



# Guidelines for connectivity conservation and planning in Europe

*Webinar Ecological Connectivity*

*Conservation in Europe*

*25.03.2025*

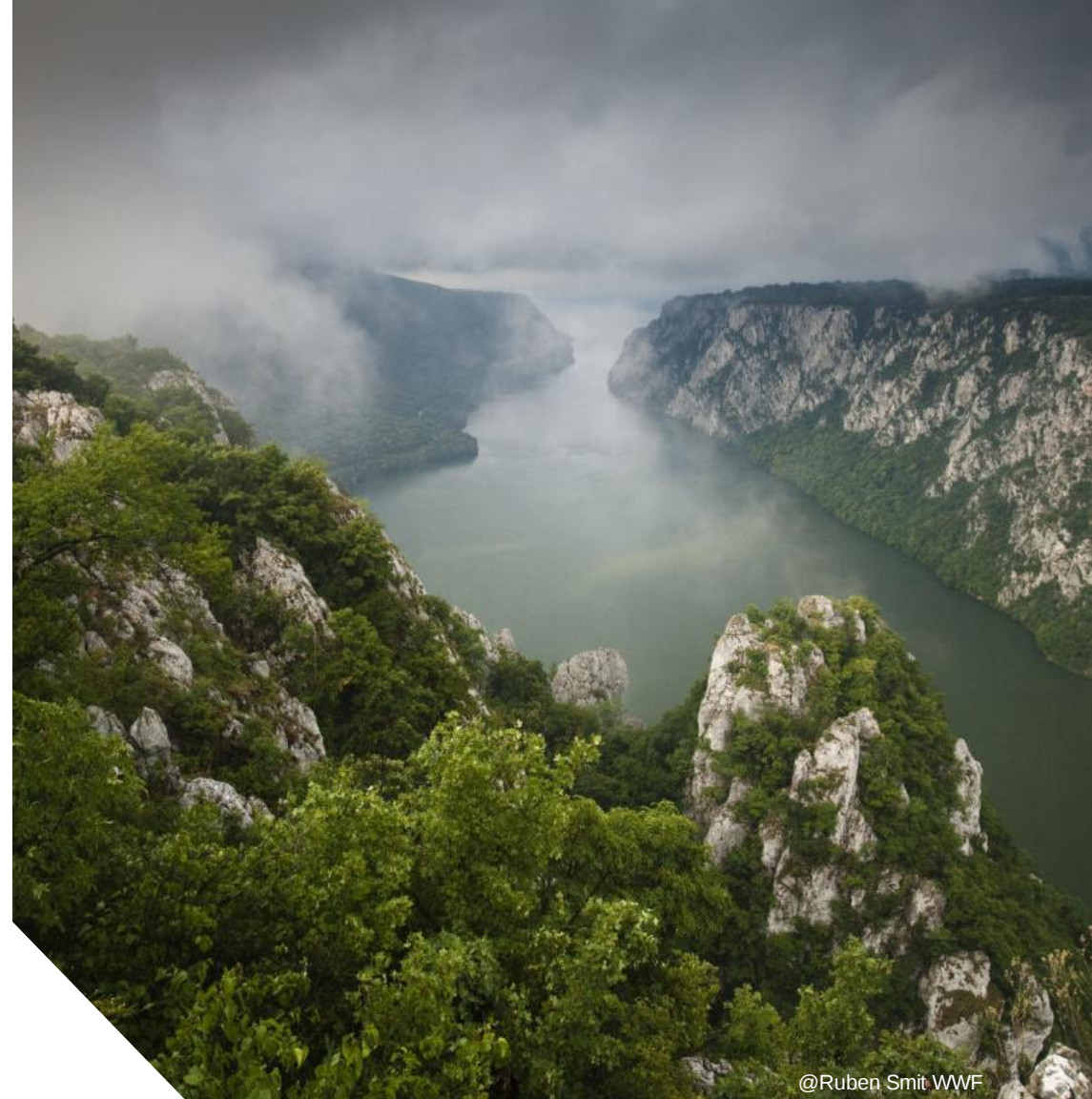
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**Funded by  
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@Ruben Smit WWF

25/03/2025

What is ecological  
connectivity?  
Why is it important?

# Why is ecological connectivity important?

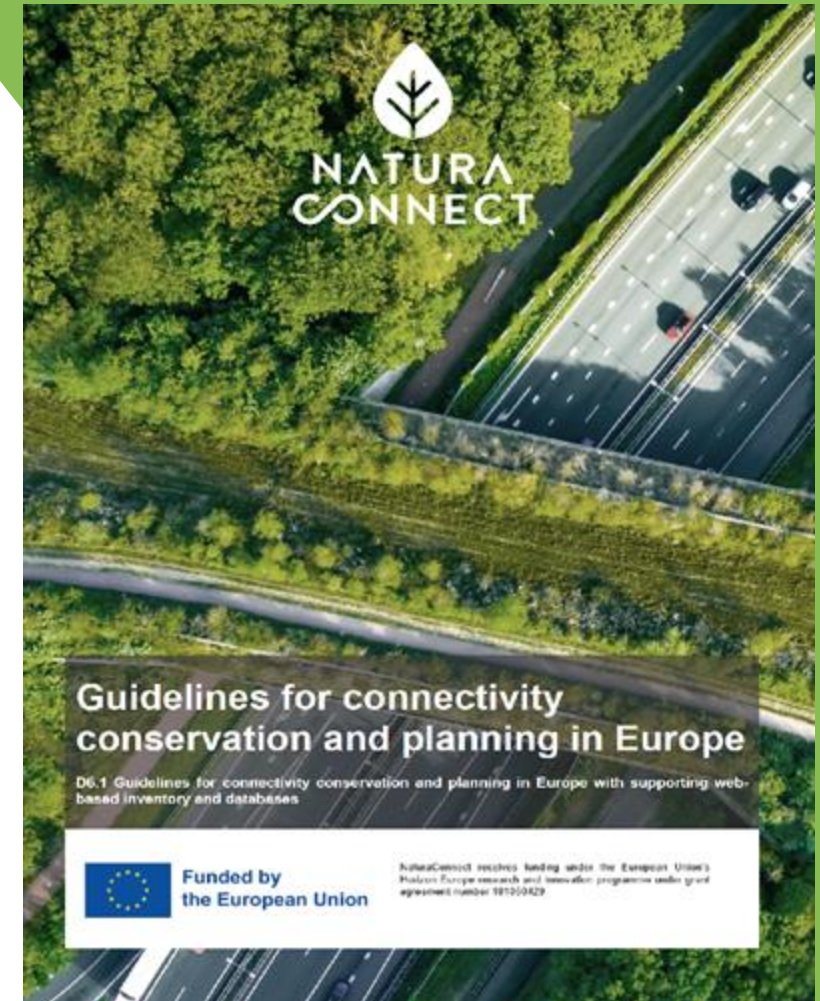
- Functional and physical connections between habitats and ecosystems enabling the movement of species, nutrients, and ecological processes across landscapes
- Critical role in preserving biodiversity, ensuring the long-term persistence and adaptability of populations and communities
- Conserving and restoring connectivity are key to counteract ecosystem degradation, habitat loss, and fragmentation



# Why guidelines?

# Why guidelines?

- Address needs, opportunities, and challenges for connectivity planning
- Support the implementation of policy commitments for biodiversity conservation and restoration
- Review of available methods, tools and data sources for connectivity planning
- Recommendations for designing connectivity projects supporting a **coherent and resilient Trans-European Network of Protected Areas (TEN-N)**



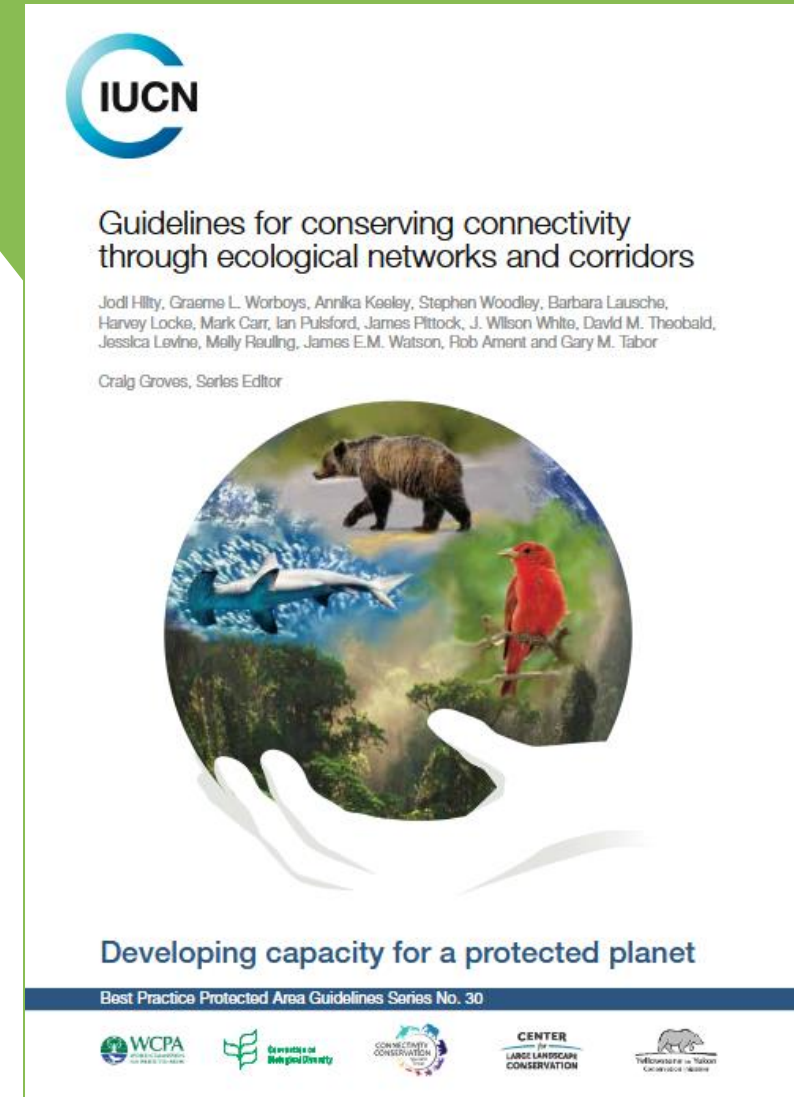
# Why guidelines?

There are other resources...

## IUCN “*Guidelines for conserving connectivity through ecological networks and corridors*”

(Hilty et al., 2020)

- ☑ Recommendations for implementing ecological connectivity
- ☑ Showcase different approaches for conserving ecological corridors with case studies from around the world



# Why guidelines?

There are other resources...



Our report **complements** the IUCN guidelines and other existing literature by:

- ➔ Providing a thorough review of approaches, information needs identified by stakeholders, and practical recommendations
- ➔ Focusing on the specificities of the European context



## Guidelines for conserving connectivity through ecological networks and corridors

Jodi Hilty, Graeme L. Worboys, Annika Keeley, Stephen Woodley, Barbara Lausche, Harvey Locke, Mark Carr, Ian Pulsford, James Pittcock, J. Wilson White, David M. Theobald, Jessica Levine, Molly Reuling, James E.M. Watson, Rob Ament and Gary M. Tabor

Craig Groves, Series Editor



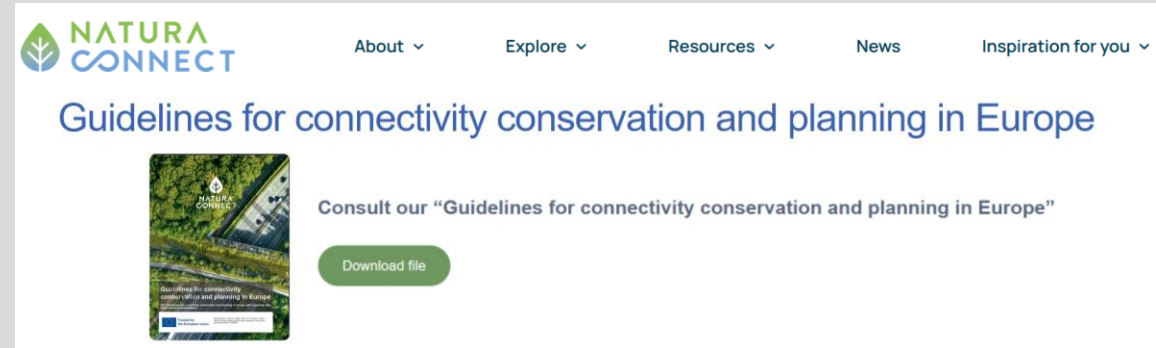
Developing capacity for a protected planet

Best Practice Protected Area Guidelines Series No. 30



So, what do the  
guidelines contain?

# Where can you find them?



[naturaconnect.eu/guidelines-for-connectivity-conservation-and-planning-in-europe/](https://naturaconnect.eu/guidelines-for-connectivity-conservation-and-planning-in-europe/)



<https://preprints.arphahub.com/article/129021/>

# We would love to hear from you!



- Relevant?
- Useful?
- Comprehensive?

➔ Identify interests and needs for capacity building



## Review: Guidelines for Connectivity Conservation Planning in Europe

Thank you for participating in this review. You can access the **Connectivity Conservation Planning Guidelines** [here](#). The survey will help us identify interests and needs for capacity building. We plan to address these needs in training modules on the future NaturaConnect Learning Platform. Your name will be listed as a reviewer if you agree.

We warmly invite you to join the [NaturaConnect Stakeholders Community](#) before or after completing your review. This way, we will keep you updated about NaturaConnect results and opportunities for engagement. It also facilitates recording your contributions to this review.

You do not need to answer all the questions. For example, if you have read only specific sections, feel free to comment only on those. You are also welcome to return and complete the survey after reviewing new sections or the entire document. At the end of the questionnaire, you will be able to provide comments that may not fit in any of the sections.

Thank you for taking the time to share your feedback as we work to enhance the guidelines.

Best regards,

**The NaturaConnect Team**

*We protect your data following the EU Data Protection Regulations. Your personal information will not be shared with third parties and will be used only for the mentioned purpose. Your inputs and comments will remain confidential.*

*NaturaConnect receives funding under the European Union's Horizon Europe research and innovation programme.*

Part I.

# Connectivity in Europe: key concepts, policy context, and implementation

Part I.  
Connectivity in Europe:  
key concepts,  
policy context,  
and implementation

Part II.  
Tools and guidelines  
for implementing  
connectivity projects  
in Europe

# Concepts



# Concepts



# Policies



# Concepts



# Projects



# Policies



# Concepts



# Projects



# Policies



# Gaps and needs



Concepts



Projects



Tools



Policies



Gaps and needs



Concepts



Projects



Tools



Policies



Gaps and needs



Framework



# Part I.

## Connectivity in Europe: key concepts, policy context, and implementation

# Connectivity concepts and approaches



# Connectivity concepts and approaches



1. Protected areas and ecological corridors
2. Structural and functional connectivity
3. Connectivity in the context of Green and Blue Infrastructure
4. Spatial scale issues and dispersal
5. Corridors and stepping stones design
6. Freshwater and cross-realm connectivity
7. Integration of connectivity in the process of area-based planning
8. Caveats of corridor design
9. Do ecological corridors work?



# Global and EU policy instruments addressing connectivity



# Global and EU policy instruments addressing connectivity



1. Connectivity in the post-2020 Global Biodiversity Framework
2. Connectivity in the EU Biodiversity Strategy
3. Connectivity in the EU Forest Strategy
4. Connectivity in the Green and Blue Infrastructure Strategy
5. Connectivity in the Water Framework Directive
6. Connectivity in the EU Pollinators Initiative



# Connectivity projects in Europe (survey and repository)



# Connectivity projects in Europe



## The survey:

- Collect information on ecological connectivity projects in Europe
- Produce a public repository of connectivity projects
- Support knowledge sharing



### Survey of ecological connectivity projects in Europe

The NaturaConnect project (<https://naturaconnect.eu>) is an EU-funded Research and Innovation action that develops knowledge, tools, and capacity- building to support the implementation of a coherent network of protected areas across Europe - the Trans-European nature network (TEN-N). The present survey aims to collect information on ecological connectivity projects in Europe undertaken at Regional to National and Pan-European levels. Projects may include public and private conservation action plans and strategies, connectivity conservation and restoration measures, research and innovation projects, etc. The inputs will be used to produce a public repository of connectivity projects that can support knowledge sharing.

Contact: The NaturaConnect Project ([naturaconnect@iiasa.ac.at](mailto:naturaconnect@iiasa.ac.at))

# Public repository of ecological connectivity projects


[+ Add project](#)

Displaying 80 Projects

Show 25 ▾

## Country

Nothing selected ▾

## Ecosystem types

Nothing selected ▾

## Spatial scope

Nothing selected ▾

## Approaches for assessing connectivity

Nothing selected ▾

## Biogeographical region

Nothing selected ▾

## Other benefits

Nothing selected ▾

### Walloon ecological network design

University of Liège

No description provided

Forests Shrublands Grasslands  
Wetlands Rivers  
Agricultural areas

### Conservation of connectivity in the West Carpathians for large carnivores

Friends of the Earth Czech Republic

The project is aimed on conservation of large carnivore populations in the edge of their western distribution in the Carpathians. Activities contain detailed monitoring of wolf, lynx and bear population density and other demographic parameters, ...

Forests Grasslands  
Agricultural areas  
Urban and periurban

### European Biological Corridors

Eurac Research; Fondazione Capellino; Wageningen University

EuroBIOCOR combines unique, multifaceted knowledges from ecological, economic and social sciences and a communication and dissemination approach to address the current challenges in building a coherent and resilient trans-European nature network of ...

Forests Grasslands Wetlands  
Rivers Agricultural areas

### Connectivity of riparian habitats in the Duero river basin, current situation and climate change scenarios

Catholic University of Ávila

Climate projections point to an increase in temperatures and a decrease in precipitation, a situation that may compromise the connectivity of riparian habitats and aggravate fragmentation processes. This project has analyzed the variation in the ...

Forests Rivers

# Conservation of connectivity in the West Carpathians for large carnivores

Acronym: N/A

Friends of the Earth Czech Republic

Other participating institution(s): Czech University of Life Sciences; Mendel University in Brno

[Forests](#)
[Grasslands](#)
[Agricultural areas](#)
[Urban and periurban](#)



Country or countries of application: Czech Republic, Slovakia

The project is aimed on conservation of large carnivore populations in the edge of their western distribution in the Carpathians. Activities contain detailed monitoring of wolf, lynx and bear population density and other demographic parameters, research of movements across urbanized landscape, identification of critical sections of wildlife corridors, dealing with local authorities, participation in decision making processes and spatial planning, and in some cases also practical realization of wildlife corridors (e.g. planting of forest patches as stepping stones in wildlife corridors).

[Website](#)

Funding sources

[Approaches for assessing connectivity](#)

[Other benefits](#)

- Nature conservation funds from National and/or Regional administrations
- Development funds from National and/or Regional administrations
- European funds associated to other sustainability policies
- Private funds
- Private funds

Name of funding programme(s): N/A

Temporal information

Start - End

2008 - 2024

Duration

16 years

Spatial information

Spatial scope

- Sub-national
- Transboundary

Biogeographical region

- Alpine

Spatial information

- Locations for ecological corridors
- Locations for stepping stones
- Locations to increase permeability of linear infrastructures

Thematic scope

Connectivity goals

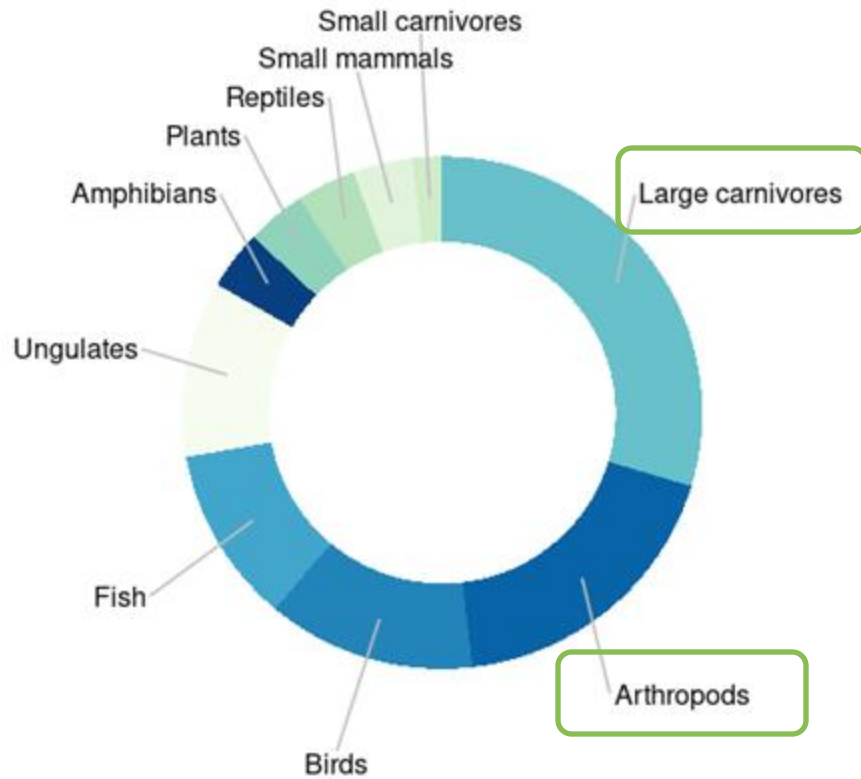
Target users of the results

Policy support



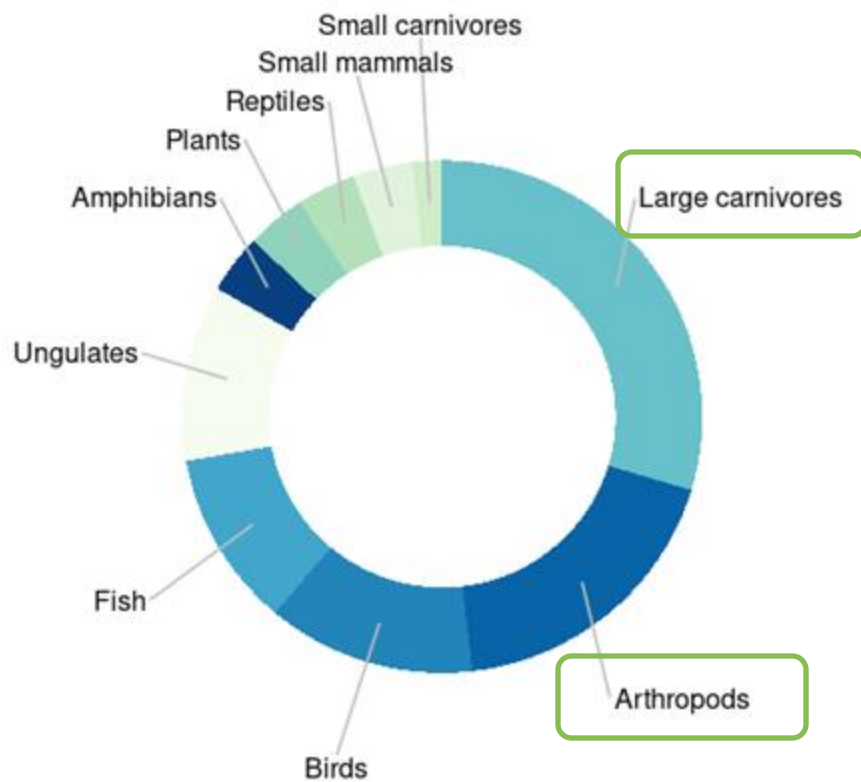
# Connectivity projects in Europe

## Targeted taxa

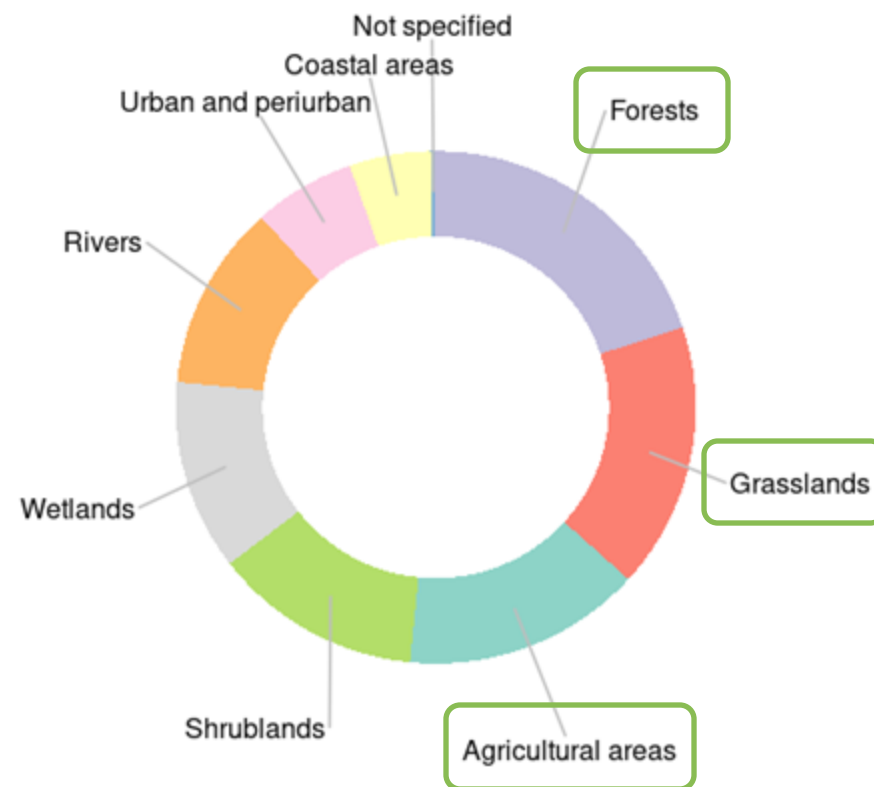


# Connectivity projects in Europe

## Targeted taxa

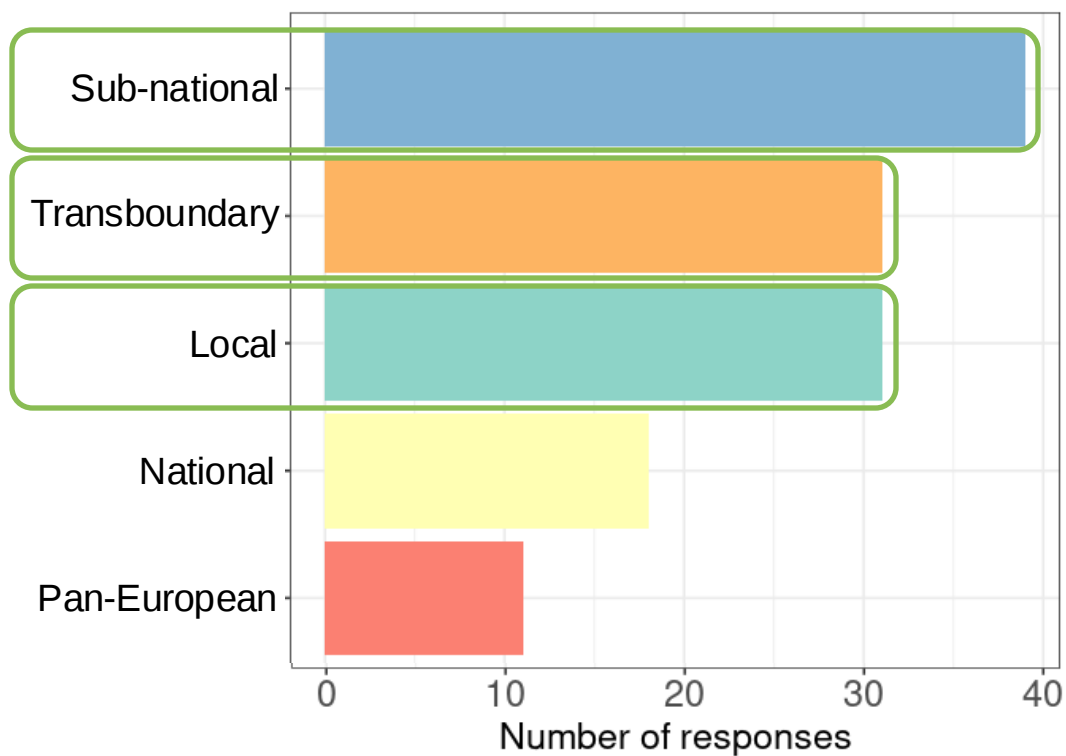


## Ecosystem types



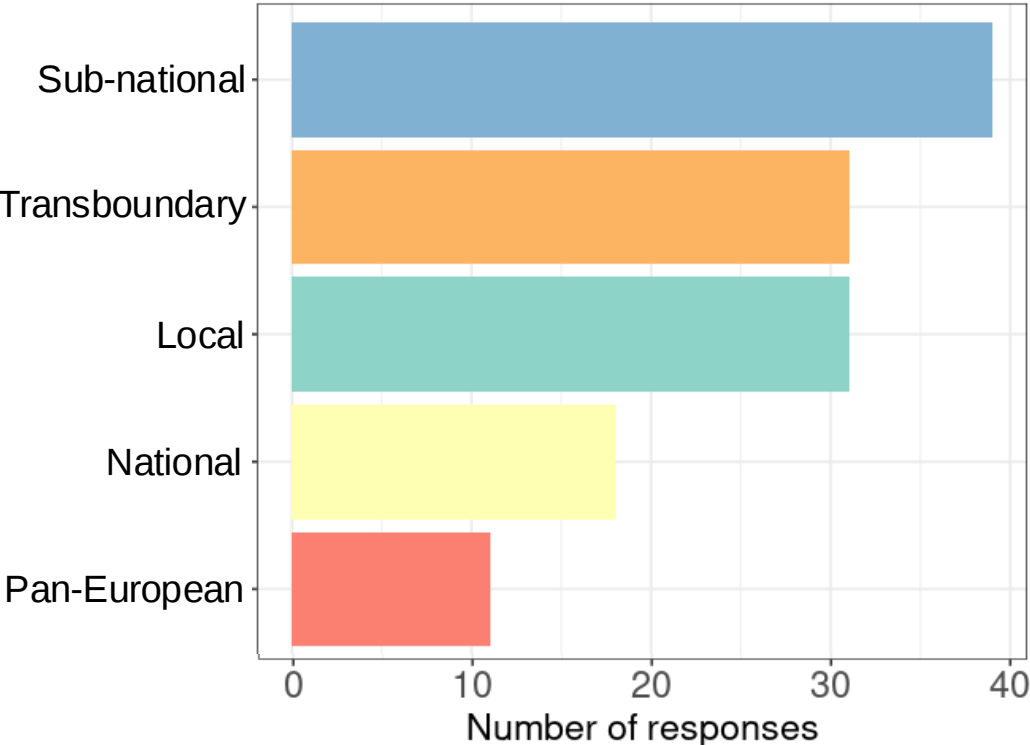
# Connectivity projects in Europe

## Spatial scope

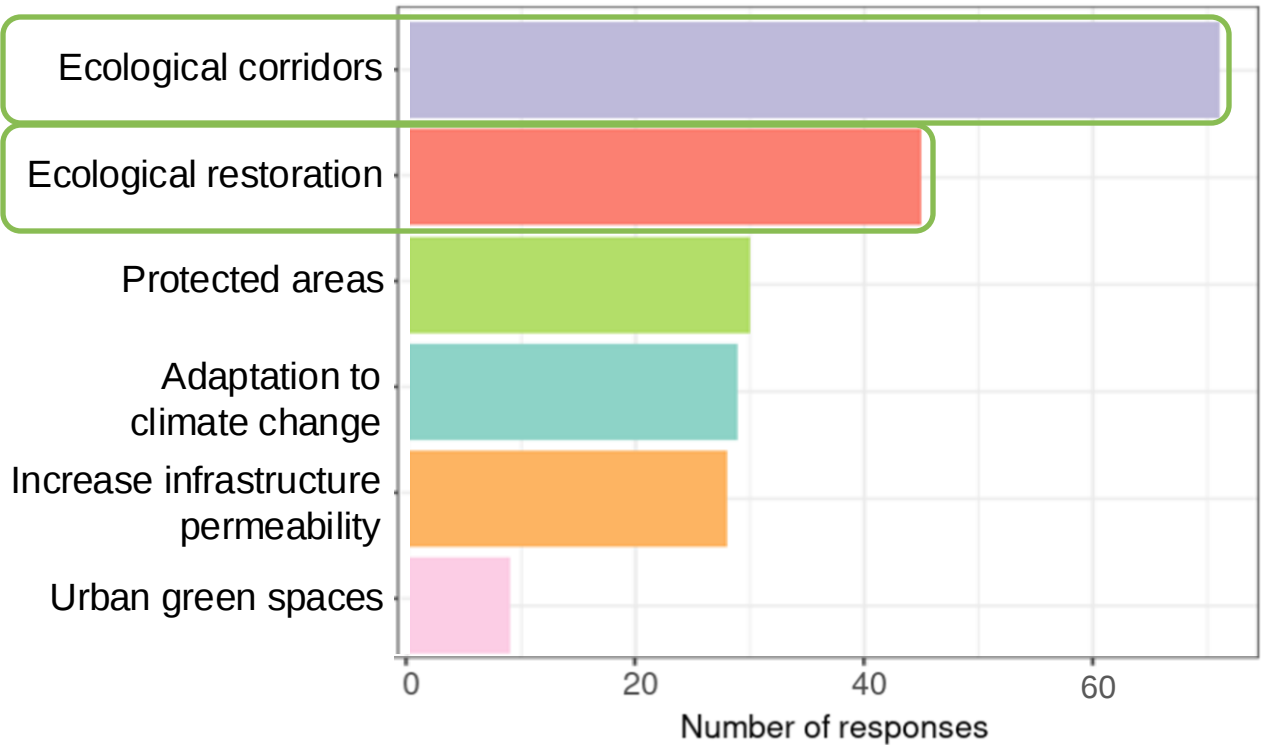


# Connectivity projects in Europe

## Spatial scope

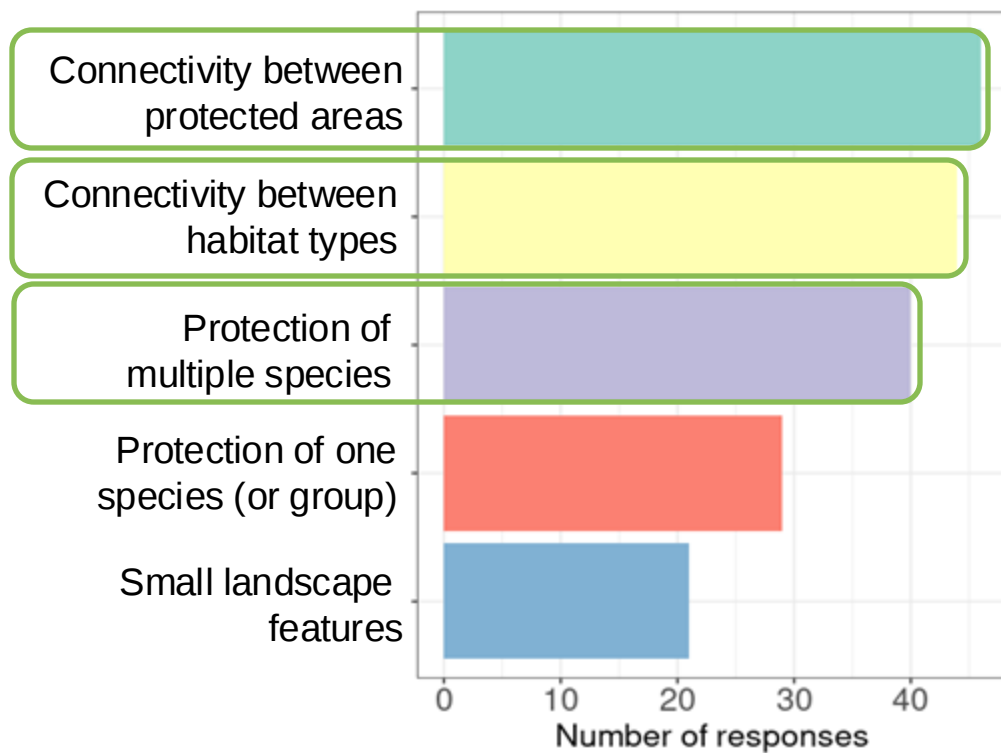


## Thematic scope



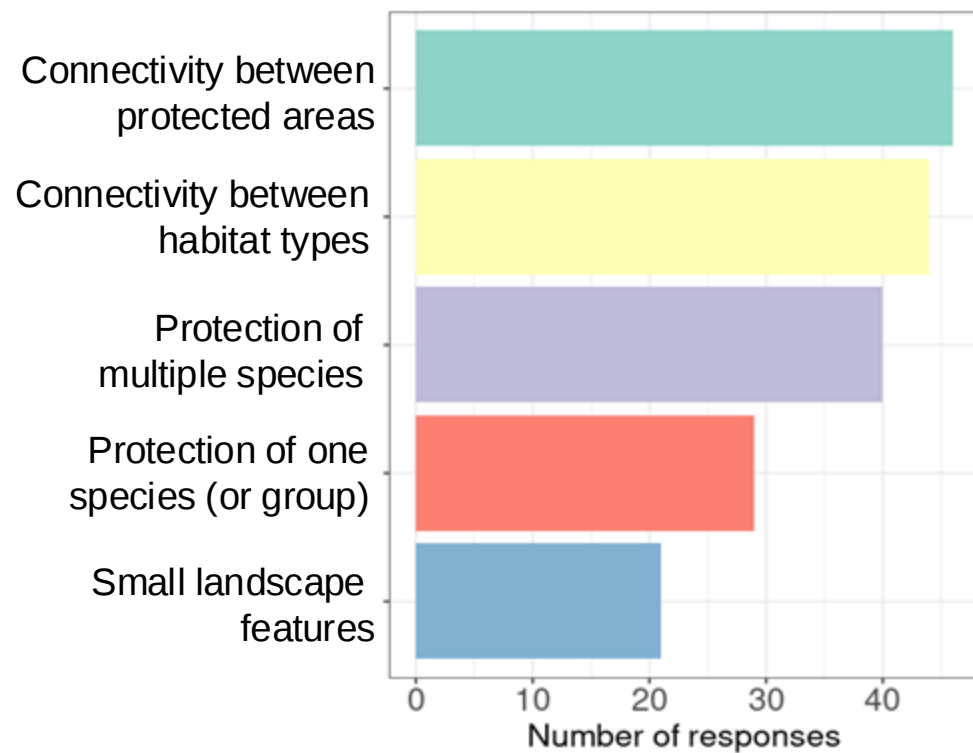
# Connectivity projects in Europe

## Connectivity goals

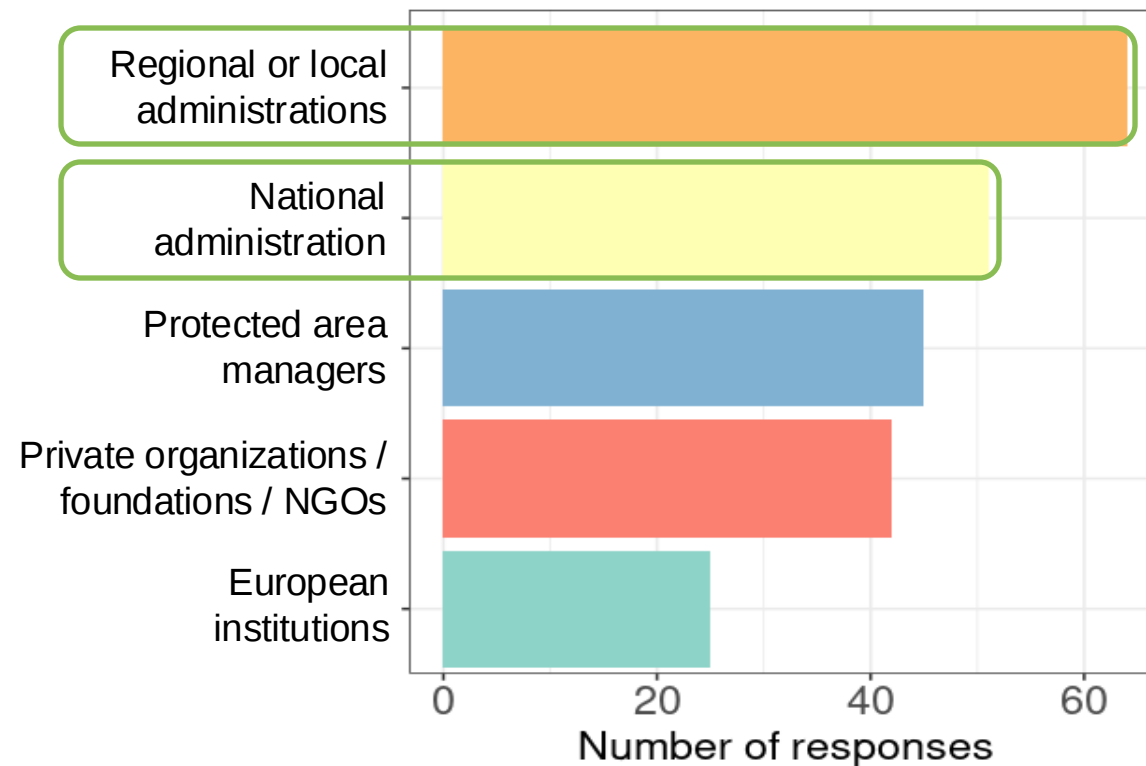


# Connectivity projects in Europe

## Connectivity goals

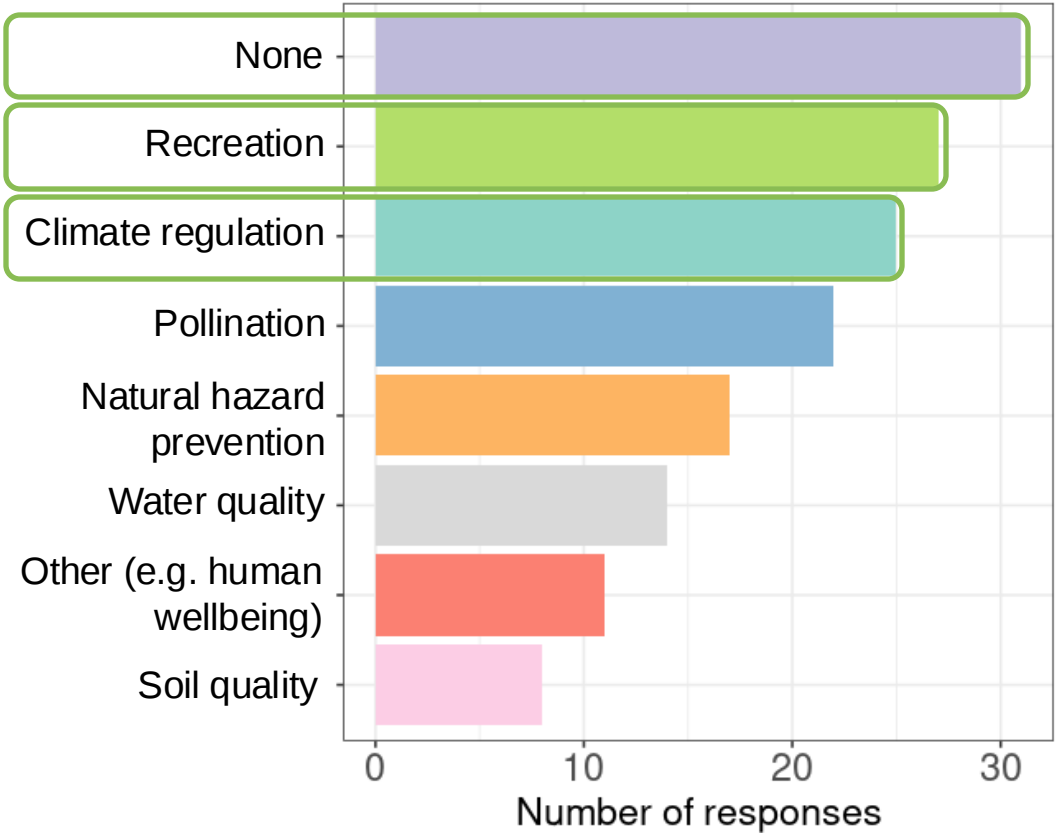


## Target users



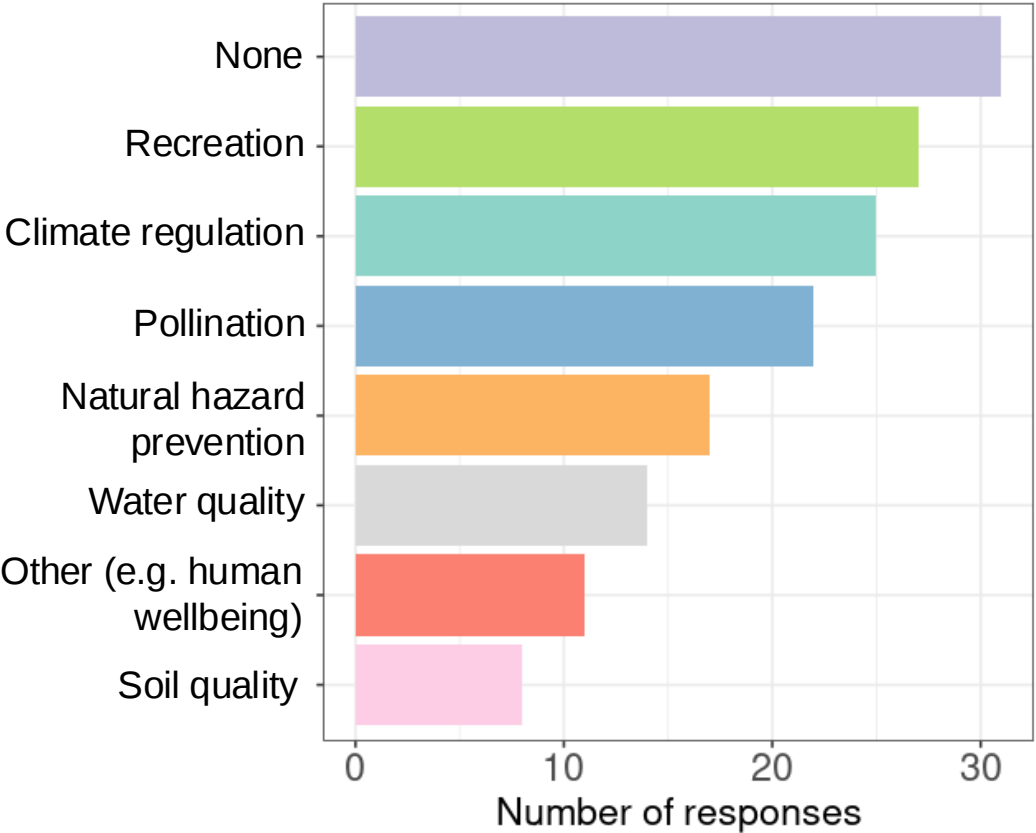
# Connectivity projects in Europe

## Other benefits

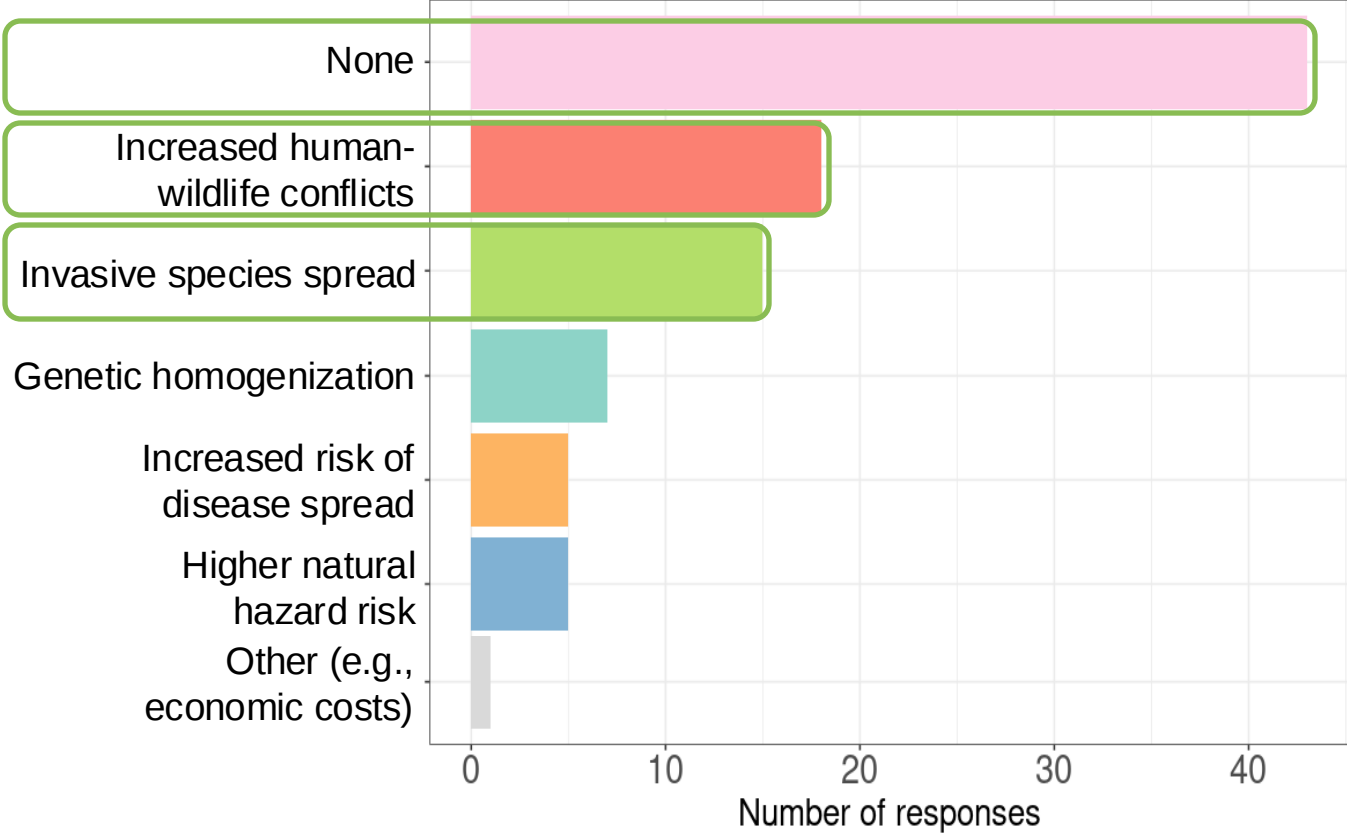


# Connectivity projects in Europe

Other benefits

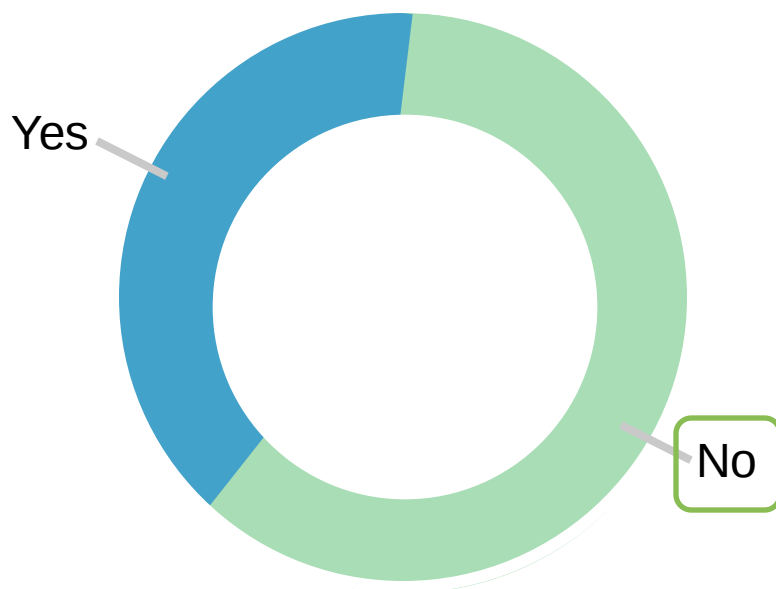


Negative impacts



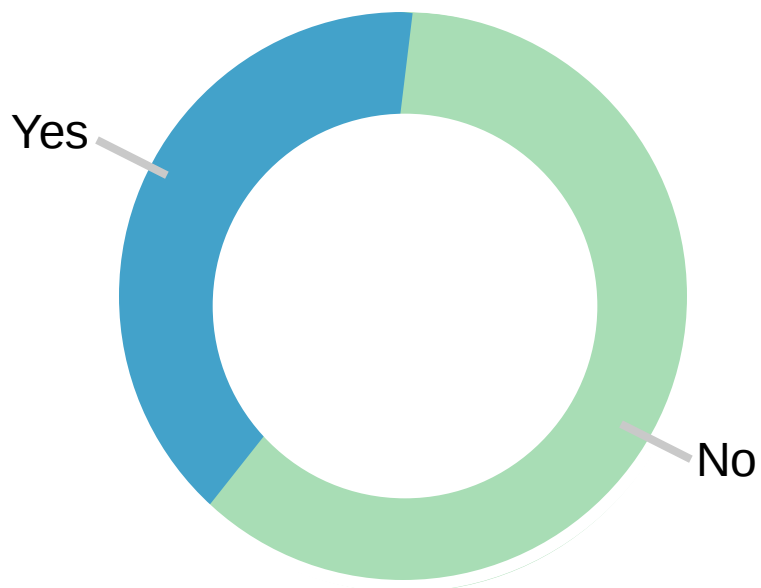
# Connectivity projects in Europe

Was the project commissioned?

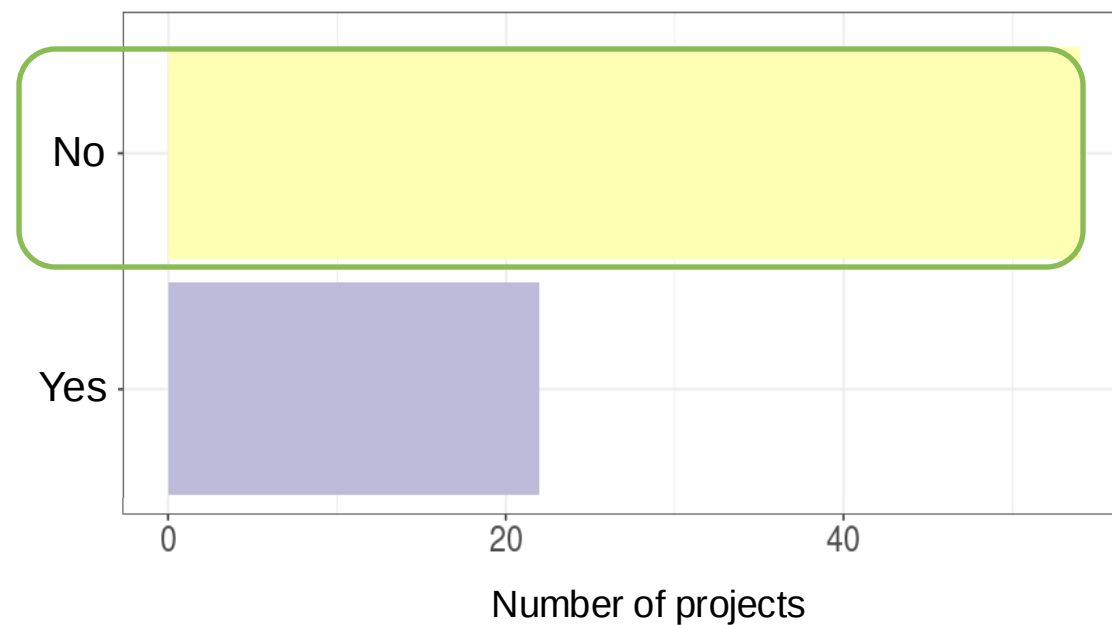


# Connectivity projects in Europe

Was the project commissioned?



Was there any monitoring?



# Priorities, gaps, and challenges in European connectivity planning (workshop)





Online Workshop  
23 & 24  
October 2023  
10:30 - 12.30 CEST

Assessing Ecological Connectivity in Europe:  
*Conservation Goals and Information Gaps*

 **NATURA  
CONNECT**

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the European Union**

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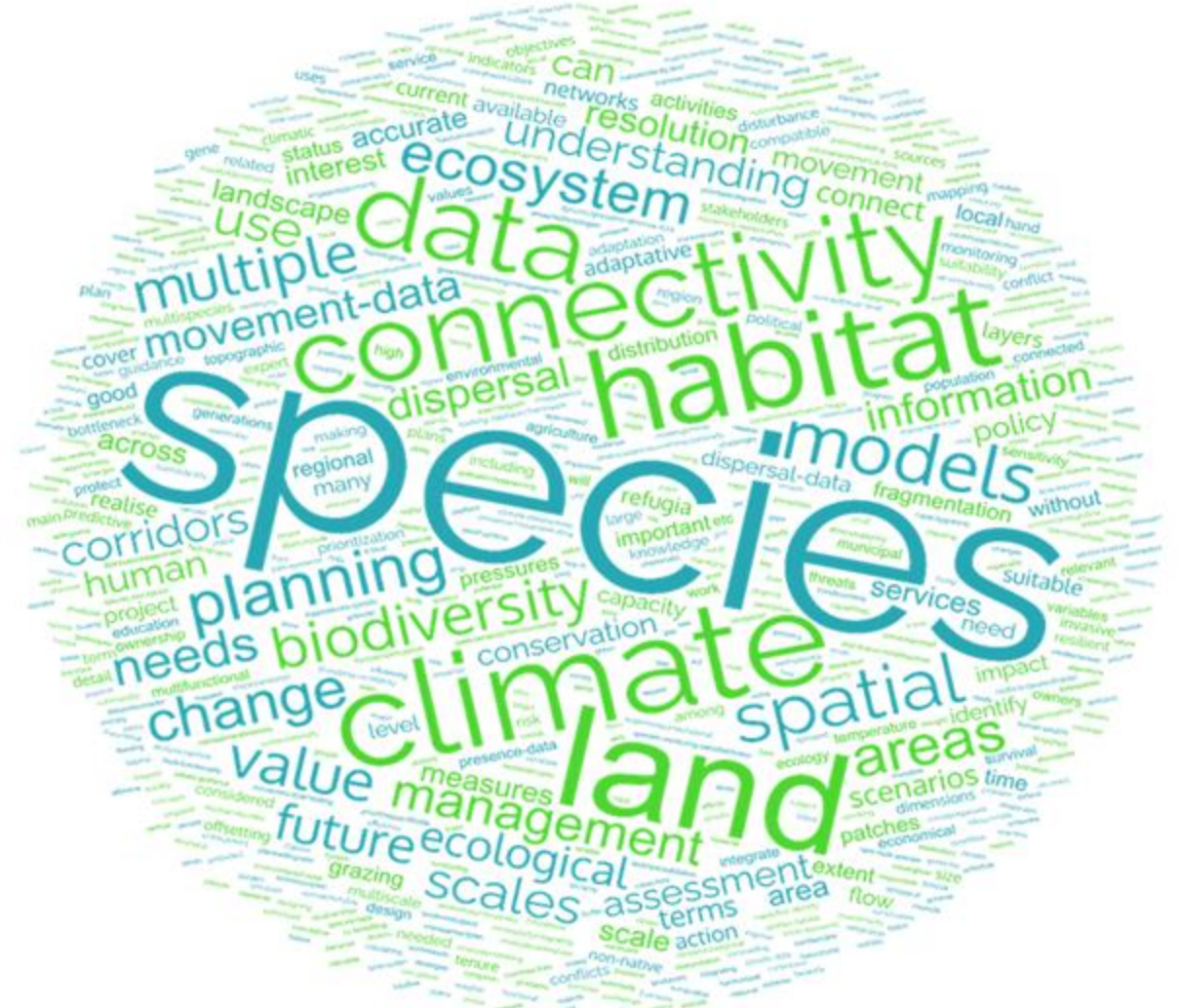
**naturaconnect.eu**

<https://naturaconnect.eu/workshop-assessing-ecological-connectivity-in-europe/>

# Priorities, gaps, and challenges in European connectivity planning



- i. Stakeholders' priorities for connectivity planning
- ii. Technical challenges for connectivity planning
- iii. Solutions to overcome challenges and needs



# Part II.

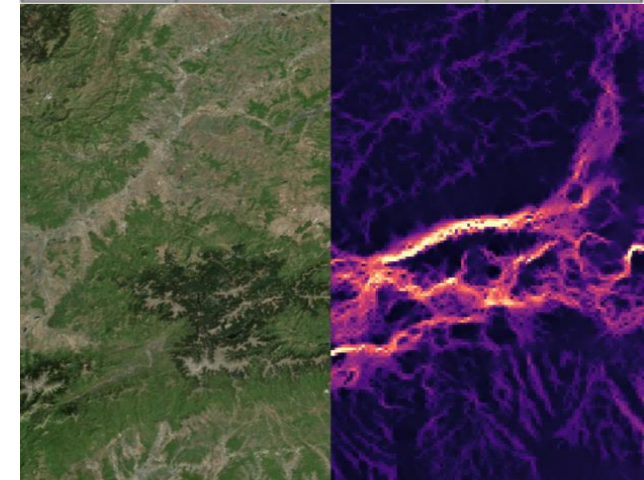
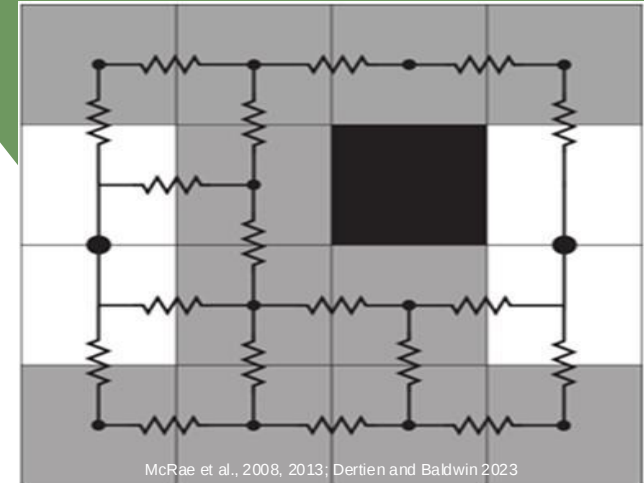
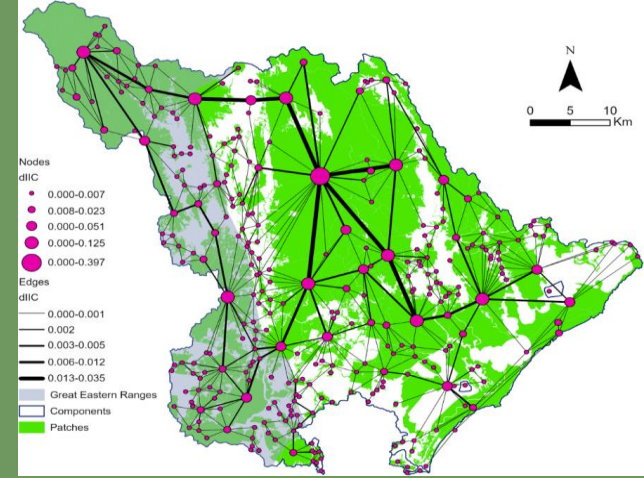
## Tools and guidelines for implementing connectivity projects in Europe

# Tools and data sources for modelling connectivity



# Tools and data sources for modelling connectivity

1. Least-cost path and resistance kernels
2. Graph theory
3. Circuit theory
4. Agent based models
5. Structural connectivity metrics and moving window analysis
6. Assessing ecosystem services



# Tools and data sources for modelling connectivity



- The most common modelling families for functional and structural connectivity
- List is not exhaustive but demonstrates some of the possibilities with these models

| Model Family                                   | Data Needs                                                                                                                                                                                   | Applications                                                                                                                                                                              | Software & Packages                                                                   |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <i>Least-cost Path &amp; Resistant Kernels</i> | Resistance surface, focal nodes, and species dispersal data (RK)                                                                                                                             | Focal species corridors, population dispersal potential, area of potential use, pollinator movement, probability of human movement                                                        | LCP: ArcGIS Tools, QGIS plugin, R packages ('gdistance', 'leastcostpath'); RK: UNICOR |
| <i>Graph Theory</i>                            | Focal nodes & connection file of attributes between node pairs                                                                                                                               | Analysis of landscape structure and potential functionality, prioritisation of patches and connections, long-term population persistence                                                  | Conefor, ArcPro Network Analyst, R packages ('iGraph', 'riverconn')                   |
| <i>Circuit Theory</i>                          | Resistance surface & focal nodes (Circuitscape) or source weight surface (Omni)                                                                                                              | Focal species connectivity and pinch points, water flow, pollinator movement, invasive species control                                                                                    | Circuitscape, GFlow, Omniscape, Linkage Mapper (multi-family)                         |
| <i>Agent-based models</i>                      | Model specific: Focal node and network data, survival rate, population growth rate, fecundity, node transition probabilities, resistance surface, etc.                                       | Long-term population persistence, patch and connection importance, source-sink analysis                                                                                                   | MetaIPM, HexSIM, NetLogo, R packages ('p SiMRiv')                                     |
| <i>Structural Connectivity Metrics</i>         | (Will differ depending on the used metric(s)) Number of patches, patch size(s), boundaries and perimeter, distance between patches, focal nodes, presence/absence of links, number of paths. | Assessing connectivity of select components in the physical landscape, e.g. protected areas, specific habitats and/or corridors. Both in relation to intra- and inter-patch connectivity. | Conefor, ArcPro Network Analyst, R packages ('iGraph', 'riverconn', 'gdistance')      |
| <i>Spatial prioritisation tools</i>            | Study area planning units layer, biodiversity distributions, land cover/land use, current protected areas, etc.                                                                              | Identifying structural connectivity via prioritisation of landscape elements and systematic conservation planning                                                                         | Marxan, Zonation, R packages ('prioritizr')                                           |

# Tools and data sources for modelling connectivity



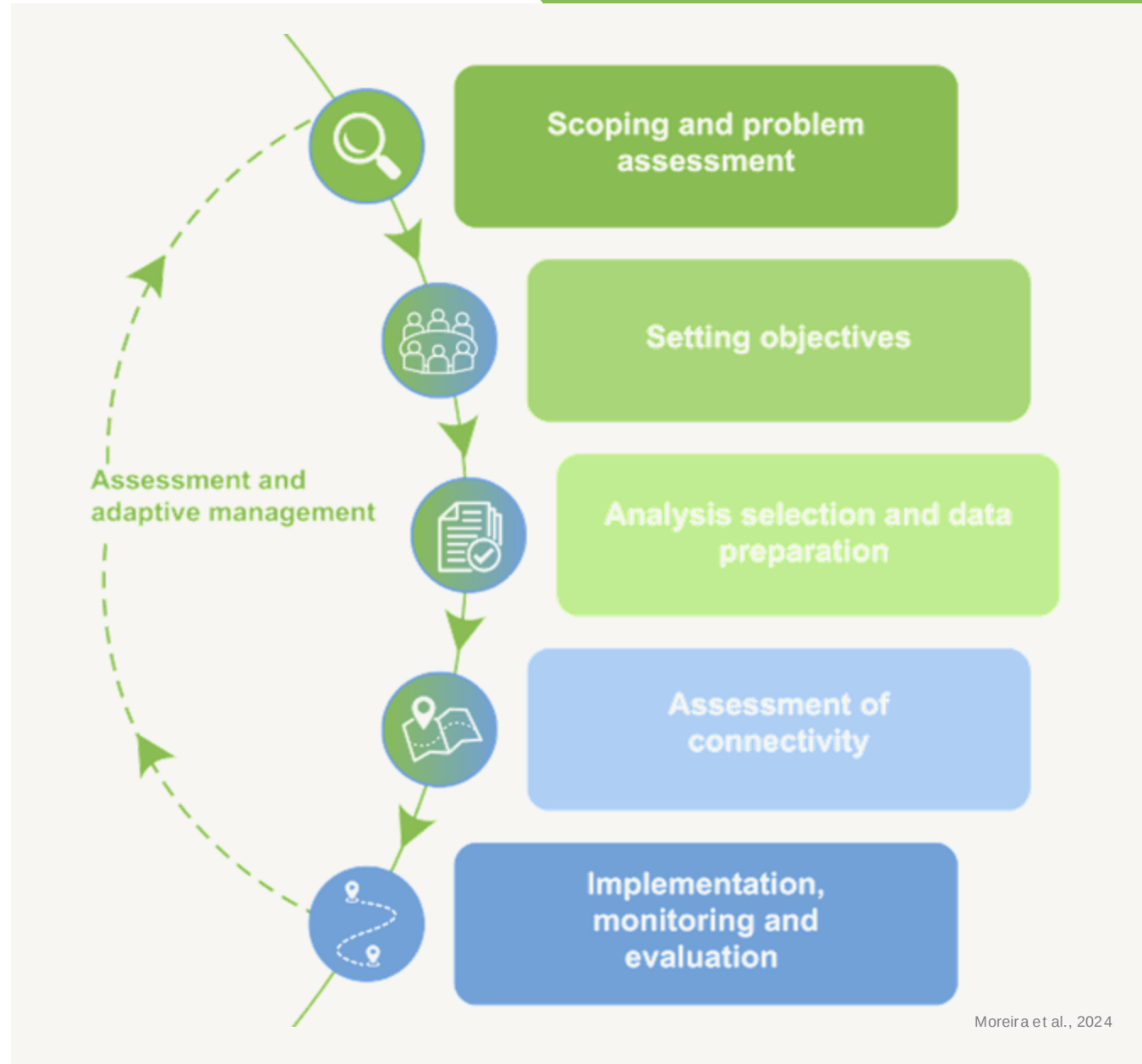
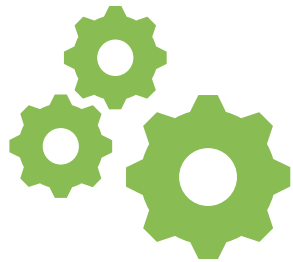
- Geospatial data sources for Europe

| Sector                             | Data Source Name                                          | Author                  | Authoring organization                 | Data location                                                                                                                                                                                                                                     |
|------------------------------------|-----------------------------------------------------------|-------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Land use &amp; Land cover</b>   | CORINE Land Cover                                         | Copernicus              | Copernicus-European Environment Agency | <a href="https://land.copernicus.eu/en/products/corine-land-cover">https://land.copernicus.eu/en/products/corine-land-cover</a>                                                                                                                   |
|                                    | High Resolution Layer Water and Wetness                   | Copernicus              | Copernicus-European Environment Agency | <a href="https://land.copernicus.eu/en/products/high-resolution-layer-water-and-wetness">https://land.copernicus.eu/en/products/high-resolution-layer-water-and-wetness</a>                                                                       |
|                                    | Global Tree Cover 2010                                    | Hansen, M.C. et al.     | Global Forest Watch                    | <a href="https://glad.umd.edu/dataset/global-2010-tree-cover-30-m">https://glad.umd.edu/dataset/global-2010-tree-cover-30-m</a>                                                                                                                   |
|                                    | Forest management map for Europe                          | Oostdijk, Saskia et al. | Vrije Universiteit Amsterdam           | <a href="https://dataverse.nl/dataset.xhtml?persistentId=doi:10.34894/HQIJN5">https://dataverse.nl/dataset.xhtml?persistentId=doi:10.34894/HQIJN5</a>                                                                                             |
|                                    | Primary forest                                            | Sabatini et al.         | Nature                                 | <a href="https://www.nature.com/articles/s41597-021-00988-7#Sec7">https://www.nature.com/articles/s41597-021-00988-7#Sec7</a>                                                                                                                     |
| <b>Roads &amp; Linear Features</b> | Open Street Map                                           | Open Street Map         | Open Street Map                        | <a href="https://www.openstreetmap.org">https://www.openstreetmap.org</a>                                                                                                                                                                         |
|                                    | EU Hydro Rivernet                                         | Copernicus              | Copernicus-European Environment Agency | <a href="https://land.copernicus.eu/en/products/eu-hydro/eu-hydro-river-network-database">https://land.copernicus.eu/en/products/eu-hydro/eu-hydro-river-network-database</a>                                                                     |
| <b>Evaluation &amp; Topography</b> | European Digital Elevation Model (EU-DEM)                 | EEA                     | European Environment Agency            | <a href="https://www.eea.europa.eu/en/datahub/datahubitem-view/d08852bc-7b5f-4835-a776-08362e2fbf4b?activeAccordion=735550">https://www.eea.europa.eu/en/datahub/datahubitem-view/d08852bc-7b5f-4835-a776-08362e2fbf4b?activeAccordion=735550</a> |
|                                    | Copernicus Global DEM                                     | ESA                     | European Space Agency                  | <a href="https://spacedata.copernicus.eu/collections/copernicus-digital-elevation-model">https://spacedata.copernicus.eu/collections/copernicus-digital-elevation-model</a>                                                                       |
| <b>Boundaries &amp; Bioregions</b> | Biogeographical regions 2016                              | EEA                     | European Environment Agency            | <a href="https://www.eea.europa.eu/data-and-maps/figures/biogeographical-regions-in-europe-2">https://www.eea.europa.eu/data-and-maps/figures/biogeographical-regions-in-europe-2</a>                                                             |
|                                    | EEA Administrative Boundaries based on GISCO NUTS and EBM | EEA                     | European Environment Agency            | <a href="https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/94438969-2dd5-4ba3-b708-e4d29a8b7699">https://sdi.eea.europa.eu/catalogue/srv/eng/catalog.search#/metadata/94438969-2dd5-4ba3-b708-e4d29a8b7699</a>                 |
| <b>Species Data</b>                | Global Biodiversity Information Facility (GBIF)           | GBIF                    | GBIF                                   | <a href="https://www.gbif.org/">https://www.gbif.org/</a>                                                                                                                                                                                         |
| <b>Protected Areas</b>             | European network of protected sites Natura 2000           | EEA                     | European Environment Agency            | <a href="https://www.eea.europa.eu/en/datahub/datahubitem-view/6fc8ad2d-195d-40f4-bdec-576e7d1268e4">https://www.eea.europa.eu/en/datahub/datahubitem-view/6fc8ad2d-195d-40f4-bdec-576e7d1268e4</a>                                               |
|                                    | Nationally designated areas (CDDA)                        | EEA                     | European Environment Agency            | <a href="https://www.eea.europa.eu/en/datahub/datahubitem-view/f60cec02-6494-4d08-b12d-17a37012cb28">https://www.eea.europa.eu/en/datahub/datahubitem-view/f60cec02-6494-4d08-b12d-17a37012cb28</a>                                               |

# A framework for connectivity conservation and planning



# A framework for connectivity conservation and planning



# Connect with NaturaConnect!

 [www.naturaconnect.eu](http://www.naturaconnect.eu)

 [naturaconnect@iiasa.ac.at](mailto:naturaconnect@iiasa.ac.at)

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Scan the code to visit our website!

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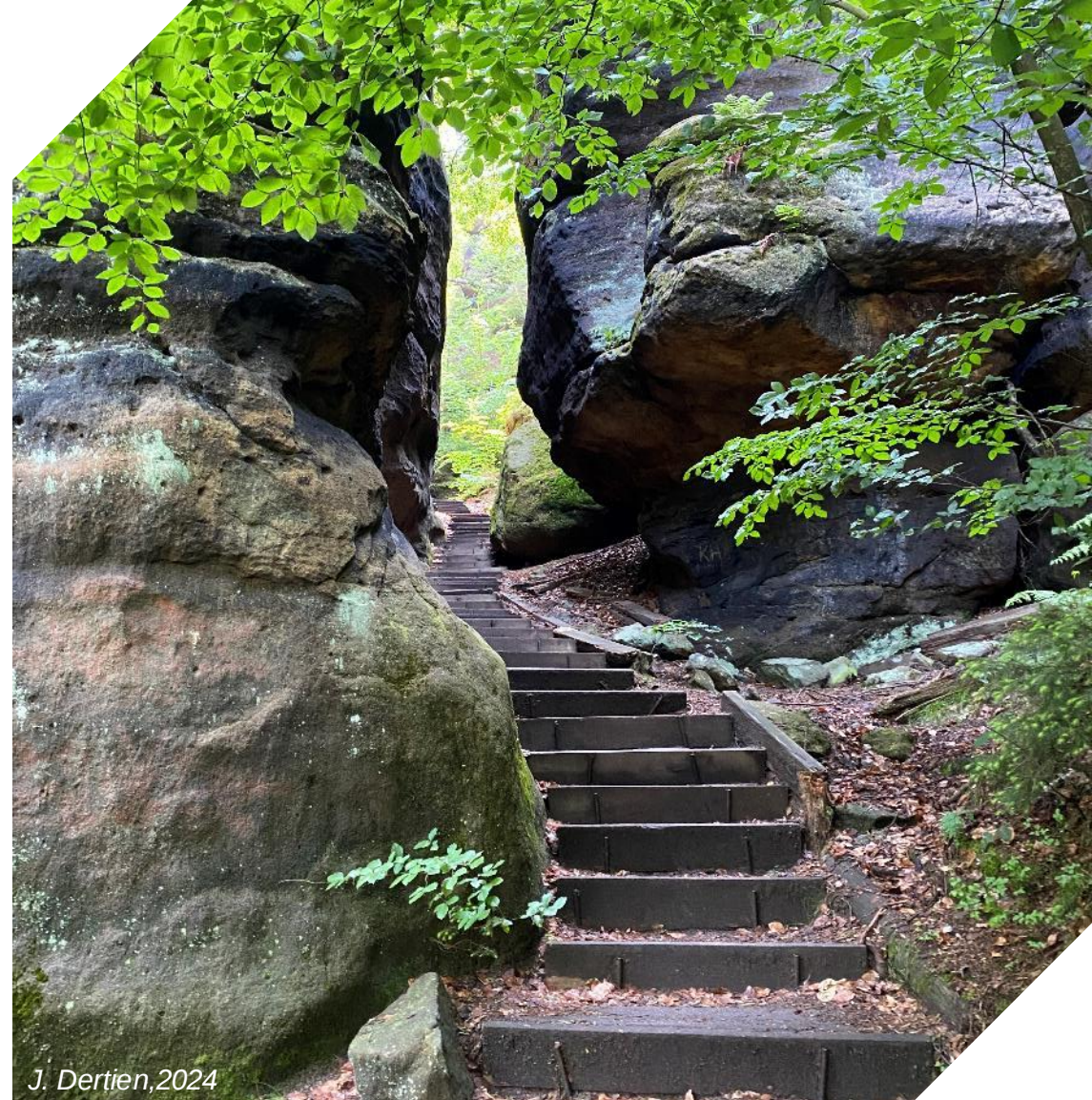


# Ecological Connectivity Planning and Modelling at the Pan-European scale

Jeremy Dertien

German Integrative Biodiversity Research Institute (iDiv) &  
Martin Luther Universität Halle-Wittenberg

[jeremy.dertien@idiv.de](mailto:jeremy.dertien@idiv.de)



J. Dertien, 2024



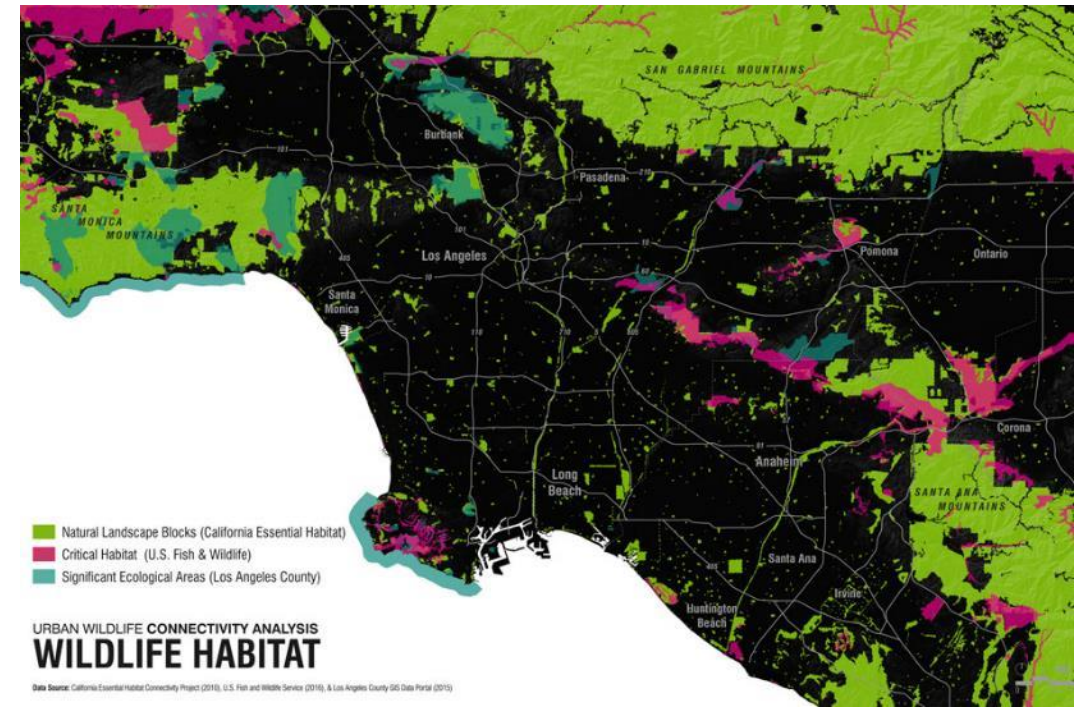
**Funded by  
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25/03/2025

# Global Connectivity Management

- Connectivity conservation projects around the world
- Green bridges, underpasses and rope bridges
- Potential for difficult scenarios with increasing wildlife populations or invasive species



Studio-MLA, 2017



© Parcs Canada



© Safe Passage

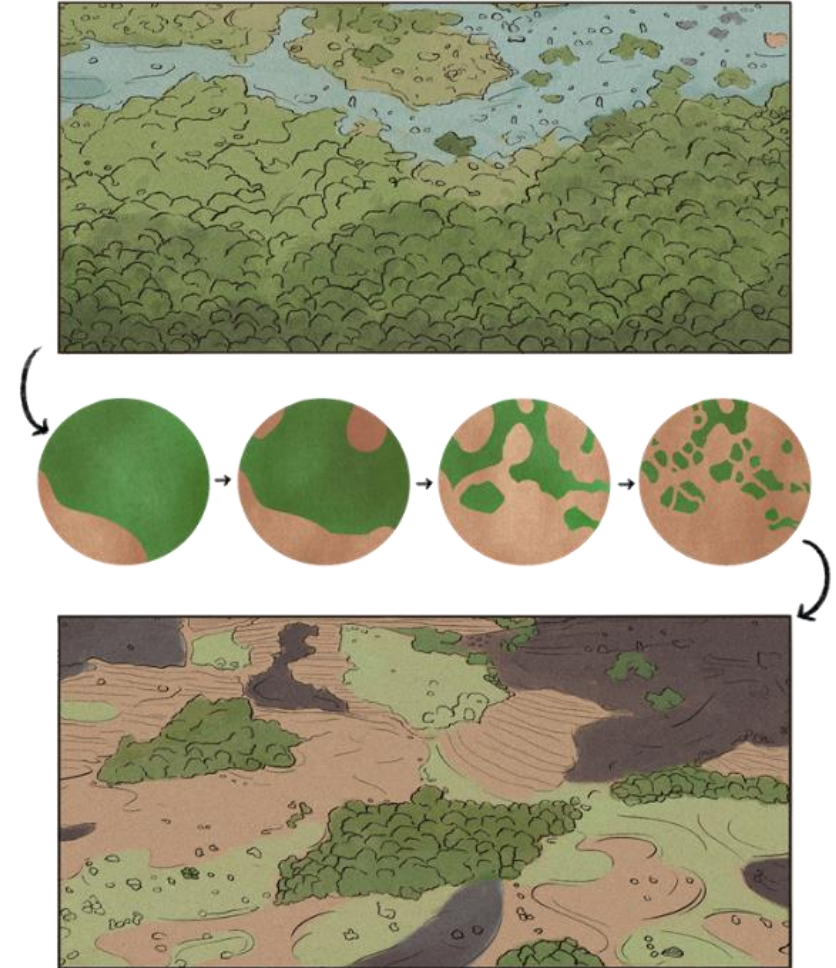


Steve Winter; Nat. Geo.

# Global Attention to Connectivity

## A Core of Conservation Science

- Habitat fragmentation via human land alteration
  - Unsuitable habitat & impervious cover
  - Linear infrastructure
    - Roads
    - Dams
    - Giant walls
    - Railways
    - Powerlines



*Wildlife Conservation Society, 2020*

# Fragmentation & Connectivity

## Human transformation

- Unsuitable habitat & impervious cover
- Linear infrastructure

## Disturbance events

- Fire, flood, timber harvest
- Volcanic eruption

## Natural landscape differences

- Topography (slope, aspect, elevation)
- Gradients (e.g., moisture, soil fertility)
- Climate variability (fx[elevation, latitude])
- Biotic interactions (e.g., predation, competitive exclusion)
- Natural land cover

# Effects of Habitat Fragmentation

- Fragmentation can reduce:
  - Dispersals
  - Genetic diversity
  - Species diversity
  - Fecundity
  - Abundance
  - Nutrient cycles, etc.
  - Flood regulation
- Wide variety of time scales
  - Individual movement → a century of genetic flow



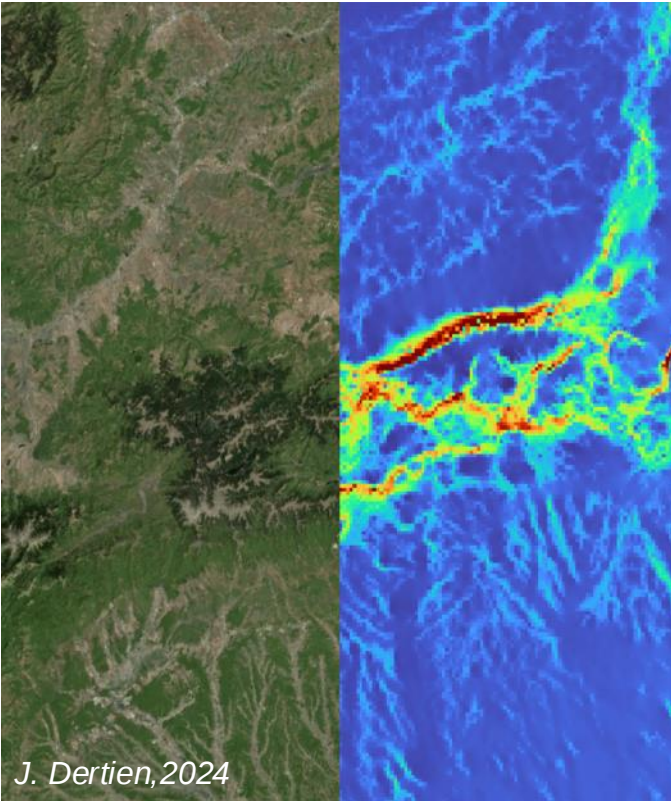
# Connectivity and Conservation Policy

- EU Biodiversity Strategy goal to enlarge protected area (PA) network to 30% of land and ocean area.
  - Connected Trans-European Nature Network
- Connectivity a consideration in:
  - Global Biodiversity Framework
  - EU Forestry Strategy
  - Green & Blue Infrastructure Strategy
  - Water Framework Directive
  - EU Pollinators Initiative
  - EU Nature Restoration Law



J. Dertien, 2024

# Natura Connect Continental Connectivity Goals



- Multi-taxa terrestrial wall-to-wall connectivity maps
- Structural EUNIS habitat connectivity
- Freshwater connectivity maps
- Prioritization of corridors between protected areas

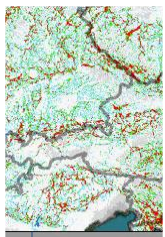


# Connectivity Modelling

J. Derrin, 2024

# Pan-European Connectivity Models

Multiple use data products



Omniscape models  
for 26 terrestrial  
archetypes



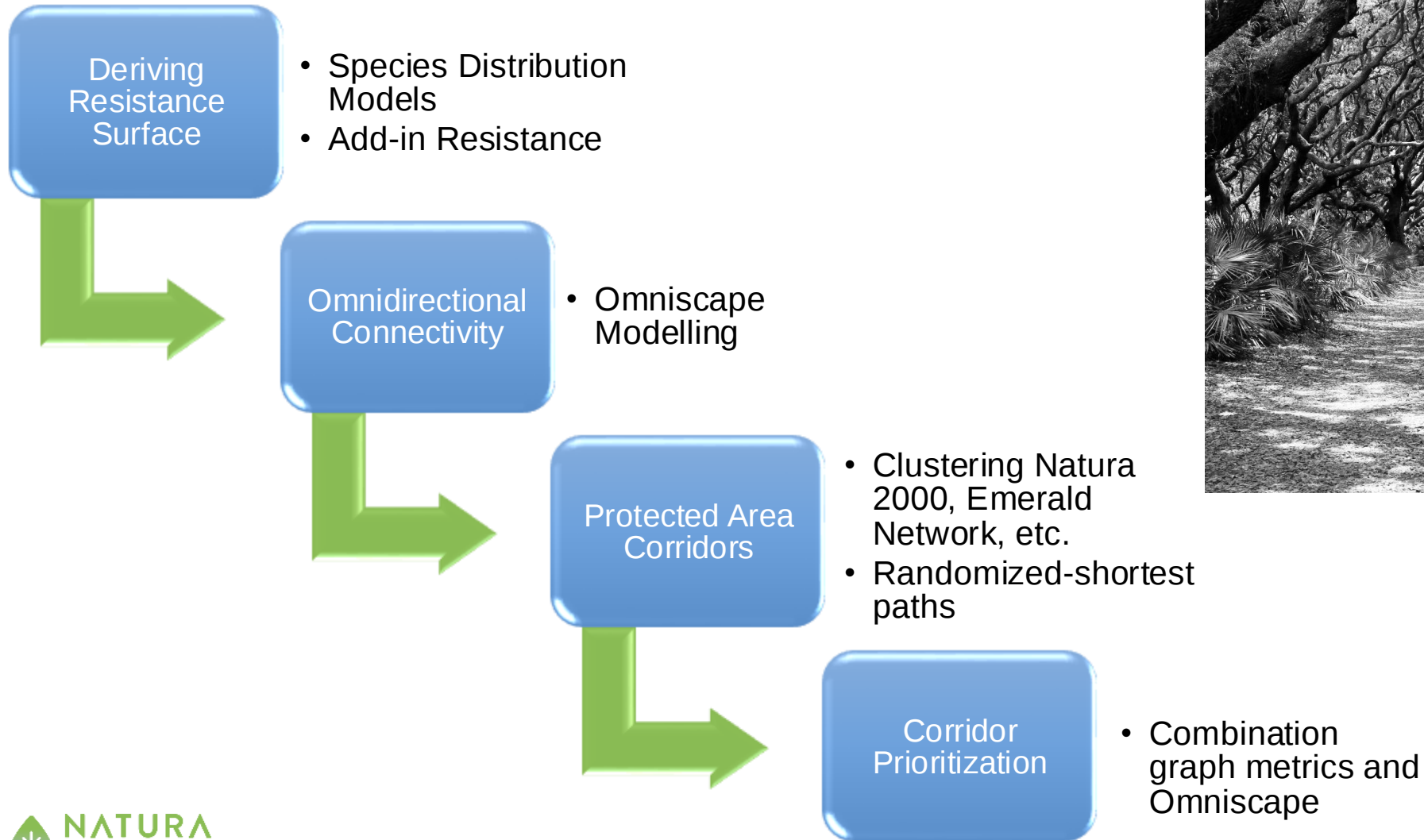
Structural freshwater  
and riparian  
connectivity models

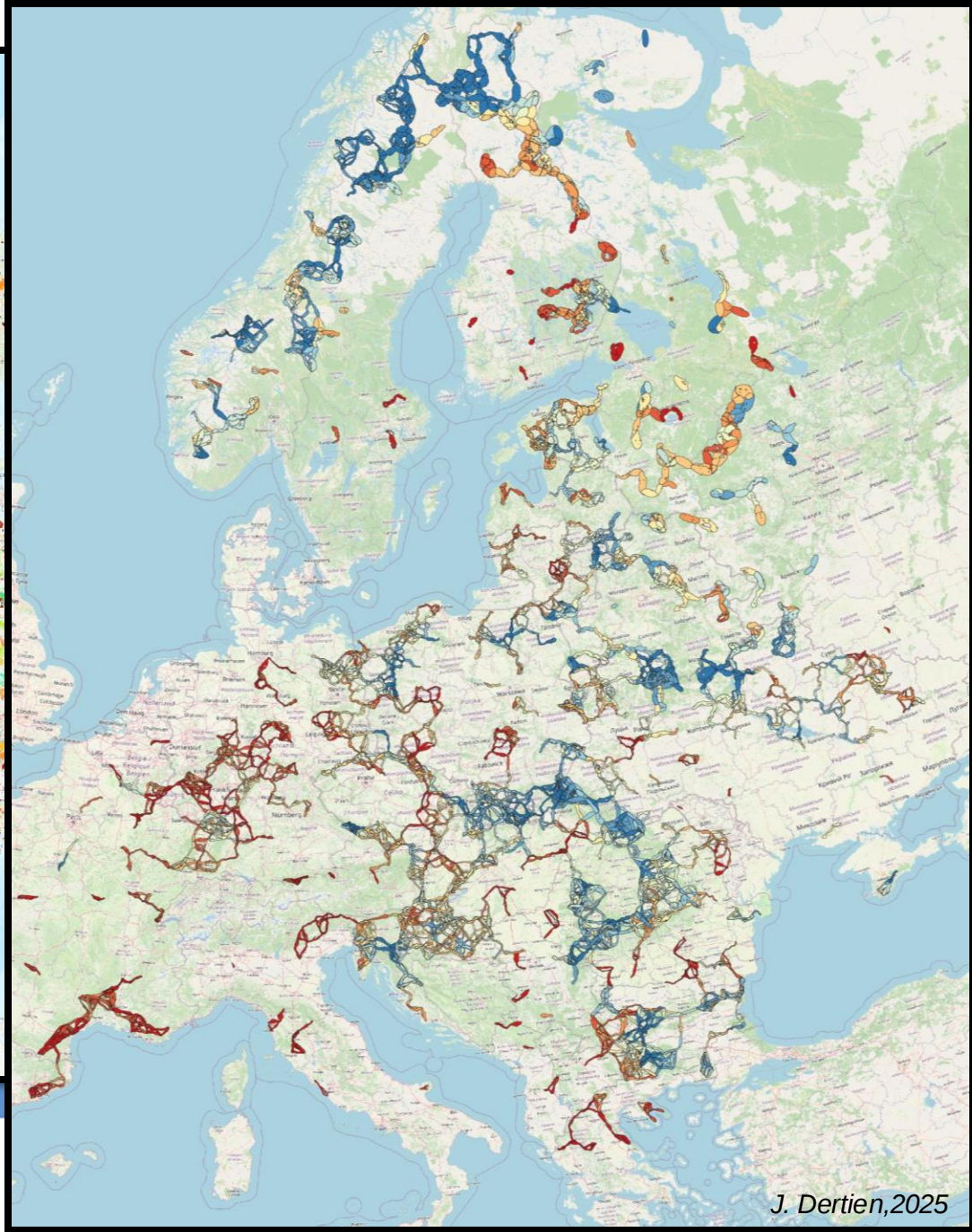
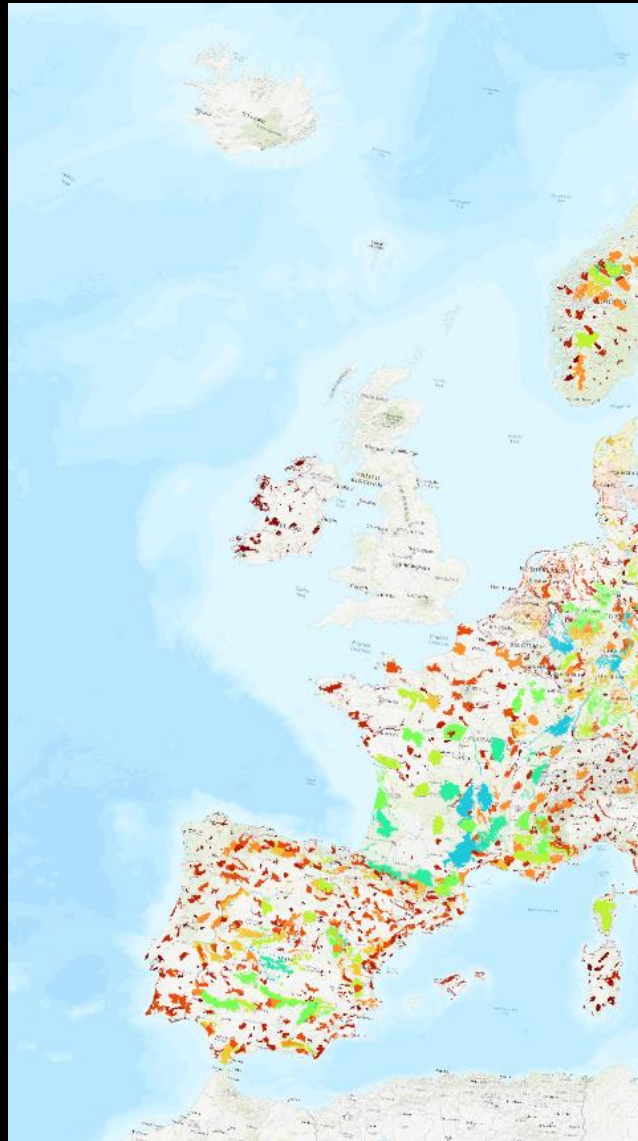


Multi-scale corridor  
prioritizations



# Process Overview

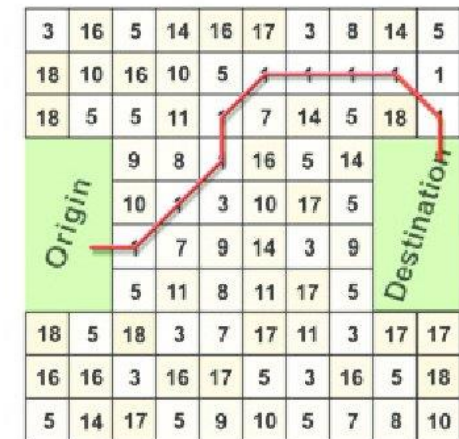




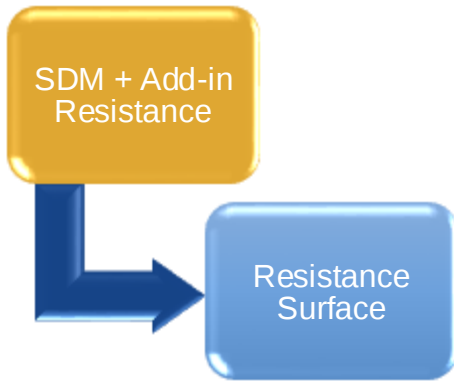
# Resistance Surfaces

Deriving  
Resistance  
Surface

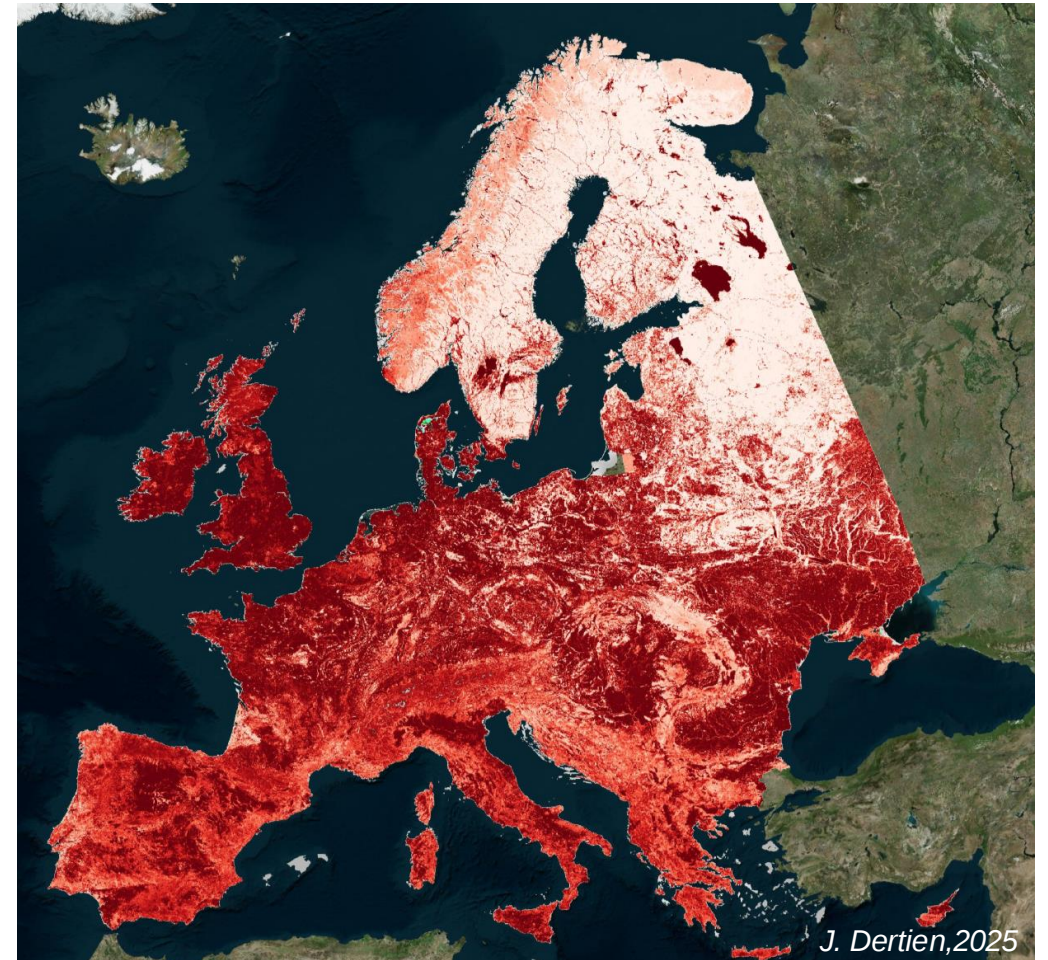
- A raster where each pixel represents the potential resistance faced by a species or process to cross that pixel space.
  - Used by various models to predict highest probability paths of movement base on lowest cost.
  - Also called “cost surface”
- Derived from various sources:
  - Expert opinion (e.g., reclassifying land cover)
  - Species distribution models
  - Landscape genetics data
  - GPS/telemetry data



Least-Cost Path



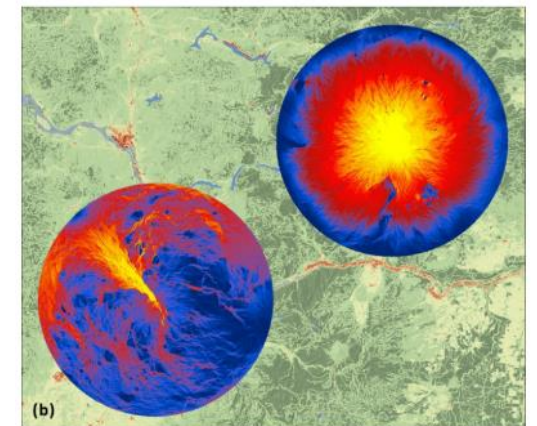
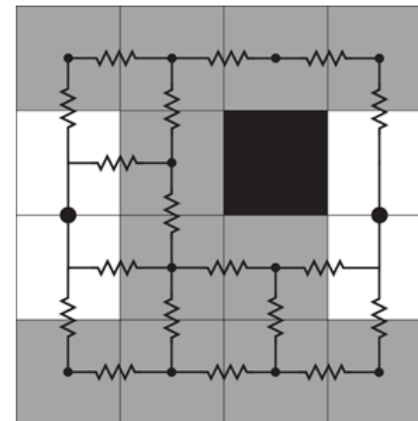
- Deriving Resistance and Source Surfaces
  - Ensemble species distribution models
  - Inverted and neg. exp. transformation
- Add-in Resistance Layer
  - Create additional raster for areas lacking realistic resistance values from SDM
    - Roads – Open Street Map data
    - Walls, fences, barriers – Manually digitized
    - Water features – Copernicus High Res. Wetness layer
    - Glaciers & Perm. Snow - CORNIE
  - Wildlife Passages – Open Street Map data



# Electrical Circuit Theory Based Models

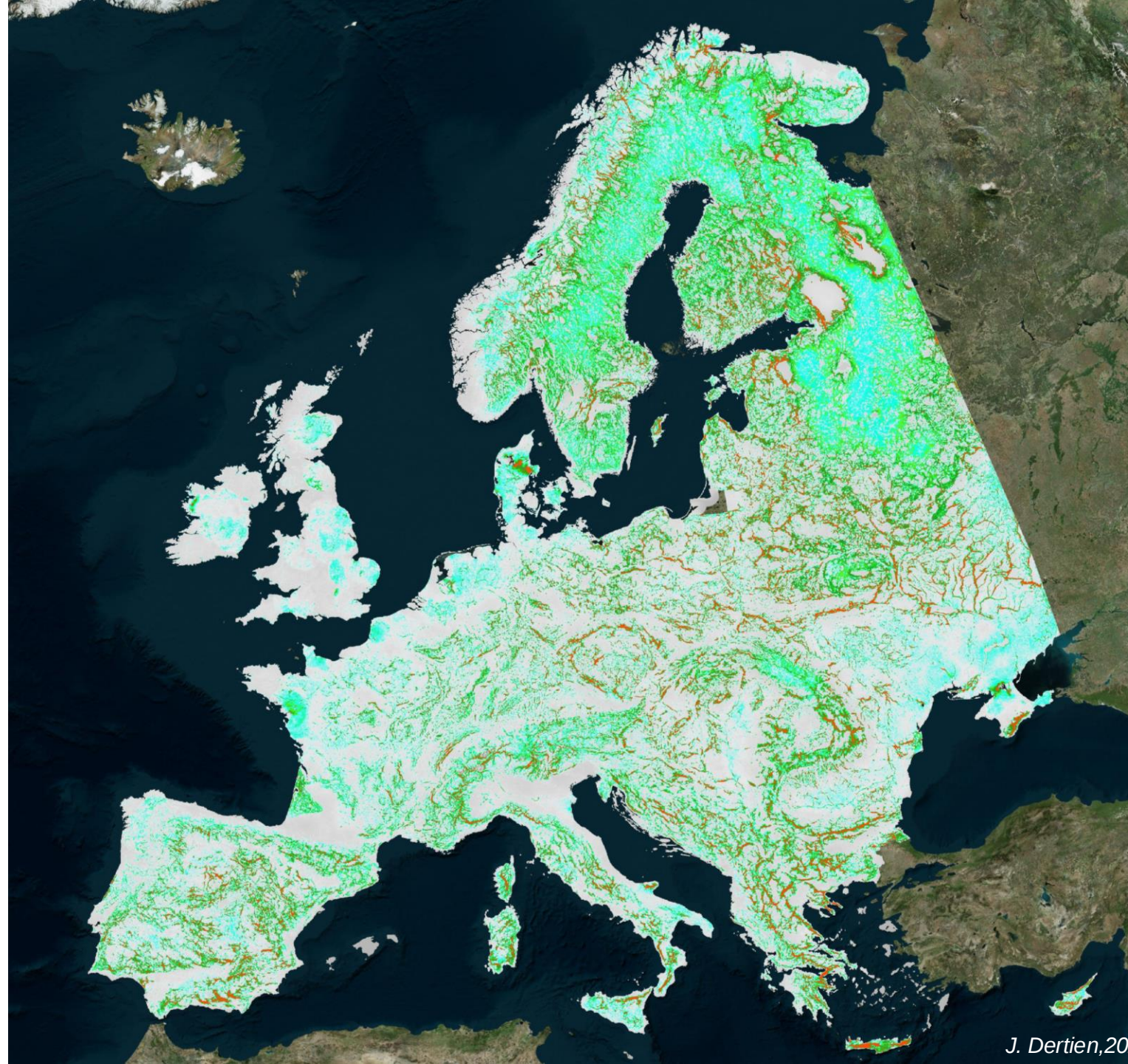
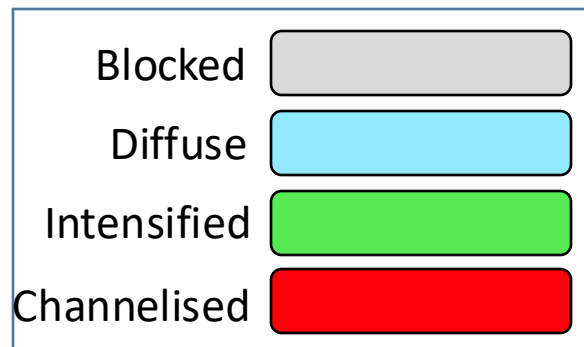
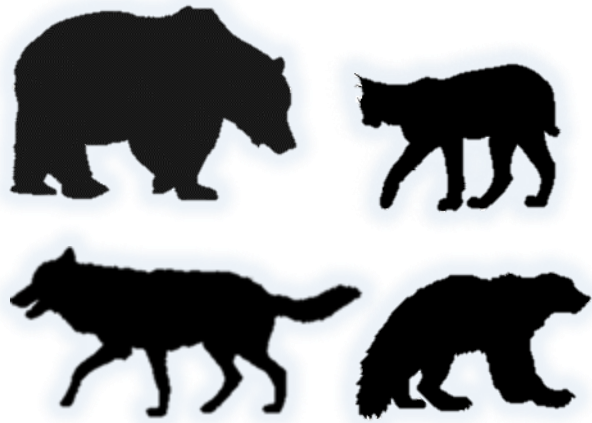
Omnidirectional  
Connectivity

- Pairwise Circuitscape 5 analysis (directional)
  - Uses source nodes of electrical current flowing to a ground node to calculate connectivity.
  - Current flows over a resistance surface where each pixel is the value of resistance to species movement.
- Omniscape (omni-directional)
  - Moving window
  - Source weighted raster

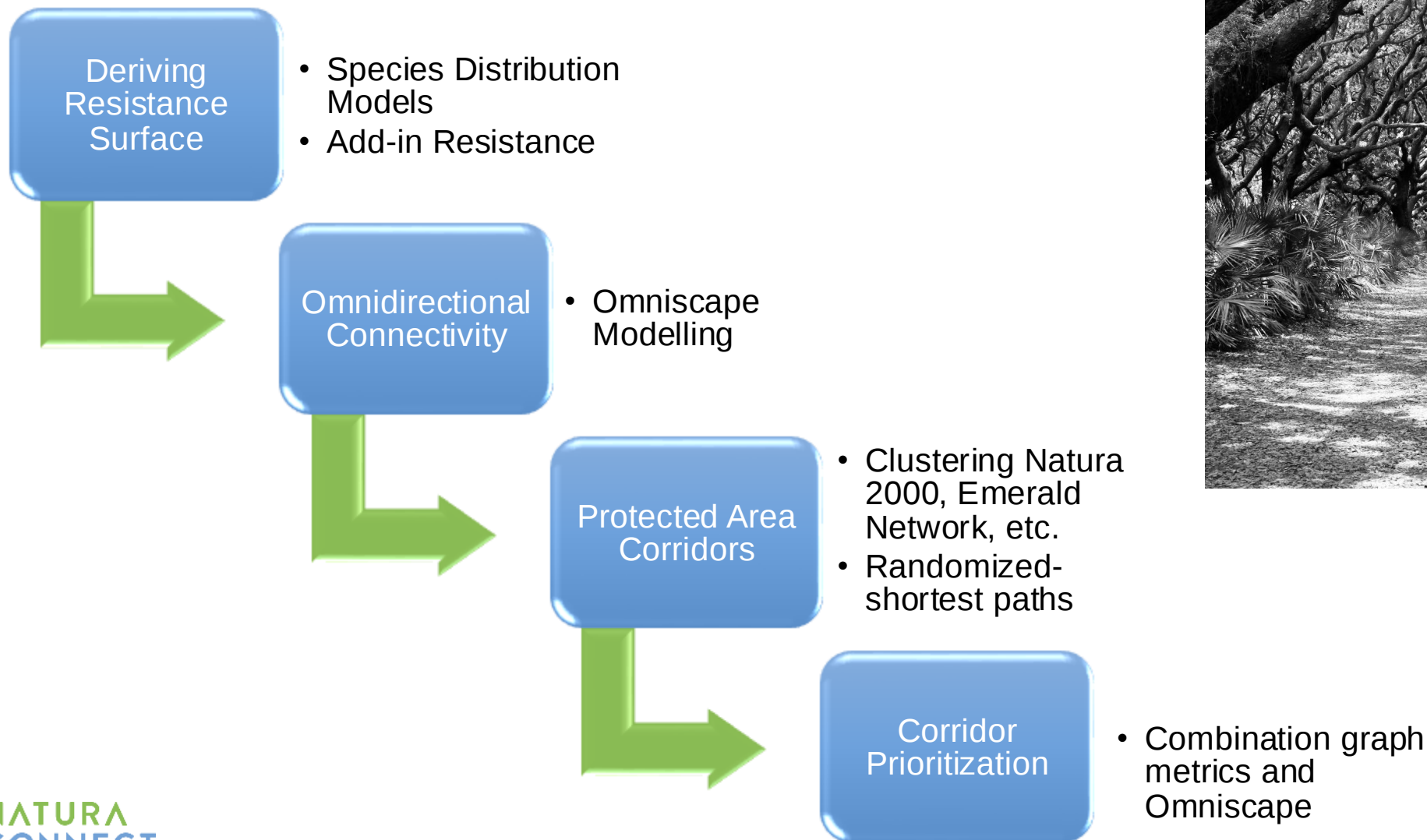


McRae et al., 2016

# Predator Normalized Current Density



# Process Overview

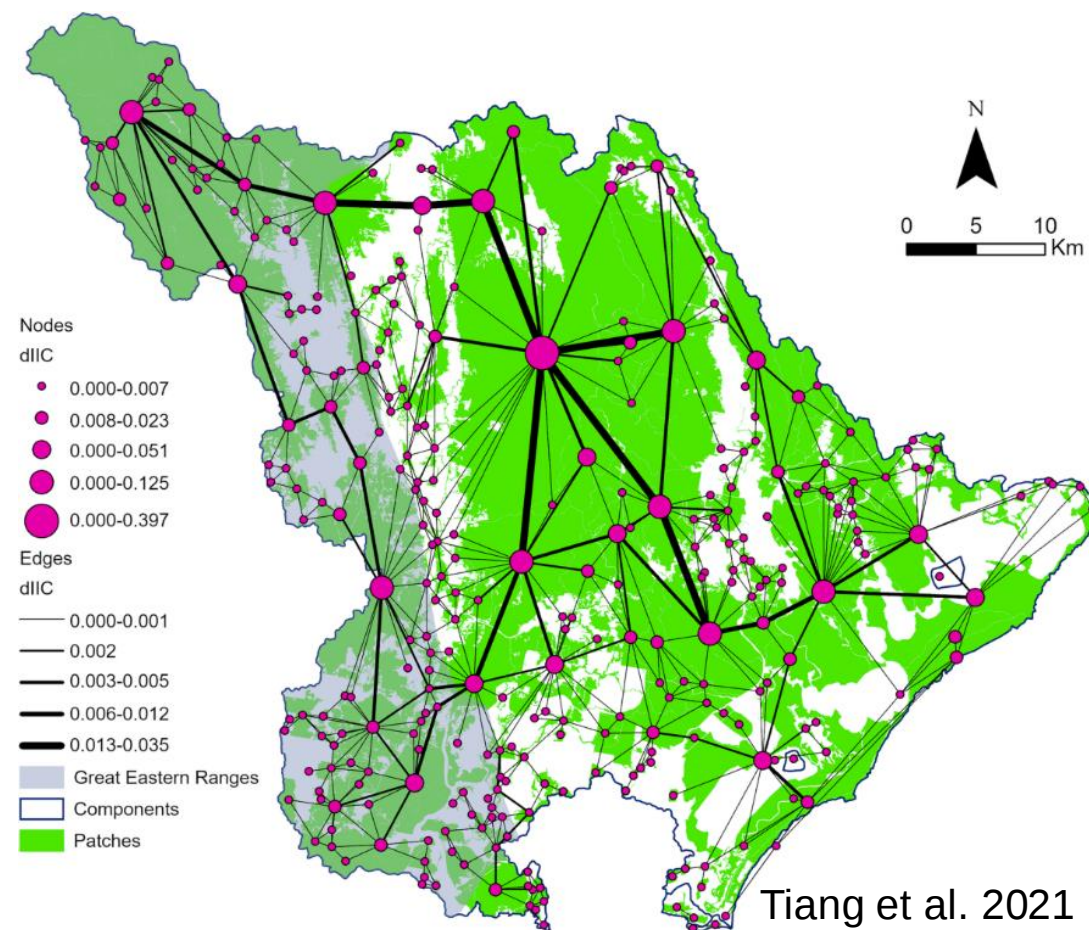


J. Dertien, 2024

# Corridors Prioritization Values

## Change in Probability of Connectivity ( $dPC$ )

- Graph-theoretical connectivity metrics
  - Measure of individual PA or linkage importance
    - Based on a PA “attribute”
- R package “Makurhini” derived from Conefor



Tiang et al. 2021

# Corridors Prioritization Values

## Change in Probability of Connectivity ( $dPC$ )

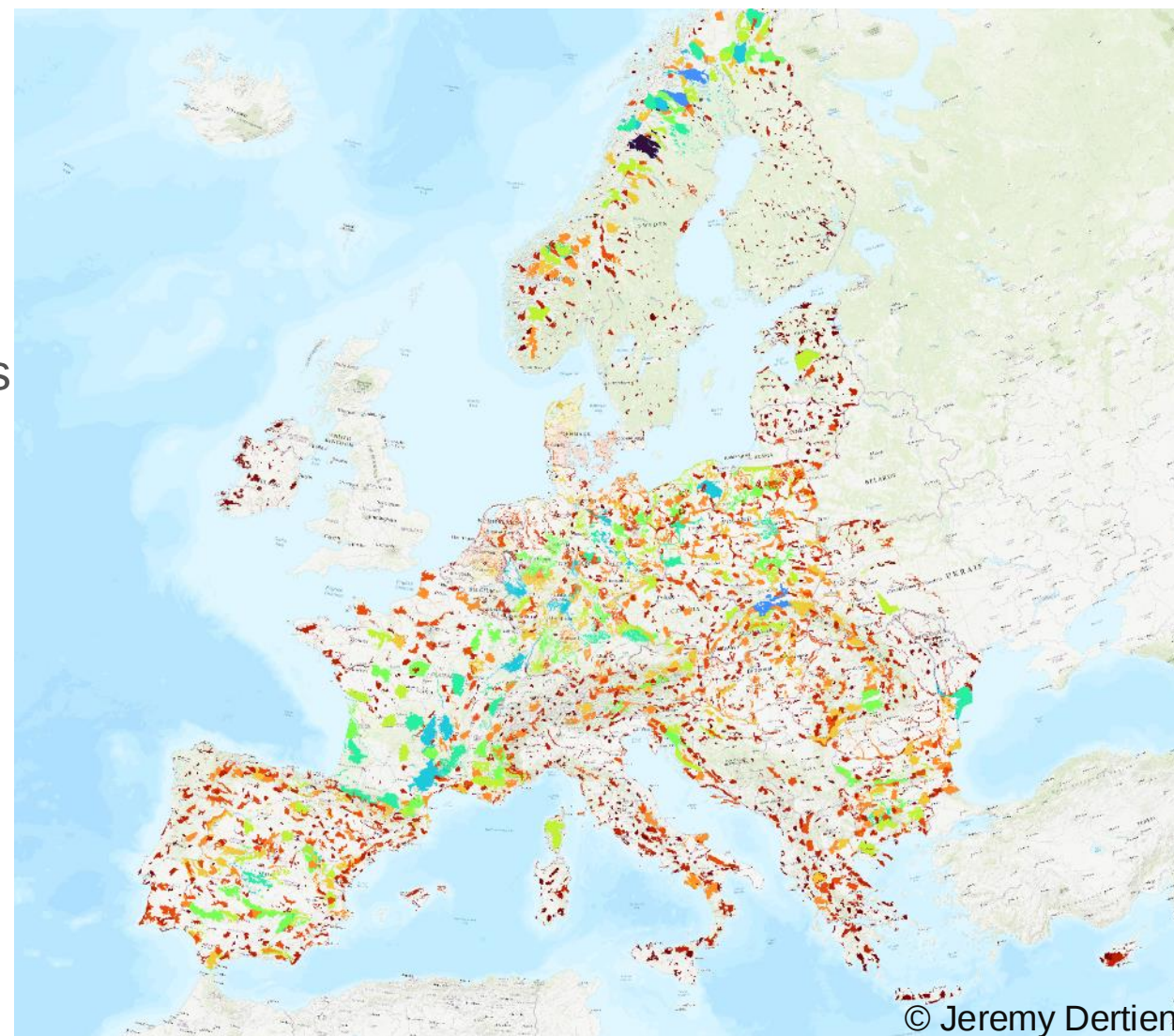
### Protected Area Attributes

- Habitat area for select species or archetypes
- More specific attributes
  - T&E species habitat
  - Climate resiliency
  - Cultural landscapes

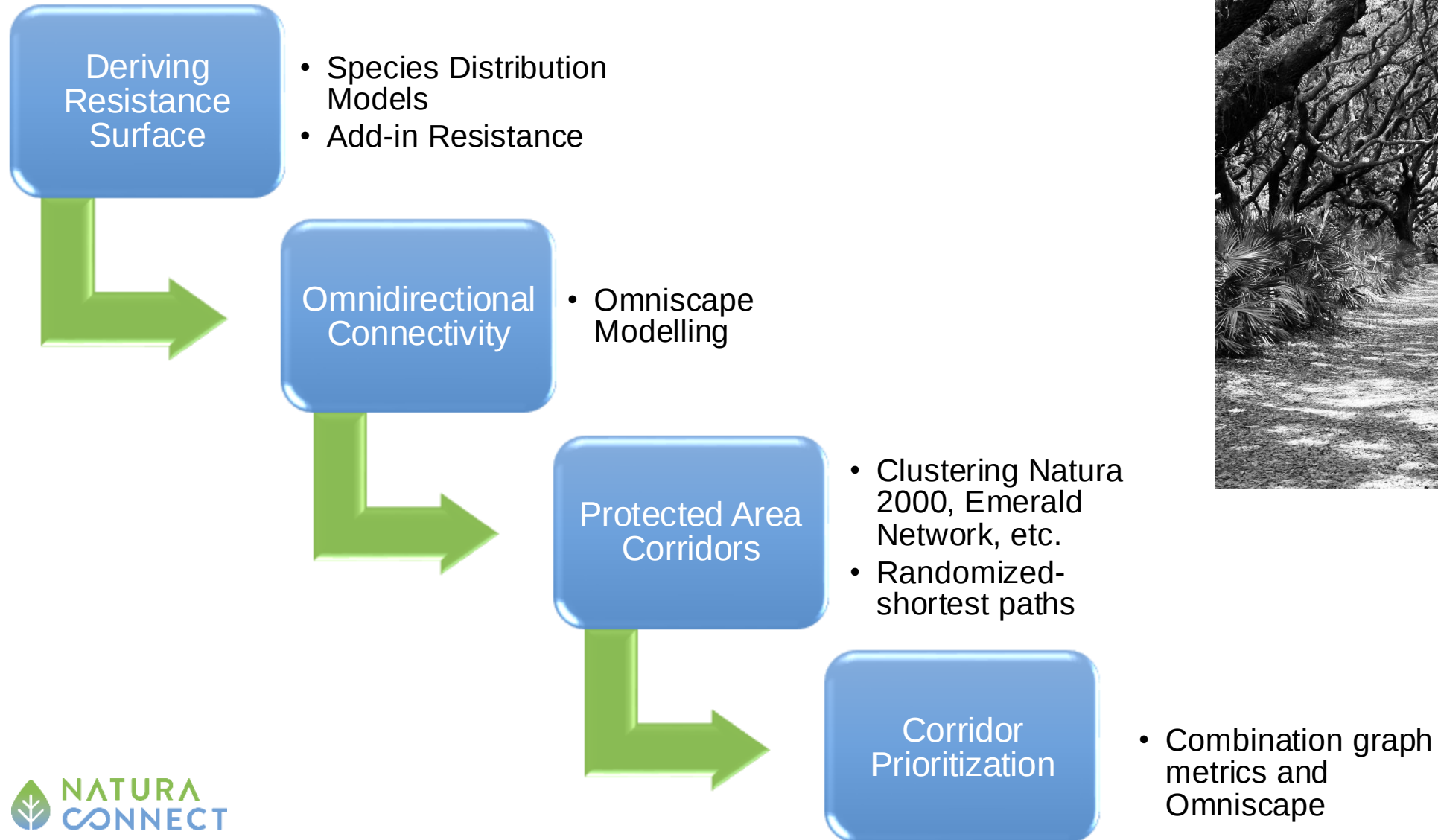
- Valuation by PA area (km<sup>2</sup>)
- Dispersal Max. 50 km

Higher  $dPC$

Lower  $dPC$



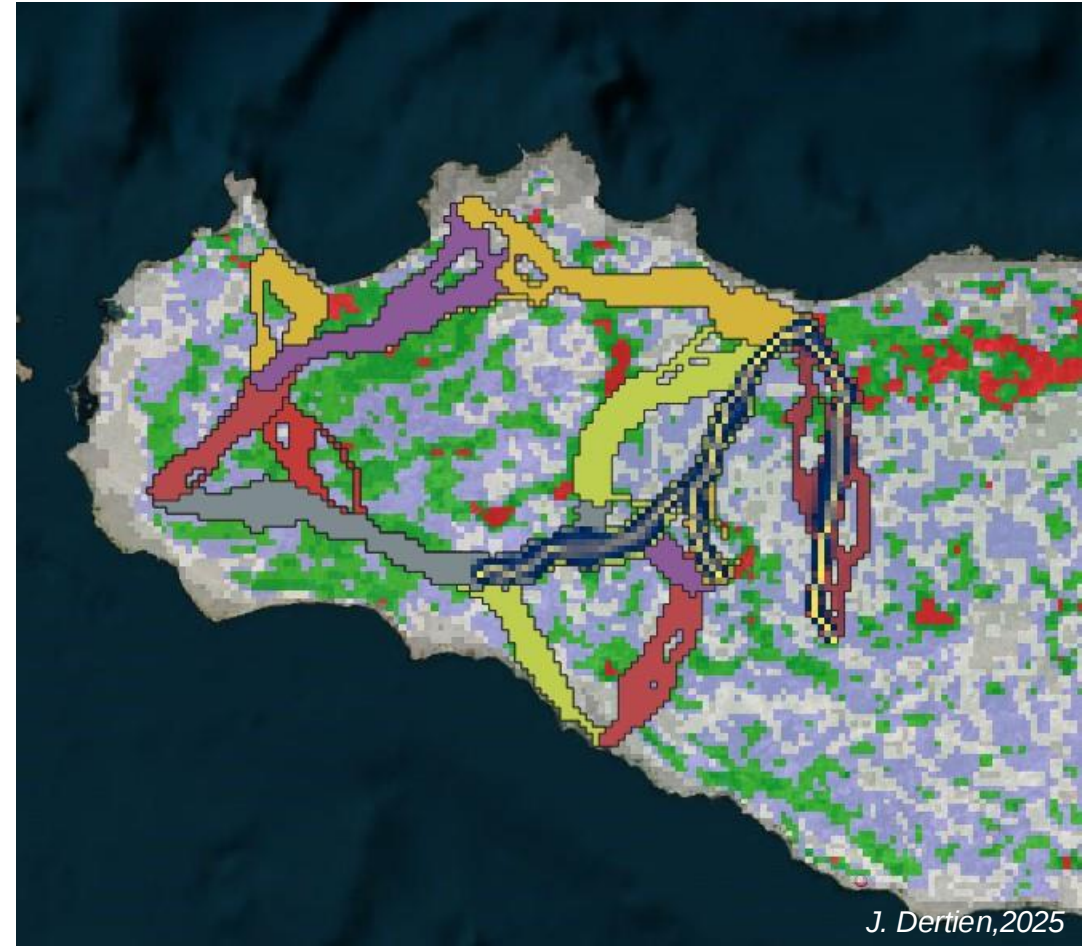
# Process Overview



# Defining the corridor space

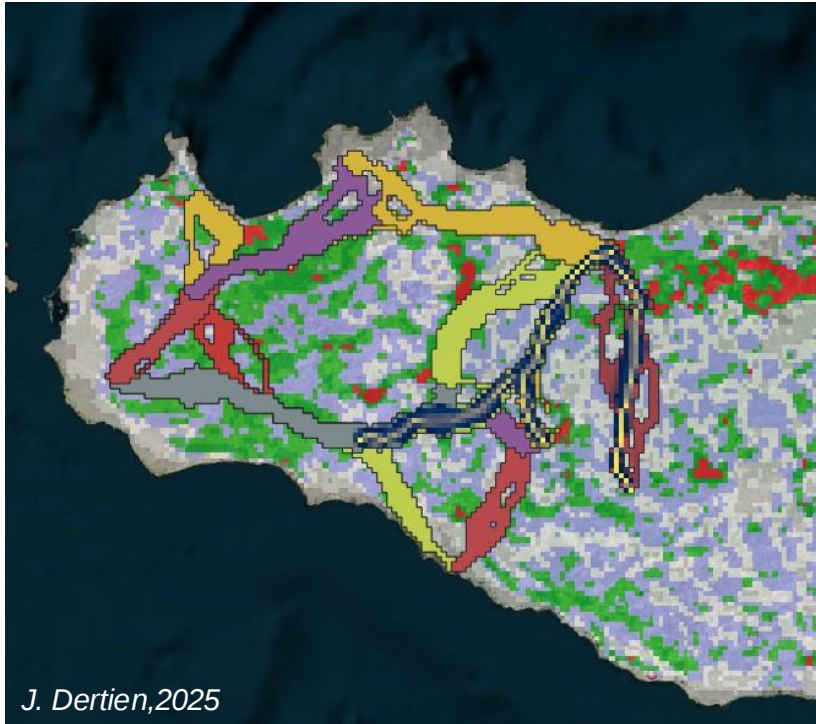
## Randomized-shortest paths

- Similar to least-cost path but with randomizer
- PA centroid to centroid
- Convert to binary polygon

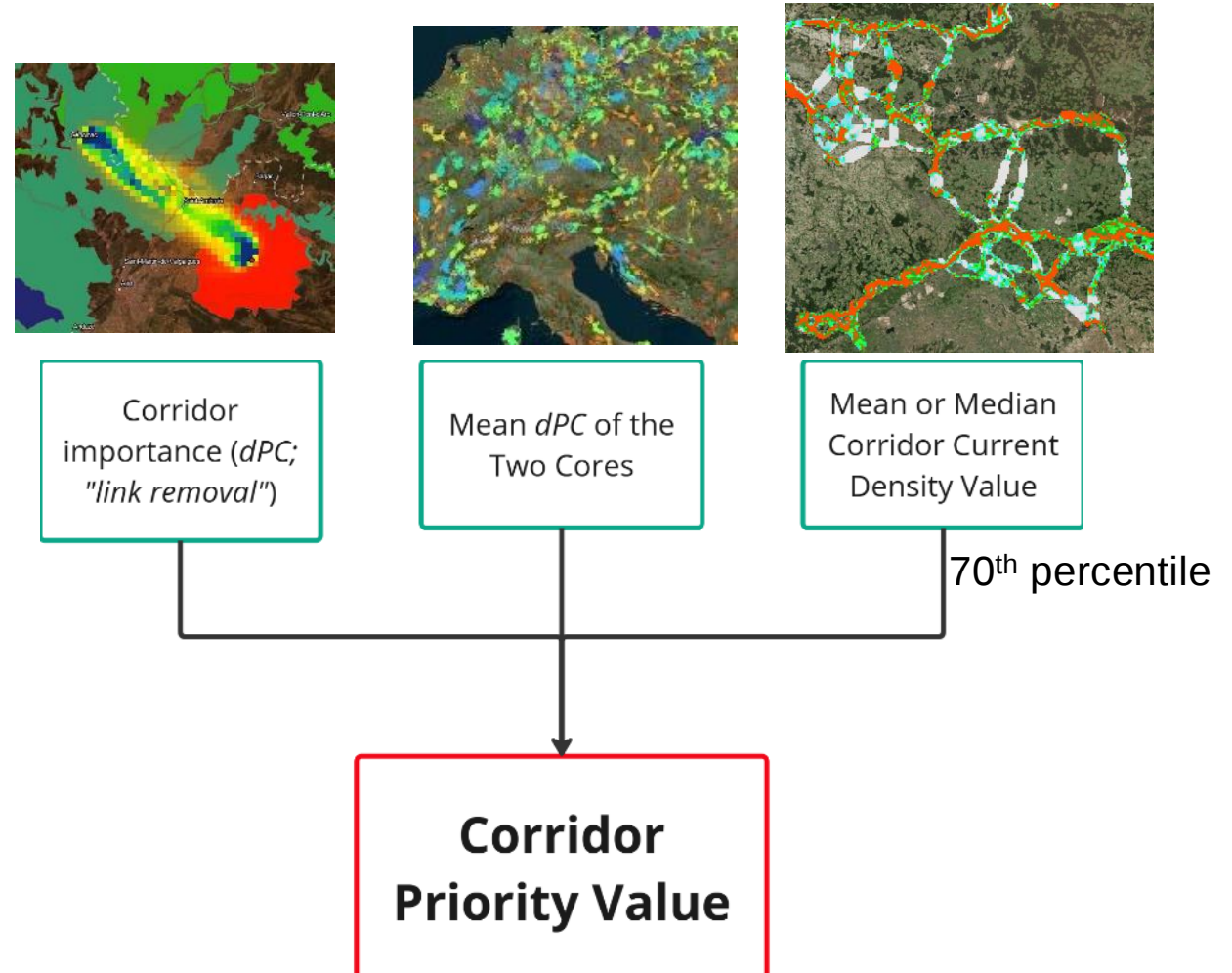


# Prioritising Ecological Corridors

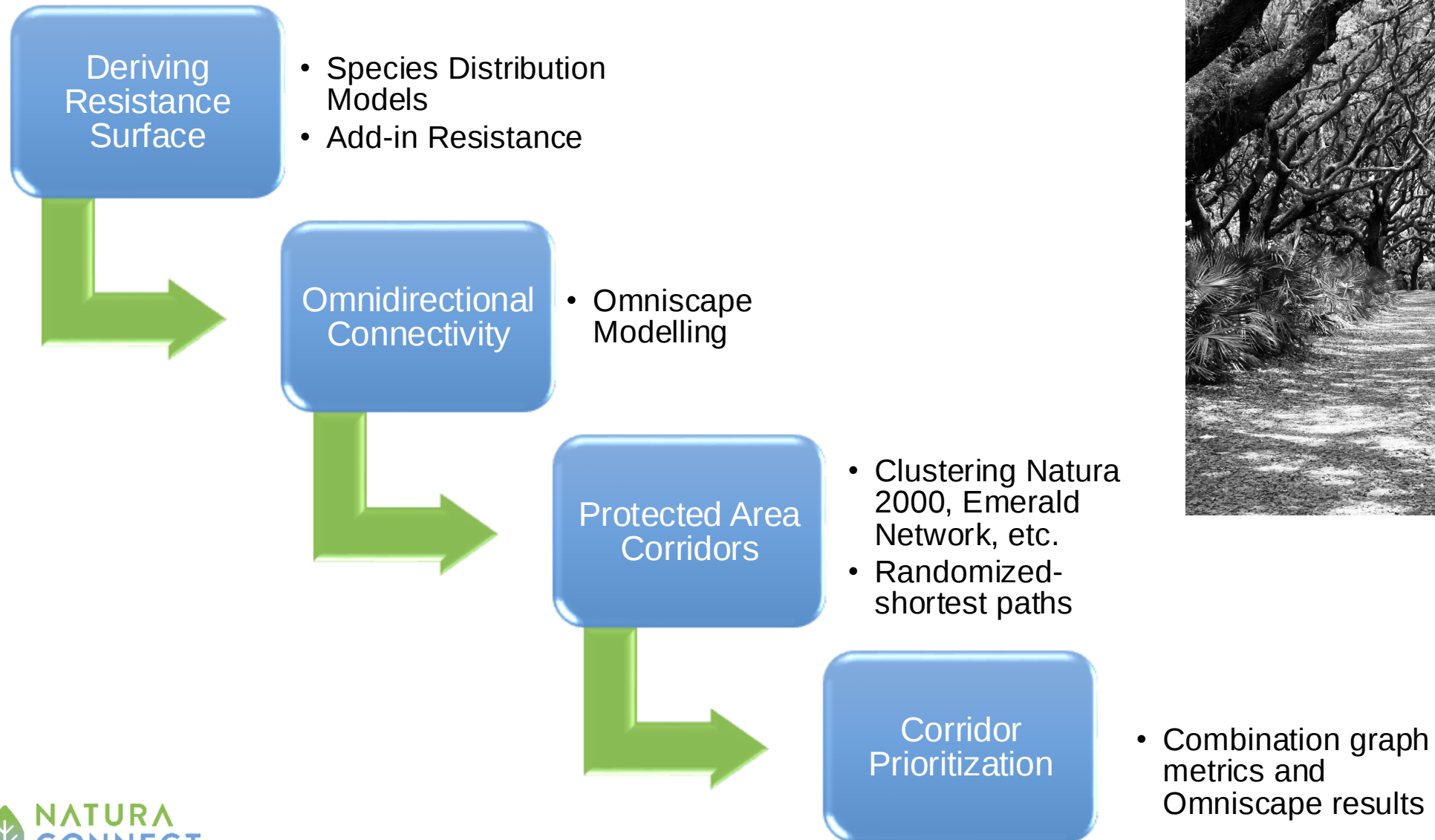
Corridor  
Prioritization



Randomized Shortest Paths to  
identify corridor space

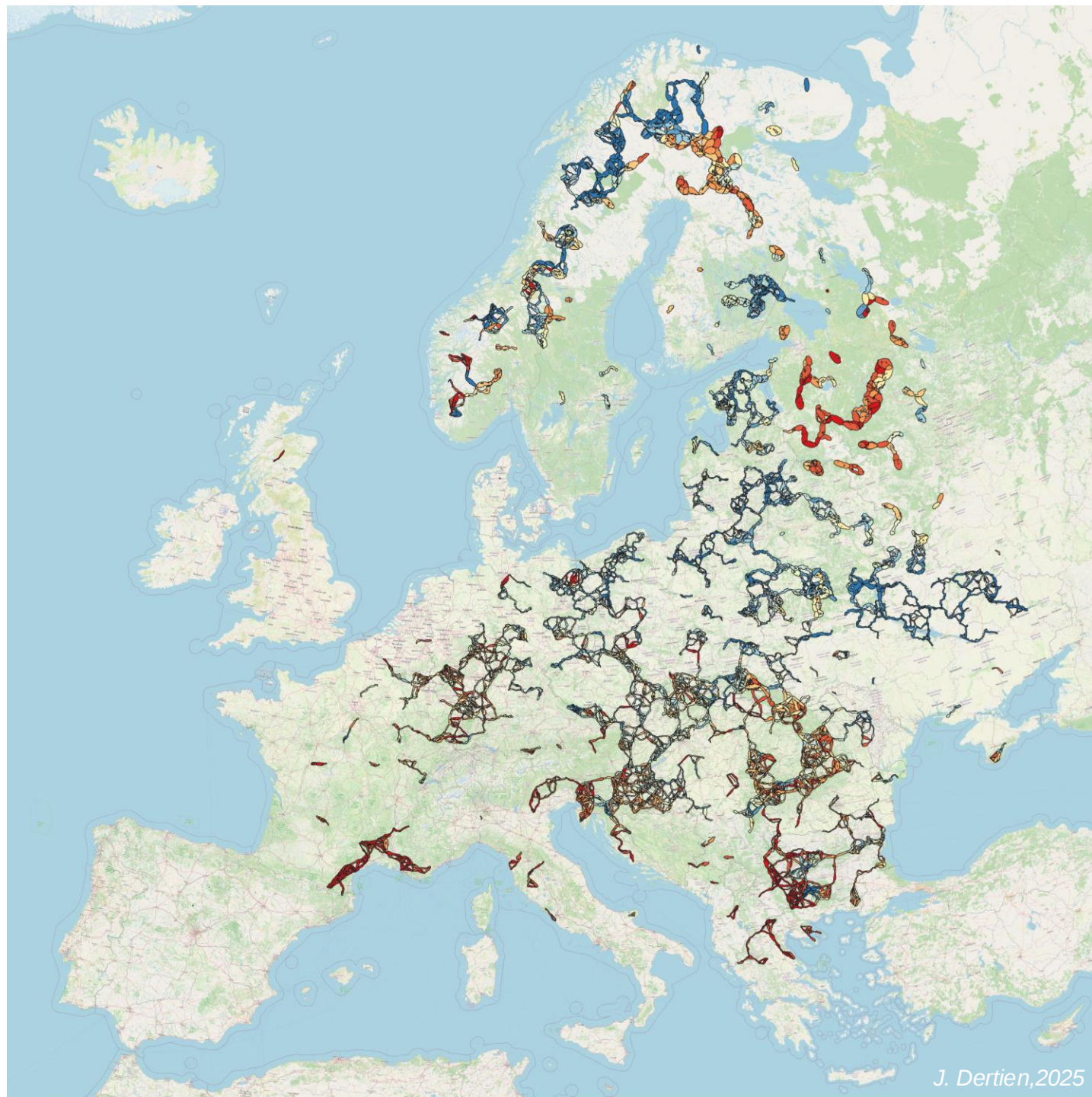


# Process Overview



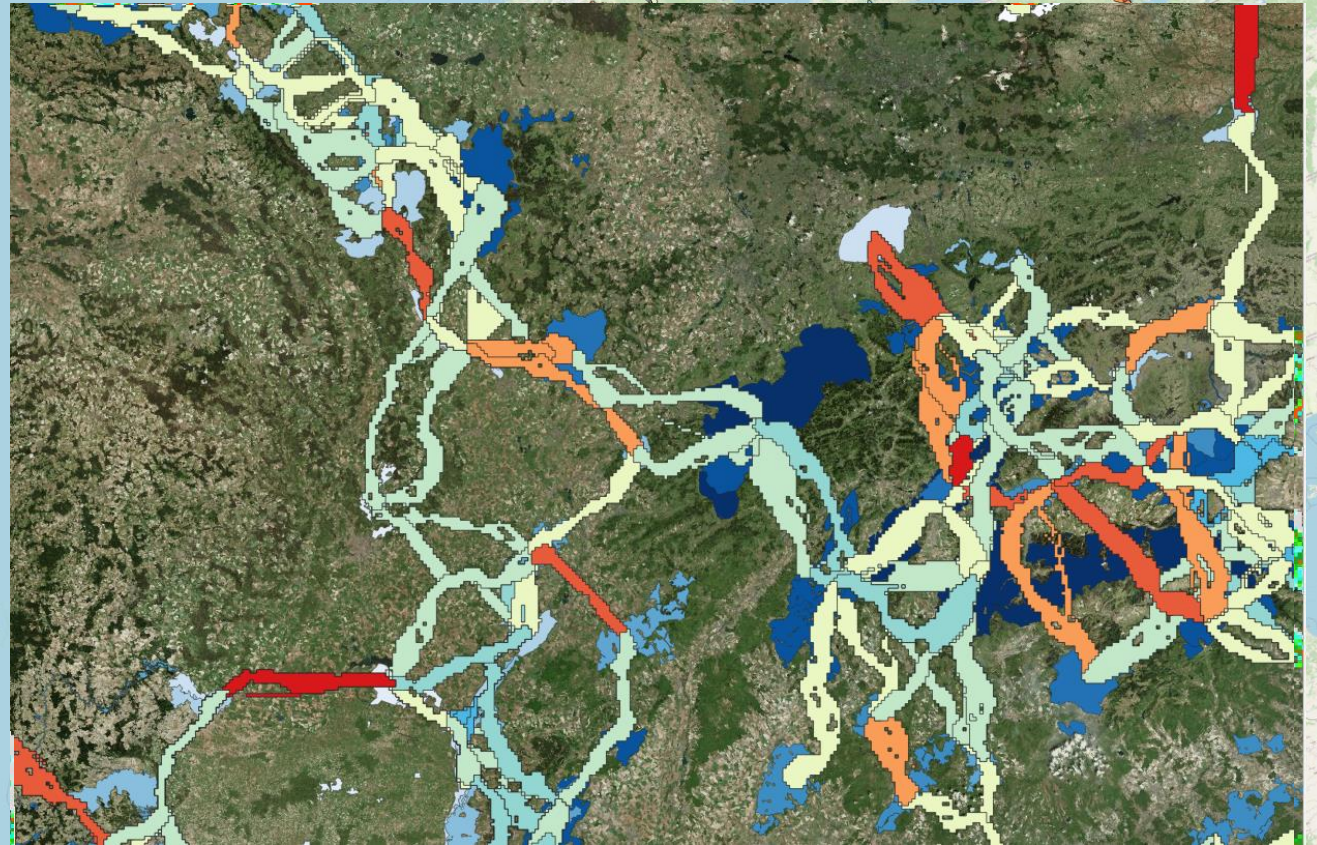
# Continental Corridor Prioritization

- Identifies most likely corridor between two PA clusters.
  - Within a certain dispersal distance
- Areas with many corridor redundancies
- Broken connections in western Europe and some major agricultural regions.



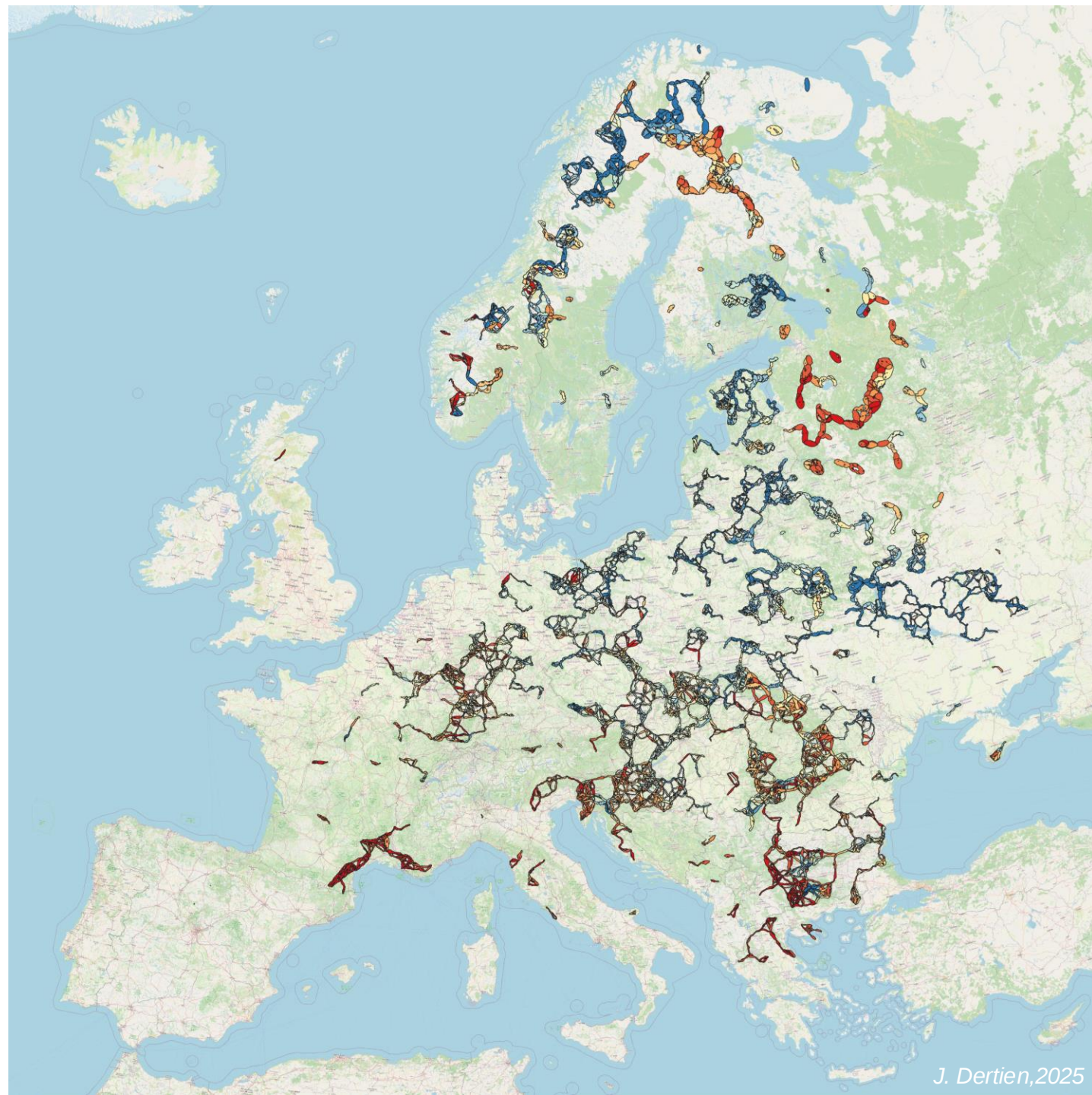
# Continental Corridor Prioritization

- Classify PA importance
- Model randomized shortest paths (RSP)
- Extract Omniscape values for each RSP
- Add together omni values, PA importance, and link importance = corridor priority



# Continental Corridor Prioritization

- Classify PA importance
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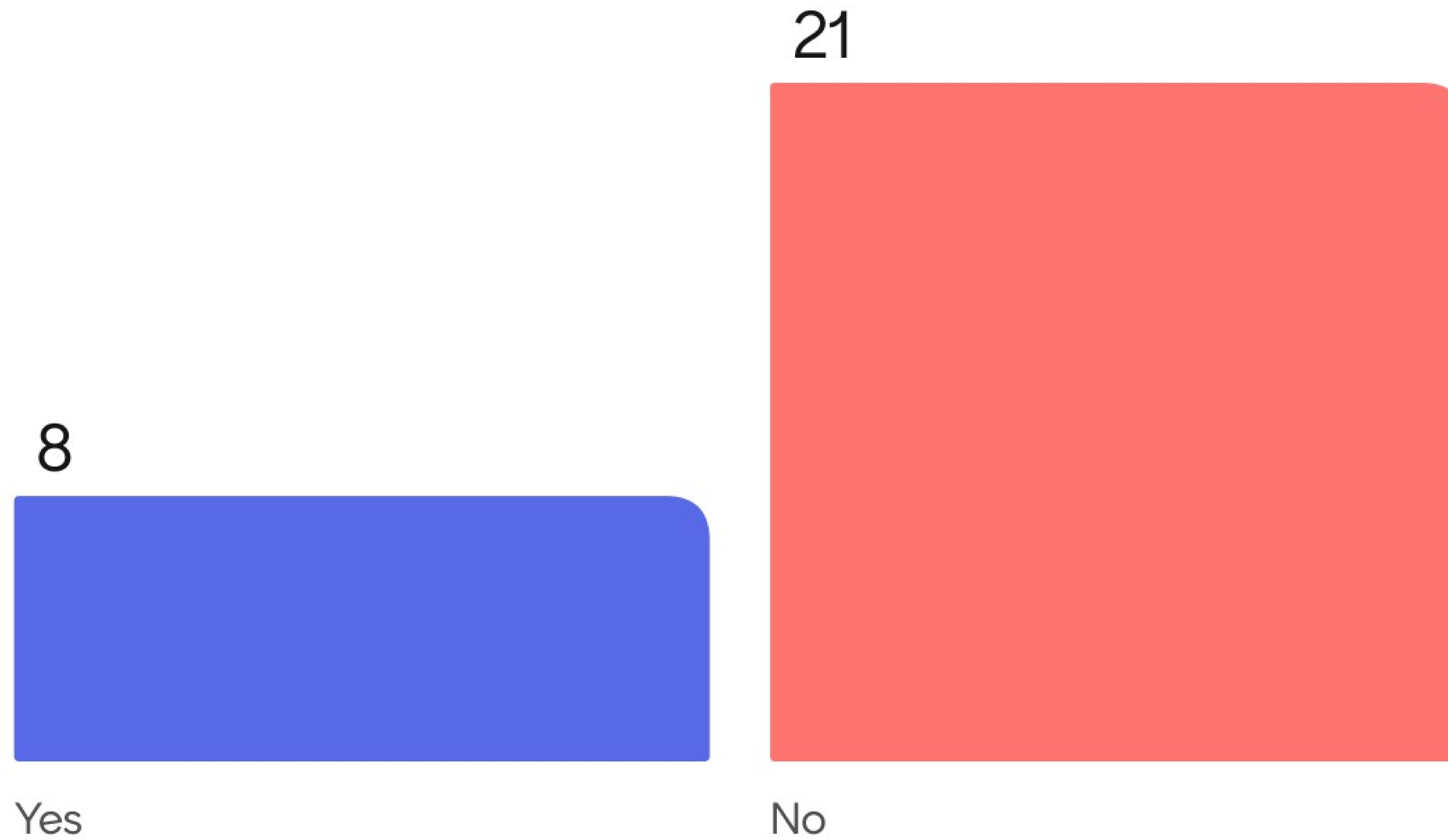


# Conclusion & Moving Forward

- Multi-step connectivity analysis allows for multiple inputs for prioritization
- Flexible to multiple scales
- Moving forward:
  - Archetype specific corridor prioritization
  - Total vertebrate continental prioritization
  - Structural connectivity metrics for all EUNIS habitat types
  - Freshwater/riparian connectivity systematic prioritization

# Thank you for your attention!

# Are you a member of IUCN WCPA Europe?



If you could magically create one ecological corridor anywhere in Europe to connect fragmented habitats, where would it be and why?

Riparian areas

greenbelt-Europe

cross-EU ... so we realise  
our connections

From Mediterranean  
north to allow climate  
adaptation / migration.

Complex mosaic  
landscapes in the Danube-  
Carpathians! They are  
amazing!

Po valley Italy

Po river

north-south. roughly  
around bird migration  
routes

If you could magically create one ecological corridor anywhere in Europe to connect fragmented habitats, where would it be and why?

Carpathians to Alps

Accross western Europe especially where habitats are more fragmented by dense populations and road networks

Jablanica - Karaorman - Stogovo corridor in North Macedonia, connecting Shebenik NP with Mavoro NP helping large carnivores to move freely.

Salmon rivers in Bothnian bay

Slovakia and Czech republic

Carpathian basin

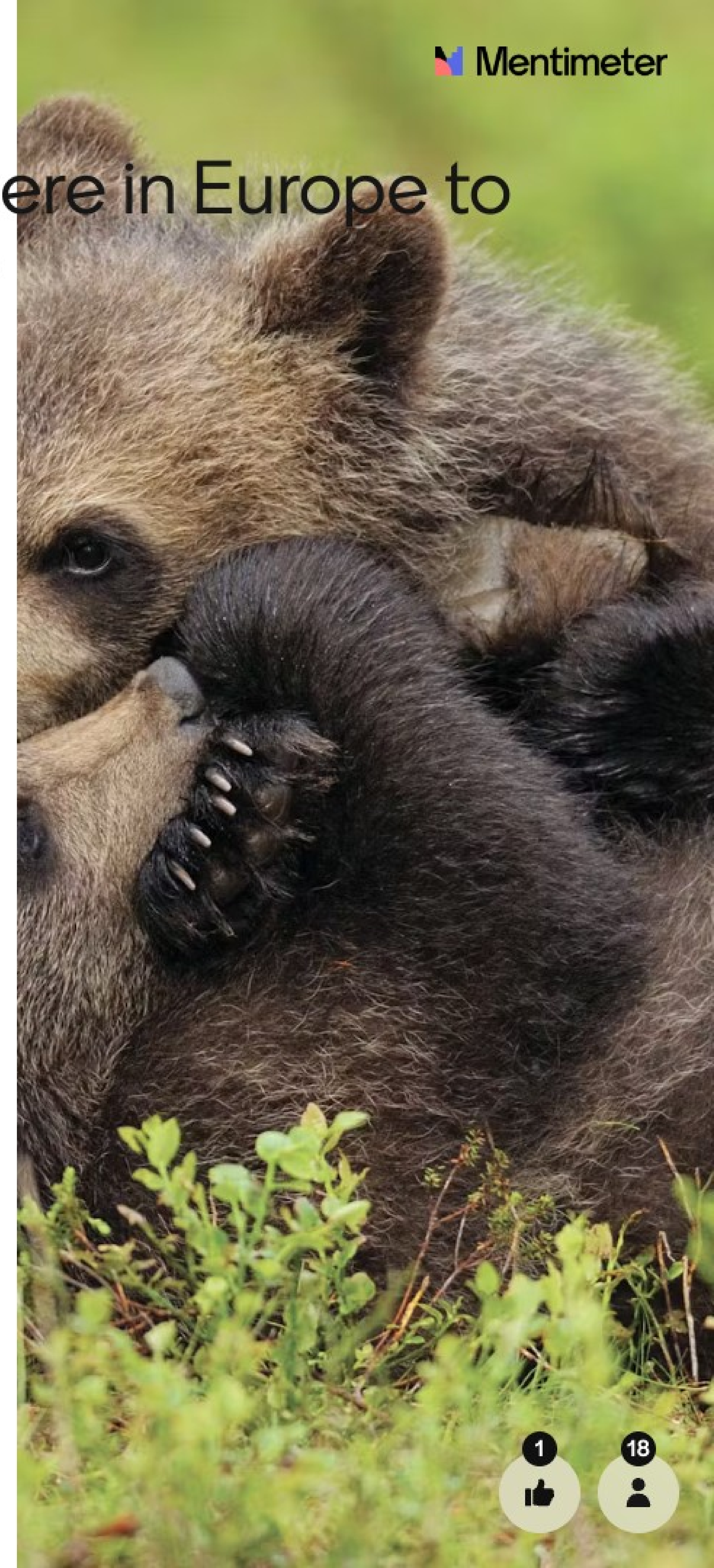
Improved connectivity from western Europe to eastern Europe

Latorica River connecting Ukraine to Slovakia and the EU

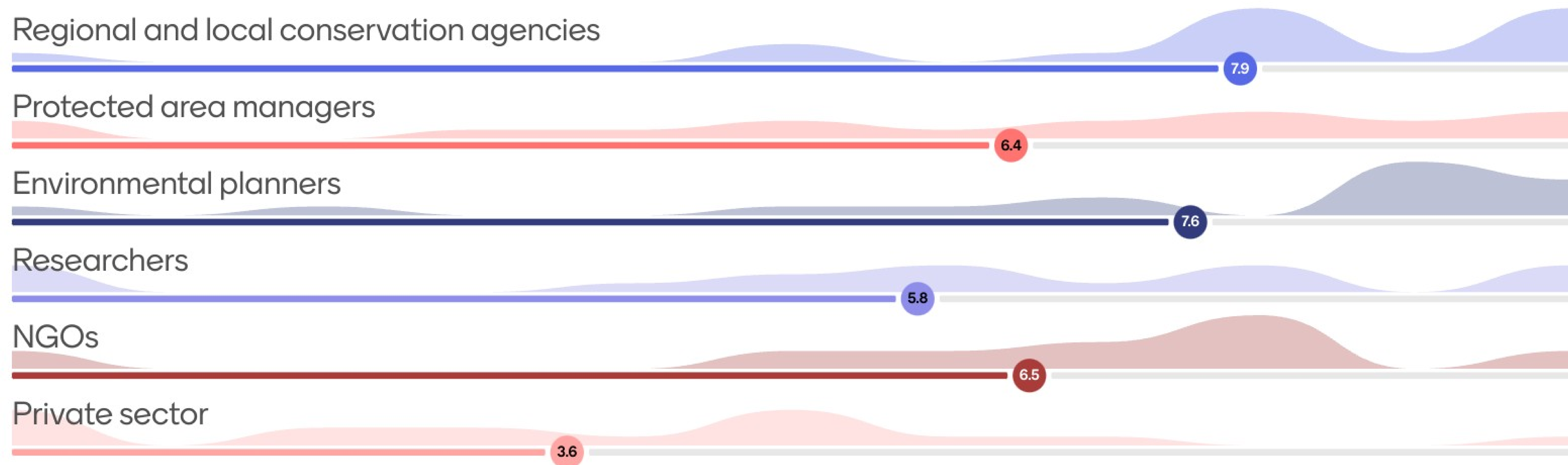
If you could magically create one ecological corridor anywhere in Europe to connect fragmented habitats, where would it be and why?

Carpathian Mountains to the Alps via the Dinaric Alps and the Balkan Mountains --> Connecting Biodiversity Hotspots, establish a wildlife corridor

Along the Apennines and across the Alps to connect fragmented areas in Italy with Europe



# For whom do you think these guidelines are most relevant?



## Knowledge needs

In your role, what are some of the specific challenges or obstacles you encounter planning for ecological connectivity?

Data availability

Legal issues, no designation methodology agreed on, no legal recognition of corridors in spatial planning, all on voluntary basis at the moment.

Ability to access the technical tools to allow sensible connectivity analysis.

data standards and methodology

Establishing monitoring systems

Regulations and private land outside of national park borders. E.g. I work with red deer and if they move outside of specific "red deer areas" in Germany they will be shot...

high complexity and therefore chance of bias

Knowing what approaches work best for to maximise biodiversity returns

Knowledge needs

In your role, what are some of the specific challenges or obstacles you encounter planning for ecological connectivity?

Understanding of the importance of connectivity. A lot of time should be scheduled for engaging with stakeholders to collaboratively work on the land for which use many ideas/needs exist.

How can we maximise the use of EO products (e.g. sentinel data) in analysis.

long term funding/project

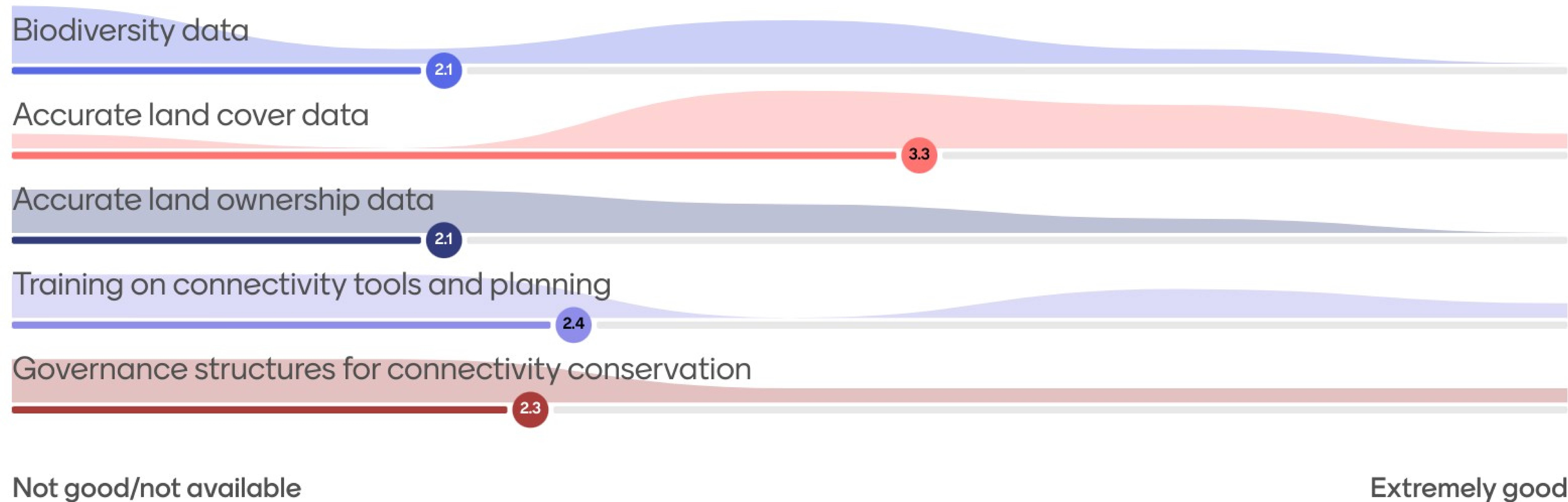
environmental assessments limitations

Trying to balance top down 'v' bottom up approaches.

Participatory processes

Data and training needs

# What is the quality or availability of the following data or categories to you or your team?



Resource needs

# How useful are the following resources to you or your team?



# What protected areas or landscape features do you believe are especially important for European connectivity conservation?

29 responses

