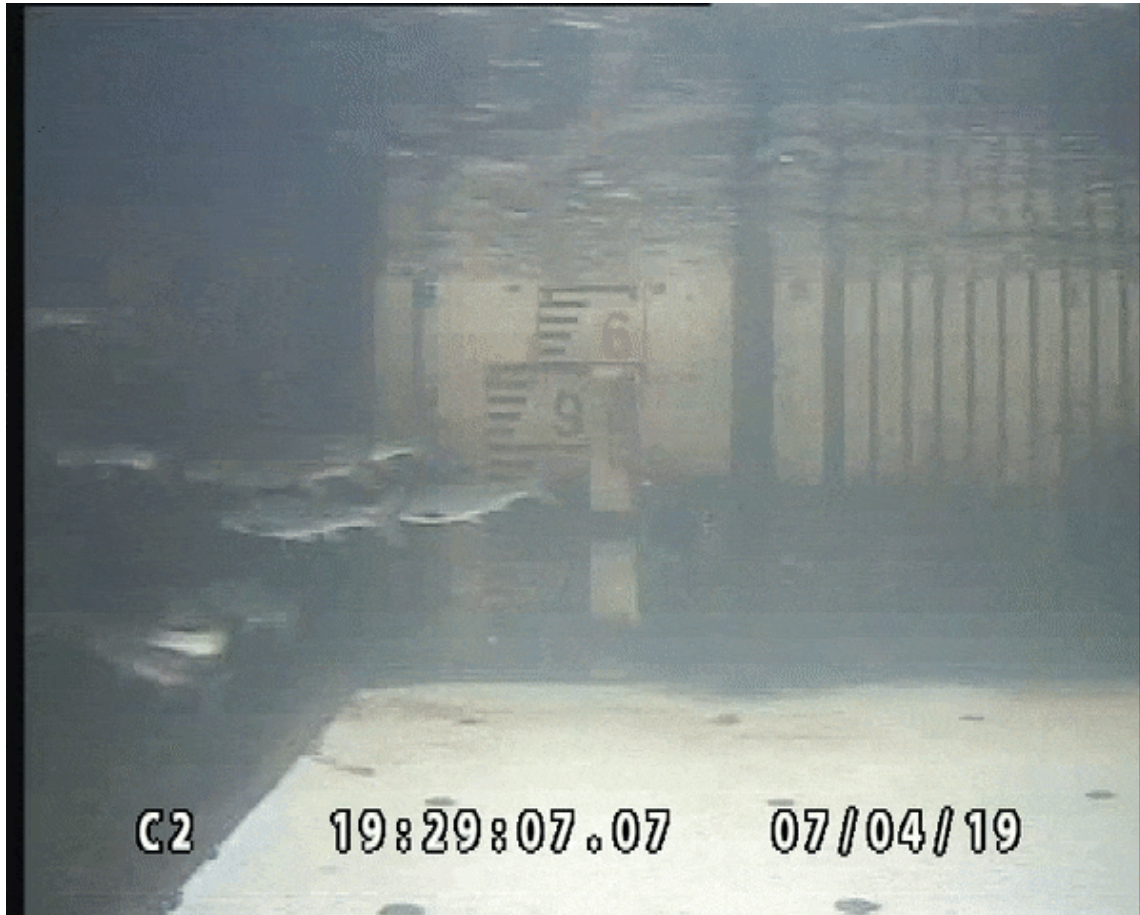
# What can practitioners do?

- Consider all structures
- Report new barrier data in a consistent way – EA / NRW / Barrier Tracker
- Target weakly fragmented rivers, not heavily fragmented ones





# Thank you!



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 689682.

