

From mitigation to biodiversity gain:

why academia–industry dialogue matters for infrastructure asset management



Infrastructure Ecology research group

Clara Grilo

Filipa Coutinho
Soares

Francisco
Moreira

Joana
Bernardino



cibio



BIOPOLIS

Infrastructure asset management is **changing**

From traditional performance goals to a broader, more sustainable vision

PAST

Traditional focus



SAFETY



RELIABILITY



COST
EFFICIENCY



SERVICE
PERFORMANCE

TODAY

A broader set of expectations



SAFETY



RELIABILITY



COST
EFFICIENCY



SERVICE
PERFORMANCE



ENVIRONMENTAL
PERFORMANCE

NEXT

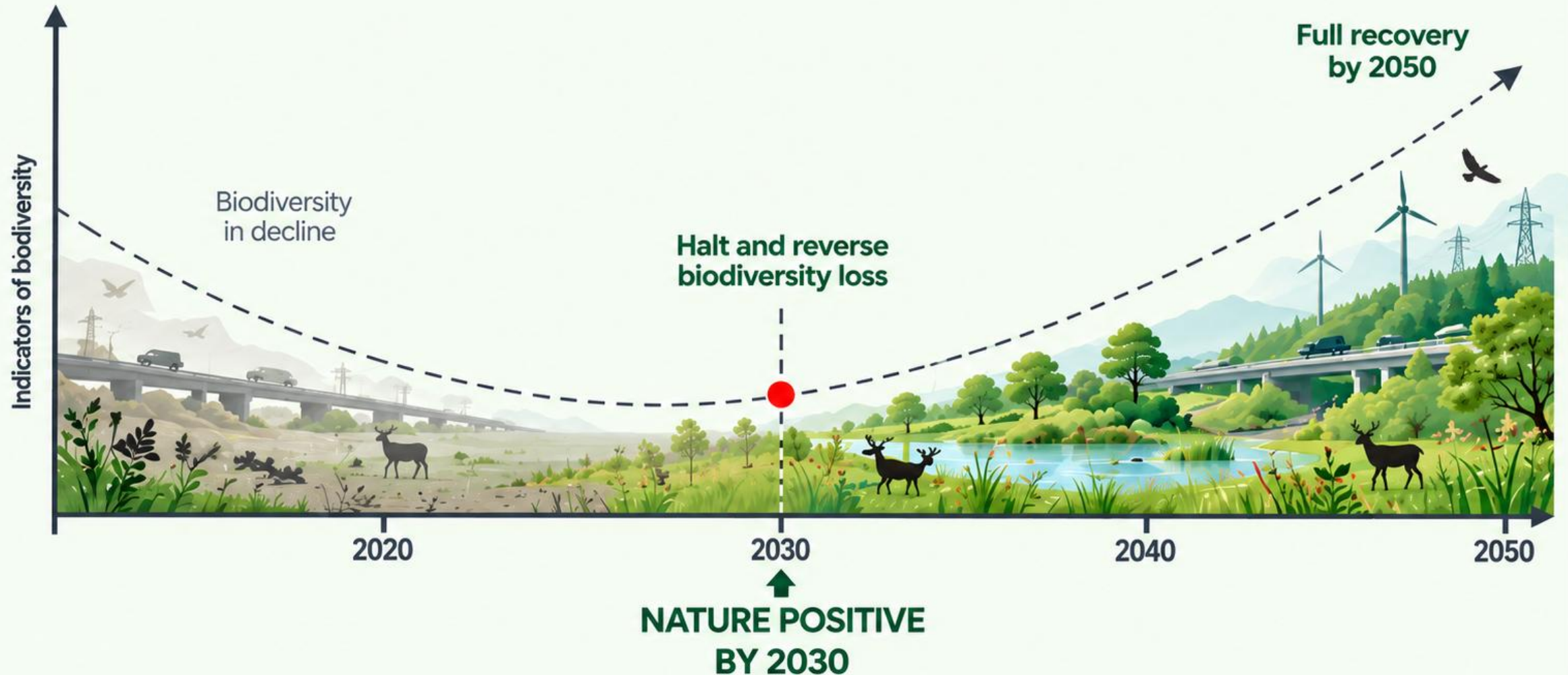
Beyond impact mitigation



WHY BIODIVERSITY GAIN?

Global Goal for Nature: Nature Positive by 2030

Reversing biodiversity loss and putting nature on a path to recovery



From mitigation to **biodiversity gain**

The ambition is changing



Delivering biodiversity gain is complex

Multiple disciplines, data and practical constraints



ECOLOGICAL COMPLEXITY

Species, habitats and ecosystem processes respond differently.



KNOWLEDGE AND DATA GAPS

Limited evidence on what works, especially at scale and long term.



OPERATIONAL CHALLENGES

Integrating biodiversity into planning, design, construction and maintenance.



MULTIPLE STAKEHOLDERS

Different goals, expertise, timelines and constraints across sectors.



A challenge we can only address together

Achieving biodiversity gain requires **evidence, practical solutions and collaboration** across academia and industry.

Collaboration between academia and industry

that combines scientific evidence with practical experience to develop solutions that are both ecologically effective and operationally feasible.

Infrastructure and biodiversity create **risks on both sides.**



BIODIVERSITY RISKS

Impacts on species and ecosystems



Wildlife mortality

Direct loss of individuals



Barrier effects

Fragmentation of populations



Habitat degradation

Loss and alteration of habitats



Disturbance

Noise, light and human presence



INFRASTRUCTURE / BUSINESS RISKS

Impacts on asset performance and management



Wildlife-vehicle collisions

Human safety, vehicle damage



Power outages and faults

Due to wildlife interactions (e.g. birds)



Maintenance and repair costs

Damage to infrastructure and equipment



Service disruption

Delays and loss of reliability



Regulatory and reputational risk

Increasing expectations and scrutiny

**So reducing biodiversity impacts can also
improve infrastructure performance**

Infrastructure can also create opportunities

Well-designed and well-managed infrastructure can deliver benefits for biodiversity and society.



ROADS AND RAILWAYS

- Overpasses and underpasses
- Fencing
- Vegetated verges and railway margins
- Maintain and restore ecological connectivity



POWER LINES

- Improve habitat under power lines
- Creation of nesting locations for birds



WIND ENERGY

- Improve habitat around wind farms
- Create and restore habitats for wildlife and pollinators

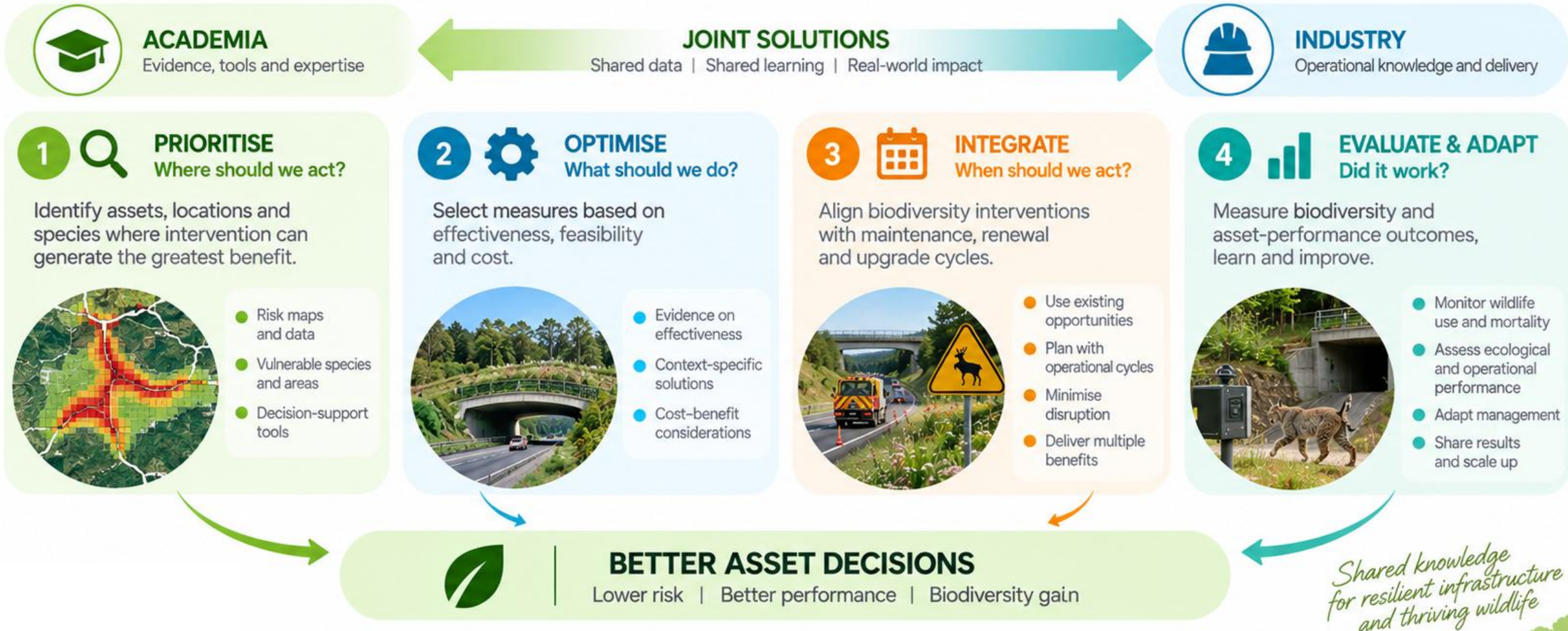
Why is progress still slow?

Science and operational practice often develop separately.

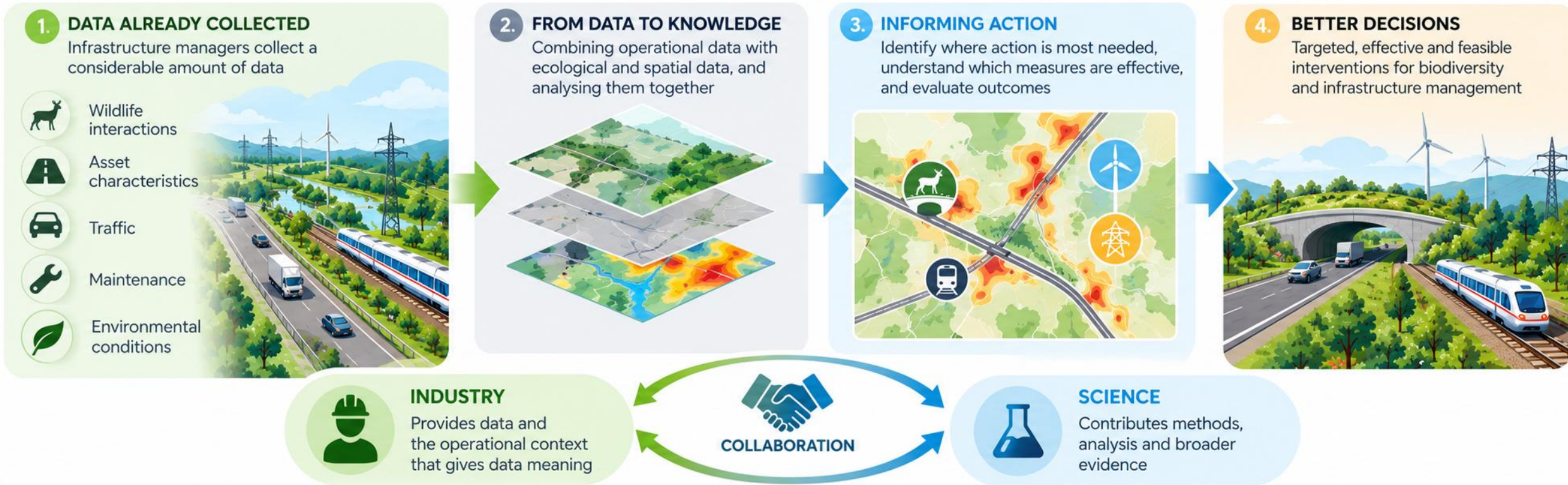


Academia and industry should co-define the problem

What decisions, ecological objectives and operational constraints need to be addressed?



From data to knowledge and **better decisions**



RISKY Bridging data, science and infrastructure



www.risky.pt

Infrastructure and stakeholders share data. Science turns data into knowledge for better decisions.

SHARE DATA

Infrastructure and researchers



Roads

Roadkill, traffic, road characteristics



Railways

Wildlife collisions, operational data



Power lines

Mortality monitoring



Wind farms

Mortality monitoring



SHARED
DATA



RISKY PLATFORM

Integrate • analyse • predict



Data integration
and standardization



User friendly
analytical tools



Analysis and
risk mapping

RISKY bridging data, science and infrastructure

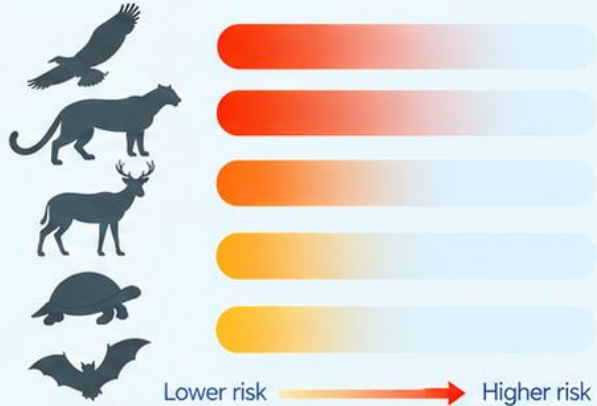


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From data to knowledge to support better decisions for biodiversity and infrastructure management.

Species at higher risk

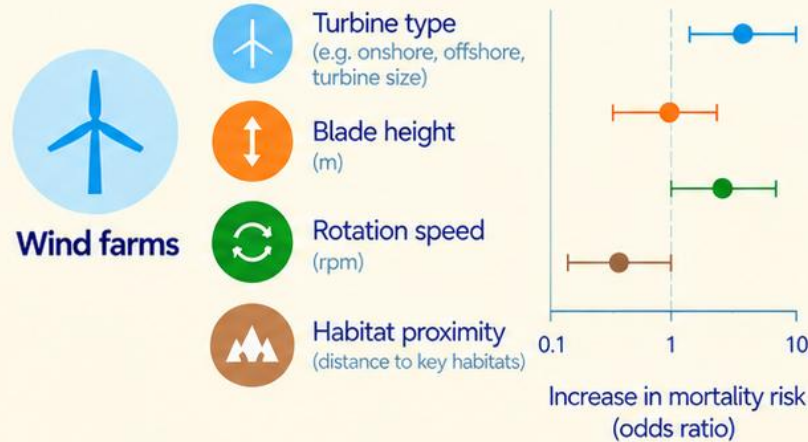
Examples from different infrastructure types



Species and groups with higher risk of mortality or displacement from infrastructure.

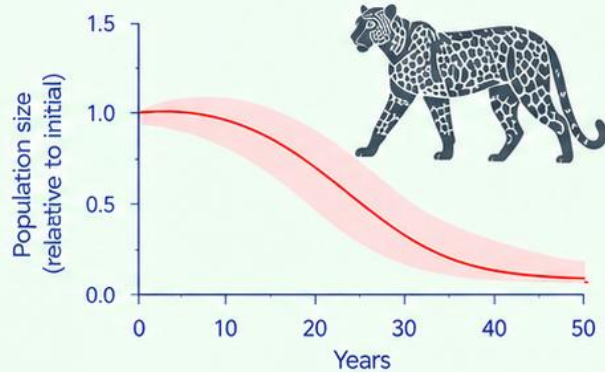
Wind farm features increase the risk

Examples of variables associated with higher risk



Mortality thresholds

At what level might mortality affect populations?



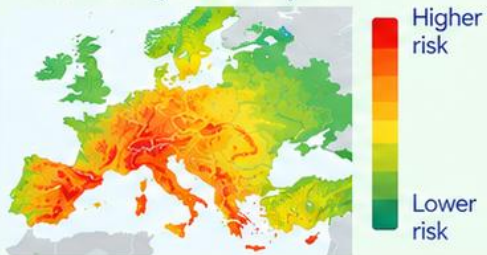
Example of a population trajectory under a given mortality rate (e.g. leopard).

Spatial risk and effectiveness of mitigation measures

Examples from different infrastructure types

Sensitivity map

Areas with higher mortality risk



Turbine curtailment (wind farms)

Reduction in bird mortality during high-risk periods.



Wildlife crossings (roads and railways)

Reduction in mammal collisions.



RISKY



So far... 

Building the most comprehensive open platform
on wildlife mortality from transport and energy infrastructure



ROADS

+240 000

mortality records

from +50 countries
on 5 continents

The world's largest open dataset
on wildlife road mortality



RAILWAYS

+40 000

mortality records

from +10 countries
on 5 continents

to be published soon



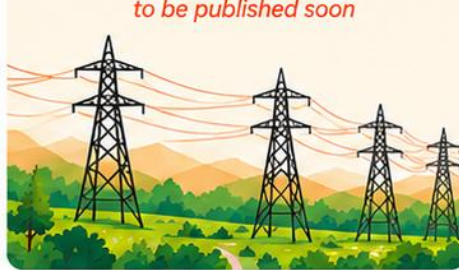
POWER LINES

+40 000

mortality records

from +30 countries
on 5 continents

to be published soon



WIND FARMS

+30 000

mortality records

from +20 countries
on 5 continents

to be published soon



KNOWLEDGE, TOOLS & RESOURCES



14

SENSITIVITY MAPS

compiled to identify
areas and species
potentially more
vulnerable



300+

SCIENTIFIC ARTICLES

on wildlife mortality
from infrastructures
compiled



8

CASE STUDIES &
RESEARCH ARTICLES
compiled



7

ANALYTICAL TOOLS

compiled to explore
data and assess
mortality patterns and
population-level impacts

www.risky.pt



Open data. Open tools.
Open science.

BIODIVERSITY GAIN

Restoring habitats and reducing infrastructure impacts can support biodiversity recovery.



ROADS

Wildlife crossings and habitat restoration

Before



After



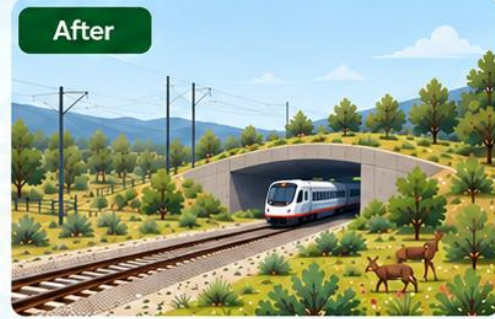
RAILWAYS

Wildlife crossings and habitat restoration

Before



After



POWER LINES

Safer designs and habitat restoration

Before



After



WIND FARMS

Improve habitat around wind farms and create and restore habitats for wildlife and pollinators

Before



After



Together, we can turn infrastructure
from a threat into **a solution for biodiversity.**

Thank you!

Clara Grilo

CIBIO | BIOPOLIS
Universidade do Porto

✉ clara.grilo@cibio.up.pt

LET'S WORK TOGETHER CIBIO | BIOPOLIS

Research and solutions for a more sustainable coexistence between infrastructure and biodiversity.



Research
collaboration



Monitoring
evidence



Decision support
and guidelines



cibio



BIOPOLIS

<https://www.cibio.up.pt>

JOIN RISKY

A global platform for wildlife mortality from transport and energy infrastructure.



Share
your data



Data analysis
and modelling



Develop
tools



Be part of the
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