



Estimating fish habitat fragmentation patterns

Jaime García (IGB), Sami Domisch (IGB), Katarina Cetinic (NIVA)

www.sos-water.eu

Free Flowing Conference
Groningen, 15 April 2024



IGB

Leibniz Institute of Freshwater Ecology
and Inland Fisheries



Introduction



A common global aim for the conservation of freshwater systems is the restoration of river continuity

Many indices have been developed but most based on the effect of barriers on stream segments

Stream segment fragmentation might have a different meaning for different species

Need to explore further fragmentation patterns from the species presences and habitats



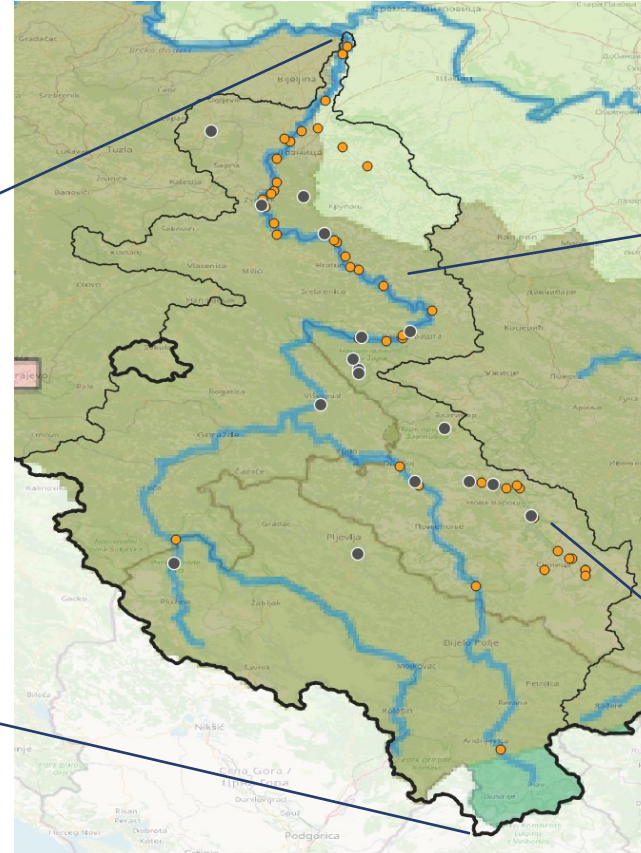
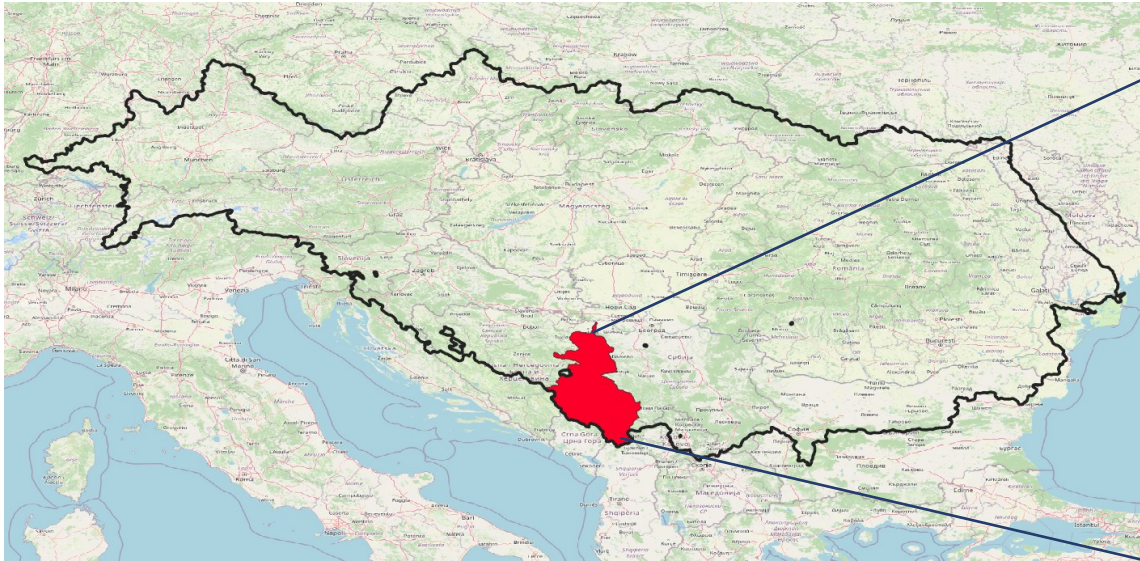
Objectives



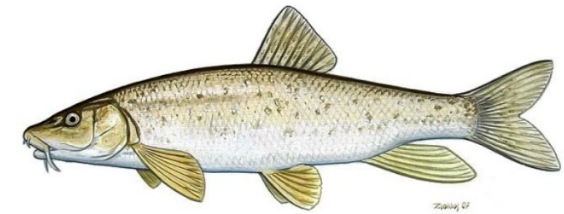
- 1) use fish species occurrence information to calculate along the network distance connectivity measures,
- 2) use the output of species distribution models to estimate the potential distribution habitats of fish species along the stream network,
- 3) calculate the status of fish habitat fragmentation given the current set of barriers



Study area: Drina River Basin



Barbus barbus



<https://asv-konstanz.de/index.php/natur-artenschutz/fisch-des-jahres/33-2003-barbe-barbus-barbus>

53 occurrence points

GeoDar v1.1 dams

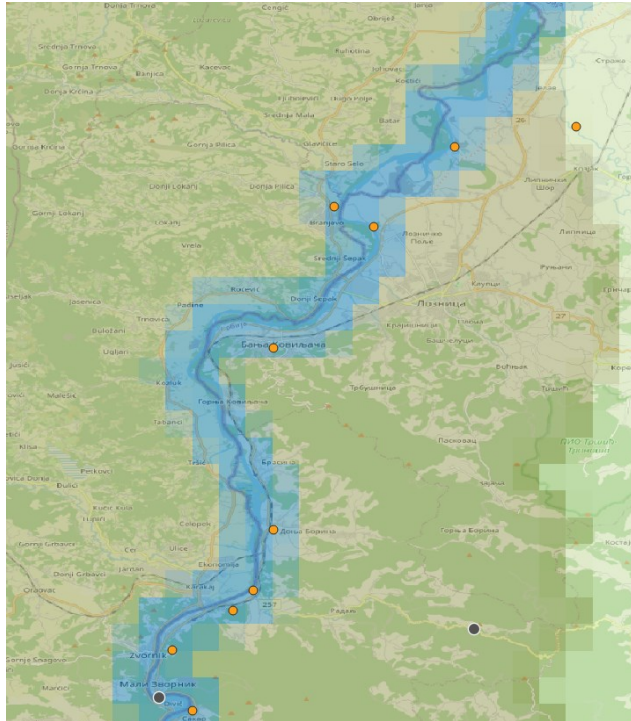
17 dams



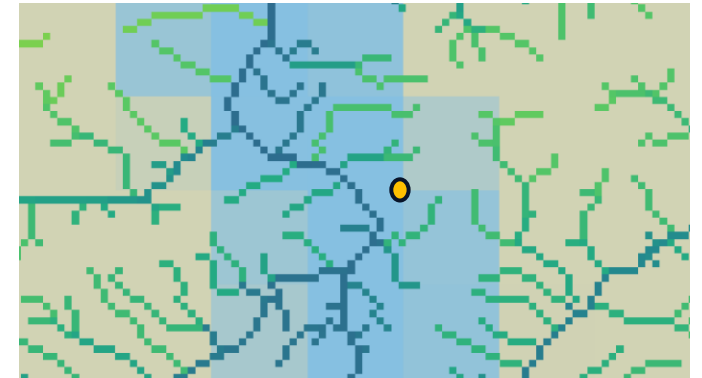
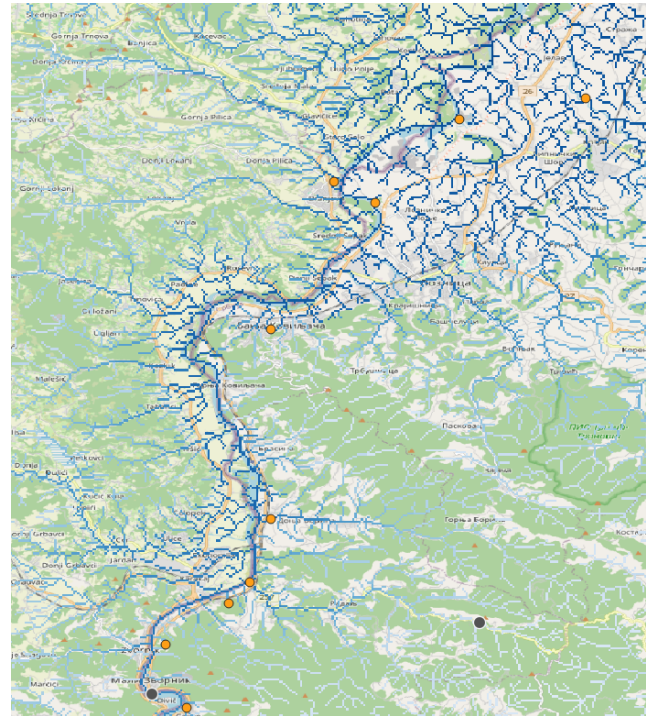
River network resolution & snapping



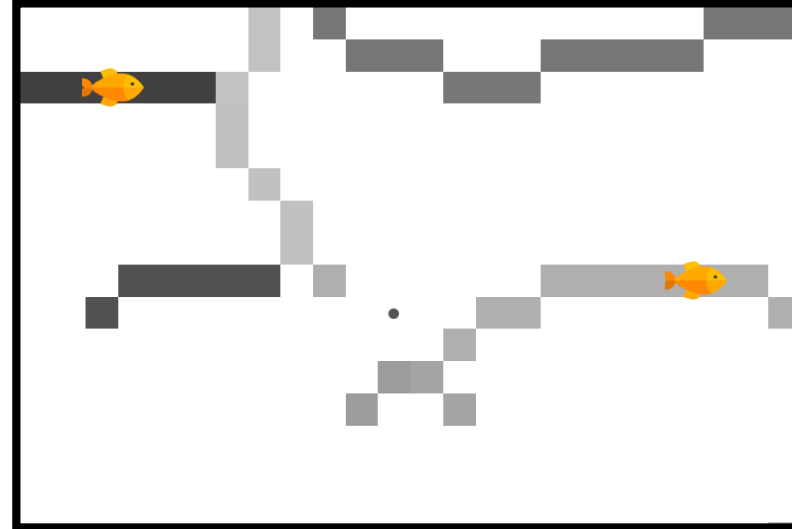
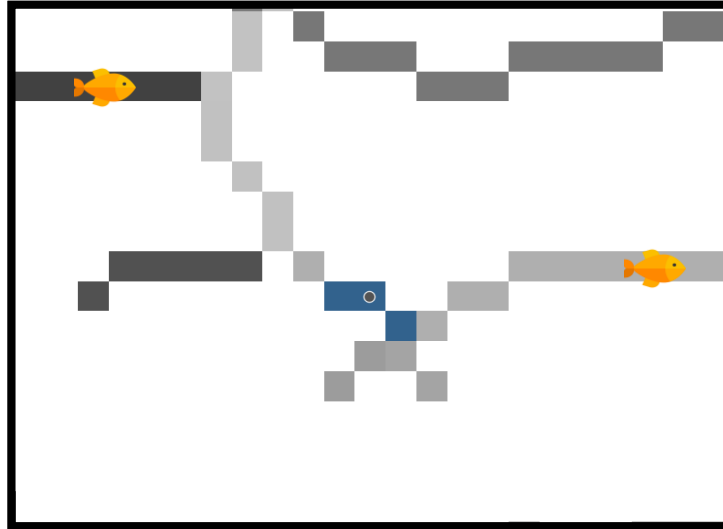
DRBMP 2021



Hydrography90m



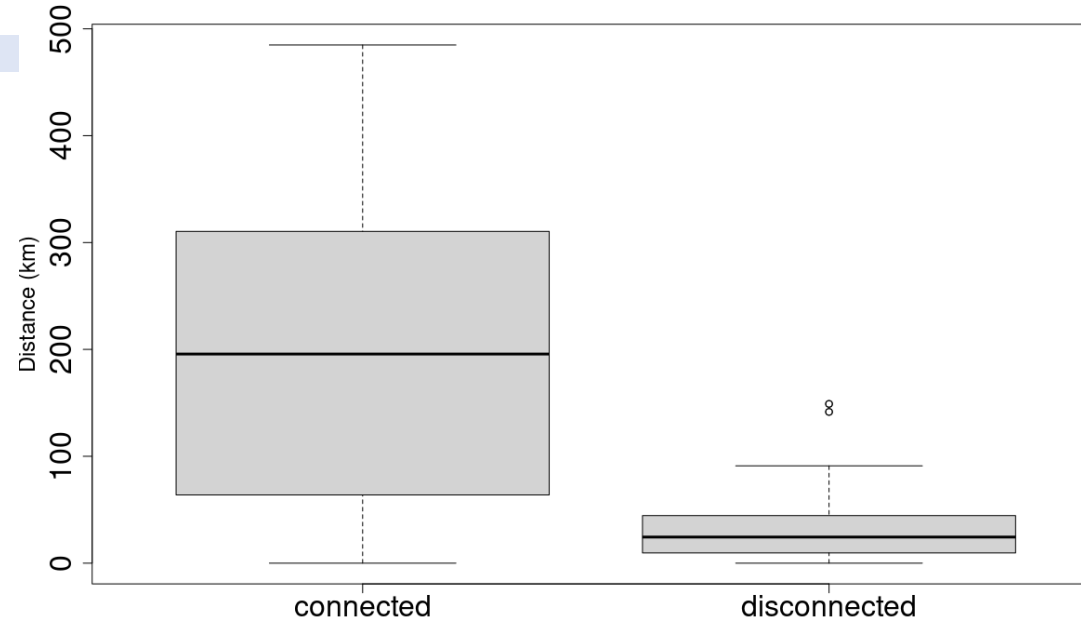
Breaking the network



- Changes in distances between occurrence locations ?
- How many connections are broken ?
- Who are the most affected ?
- Identification of fragmentation clusters ?



Distance based comparison



Connected river network

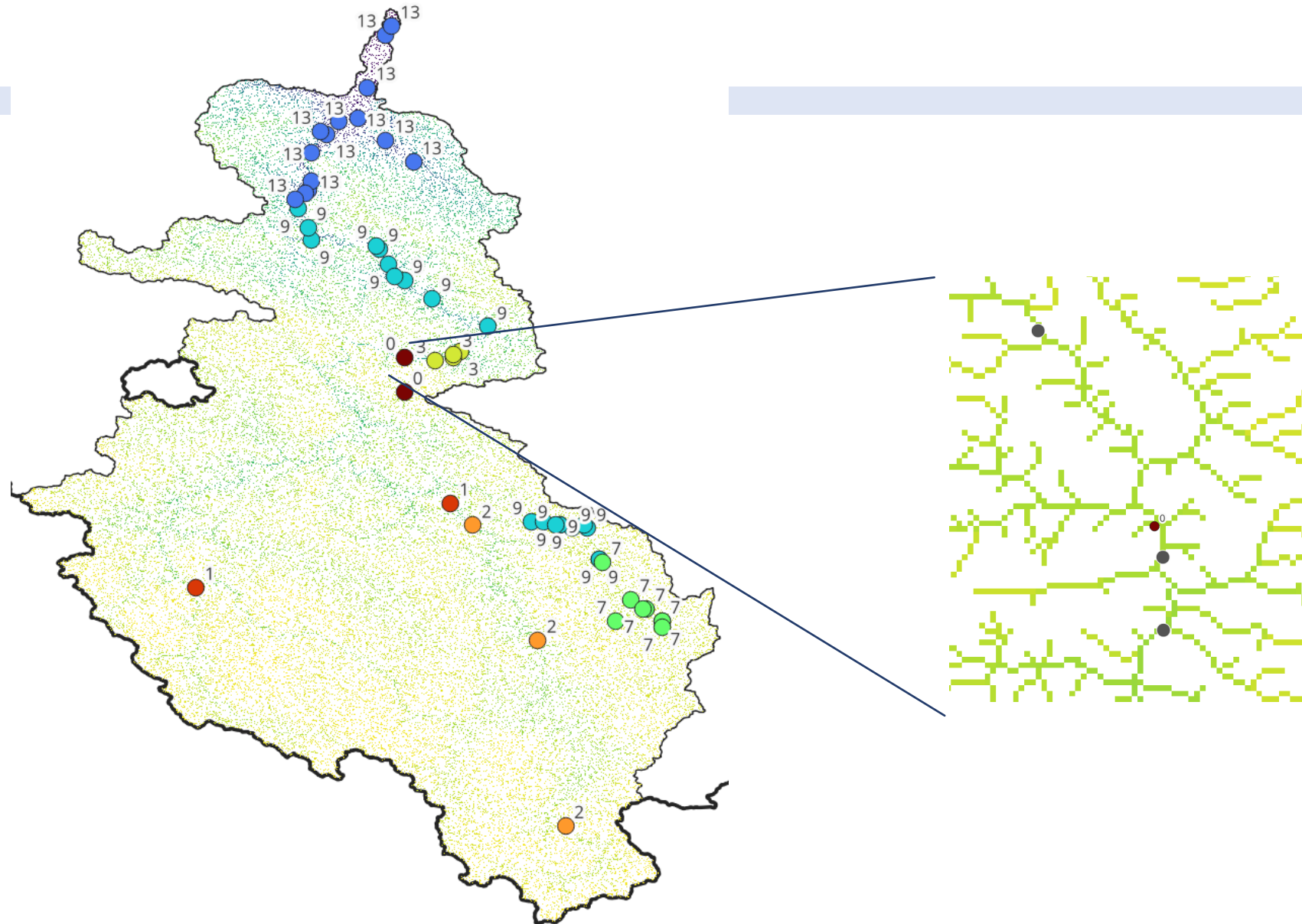
- 2757 connections
- Mean = 194.8 km
- Maximum = 484.9 km

Barriers (dams) included in the network

- 439 connections
- Mean = 30 km
- Maximum = 149.0 km



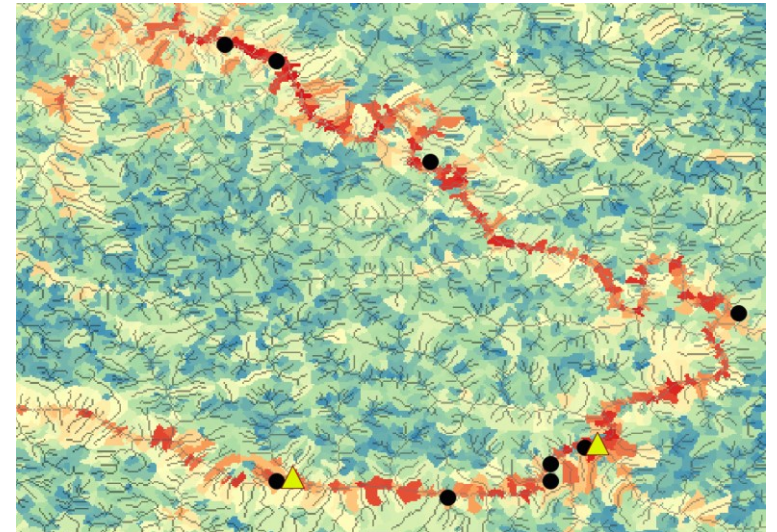
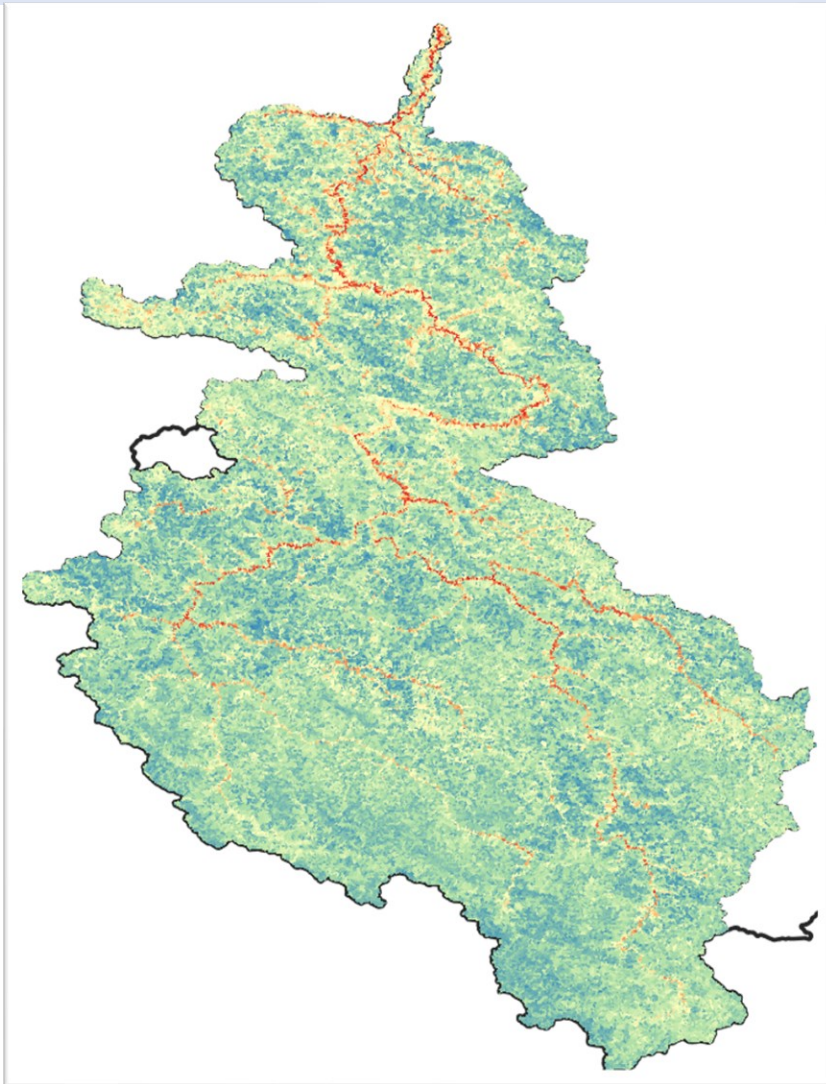
Remaining connections



Habitat Distribution



- Random Forest
- Environment90m dataset



Outlook



- Upscale analysis for larger basins
- ENFA analysis on clusters
- Simulation of dam's removal or future dams
- Analysis for multiple species



Get in touch

Jaime García

Jaime.marquez@igb-berlin.de



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement no. 101059264. Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or REA. Neither the European Union nor the granting authority can be held responsible for them.

