

# BISON WILDING RAILWAYS

## SCALING UP THE EU-PROJECT OUTCOMES FOR RAILWAYS

27 February, 2023 - UIC HQ, Paris



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*

# AGENDA

TIME	ACTIVITY
9:00 – 9:30	Welcome Remarks
9:30 – 10:30	THINK TANK DISCUSSIONS ( <i>for in person participants</i> )
10:30 – 10:45	COFFEE BREAK
10:45 – 12:15	POLICIES AFFECTING LAND USE MANAGEMENT
	LAND COVER, SEALED SURFACES AND NATURE BASED SOLUTIONS
12:15 – 13:30	LUNCH



INTERNATIONAL UNION  
OF RAILWAYS



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# AGENDA

TIME	ACTIVITY
13:30 – 14:45	RELATIONSHIPS WITH NEIGHBOURING COMMUNITIES AND BIODIVERSITY STRATEGIES
	BIODIVERSITY MONITORING, REPORTING AND ENHANCEMENT
14:45 – 15:15	COFFEE BREAK
15:15 – 16:15	VEGETATION MANAGEMENT
	DEVELOPING TOOLS FOR ECOSYSTEM SERVICES
16:15 – 16:25	COFFEE BREAK
16:25 – 16:40	CLOSING REMARKS



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[Watch at UIC's  
YouTube Channel](#)

# INTRODUCTION



**LUCIE ANDERTON**

**NETWORK RAIL (UK)  
HEAD OF UIC SUSTAINABILITY  
UIC NORTH AMERICA COORDINATOR**



**CHRISTINE VANOPPEN**

**LINEAS (BE)  
UIC SUSTAINABILITY PLATFORM  
CHAIR**



**KARA OLDHOUSER**

**AMTRAK (USA)  
DIRECTOR OF SUSTAINABILITY  
UIC SUSTAINABILITY PLATFORM  
VICE-CHAIR**



**THIERRY GOGER**

**FEHRL (BE)  
GENERAL SECRETARY  
H2020 BISON PROJECT LEADER**



**BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS



**INTERNATIONAL UNION  
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# A New Era for Rail: More Trains for More People

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UIC Sustainable Action Week

February 27, 2023



# Safety and Security Briefing



## Emergency Preparation

Our physical address is

Who will call 911, and who is their backup?

Who is CPR/AED qualified?

Emergency equipment location

Evacuation plan



## Evacuation

Communicate the need to evacuate

Follow facility evacuation plan

Assist those who may need help evacuating

Wait for permission to re-enter the facility



## Situational Awareness

Proactively identify and mitigate hazards

Always be aware of surroundings

Follow rules and policies



## Health and Welfare

Wellness is a priority

Take seasonal precautions

Isolate if sick



## Security

See something, say something: call 800-331-0008 / text APD at 27311

Active Shooter: Flee, Hide, Fight

Display and verify proper ID on Amtrak property



## Cybersecurity

Pay attention to phishing traps in emails

Don't click on links or attachments from unknown sources

Report all suspicious email and cyber incidents

# Topics

- Amtrak by the numbers
- Where we operate
- Infrastructure investment
- Policy
- Climate Research
- Amtrak's Climate Resilience Strategic Plan





# Amtrak – Fiscal Year 2022: By the Numbers

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- 22.9 million trips
- 7 million new customer trips
- 3,700+ new hires
- 11 new and returning services
- 10 major capital projects advanced
- Net-zero carbon emissions by 2045
- \$2.8 billion in revenue
- Achieved \$145 million reduction in operating loss over plan

*Roanoke passengers waiting to board on first day of increased service, July 11, 2022*

39

→ New routes

25

→ Enhanced routes

160

→ New stops

20 million

→ More riders

All 50

→ Largest metro areas served



This vision was just a starting point – Amtrak is working with the Federal Railroad Administration, states, and other eligible entities to advance new and expanded corridors

# Investing in the New Era for Rail

*The Bipartisan Infrastructure Law is America's greatest level of investment in passenger and freight rail than all 51 years of Amtrak combined.*

## \$66B

in passenger and freight rail  
Investment over 5 years

- \$22B is for Amtrak to focus on improving and upgrading our assets.
- \$44B will flow through Federal discretionary grant programs.





# Rebuilding Infrastructure

(Re)Building the Railroad includes major structure replacements in addition to annual renewal programs. Key Projects underway include:

- Gateway program (Hudson Tunnel Project) (NY/NJ)
- Frederick Douglass Tunnel (MD)
- Connecticut River Bridge replacement (CT)
- East River Tunnel Rehabilitation (NY)
- \$33B State of Good Repair Backlog

## FY23 Highlights:

- Annual Plan: \$1.38B (141 active projects with \$22B total Life of Project)
- First Construction Manager At Risk contract



# National Environmental Policy Act (NEPA)

- Signed into law on January 1, 1970.
- The National Environmental Policy Act (NEPA) was one of the first laws ever written that establishes the broad national framework for protecting America's environment.
- NEPA requires that prior to funding, authorizing, or implementing an action, federal agencies **must consider the effects** the proposed action **may have on the environment**, and the related **social** and **economic** effects.





# 2022 Amtrak Climate Resilience Strategic Plan

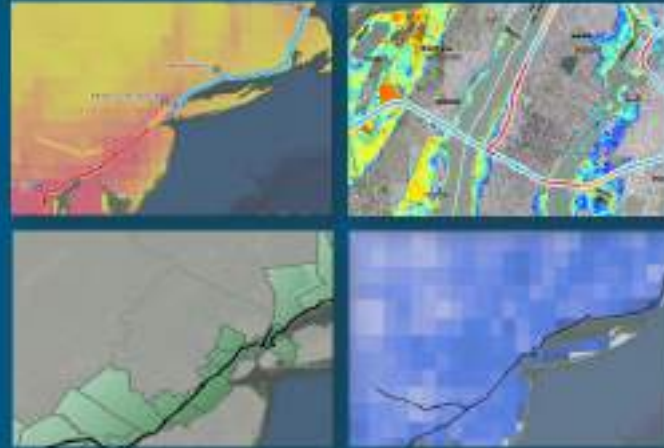
Amtrak's Northeast Corridor



Prepared by  Stantec



# 2022 Amtrak Climate Vulnerability Assessment Summary Report



September 2022

# Amtrak's Climate Resilience Strategic Plan: Priority Actions

## PEOPLE

- Increase the availability of Climate SMEs across the organization through new hires.
- Develop a climate task force to spearhead climate resilience efforts.
- Build internal capacity for integration of climate resilience.

## PRACTICES

- Update Engineering specifications and practices to include design standards that boost climate resiliency.
- Integrate climate resilience into planning efforts led by the Executive Leadership Team.
- Develop a mechanism to geotag hazard events.

## ASSETS

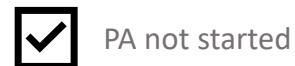
- Utilize climate stressor data to develop climate resilience targets for assets.
- Develop criteria for prioritizing asset upgrades, relocation, and adaptation measures.
- Develop resiliency targets for all real estate, stations and facilities served by Amtrak, and integrate into building design standards.



PA underway



PA initiated



PA not started

# Priority Action: Develop Criteria for Prioritizing Asset Upgrades, Relocation, and Adaptation Measures

The Capital Delivery Department will develop and apply prioritization criteria for asset upgrades, relocation, and adaptation.

The passage of the 2021 IJA and Amtrak's Board of Directors corporate goals for strategically reducing climate risk created an opportunity to adapt existing and future assets to withstand the projected conditions of a future climate. Action 7 addresses selecting climate data sources and developing resiliency targets for assets.

Once targets are set, existing assets should be evaluated to determine potential modifications necessary to address risk. New projects will also incorporate this information. A project prioritization mechanism is necessary to effectively reduce impacts across Amtrak while strategically allocate resources over time. Prioritization mechanisms could be integrated into Amtrak policies and systems (e.g., capital improvement planning, AIMS, and business case reviews).

## ACTION TYPE:

Policy, Design Standard, Capital Planning

## LEAD DEPARTMENT:

Capital Delivery – Project Delivery

## SUPPORTING DEPARTMENTS:

Capital Delivery, Executive Leadership Team, Strategy & Planning - Sustainability & Climate Group, Safety & Security – Emergency Management, Strategy & Planning – Real Estate Stations, Facilities, Properties & Accessibility, Finance

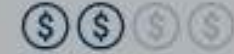
## STEPS:

1. Develop criteria for prioritizing adaptation measures for new capital projects as well as retrofitting/upgrading for existing assets. Prioritization will include considerations such as project size, risk reduction potential, asset lifecycle, cost, benefits, and return on investment, among other factors.
2. Pilot prioritization criteria with a select group of assets (including a range of new design/construction and asset upgrades) to evaluate feasibility and necessary refinements.
3. Determine the appropriate policy or system for integration into planning and operational decisions, as well as consistent, organization-wide adoption.

## BENEFITS:

-  Operations
-  Direct Losses Avoided
-  Reputation

## ESTIMATED COST:



**TIMELINE:**  
FY2022

## MEASURING SUCCESS:

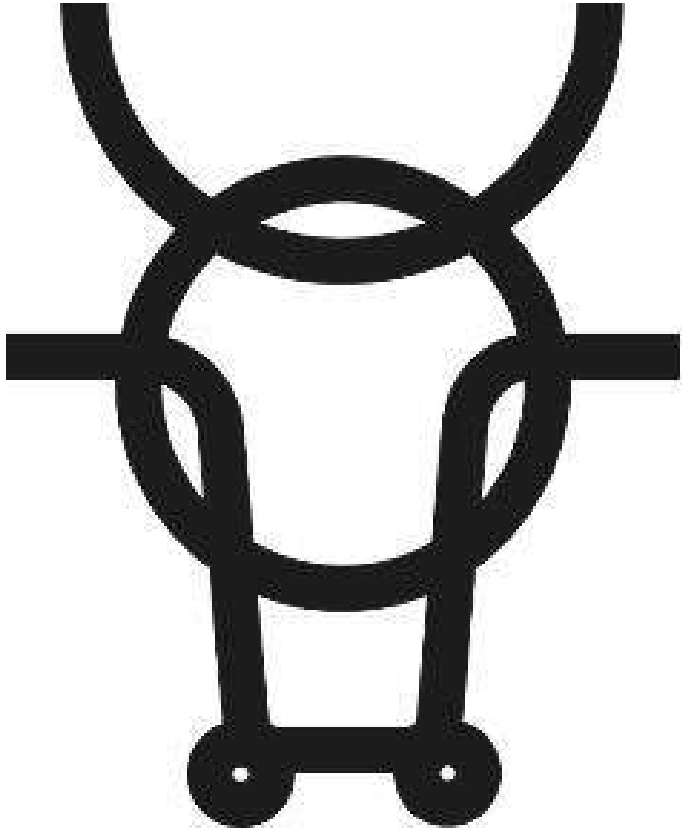
- Criteria has been developed for prioritizing adaption projects.
- A pilot program has been established to apply criteria to select assets.
- Lessons learned from pilot program have been leveraged to refine and finalized criteria.





Thank You for Riding with Us!



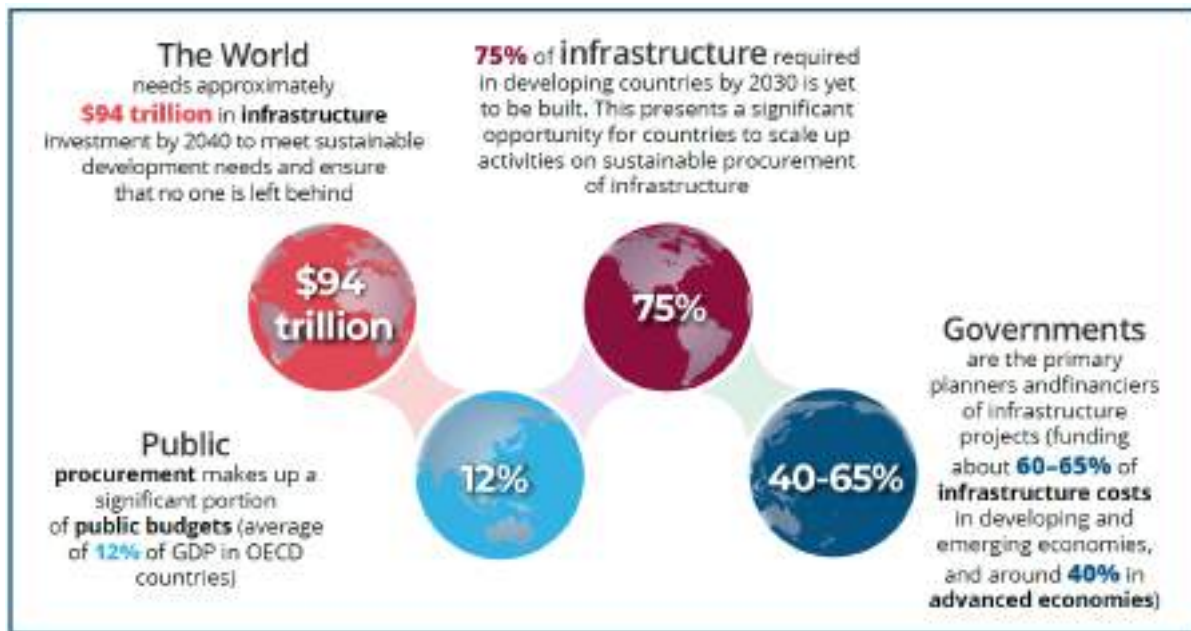


# BISON

**BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS**









- + 50% of new roads network by 2050 (60 million of km)
- + 5% of new energy networks/year
- Major Investments on infrastructure with the need to develop global drivers

## A very progressive and recent awareness of synergy needs



UNEP/EA.5/Res.9  
Distr.: General  
7 March 2022  
Original: English

  **United Nations Environment Assembly of the United Nations Environment Programme**

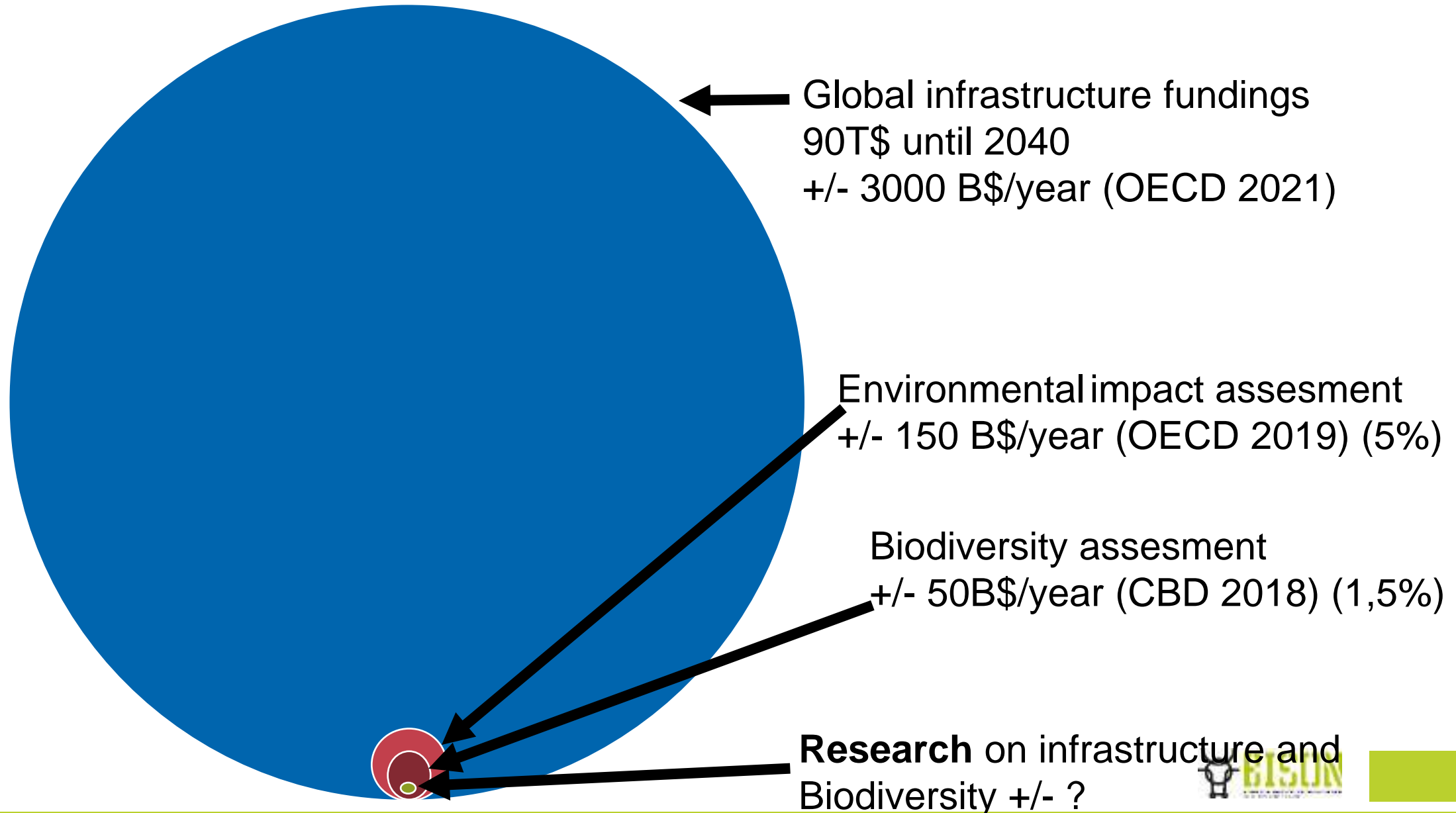
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**United Nations Environment Assembly of the United Nations Environment Programme**  
Fifth session  
Nairobi (hybrid), 22 and 23 February 2021  
and 28 February–2 March 2022

**Resolution adopted by the United Nations Environment Assembly on 2 March 2022**

5/9. Sustainable and resilient infrastructure

# WHAT DOES INFRASTRUCTURE AND BIODIVERSITY RESEARCH REALLY REPRESENT TODAY ?








# ORIGIN OF THE BISON PROJECT

## European Linear Transport Infrastructure (TI) Development

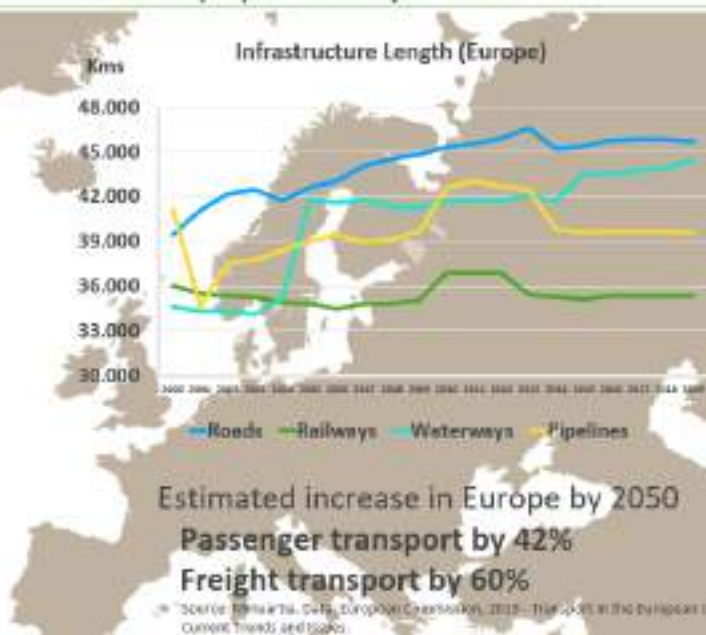
### General facts

43 Countries  
23 million km<sup>2</sup>  
845 million people

### TI facts

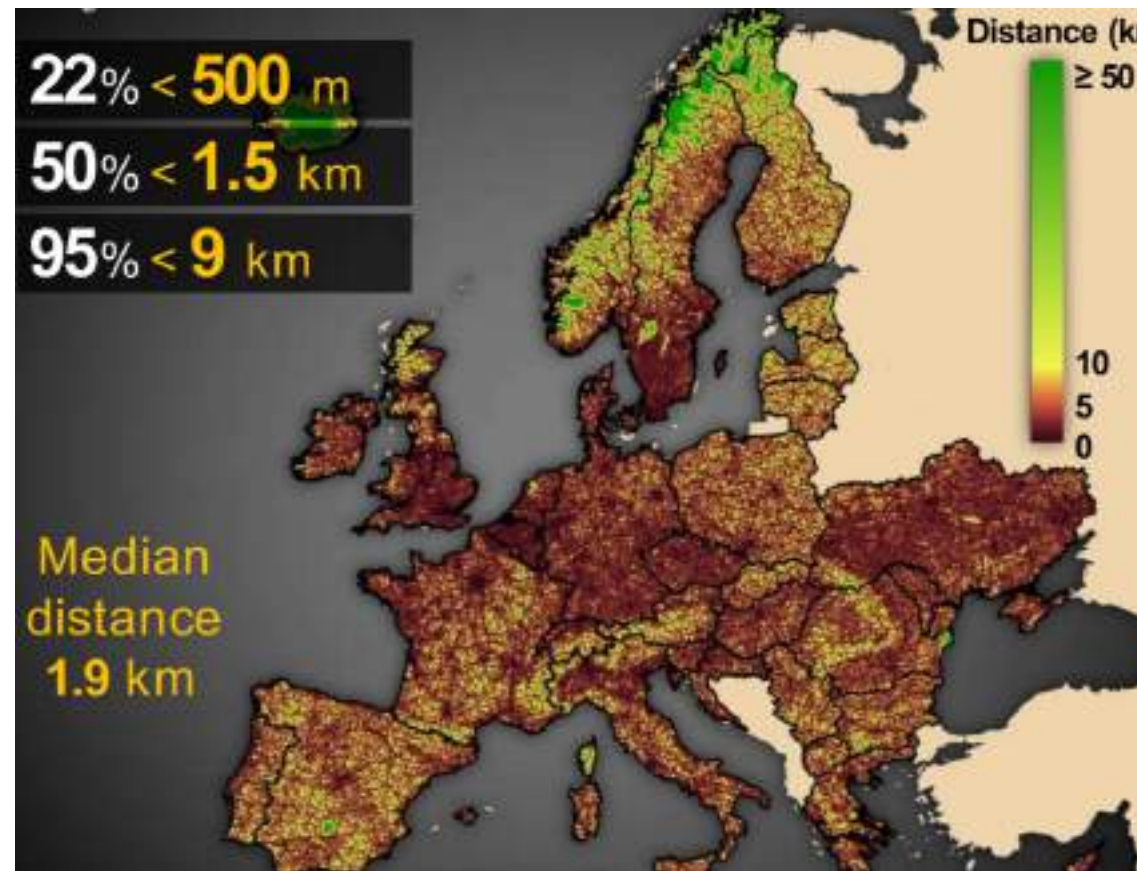
	Roads (34 countries)	4.6 million km
	Railways (30)	0.4 million km
	Waterways (15)	0.04 million km
	Pipelines (25)	0.04 million km
	Powerlines (33)	0.6 million km

UNDER DEVELOPMENT



A highly fragmented territory

Need to enhance coordination between transport infrastructure and biodiversity to contribute to cross strategies





# 2026 : 1/3 of European fundings dedicated to Natural Resources and Environment and 10% to biodiversity



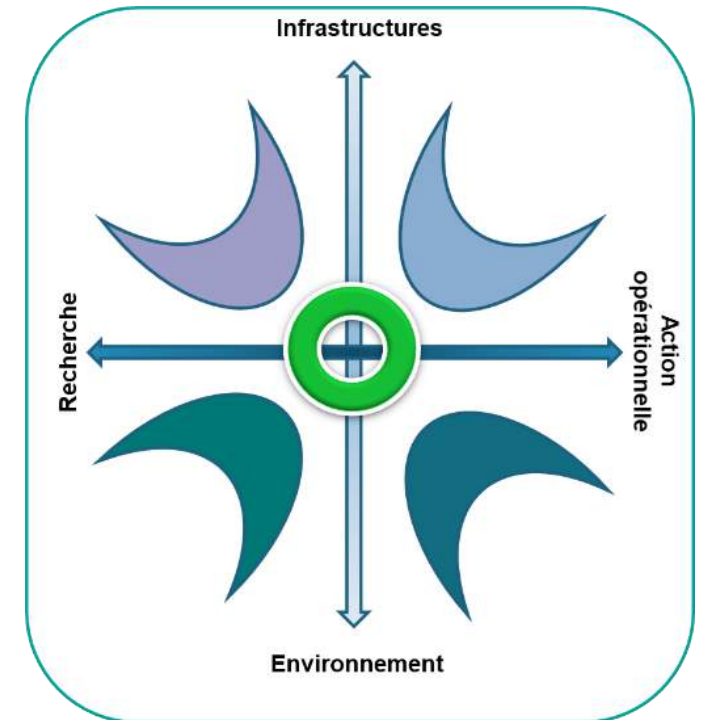
but a challenge to develop a holistic approach to research due to multiple factors:

- the dispersion of actors,
- a lack of strategic governance,
- difficulty in developing robust and replicable research,
- the difficulty in capitalising on knowledge and supporting a rise in generality.

Pillar II - Clusters

## GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS:

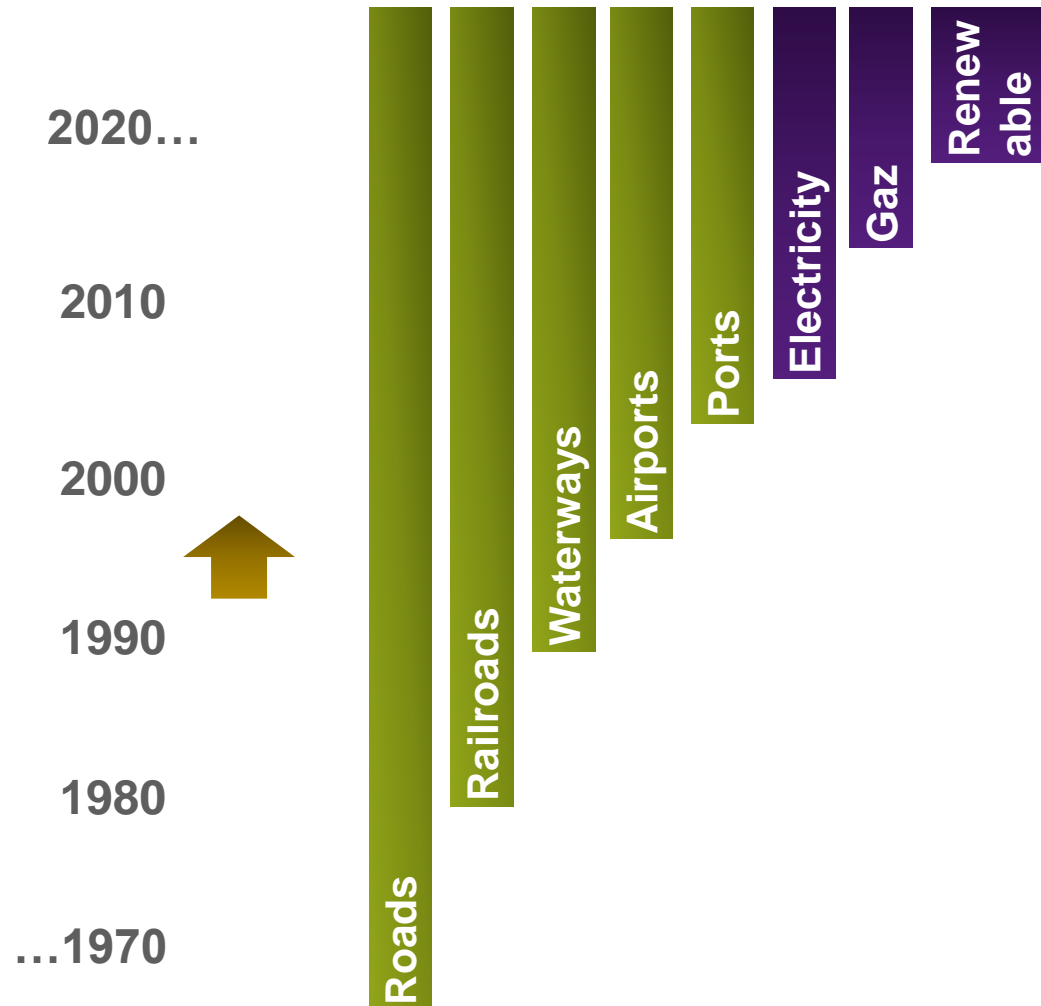
boosting **key technologies** and solutions underpinning **EU policies & Sustainable Development Goals** (6 clusters and JRC – non-nuclear direct actions)



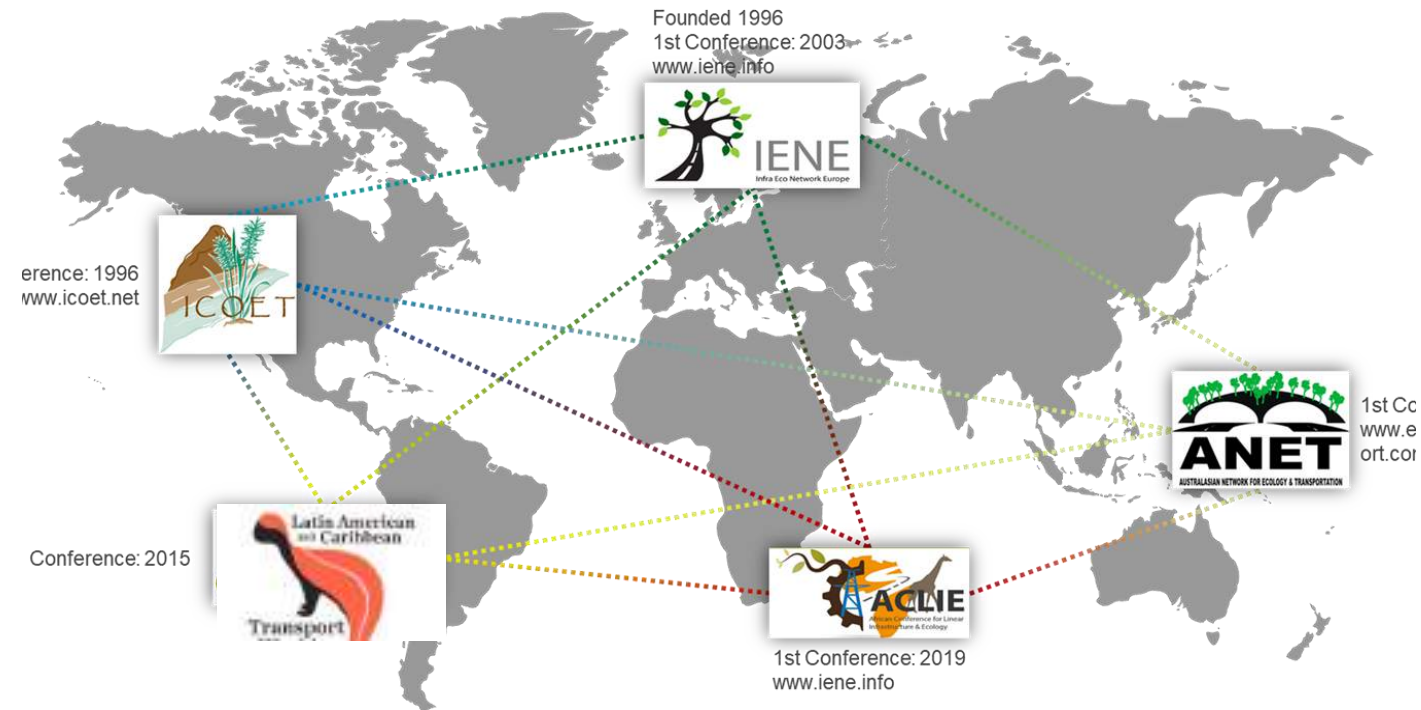
# Evolutions of research in infrastructure and biodiversity

More than 80% of research publications on infrastructure and biodiversity are based on road examples (Bison 2022)

## Infrastructure and Biodiversity as a research topic



## Research on Infrastructure and Biodiversity: a global network



# BISON IN A NUTSHELL

**BISON** – Biodiversity and Infrastructure Synergies and Opportunities for European Transport Networks

**Consortium:** 39 partners and 6 third parties - 16 countries

**Budget:** ~ 3.0 MEUR

**Start date:** 1<sup>st</sup> January 2021

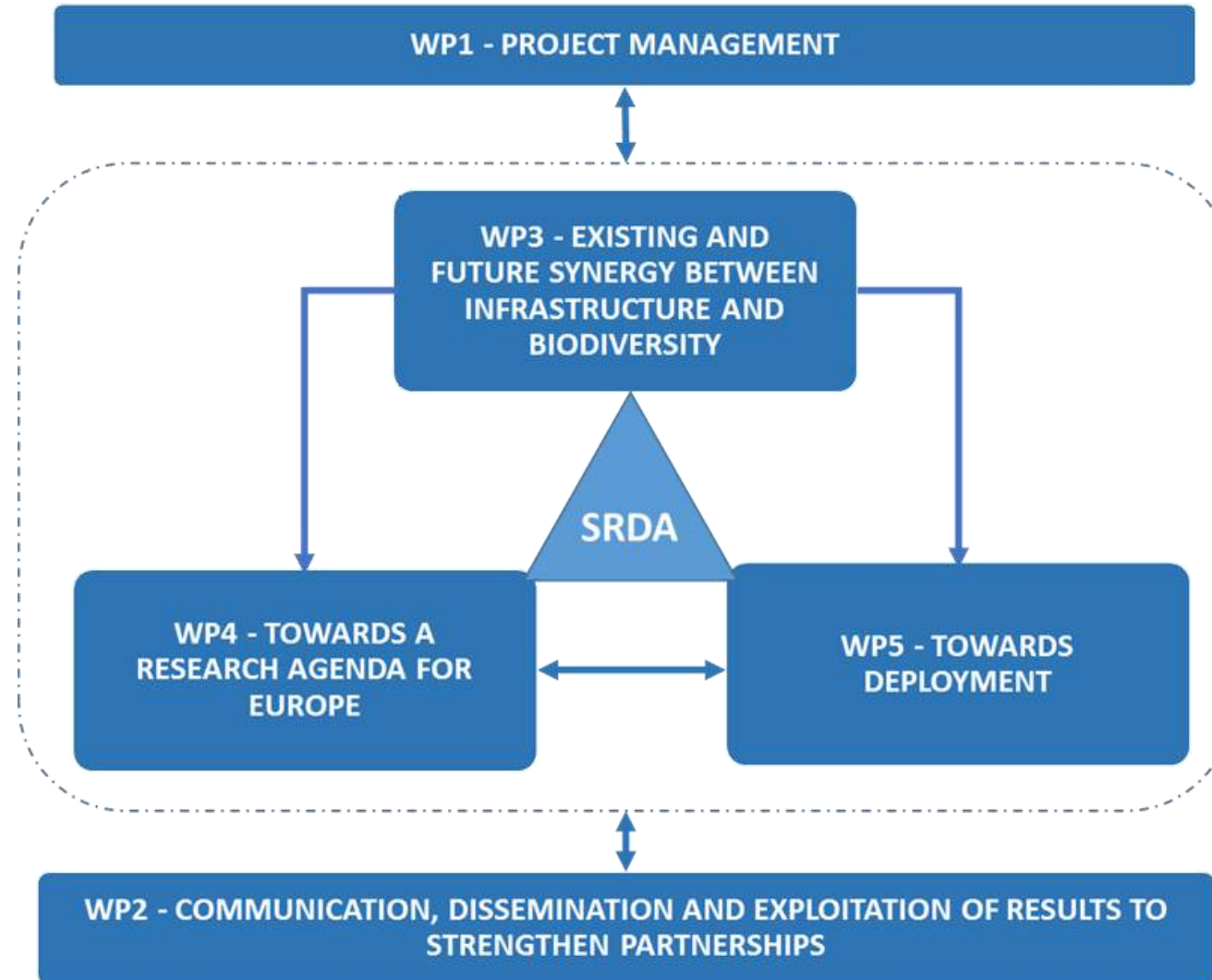
**Duration:** 30 months (end date 30<sup>th</sup> June 2023)

## KEY SYNERGIES

- Raising of awareness and recent **acceleration of multiple initiatives** at local, regional or global level
- Creating a **focal point of expertise** at the European level
- Paves the way for **long-term funding for research** on the topic
- Paves the way for long-term interactions between **research-policy and operators**



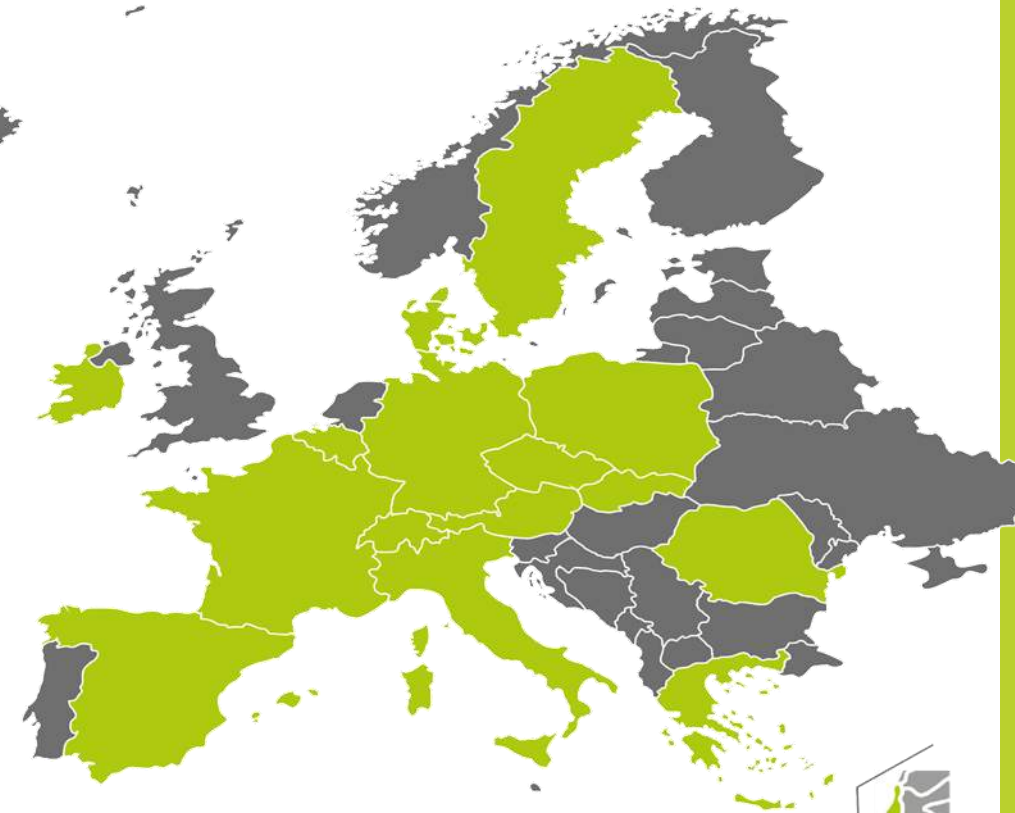
# BISON WORK PACKAGE STRUCTURE





# MULTIPLE OUTCOMES

- **State-of-the-art** on mitigating infrastructure impacts on biodiversity, from collisions to ecosystem fragmentation to pollution
- **Strategic Research and Deployment Agenda (SRDA):**
  - Identify **research needs and opportunities** for synergy in future R&I
  - Identify opportunities to **deploy acquired knowledge** on the ground
- **Funding optimization** for infrastructure R&I
- Public **policy coordination** and cross-sectoral improvements
- **Engagement** with key stakeholders and creation of a transnational **community of experts**



NTIEA - National Transport Infrastructure and Environmental Authorities (16 partners\*)

NEA - National Environmental Agencies (3)

IO-C - Infrastructure operators and companies (5)

RA - Research and academia (12)

Associations - Associations and Civil society (6)

# EXAMPLES OF ONGOING ACTIONS

## 'Defining a common language'

- [IENE-BISON Glossary](#)
  - Based on the glossary produced for the 'Wildlife and Traffic Handbook' (2003). Available at:  
<https://handbookwildlifetraffic.info/annex-1-glossary/>
  - Cooperation with other organisations. Sent to:
    - **PIARC** – Biodiversity Group
    - Sent to **ISO** TC 331 – Biodiversity
  - Future: a proposal to think about: translate it to other languages
- [BISON – Infrastructure life cycle phases](#)
  - Discussed and agreed among partners to ensure effective communication.

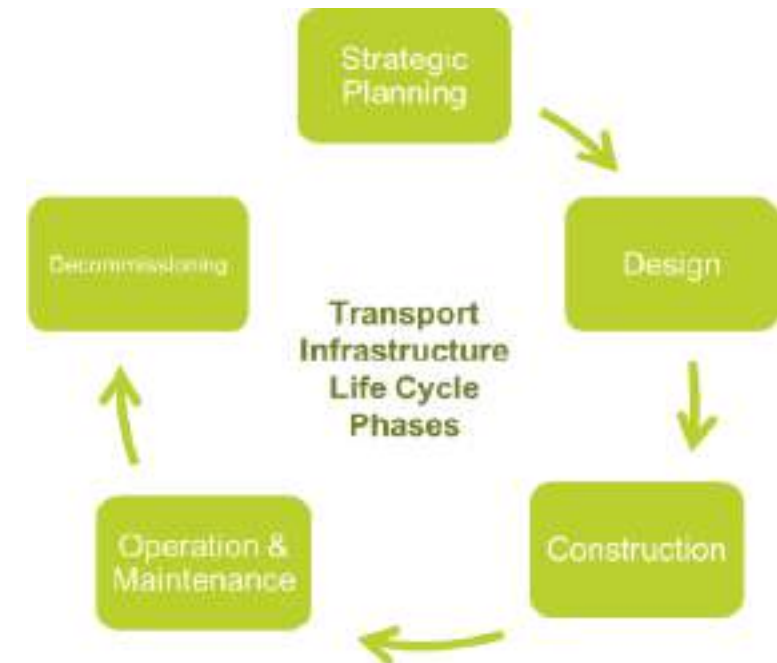


## Glossary

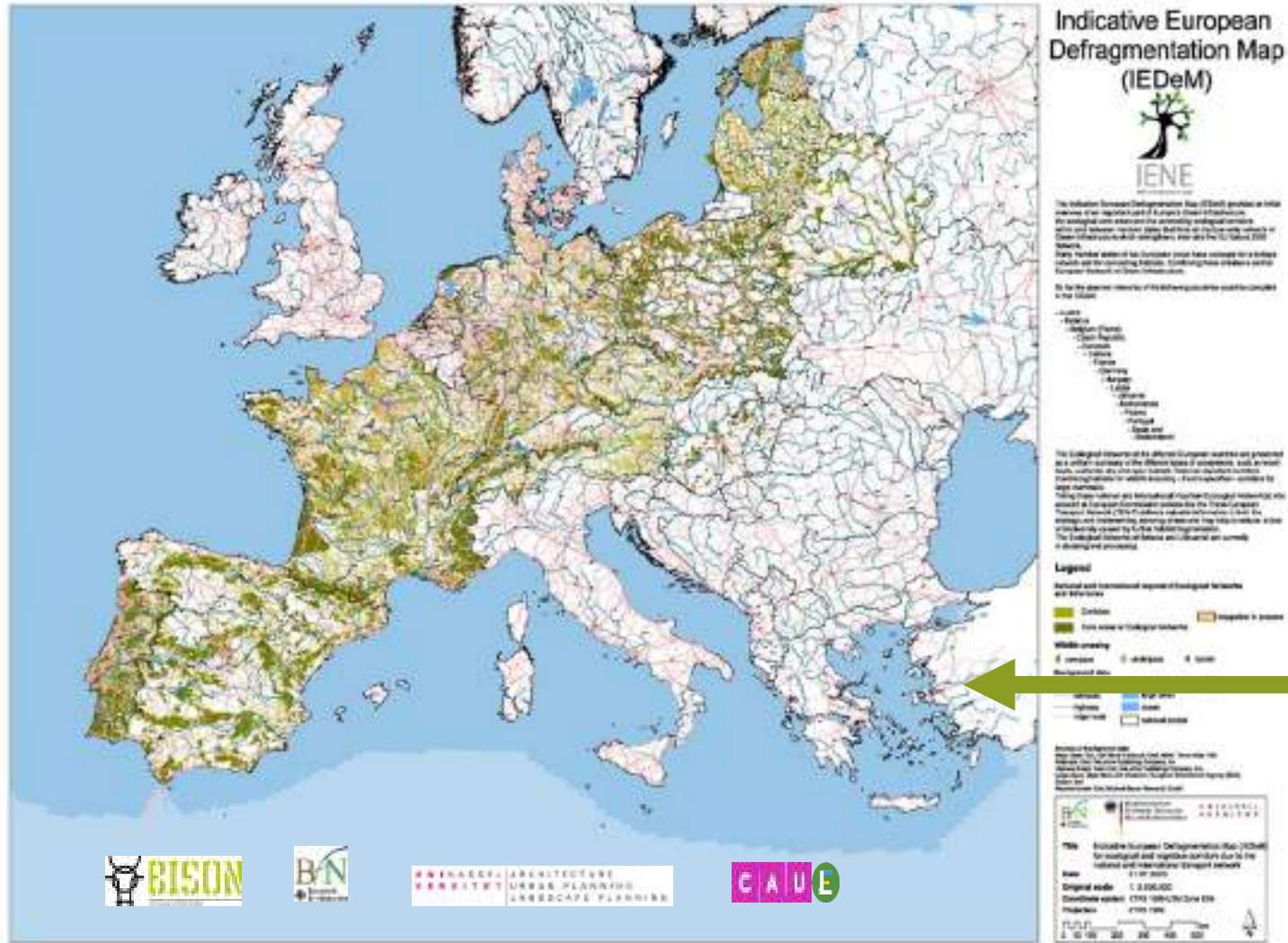
This glossary was first developed for the 'Wildlife and Traffic Handbook, A European handbook for identifying conflicts and designing solutions', published in 2003 as the main output of the Cost 341 Project promoted by the Infrastructure and Ecology Network Europe (IENE).

Both this glossary and the 'Wildlife and Traffic Handbook' have become living documents that are being continually updated in a cooperative process. As part of this process, the glossary has been updated by experts from IENE, with the contribution of the BISON Project partners.

Since September 2021 the updated version is available online including a search tool (<https://handbookwildlifetraffic.info/annex-1-glossary/>) and is open to receive contributions from users.







- **Defragmentation**

Identification of important Green Infrastructure (core areas, corridors, valuable habitats and their connectivity)

Defragmentation measures (wildlife passages and others)

Guidelines for use and further development

Need to coordinate TEN-N and TEN-T

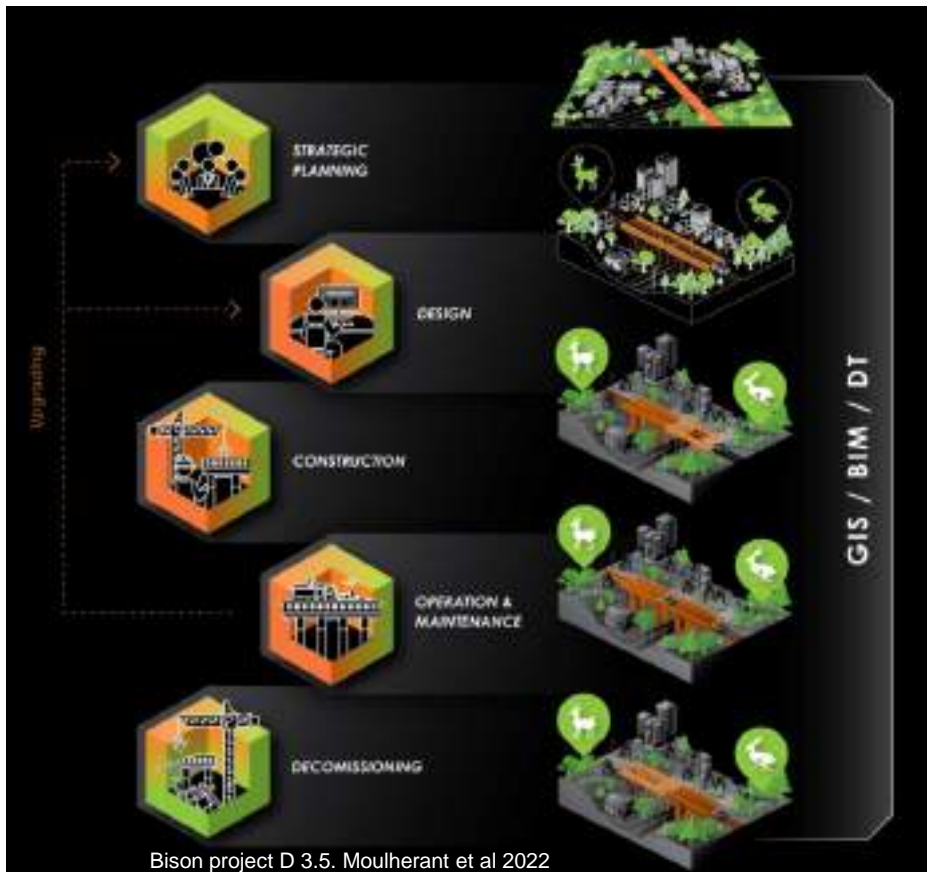




# New tools: digitalisation

Integration of the biodiversity themes in the digital environment of transport infrastructure.

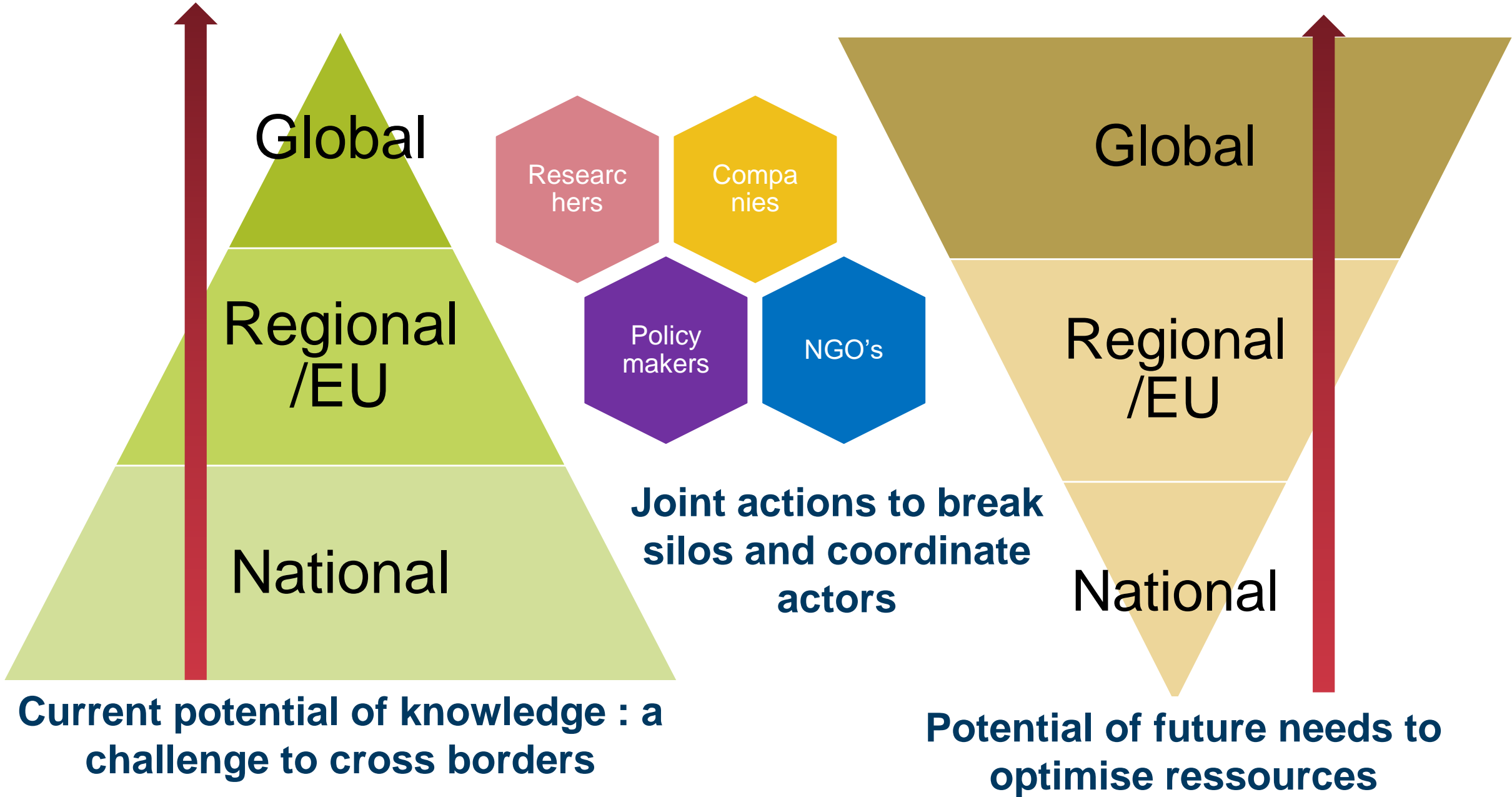
Tools must be developed to ensure that infrastructure and biodiversity managers can work together.



# VISION OF THE BISON PROJECT: A SYMBIOSIS FOR RESILIENCE BETWEEN TWO CRITICAL COMMON GOODS : BIODIVERSITY AND INFRASTRUCTURE

- Biodiversity and infrastructure: two subjects linked by their key role in the equilibrium of territories but which are largely unaware of each other
- Merging multi-stakeholder knowledge issued from a 30-year incremental process
  - ⇒ *Step-up research and knowledge from local ecology to societal issues at the crossroads of demand for biodiversity and infrastructure*
  - ⇒ *Thinking beyond resilience: a change of paradigm in transport and biodiversity policies*

# POTENTIAL SYNERGIES FOR INFRASTRUCTURE AND BIODIVERSITY



Private investment in infrastructure projects by sector and region, 2020  
(USD m)



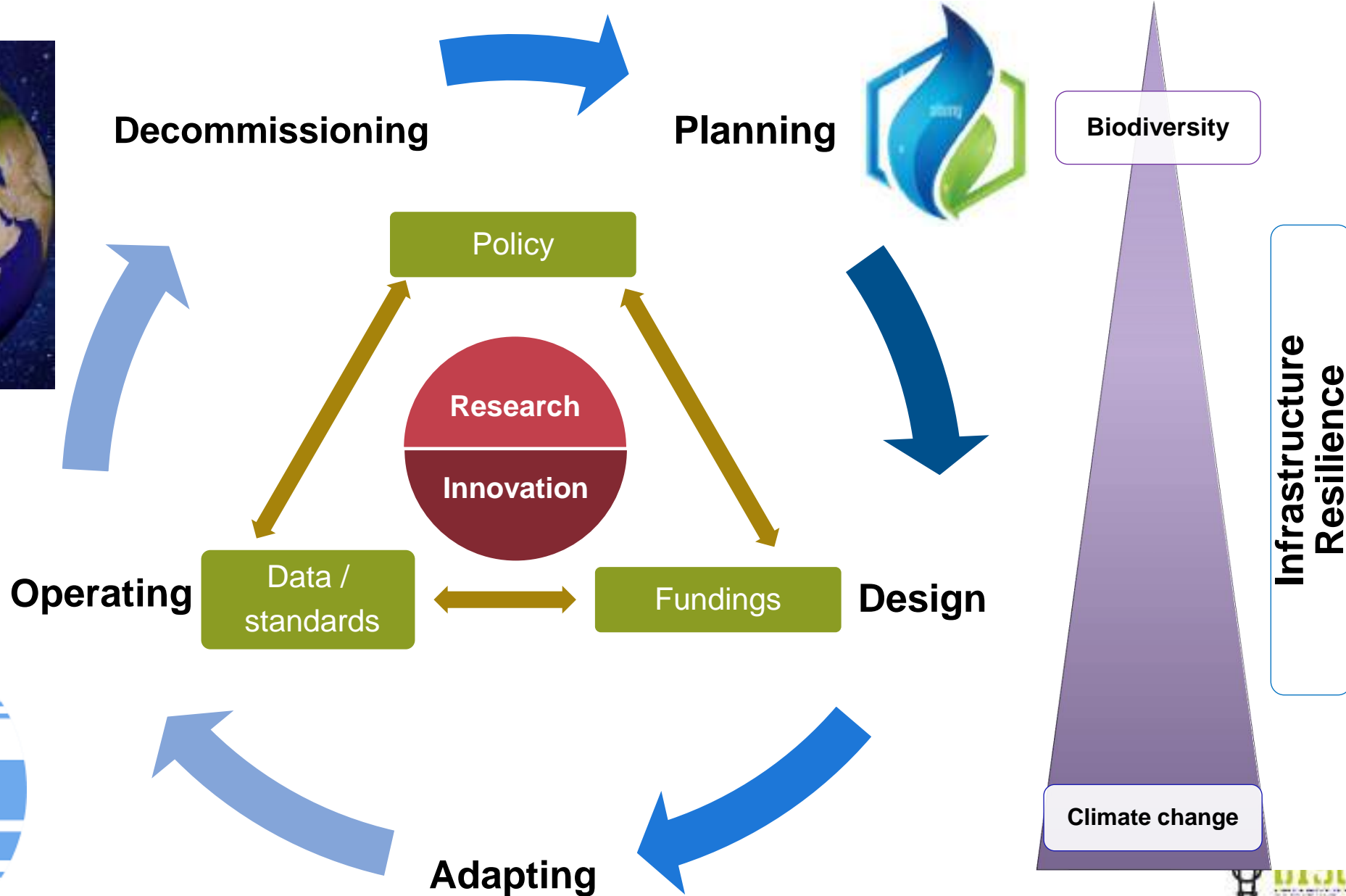
G20 - Infrastructure Monitor 2021

[https://cdn.github.org/umbraco/media/4338/github\\_infrastructuremonitor2021-v8-jan.pdf](https://cdn.github.org/umbraco/media/4338/github_infrastructuremonitor2021-v8-jan.pdf)





# HOW TO DEVELOP SYMBIOSIS BETWEEN INFRASTRUCTURE AND BIODIVERSITY ? VISION AND OBJECTIVES



# FINAL EVENT AT THE COUNCIL OF EUROPE – STRASBOURG !

**JUNE 5 TO 7** WITH UNEP, UIC, PIARC, G20, INVESTMENT BANKS...

**2 EXTRA DAYS :**

- YOUNG RESEARCHERS - JUNE 8**
- FIELD TRIPS – JUNE 9**





# Coffee Break & Think Thank



**In-person Participants - 15mins break @ 9:30 CET**  
**Online Participants - 75 mins break @ 10:45 CET**



**BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS

**#BISON**  
**#WILDINGRAILWAYS**  
**#MORETRAINS**  
**#UICSUSTAINABILITYACTIONWEEK**



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# THINK TANK DISCUSSION



**YANNICK  
AUTRET**

**Policies affecting  
land use management**



**CARME  
ROSELL**

**Land cover, sealed surfaces and  
nature-based solutions**



**SYLVAIN  
MOULHERAT**

**Biodiversity Monitoring and  
Reporting**



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# COFFEE BREAK



**SEE YOU IN 15 MINUTES AT 10:45**



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# **POLICIES AFFECTING BIODIVERSITY STRATEGIES AND LAND USE TOPICS**

**YANNICK AUTRET  
ETHEM PEKIN**



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**BISON**

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## YANNICK AUTRET

**Research and Innovation Department of  
the French Ministry of Ecological Transition**

**H2020 BISON Project Leader**

**##BISON  
#WILDINGRAILWAYS  
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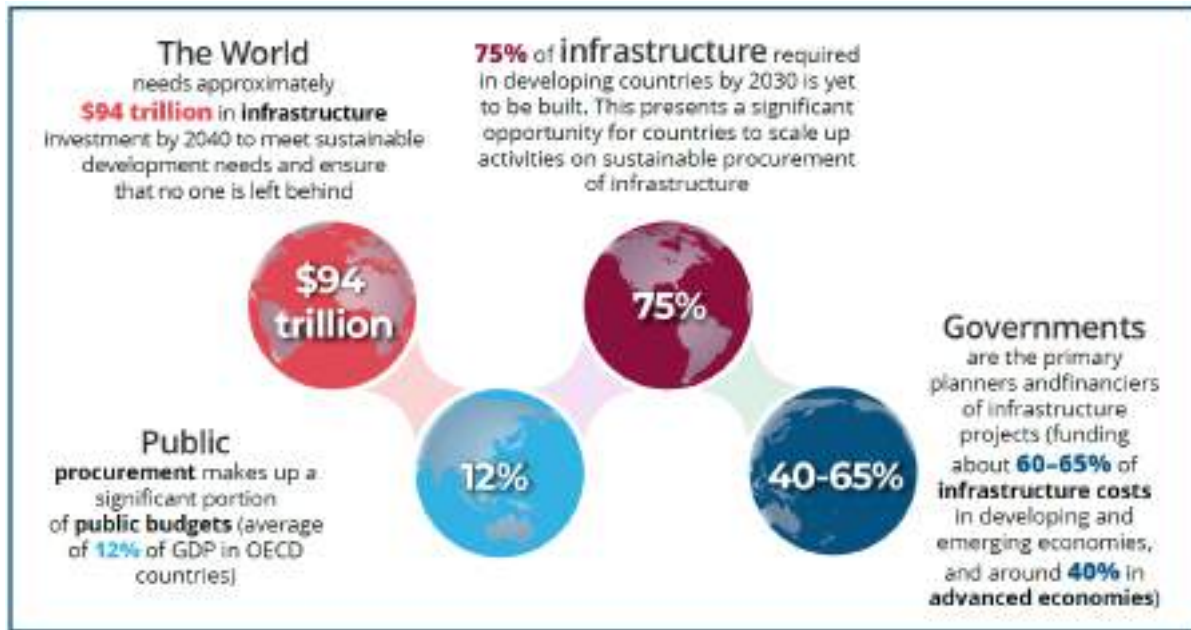




## **Policies affecting land use management**

## **Challenges and opportunities to remediate**







## A global challenge

- + 50% of new roads network by 2050 (60 million of km)
- + 5% of new energy networks/year
- Major Investments on infrastructure with the need to develop global drivers

## A very progressive and recent awareness of synergy needs



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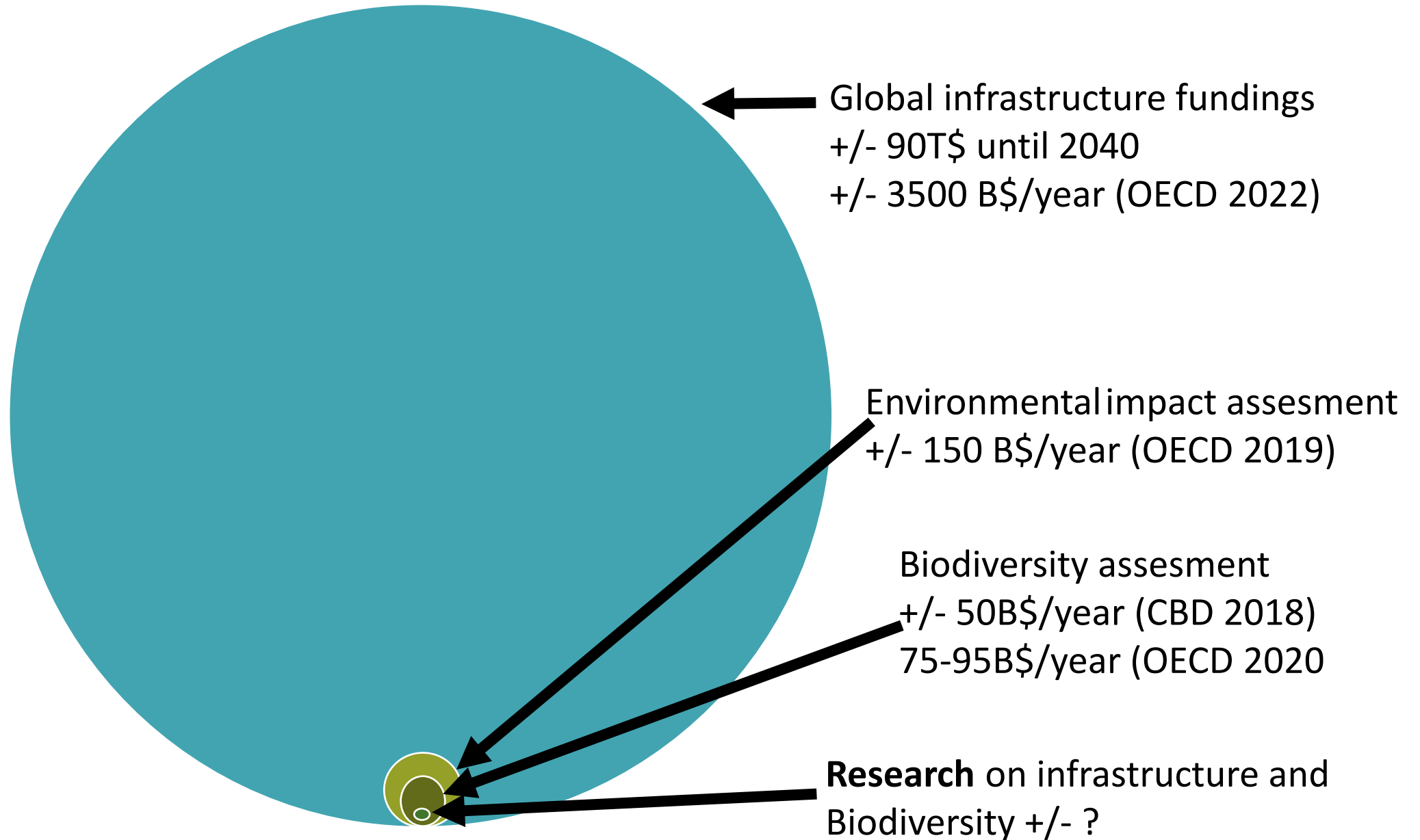
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5/9. Sustainable and resilient infrastructure

What does infrastructure and biodiversity research really represent today ?



# 2026 : 1/3 of European fundings dedicated to Natural Resources and Environment and 10% to biodiversity



## Pillar II - Clusters

### GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS:

boosting **key technologies** and solutions underpinning EU policies & Sustainable Development Goals (6 clusters and JRC – non-nuclear direct actions)

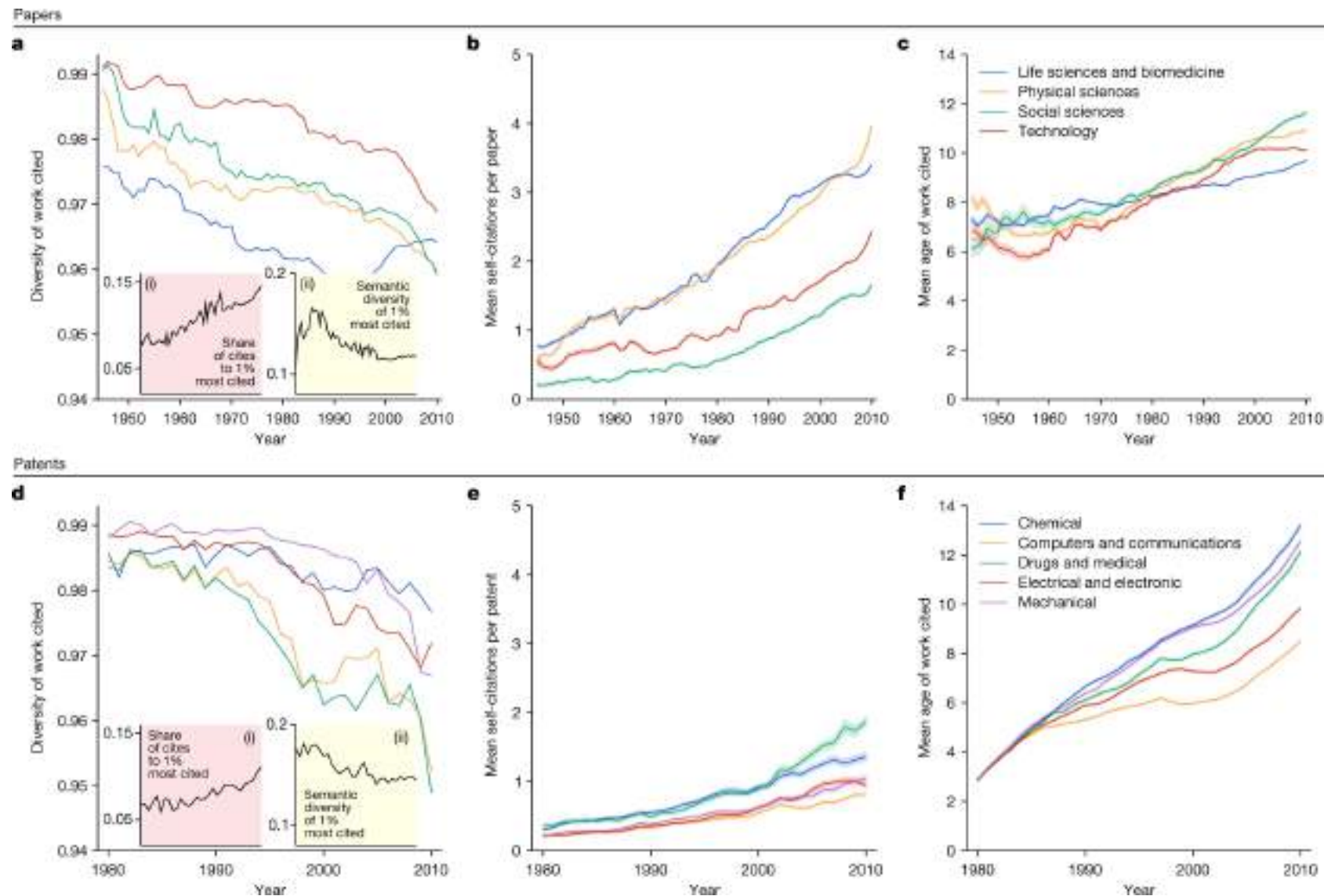


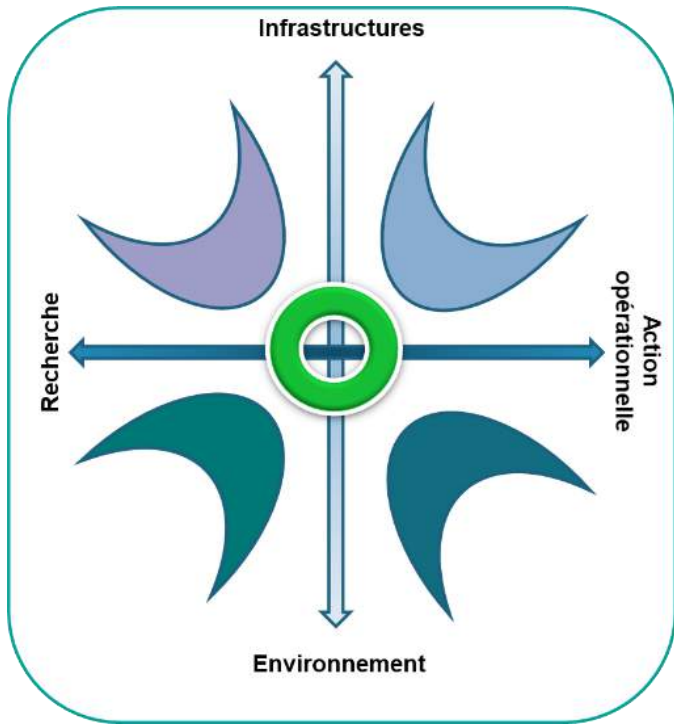
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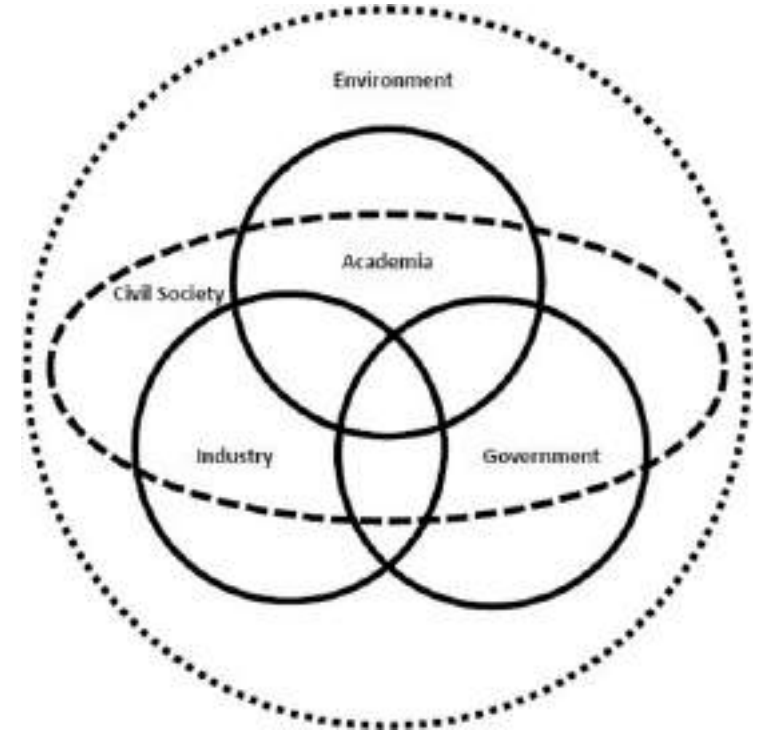


# A paradox: more complex needs but less disruptive research and innovation





# Mobility and biodiversity at a nexus of challenges for policies



## EFFECTIVE POLICIES TO FOSTER HIGH-RISK/HIGH-REWARD RESEARCH

OECD SCIENCE, TECHNOLOGY AND INDUSTRY POLICY PAPERS

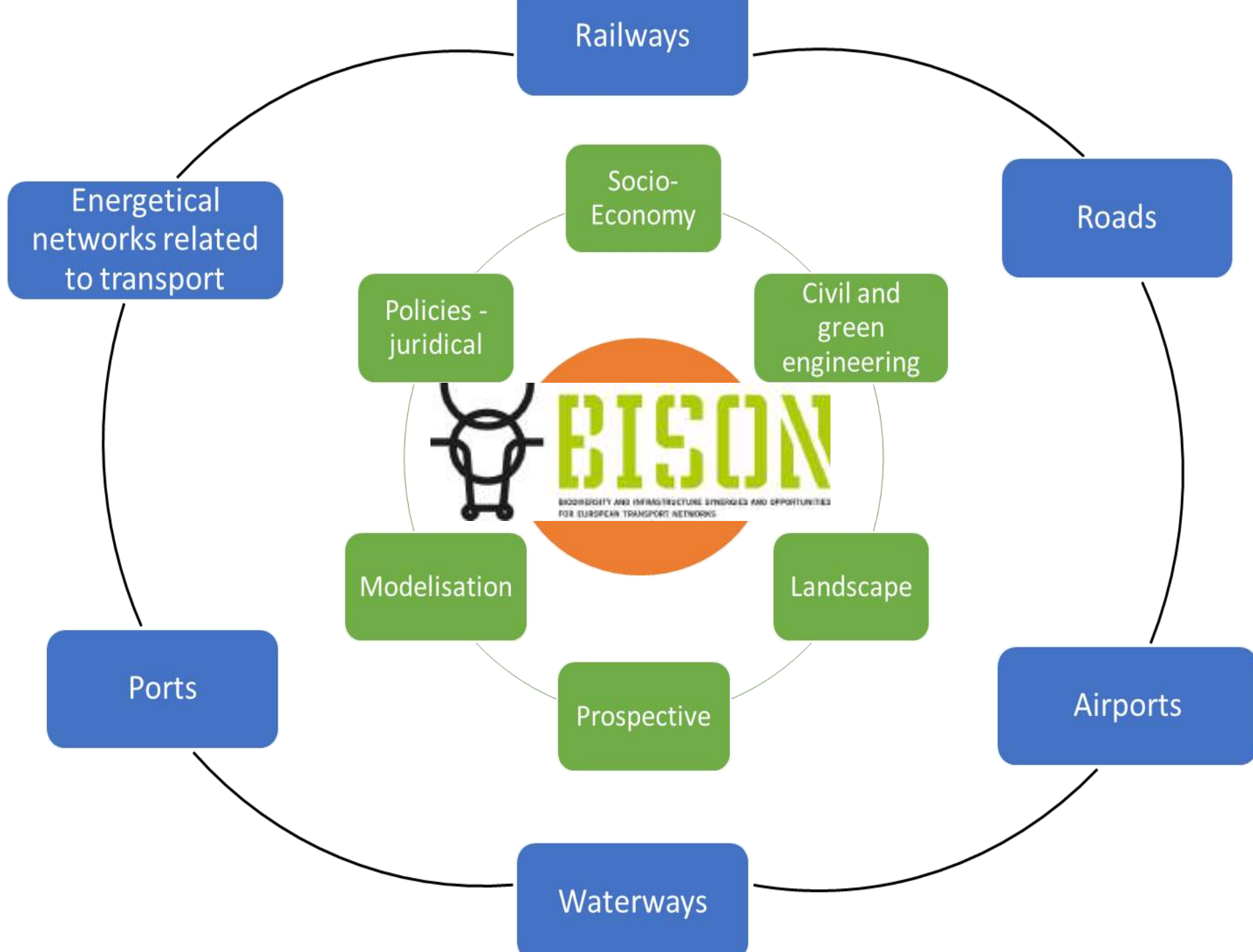
May 2021 No. 112



# COARA

Coalition for Advancing Research Assessment

<https://coara.eu/>





# Final event at the council of Europe, co-organized with UNEP !

**June 5 to 7** with UNEP, UIC, PIARC, G20, investment banks...

2 extra days :

- young researchers - June 8
- Field trips – June 9







THANK YOU FOR  
YOUR ATTENTION



Visit us at

<http://bison-transport.eu>

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## ETHEM PEKIN

**Head of Economic Policy and Sustainability of  
Community of European Railway and Infrastructure  
Companies (CER)**

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#MORETRAINS  
#UICSUSTAINABILITYACTIONWEEK**



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# Railway's role in boosting biodiversity and climate

Ethem Pekin, Head of Economic Policy and Sustainability

UIC Sustainability Action Week

27 February 2023, UIC HQ Paris



# A comprehensive policy framework

- European, global and national policy and agreements complement each other and jointly work towards **halting the loss of biodiversity**
- The United Nations **Convention on Biological Diversity** (CBD) guides the global protection of biodiversity
- Each Member State develop a National Strategy and Action Plan as part of their global commitment





*Making nature healthy again is key to our physical and mental wellbeing and is an ally in the fight against climate change and disease outbreaks. It is at the heart of our growth strategy, the European Green Deal, and is part of a European recovery that gives more back to the planet than it takes away.*

**Ursula von der Leyen**

*President of the European Commission*

## EU Biodiversity Strategy

*Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2030*

## Nature Directives

*Legislation on establishing an extensive network of special protection areas*



## Natura 2000 Network

*Backbone of the EU's green infrastructure covering a total surface area of over 1 mio km<sup>2</sup>*

# EU Biodiversity Strategy proposes key actions

- Adoption of the Zero Pollution Action Plan
- EC proposal on a new Nature Restoration Law
- EC proposal on a revised Pollinators Initiative
- EC proposal on a revised Sustainable Use of Pesticides Directive
- Work in progress for the EU Taxonomy environmental Delegated Act

# Elements of the EU Biodiversity Strategy





# Why Biodiversity Strategy is relevant to railways?

- Railway infrastructure overlap with Natura 2000 and nationally designated areas
- Railways are land-use efficient and provide ecological corridors
- Invasive alien species - railways must continue to manage vegetation also for safety operation
- Railway infrastructure is a green economic activity, included in the EU Taxonomy



Chemicals and materials



Aviation, travel and tourism



Real estate



Mining and metals



Supply chain and transport



Retail, consumer goods and lifestyle

# Green infrastructure

- Minimisation of carbon and environmental footprint of transport
- Mitigation of the effects of habitat fragmentation caused by transport infrastructure
  
- Vegetated rail beds
- Green noise barriers
- Eco-tunnels and green bridges
- Cycling and walking infrastructure
- Renewable energy integration to rail

# Enforcement of EU legislation on biodiversity

- Nature Restoration Law
  - Ensure the protection of nature
  - Do not hamper decarbonisation objectives by protecting energy and transport infrastructure
  - Achieve a coherent policy e.g. with the Water Framework Directive
- Regulation on the sustainable use of plant protection products
  - A legislation to help transition to non-chemical conventional methods of vegetation control
  - Avoid unintended impact on railway safety by not restricting the use of plant protection products as defined in the sensitive areas

- EU Green Deal & the Sustainable and Smart Mobility proposes a higher role of railways in the next decades (doubling/tripling of rail traffic)
- Railways are big landowners and responsible for providing a habitat to rare species
- Rail also play a role in carbon capture thanks to millions of trees around railway tracks
- Natural capital and biodiversity considerations to be better integrated into rail business practices
- Access to EU funds, national and private funding



# For further information:

**Ethem Pekin**

Head of Economic Policy and Sustainability

Tel: +32 496 599 316

E-mail: [ethem.pekin@cer.be](mailto:ethem.pekin@cer.be)

For regular updates on CER activities,  
visit our website: [www.cer.be](http://www.cer.be)

or follow [@CER\\_railways](https://twitter.com/CER_railways) | [CER](http://www.cer.be) 

# LAND COVER, SEALED SURFACES AND NATURE-BASED SOLUTIONS

**CARME ROSSELL**  
**THOMAS SCHAUPPENLENER**



INTERNATIONAL UNION  
OF RAILWAYS



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*



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**BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS



## CARME ROSELL

**Senior Research Consultant at Minuartia  
Researcher at University of Barcelona (UB)**

**#BISON  
#WILDINGRAILWAYS  
#MORETRAINS  
#UICSUSTAINABILITYACTIONWEEK**



INTERNATIONAL UNION  
OF RAILWAYS



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*



# BISON WILDING RAILWAYS

Biodiversity and Infrastructure synergies for railways

## Land cover, sealed surfaces and nature-based solutions

Carme Rosell – Minuartia, EU BISON Project



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*



# THE BISON PROJECT



## HORIZON 2020

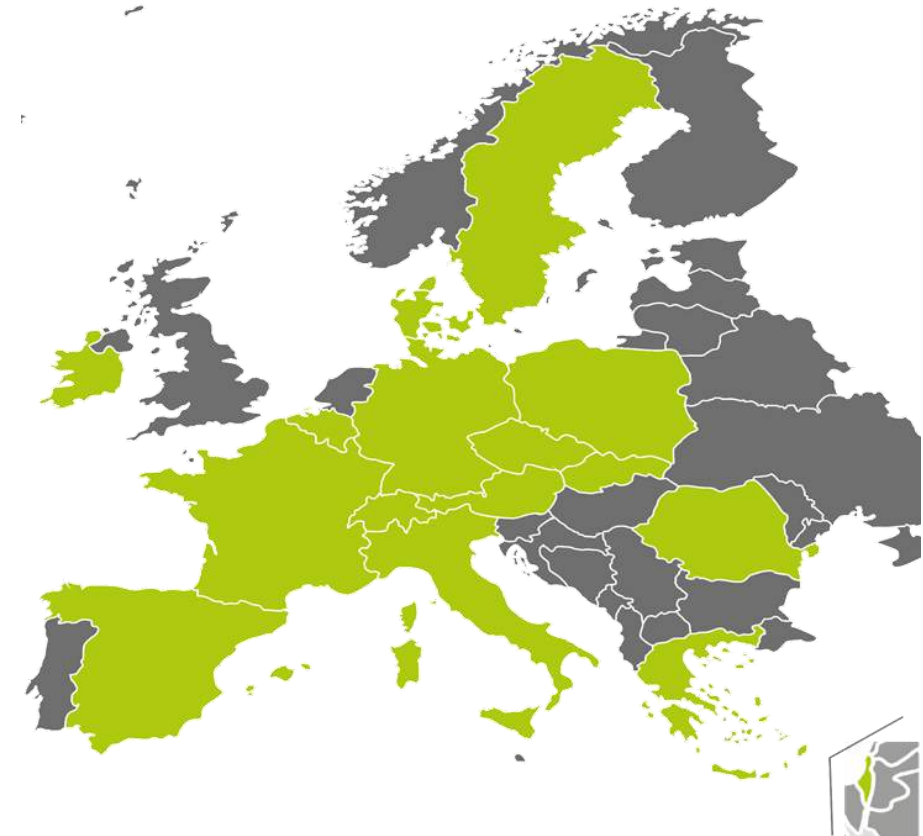
**BISON** Biodiversity and Infrastructure Synergies and Opportunities for European Transport Networks

**Consortium** 44 partners - 16 countries

**Budget** ~ 3 M€

**Duration** Jan 2021 – Jun 2023

**(Save the date! Final event  
5-7 June, European Council, Strasbourg)**



# THE BISON PROJECT

## Multiple outcomes



### State-of-the-art

Emerging trends and future challenges  
Handbook online 'Good practice'  
Defragmentation Map



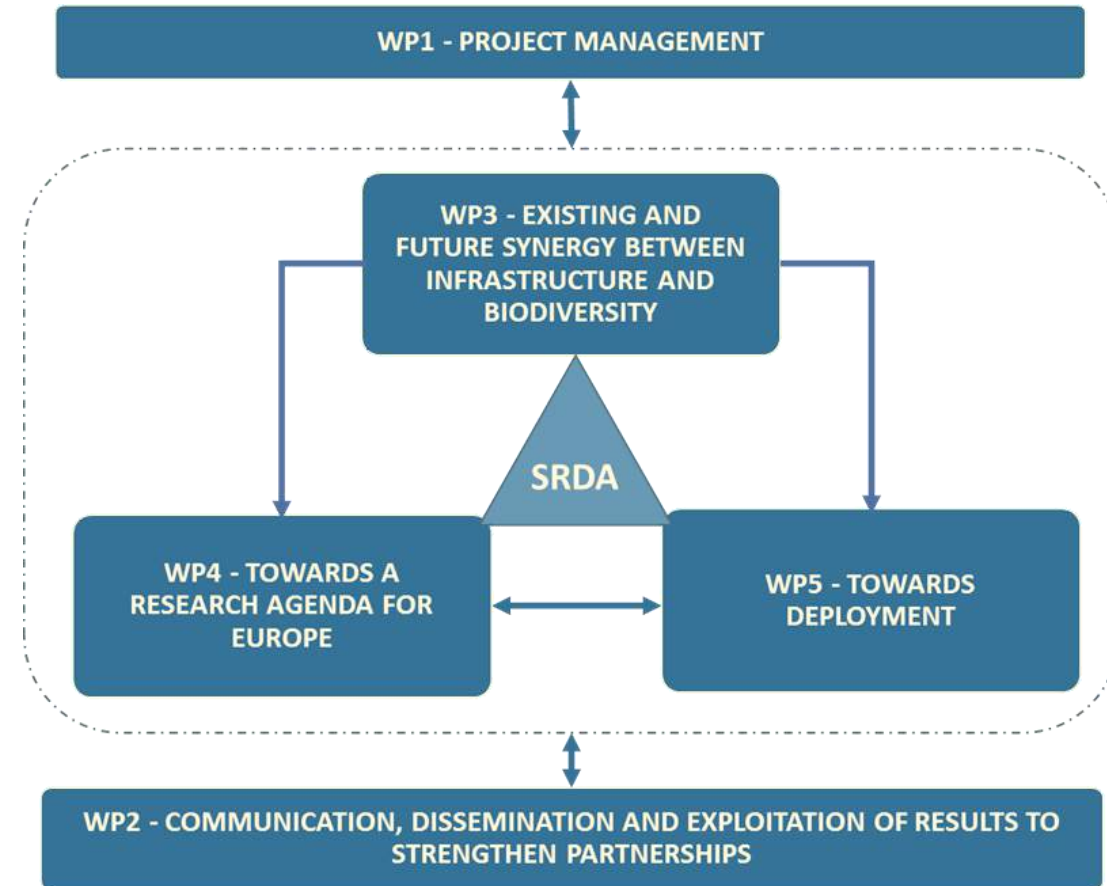
### Strategic Research and Deployment Agenda (SRDA)

Research needs, opportunities for synergy in future R&I  
Opportunities to deploy acquired knowledge on the ground



### 'Roadmap' – Towards Deployment

Funding optimization for infrastructure R&I  
Public policy coordination and cross-sectoral improvements  
Engagement with key stakeholders and creation of a transnational community of experts



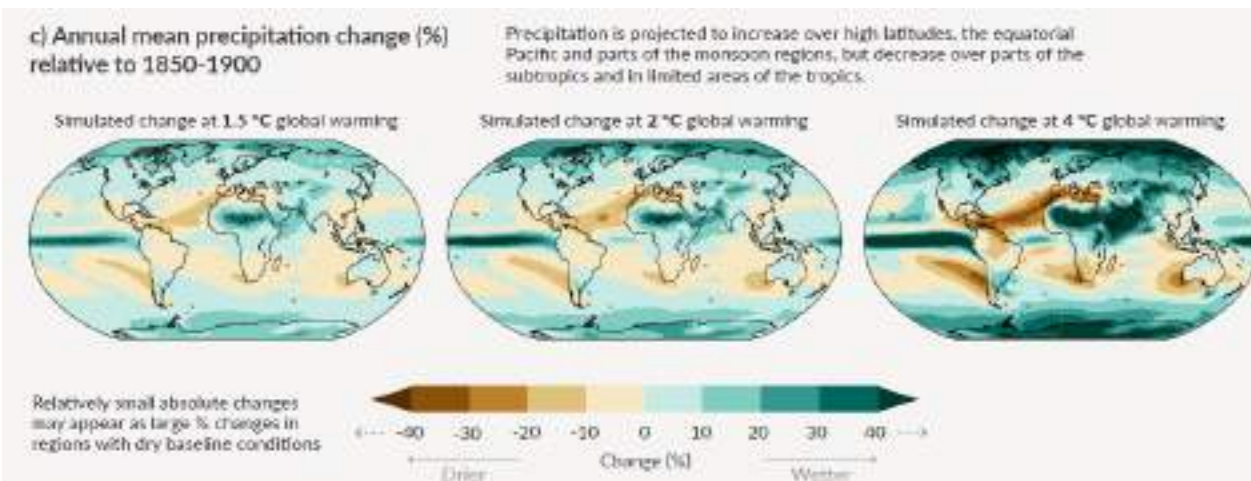
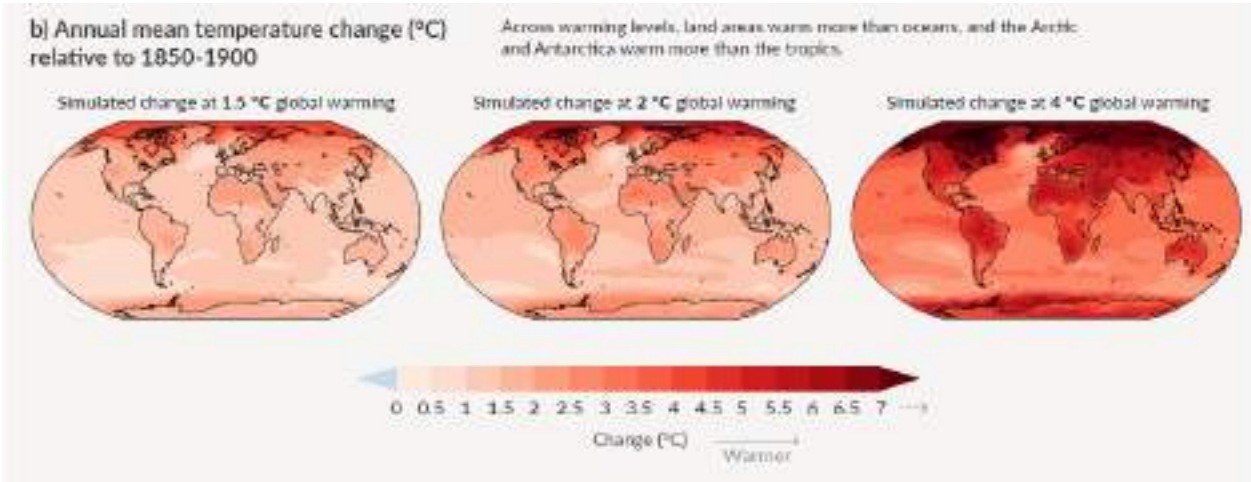
> <http://bison-transport.eu>



# TRENDS AND OPPORTUNITIES

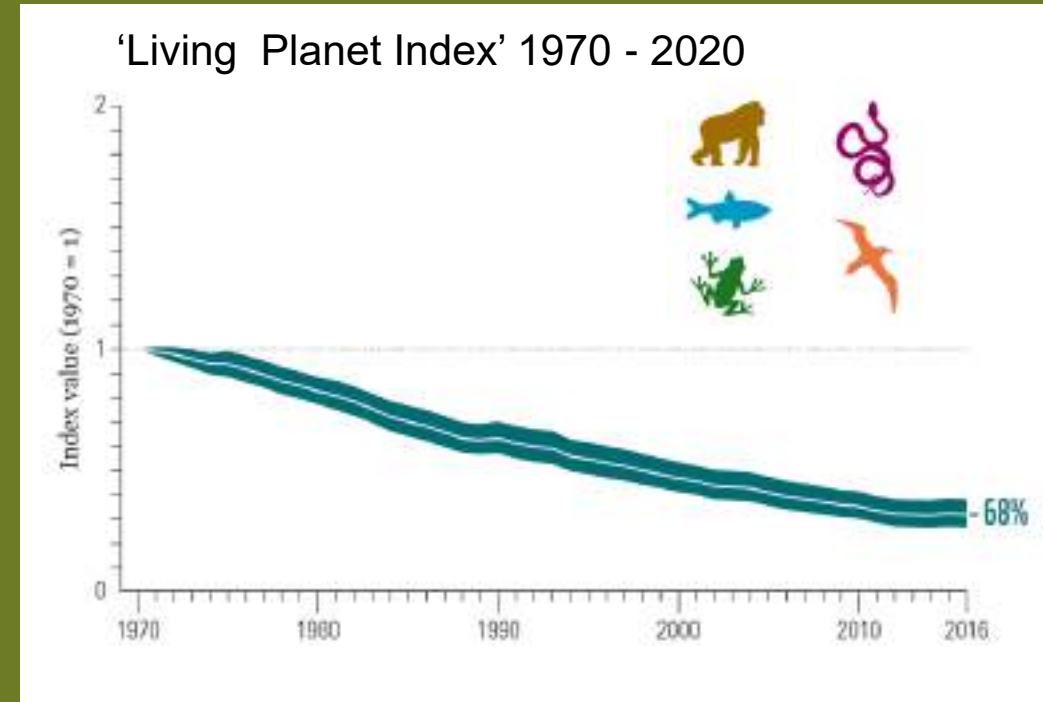


# Climate change



Source: [www.ipcc.ch/report/ar6/wg1/](http://www.ipcc.ch/report/ar6/wg1/)

# Biodiversity loss



Average 68% decline in monitored vertebrate populations between 1970 and 2016

[data from 20,811 populations representing 4,392 monitored vertebrate species]

~60% due to changes in land and sea use, including habitat loss and degradation

Source: WWF, 2020



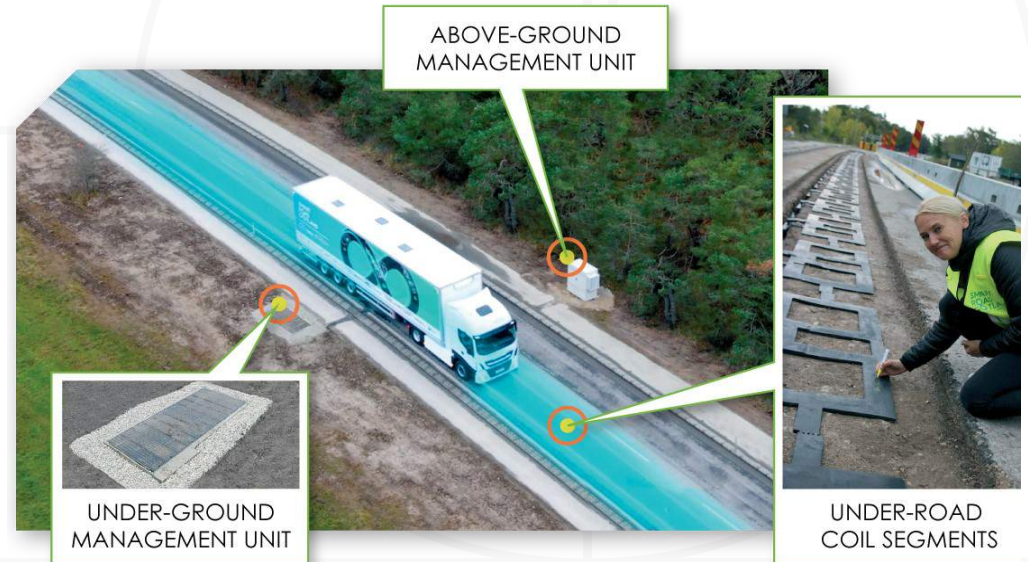
- **Transport: 'decarbonization', electric, automated, connected, shared**  
**Railways plays a key role**



ADIF - Minuartia



Government phase-out targets for vehicles with internal combustion engines. Redrawn after BloombergNEF (2021).



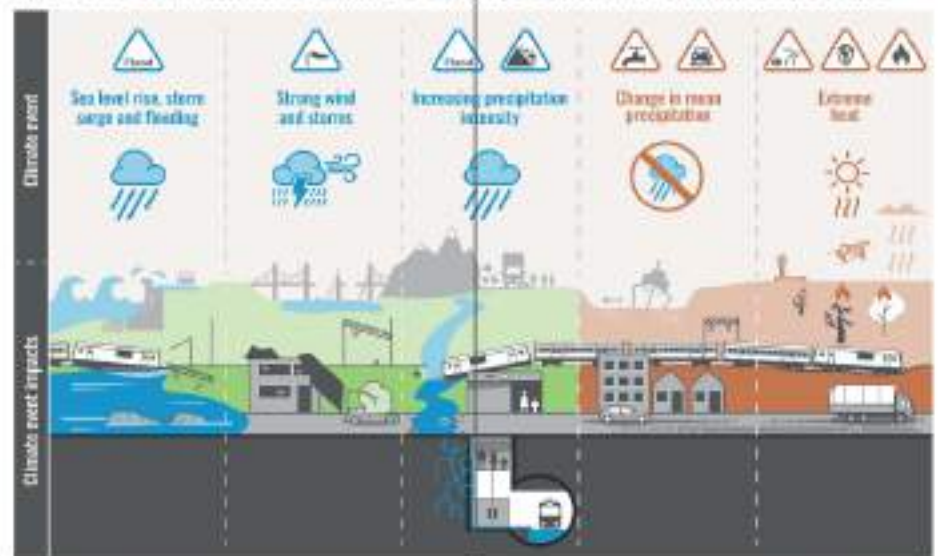
Bison project D 3.4. Seiler et al 2022 – 1. Redrawn after BloombergNEF (2021). 2. Electreon.com;





- **Infrastructure:** Adapt infrastructure to climate change to increase resilience, upgrade existing infrastructure, apply new technologies

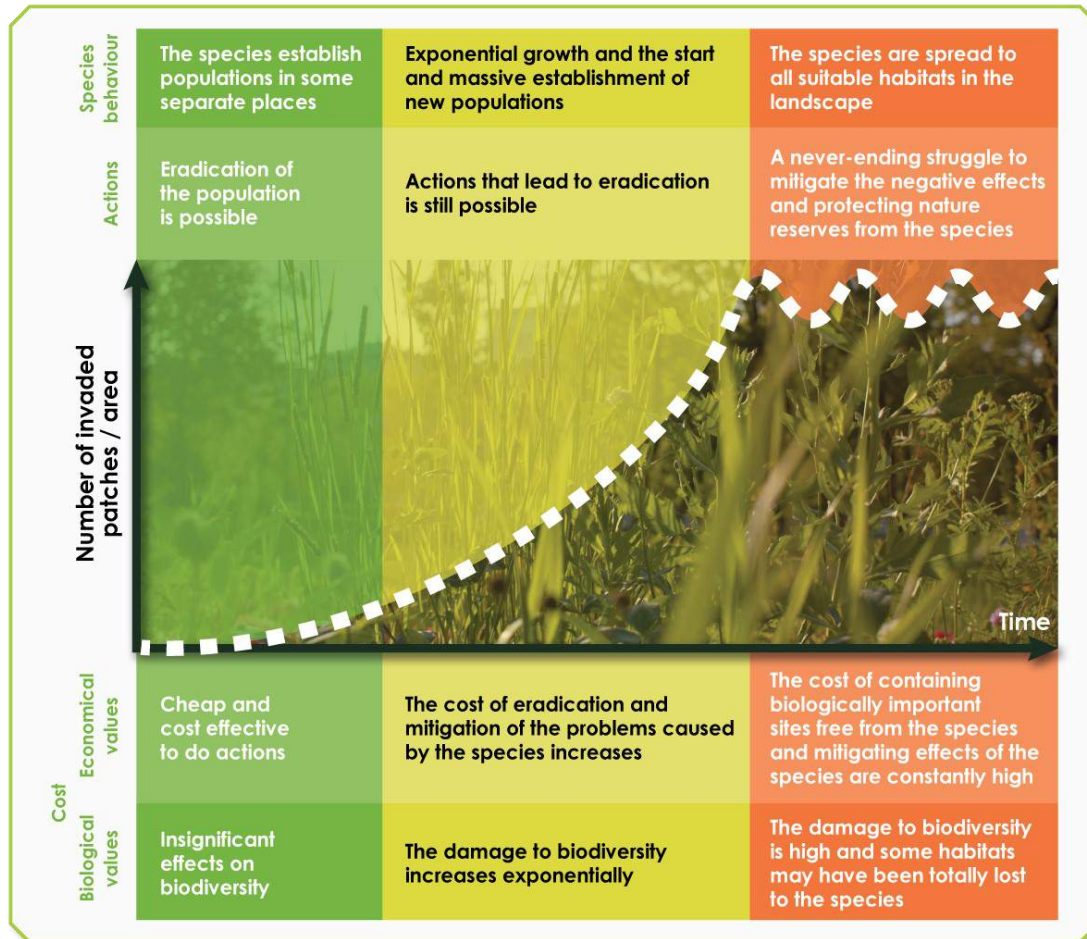
#### Impacts of Weather & Climate Change on Transport Infrastructure





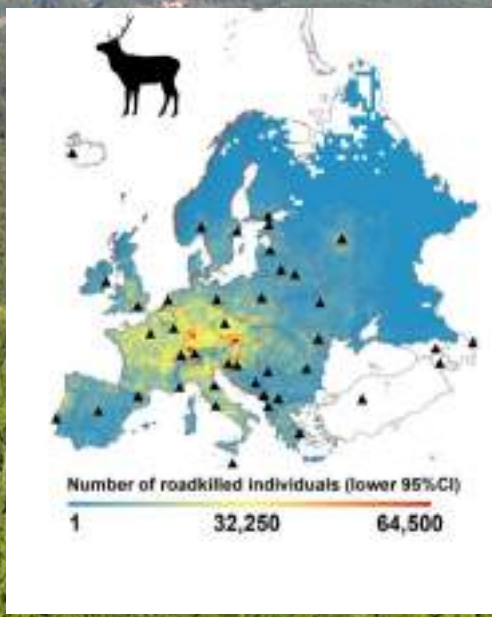
# ○ Biodiversity - Invasive species

Invasive species call for management plans and require high maintenance investments



P. Bartels; Bison D 3.4



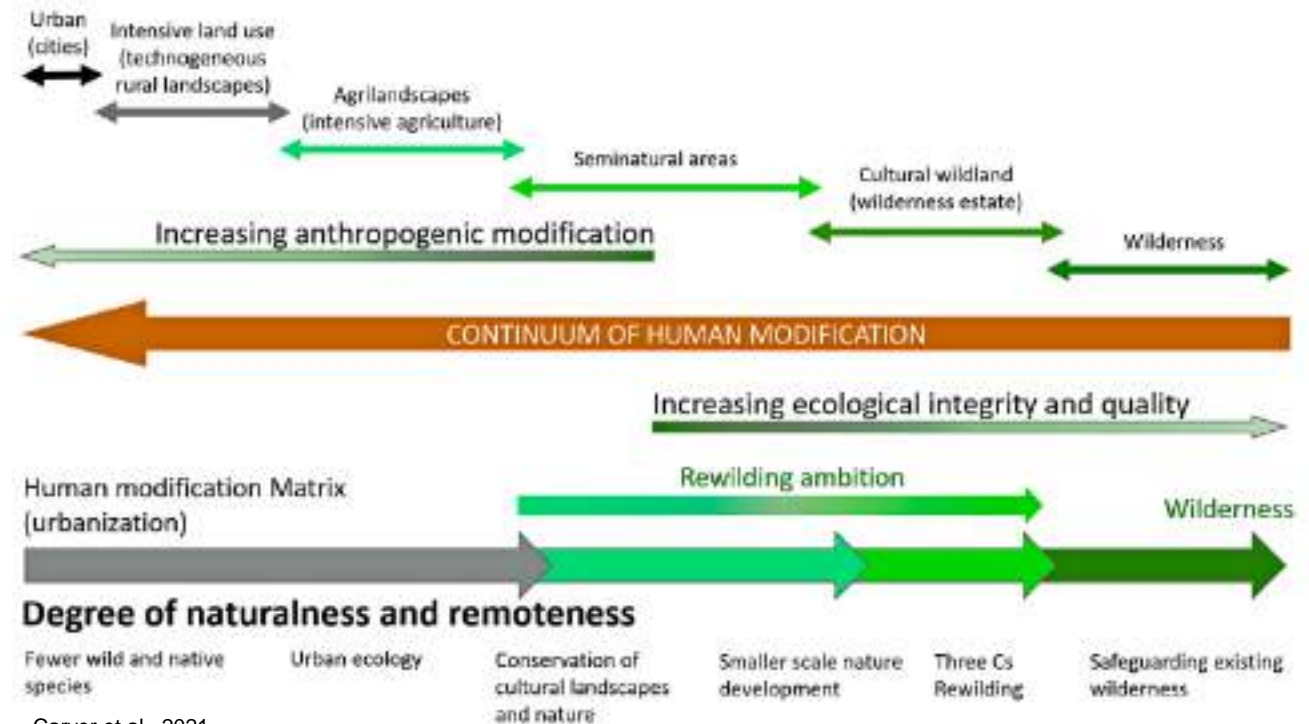


[:https://ec.europa.eu/environment/nature/conservation/species/carnivores/conservation\\_status\\_old\\_sub.htm](https://ec.europa.eu/environment/nature/conservation/species/carnivores/conservation_status_old_sub.htm)

## ○ Biodiversity - ‘Rewilding’ Traffic safety risks

Ungulates, large mammals and other keystone species are increasing its range and numbers.

High mortality and increasing risks on traffic safety.





# OPPORTUNITIES

- ❑ The European Green Deal
- ❑ EU Biodiversity Strategy for 2030
- ❑ EU Green Infrastructure
- ❑ European Bauhaus initiative
- ❑ European Climate Pact
- ❑ NextGenerationEU
- ❑ REPowerEU
- ❑ Sustainable and Smart Mobility Strategy
- ❑ Circular Economy Action Plan
- ❑ Green Public Procurement (GPP)
- ❑ New European Innovation Agenda
- ❑ 2022 SRIP (Science, Research And Innovation Performance of the EU) report
- ❑ Innovation procurement
- ❑ P4Planet 2050 Strategic Research and Innovation Agenda



Set up ecological corridors to prevent genetic isolation, allow for species migration, and enhance healthy ecosystems



Restore ecosystems. Restore 25000 km of free-flowing rivers



Reduce chemical pesticides use by 50% and fertilisers by 30%



Reverse the pollinating insect decline



Reduce the threat of Alien Invasive Species (AIS)



Promote Nature Based Solutions (NBS)



Heavy rainfall



Flooding



Landslides



Storms



Heat

- **Nature Based Solutions:** green drainages, naturalized retention ponds, green building, etc.
- Opportunities to apply NBS to reduce risks by extreme weather events. Benefits to biodiversity and people.







- **Enhance biodiversity in habitats related to transport Infrastructure**

Ecological maintenance of green and blue areas, reduce pesticides and fertilizers, benefit pollinators, etc.

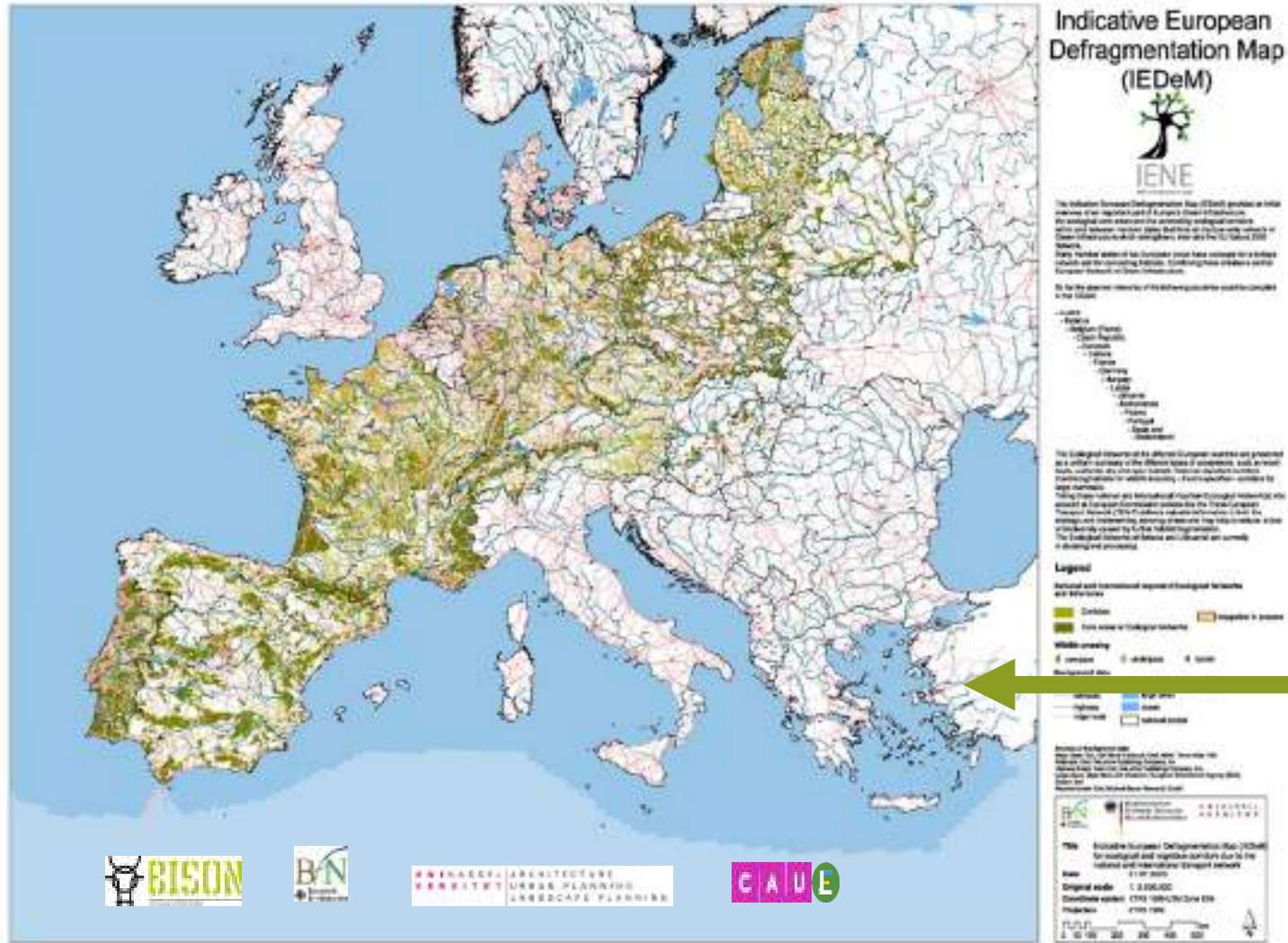




- **Enhance biodiversity in habitats related to transport Infrastructure**

Wildlife passages, providing habitats for wildlife in green and blue areas.





Bison project WP5- D 5.3 . Botcher et al 2022

- **Defragmentation**

Identification of important Green Infrastructure (core areas, corridors, valuable habitats and their connectivity)

Defragmentation measures (wildlife passages and others)

Guidelines for use and further development

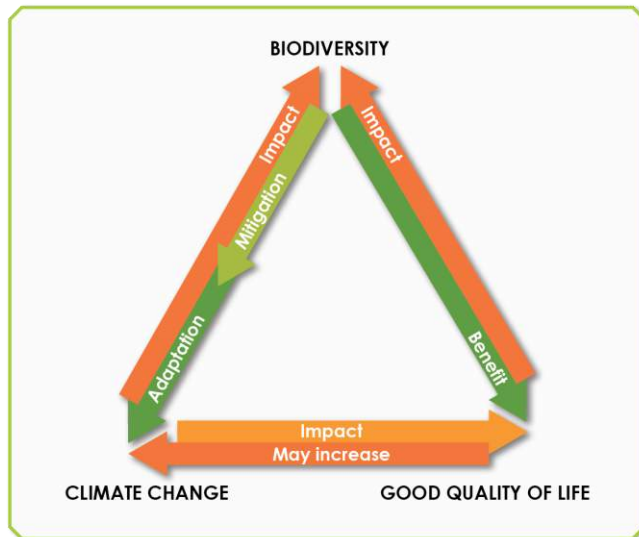
Need to coordinate TEN-N and TEN-T



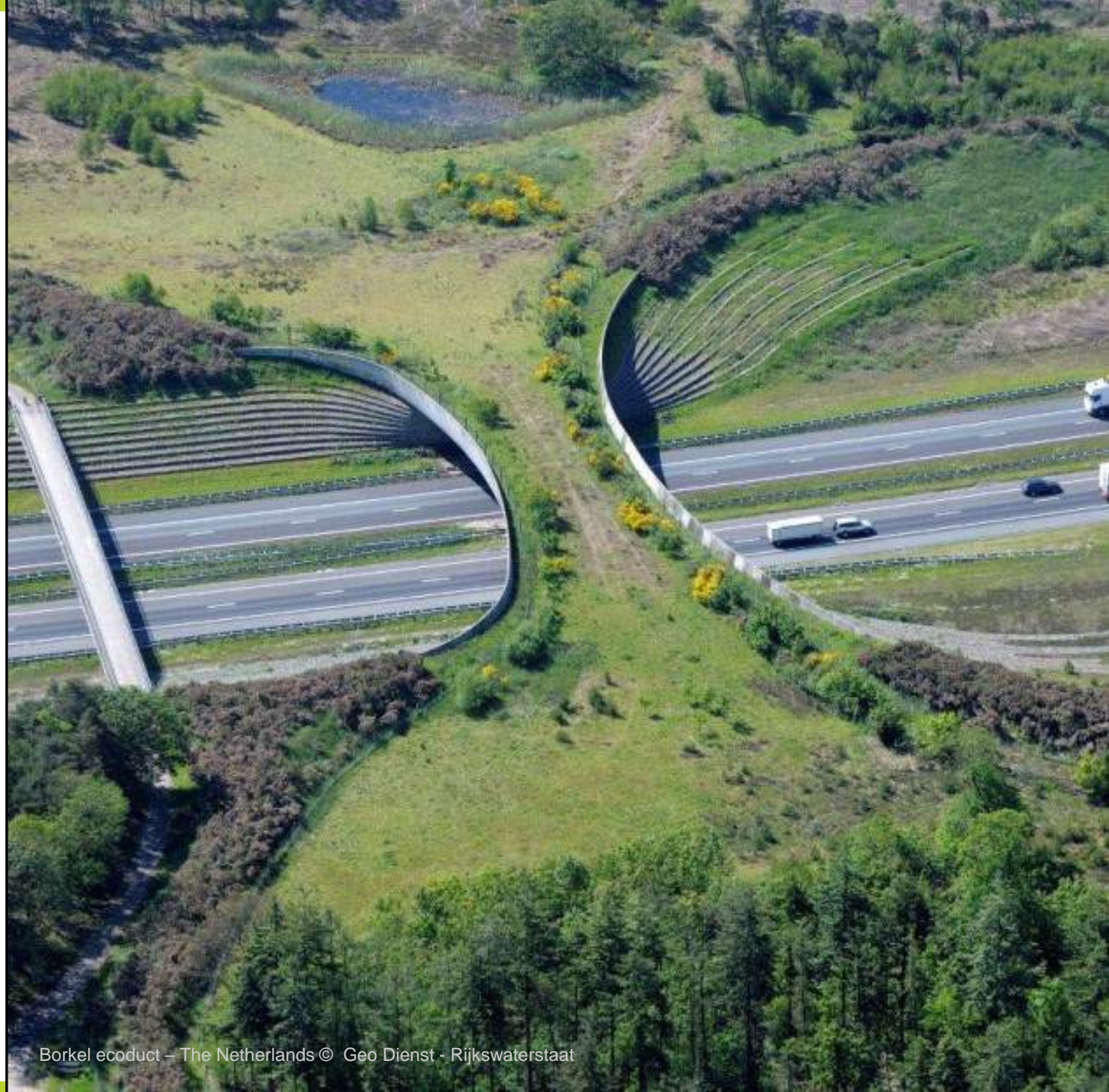


- **Solutions to preserve and restore ecosystems and ecological connectivity**

Reducing mortality, disturbance to habitats, preserving and restoring ecological connectivity



Bison project D 3.4. Redwan from Pörtner et al, 2021



# **‘Land cover, sealed surfaces and nature-based solutions’**

## **Think tank**

- 1.- Mainstreaming biodiversity in railway systems: which are the main opportunities?**
- 2.- How can NbS contribute to enhance infrastructure resilience and to provide benefits to biodiversity?**
- 3.- How can contribute railway management to enhance ecosystems and ecological corridors in surrounding landscapes?**





# Thank you!

Carme Rosell - [crocell@minuartia.com](mailto:crocell@minuartia.com)

[MINUARTIA](#) [BISON Project](#)



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*



[Watch at UIC's  
YouTube Channel](#)



**BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS



## THOMAS SCHAUPPENLEHNER

**Landscape Planner and Senior Scientist at the Institute  
for Landscape Development, Recreation and  
Conservation Planning at the University of Natural  
Resources and Life Sciences Vienna**

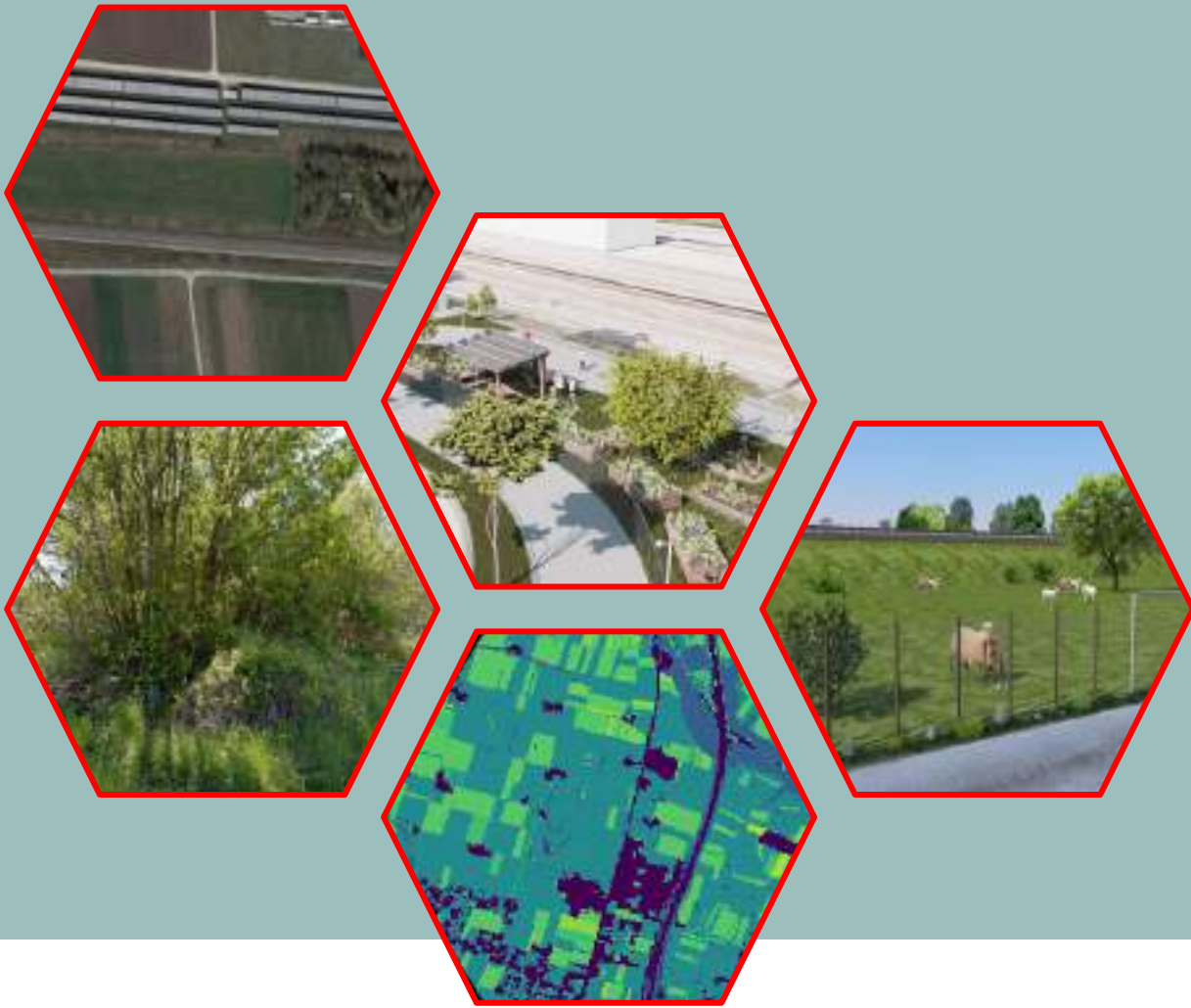
**#BISON  
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#UICSUSTAINABILITYACTIONWEEK**



INTERNATIONAL UNION  
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# THE POTENTIAL OF RAILWAYS ASSOCIATED AREAS

Thomas Schauppenlehner  
UIC Sustainability Action Week  
Paris, 27.02.2023



# BACKGROUND AND GOALS


- Research project for the Austrian Federal Railways (ÖBB)
- Development of a nationwide, spatially and thematically high-resolution dataset for assessing the landcover of Austrian federal railways property
- Basis for the analysis of spatially explicit and site-specific potentials (e.g. renewable energy development, community gardening, grazing, invasive alien species management, etc.)
- Resource for further future topics and estimations (e.g. role of ÖBB sites for biodiversity promotion, biomass potentials, etc.)

# GIS SOURCE DATA

- Railways property data (Austrian federal)
- Sentinel-2 landcover data (Umweltbundesamt)
- Digital elevation and surface models (BEV)
- GIP digital transport graph (GIP.gv.at)
- INVEKOS Agricultural fields and management (AMA)
- Forest areas (BfW)
- Small Woody Features (Copernicus Land Monitoring)
- Open Streep Map Data



umweltbundesamt<sup>U</sup>

 Bundesamt  
für Eich- und  
Vermessungswesen



# SUMMARY

- 23.965 ÖBB sites with a total size of 18.815,5 ha (0,22% of Austria)
- 18.315 Buildings
- Designation of 11 land cover categories
- Total of **965.825** landcover patches
- Allocation/analyses possible on 4 spatial levels
  - Individual area
  - Municipality
  - Political district
  - Federal state



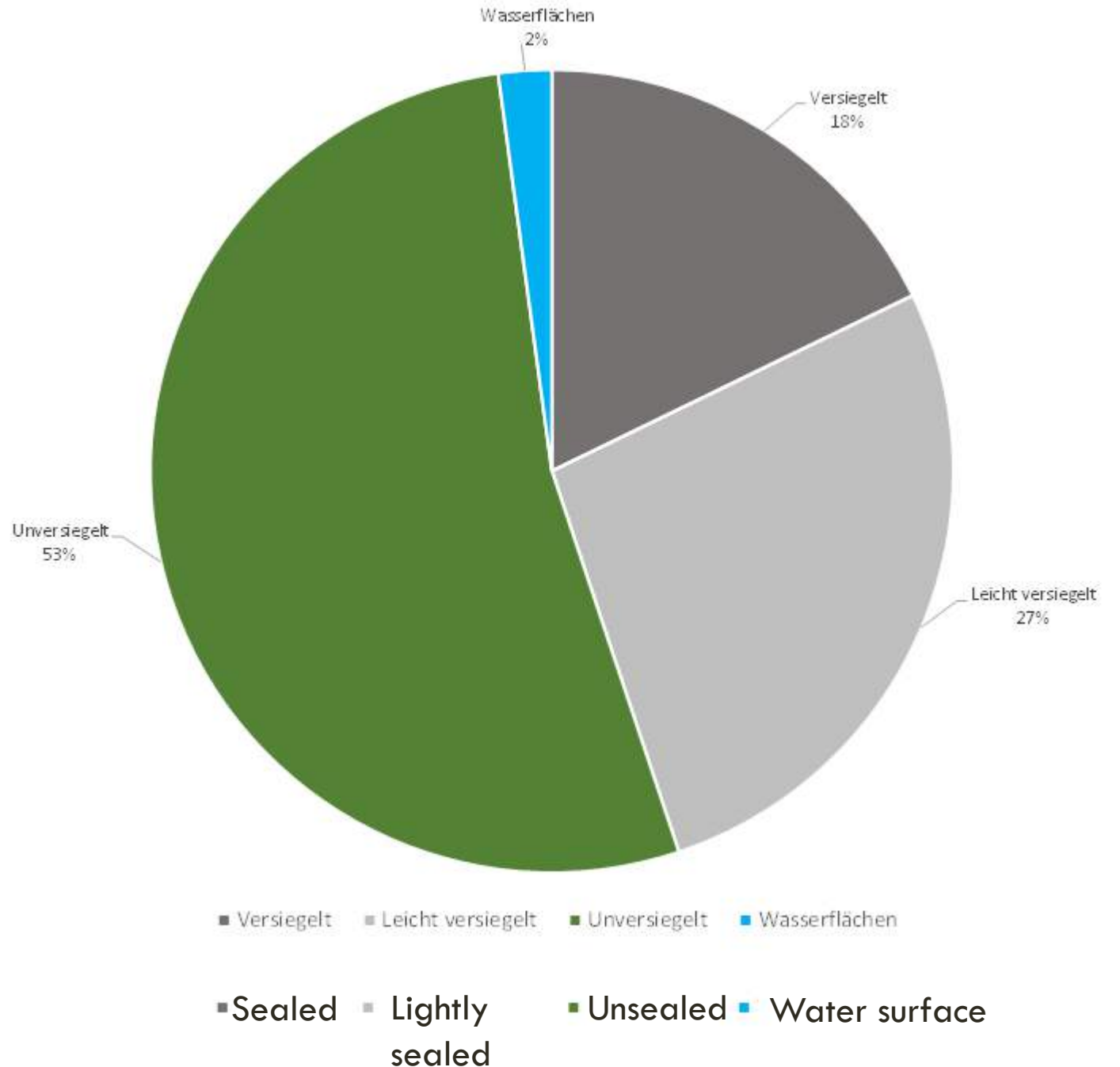


# LAND SEALING

**Sealed:** Parking and traffic areas, buildings

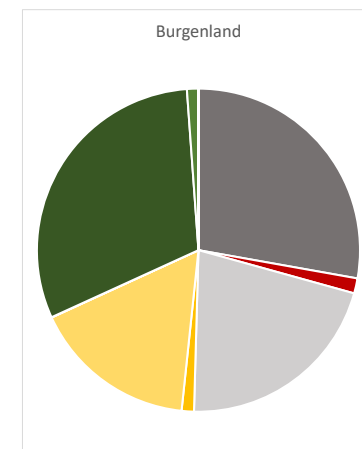
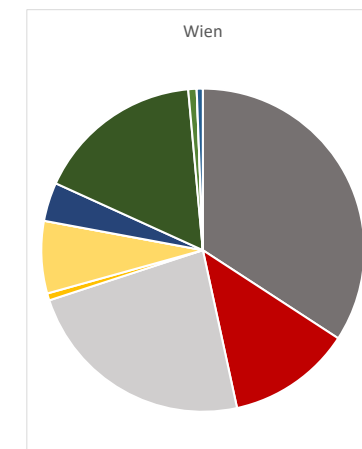
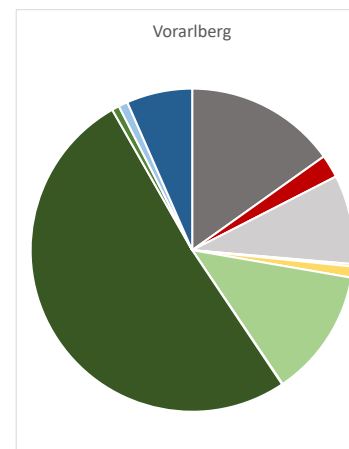
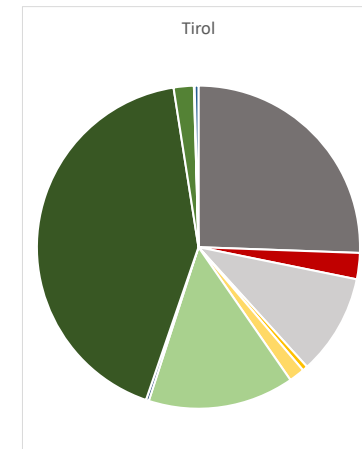
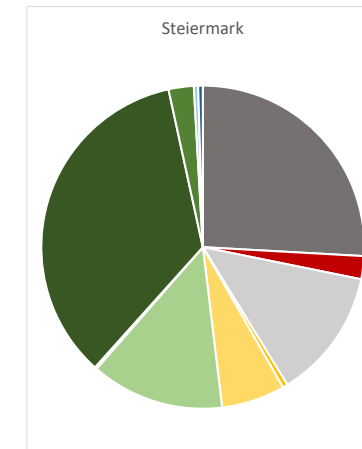
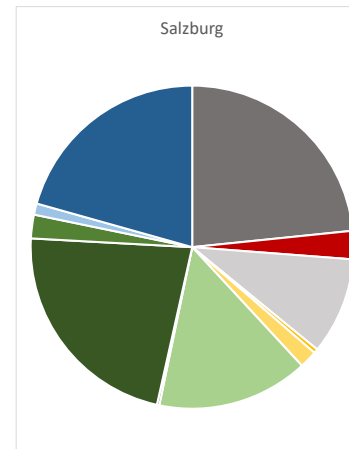
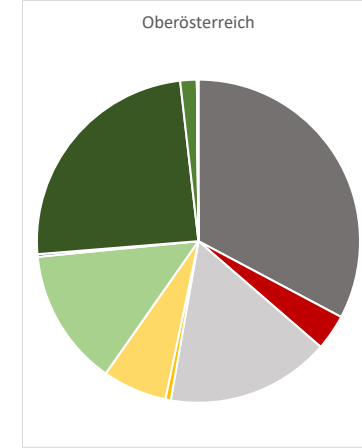
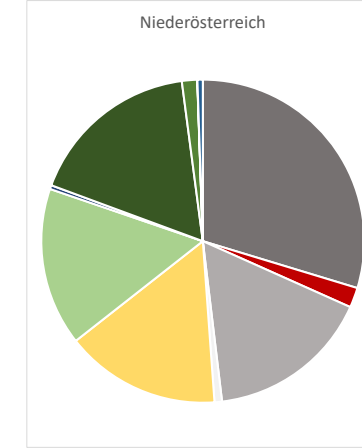
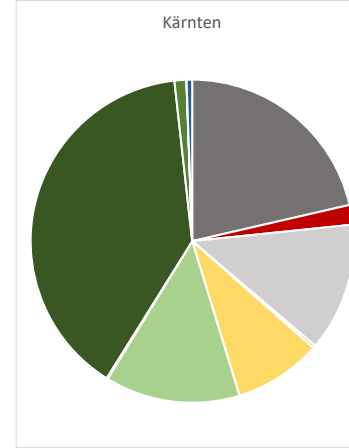
**Lightly sealed:** Railroad gravel bodies, additional gravel areas

**Unsealed:** Grassland, arable land, forest and shrub areas, gardens.



# AREA COMPOSITION

- High share of forest areas in V, T, K (protection forests) and B (forest stripes along the railroad)
- High share of railroad lines in W, NÖ, OÖ (multi-track high performance lines, larger stations)
- Approx. 15% grassland (exception W and B)
- Large water bodies in S and V due to power plant reservoirs)





# CASE STUDIES

- Identification of potential area utilisations for supporting sustainable actions
- Potential sites and potentials derived from GIS analysis
  - Community gardens (social action in urban fabrics)
  - Invasive alien species (management and awareness raising action)
  - Grazing along railway areas (extensive management, local production)
  - Renewable energy development

# CASE STUDY: COMMUNITY GARDENING

- Social dimension
  - Integrative effect
  - Experience of nature
  - Knowledge transfer
- Ecological dimension
  - Ecosystem services
  - Biodiversity promotion
- Economic dimension
  - Reduction of maintenance effort
  - Image value



# SYNERGY EFFECTS

An architectural rendering of a sustainable urban park. The scene features a paved walkway on the right where several people are walking. To the left of the path is a lush garden bed with various plants, including sunflowers and tall grasses. A wooden trellis structure with solar panels is positioned over the garden. A woman in a striped dress is walking towards the viewer. In the background, there are modern buildings and a clear blue sky with scattered clouds. A tall street lamp stands near the garden.

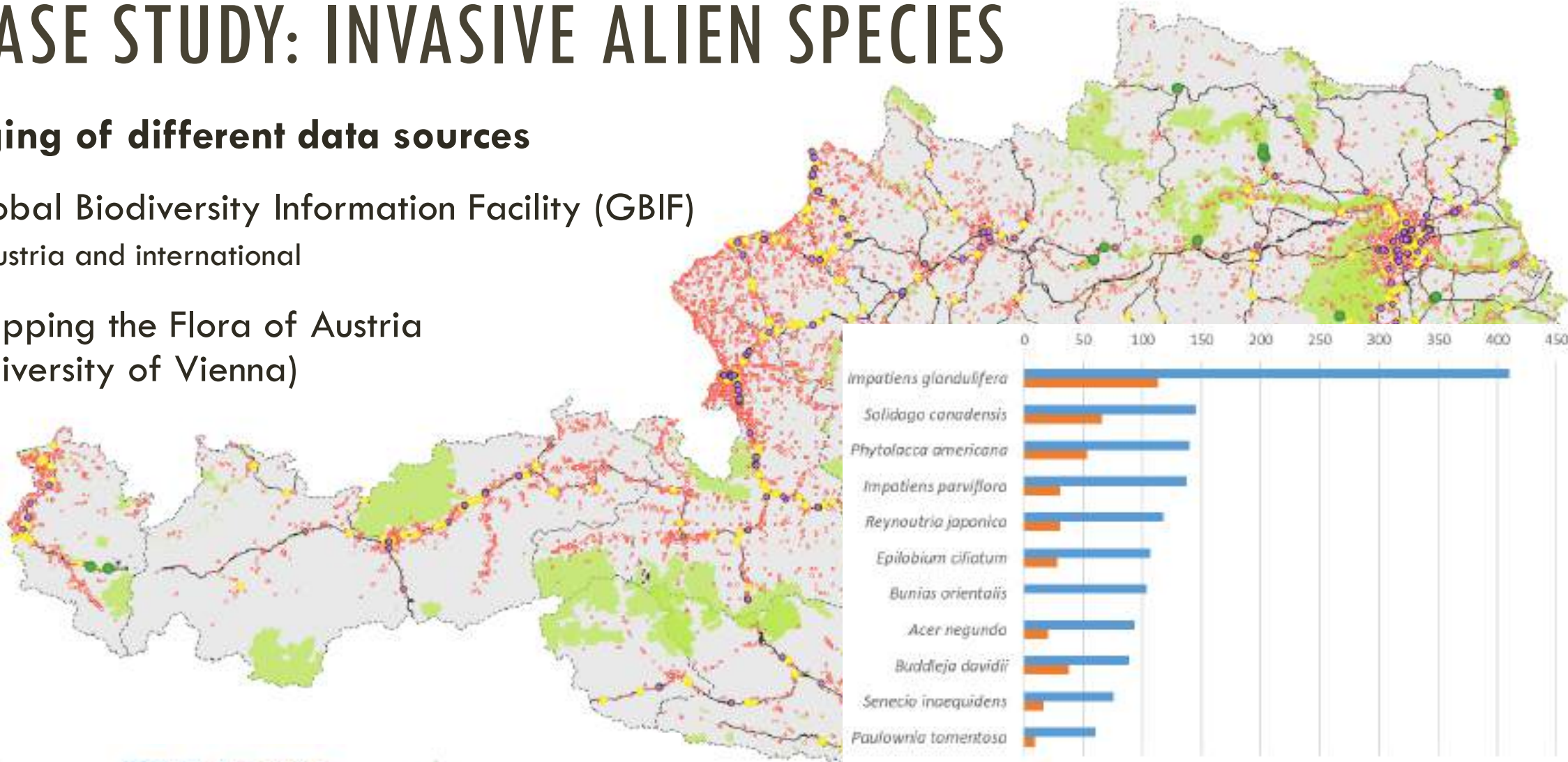
- Shading areas using photovoltaics
- Environmental education
- Restriction of alien species due to use
- Supporting local initiatives and associations
- Identity building



# CASE STUDY: INVASIVE ALIEN SPECIES

## Merging of different data sources

- Global Biodiversity Information Facility (GBIF)
  - Austria and international
- Mapping the Flora of Austria (University of Vienna)



# ECONOMICAL IMPACTS

Estimates vary widely

<b>Invasive alien species</b>	<b>Costs</b>	<b>Note</b>
Narrow-leaved ragwort ( <i>Senecio inaequidens</i> )	€ 100.000.-	on rail tracks
Summer lilac ( <i>Buddleja davidii</i> )	-	
Giant hogweed ( <i>Heracleum mantegazzianum</i> )	€ 53.000.-	In vulnerable areas of the railroad
	€ 2,3 Mio.	along on federal and state roads
Japanese knotweed ( <i>Fallopia japonica</i> )	€ 2,4 Mio.	on rail tracks and dams
<b>Sum</b>	<b>€ 4,853 Mio</b>	

# PREVENTION & MANAGEMENT

- Local control actions in individual communities
- Grazing
- Railway Vegetation Management Tool (e.g. IVEG, Swiss Federal Railways SBB)
- Involvement of employees (Monitoring)
- Involvement of railway users (Citizen Science projects, awareness raising campaigns)



# CASE STUDY: GRAZING

- Supporting small scale and local agriculture with different grazing animals
- IAS management
- Biodiversity promotion



# CASE STUDY: GRAZING

## ■ Railway areas

- (Electric) Fences along the railway infrastructure
- Exclusion of liability

## ■ Energy production

- Combination of grazing and photovoltaics

## ■ Communication

- Information of local population
- Education

## ■ Lease conditions

- Base calculation: approx. 3€/day and sheep
- Leasing instead of renting
- Subsidies, Compensation payments, grants etc.?
- Area guideline through long-term GPS tracking

## ■ Conflicts

- Dogs
- Fence crosses walking tracks





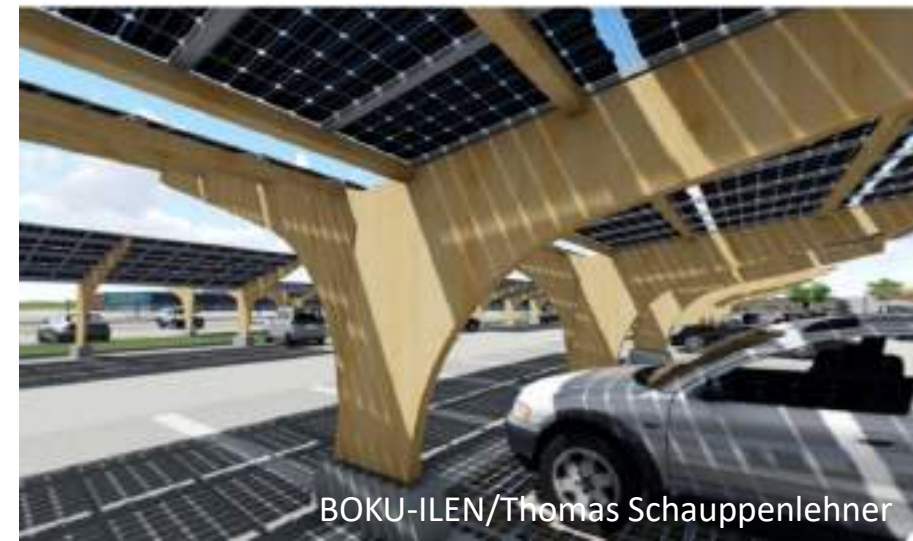


# CASE STUDY RENEWABLE ENERGY

- Contribution of railway infrastructure for renewable energy production
- Synergies with other utilisations (grazing, agrivoltaics, invasive species management)

# POTENTIAL AREAS FOR PV

- Building roofs and surfaces
- Sealed areas (Forecourts, Parking spaces)
  - Shading effects
  - Weather protection
  - E-charging stations for bicycles and cars
- Grassland areas (z.B. South-facing railways embankments)
  - Combination e.g. with grazing activities (agrivoltaics)





# POTENTIAL AREAS FOR PV

A 3D architectural rendering showing a railway track on the left with a red train. The grassy embankment between the tracks and a fence on the right is covered with rows of solar panels, illustrating potential areas for photovoltaic (PV) installation. The background features a clear blue sky and some industrial buildings.

- Grassland (e.g. railway dams)
- Agrivoltaics
- Ground mounted photovoltaics



# POTENTIAL CALCULATION

Parameter		
Parameter für die Berechnung des PV-Potenzials auf Grünland	Werte	Beschreibung
Grenzwert PV-Module	300	Mindestmodulzahl für die Potenzialeabschätzung (Stück)
Grenzwert Fläche	10000	Mindestgröße der Fläche (m²)
Wirkungsgrad	20,00%	monokristallin: 20 - 22 %/ polykristallin: 15 - 20 %
Nutzbare Freifläche	60,00%	Abschätzung des Abdeckungsgrades der Fläche mit PV-Modulen
Modulgröße	1,70	m² (380W)
Einspeisetarif	€ 0,100	Mittelwert Stromanbieter Österreich
Strompreis	€ 0,140	Der Preis für eine Kilowattstunde (kWh) Strom liegt österreichweit zwischen 0,17-0,22 Euro (e-control.at); Unternehmen sind teilweise weit draunter (6-7 Ct)
Ertragsreduktion für Ost-West Ausrichtung (ASPECTRATE=2)	90,00%	
Kohlenstoffäquivalente je Produktionsform		
CO2e_PV (gCO2e/kWh)	0	
CO2e_WASSER	97	
CO2e_WKA	4	
CO2e_BIOMASS	98	
CO2e_GAS	78	
CO2e_COAL	109	
Ergebnisse		
Anzahl Module (1,7m², 380W)	602.675 Stück	
Maximale Modulanzahl auf einer Fläche	29.104 Stück	
Stromproduktion pro Jahr	238.127.460 kWh	
	0,2381 TWh	
Einkünfte bei Einspeisung	€ 23.812.746,05	
Einsparungen bei Direktverbrauch	€ 33.337.844,47	
CO2e Einsparungen gegenüber		
Wasser	2.166.960 t CO2e	
Wind	47.625 t CO2e	
Biomasse	2.190.773 t CO2e	
Gas	1.714.518 t CO2e	
Kohle	2.452.713 t CO2e	



- Derived from GIS data

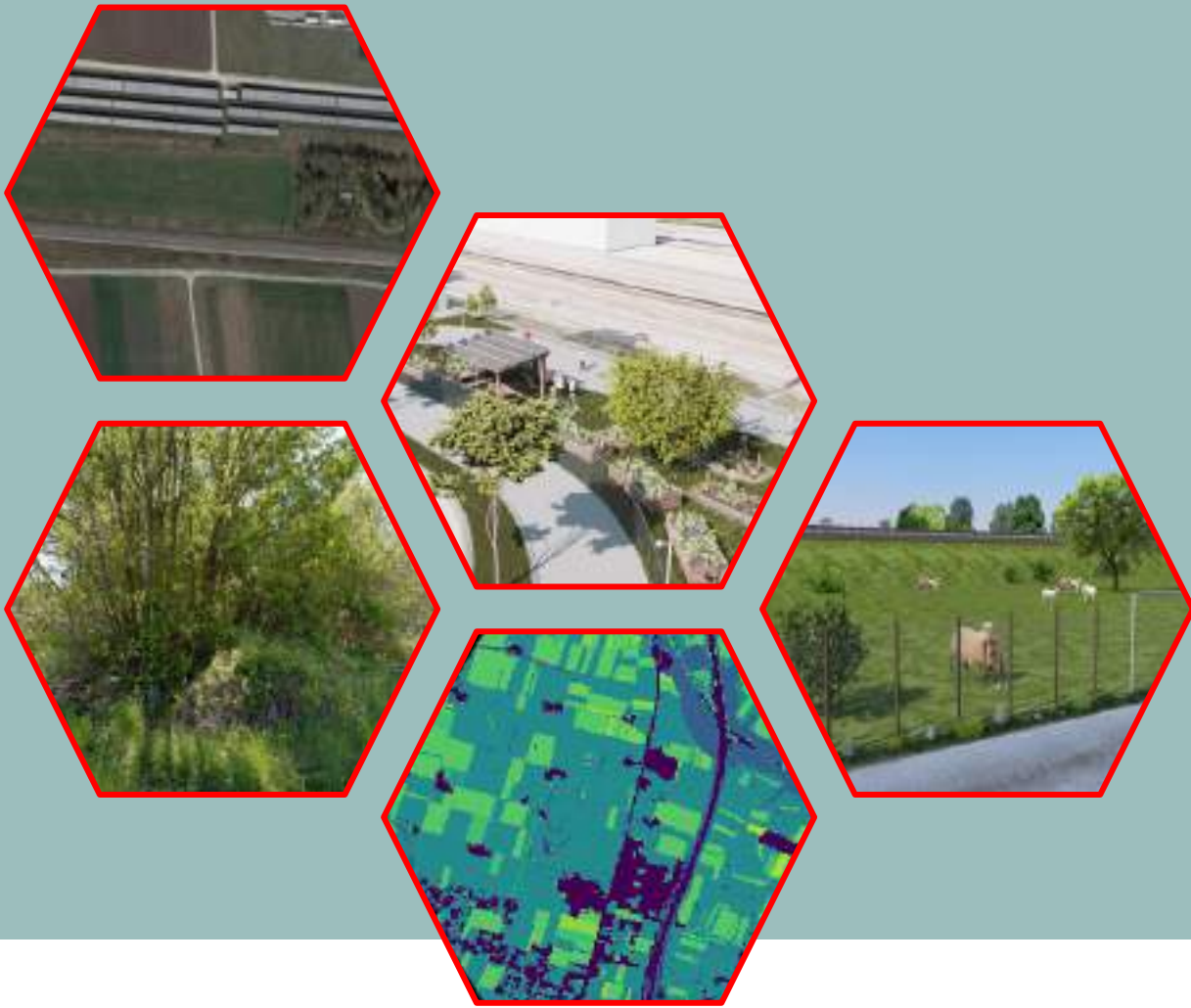
# EFFECTS

- **Economic Effects**
  - No energy fee
  - Tax advantages
- **Social effects**
  - Visual patterns of renewable energy transition
  - Production sites close to consumers (trains, railway stations, powerstations for E-mobility)
- **Ecological effects**
  - Contribution to the energy transition
  - Possible synergies with biodiversity promotion and alien species management

# SUMMARY

- Data for nation-wide high resolution data available
- Ressource for potential analysis towards sustainable development goals and site management adressing social, ecological and economical aspects
- Estimation of areas for renewable energy development
- Estimating SDG contributions





# Thank you!

Thomas Schauppenlehner  
BOKU University of Natural Resources and Life Sciences  
[thomas.schauppenlehner@boku.ac.at](mailto:thomas.schauppenlehner@boku.ac.at)



## THE POTENTIAL OF RAILWAYS ASSOCIATED AREAS

UIC Sustainability Action Week  
Paris, 27.02.2023

# LUNCH BREAK



**SEE YOU AT 13:30**



**BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS

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#MORETRAINS  
#UICSUSTAINABILITYACTIONWEEK**



**INTERNATIONAL UNION  
OF RAILWAYS**



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*

# RELATIONSHIPS WITH NEIGHBOURING COMMUNITIES AND BIODIVERSITY STRATEGIES

**JOHN VARLEY  
THOMAS SCHUH**



INTERNATIONAL UNION  
OF RAILWAYS



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**BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS



## **JOHN VARLEY**

**Chief Executive of Clinton Devon Estates**

**Chair of the “Varley Review”**

**Ex Board Member of the UK Environment Agency**

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# Relationships with Neighbouring Communities and Biodiversity Strategies

**JOHN VARLEY**

CEO Clinton Devon Estates

Chair of the “Varley Review”

*Valuing Nature – a railway for people and wildlife...*

“The railways were built with the idea that they would make the countryside more beautiful”

Sir John Betjeman CBE

Poet, writer, broadcaster and Poet Laureate

1906 - 1984





10,000 hectares in Devon, England





# England's first wild beavers





# 55 HECTARES OF ENGLISH PASTORAL LANDSCAPE INTO MUDFLATS AND SALT MARSH



**April 2021**



**November 2022**



# NOT EVERYBODY CONVINCED THAT CHANGE WAS A GOOD IDEA!



# ALTHOUGH BIODIVERSITY GAINS OBVIOUS FOR ALL TO SEE



**Glossy Ibis**

**A rare visitor to Devon**



**European white fronted  
geese**

**Largest flock since the  
1980s**



# The Guardian



## Millions of trees at risk in secretive Network Rail felling programme

Exclusive: Plan to stop leaves and branches falling on lines has already led to thousands of trees being chopped down



**Sandra Laville** *Environment correspondent*

21:19 Sunday, 29 April 2018

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**BBC NEWS**

Home UK World Business Politics

## Network Rail tree felling faces review over wildlife concerns

10 May 2018



**Network Rail's tree felling programme is to be reviewed over concerns it is harming wildlife, the government says.**

Rail Minister Jo Johnson said the review would consider whether Network Rail could use







# RECORDED INCIDENTS INVOLVING TREES OR BRANCHES







# JO JOHNSON MP – RAIL MINISTER 2018







An aerial illustration of a railway station and its surroundings. A train is stopped at a platform. The station is surrounded by residential houses, trees, and roads. A dark blue banner is overlaid on the top right of the image, containing the title and subtitle. The scene is depicted in a colorful, stylized manner with various vehicles like cars, vans, and a truck, and people walking around. The railway tracks run diagonally across the scene.

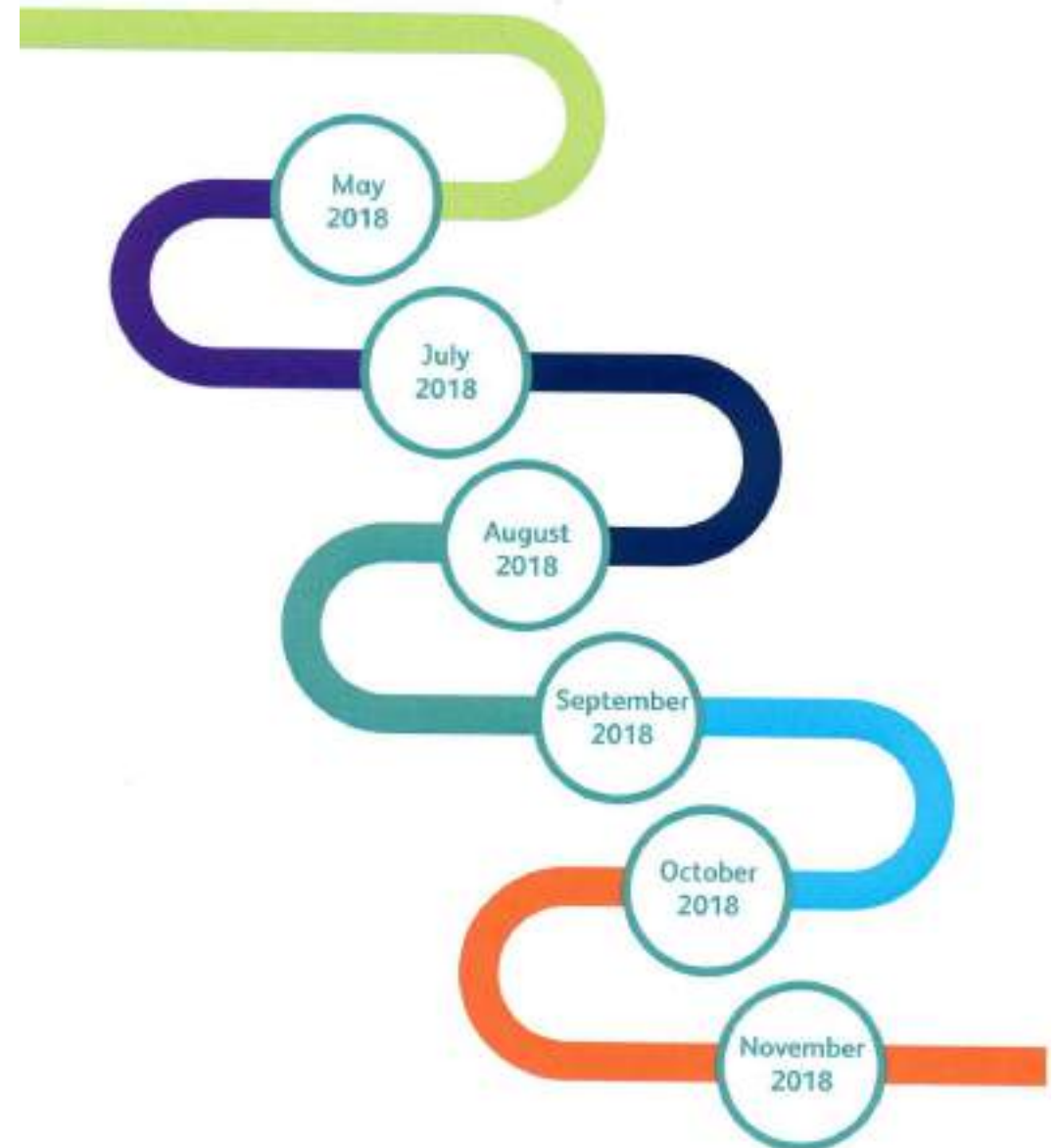
# Valuing nature – a railway for people and wildlife...

The Network Rail Vegetation Management Review



# PROJECT PROCESS TIMELINE

- Over 100 documents reviewed
- Over 40 interviews
- 5 round tables
- Over 100 stakeholders engaged
- Over 8,000 responses to public consultation





# COST MODELLING FOR DIFFERENT APPROACHES TO VEGETATION MANAGEMENT

Cut and Regrow  
£580.6M  
Over 20 years

Cut and Maintain  
£254.0M  
Over 20 years

Cut and Replace  
£222.6M  
Over 20 years

Potential savings over £200M  
on just 15% on the network

and...

better outcomes for nature



# SIX RECOMMENDATIONS

1. The Government must set out a clear policy position for Network Rail in terms of delivering for the environment
2. Appropriate Governance must be put in place at organisation, route and project level
- 3. NETWORK RAIL SHOULD PUBLISH AN AMBITIOUS VISION FOR THE LINESIDE ESTATE**
4. Network Rail must value and manage its lineside estate as an asset
- 5. NETWORK RAIL MUST IMPROVE ITS COMMUNICATION WITH AFFECTED COMMUNITIES**
6. Network Rail should lead a cultural change for valuing nature and the environment

# 3. NETWORK RAIL SHOULD PUBLISH AN AMBITIOUS VISION FOR THE LINESIDE ESTATE

## Partnership approach:

- Neighbours
- Conservation groups
- Suppliers
- Neighbouring landowners

## Nature recovery network:

- Wildlife corridors
- Extending habitat management
- Joint management plans
- Meeting wider Government targets – *500,000 ha wildlife habitat*

**NO NET LOSS OF BIODIVERSITY BY 2024 AND A NET GAIN BY 2040**



Network Rail is one of the UK's largest landowners

It owns **52,000** hectares of land on which there are nearly **6.3** million trees, most of which are less than **50** years old.



**6.3**  
million trees



Across England and Wales it manages nearly **16,000** miles of lineside.



## 5. NETWORK RAIL MUST IMPROVE ITS COMMUNICATION WITH AFFECTED COMMUNITIES

*“Totally inadequate communication and engagement with local communities and stakeholders...” - lineside neighbour network campaigner*

- Increase transparency
- Adequately address complaints
- Purposeful meetings with local residents
- Clarity over the work programme
- Highlight impacts on biodiversity and the environment

# ABBAY LINE CASE STUDY



**Before**



**After**



# TWO YEARS AFTER





# AT THE HEART OF COMMUNITIES...



## LESSONS LEARNT

- The railway can deliver significant enhancement of biodiversity on its own land
- With other landowners, the railway can enable bigger, better and joined up biodiversity on a landscape scale
- Need to learn to collaborate and understand how to build wider relationships with non-railway actors
- A huge opportunity to build much stronger relationships with the local community and mutual understanding

# MARCH 2023

## Sustainable Rail Blueprint

“A railway that supports a thriving natural environment, for the benefit of people and wildlife”



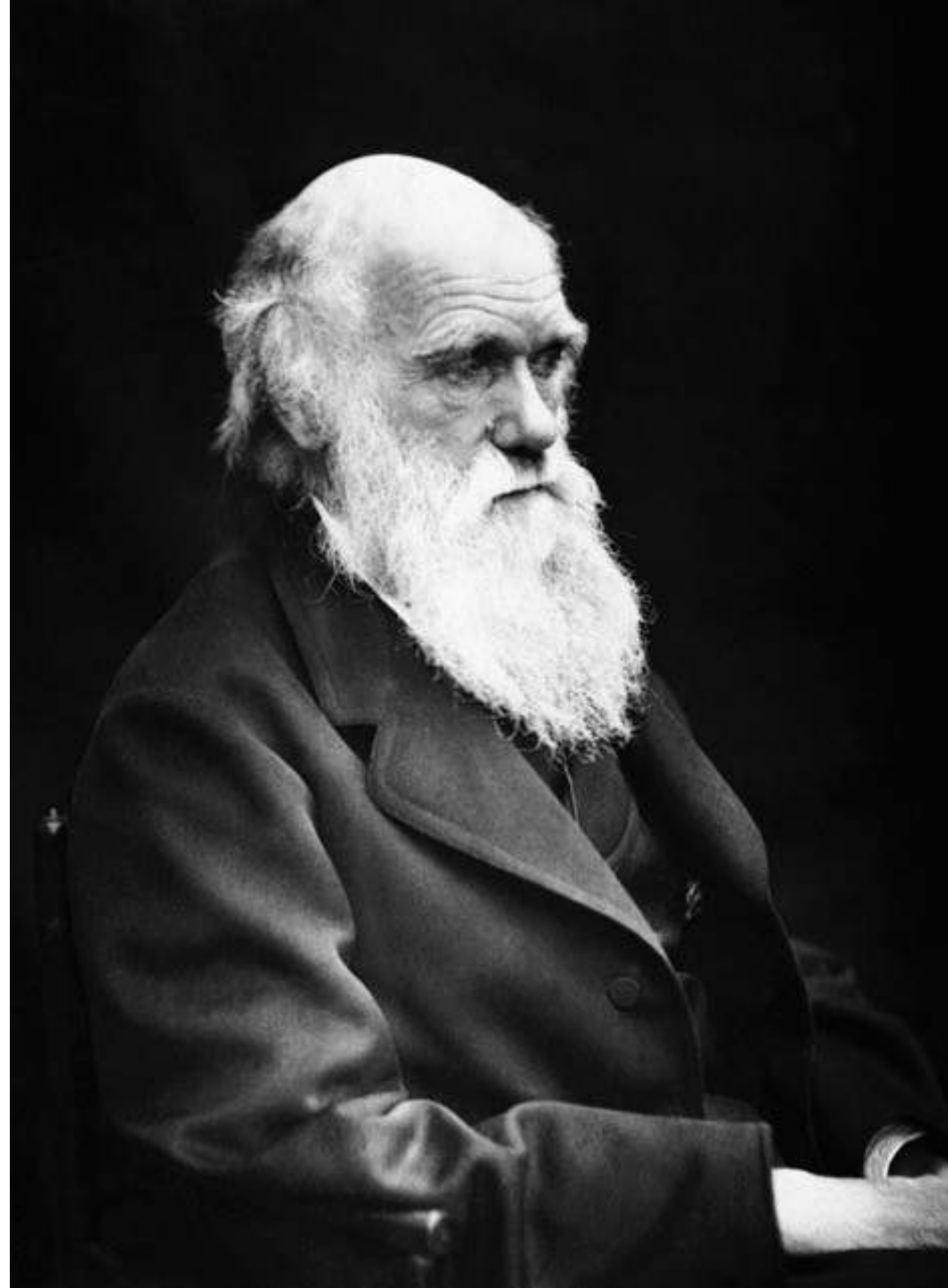


# IT IS ALL ABOUT COLLABORATION...

"It is the long history of humankind (and animal kind, too) that those who learned to collaborate and improvise most effectively have prevailed."

Charles Darwin

1809 - 1882





[Watch at UIC's  
YouTube Channel](#)



## **THOMAS SCHUH**

**Sustainability Coordinator at ÖBB-Infrastruktur AG**

**UIC Sustainable Land Use Sector Chair**



# **BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS

**#BISON**  
**#WILDINGRAILWAYS**  
**#MORETRAINS**  
**#UICSUSTAINABILITYACTIONWEEK**



INTERNATIONAL UNION  
OF RAILWAYS



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*



INTERNATIONAL UNION  
OF RAILWAYS

# **ECOLOGICAL EFFECTS OF RAILWAYS ON WILDLIFE**

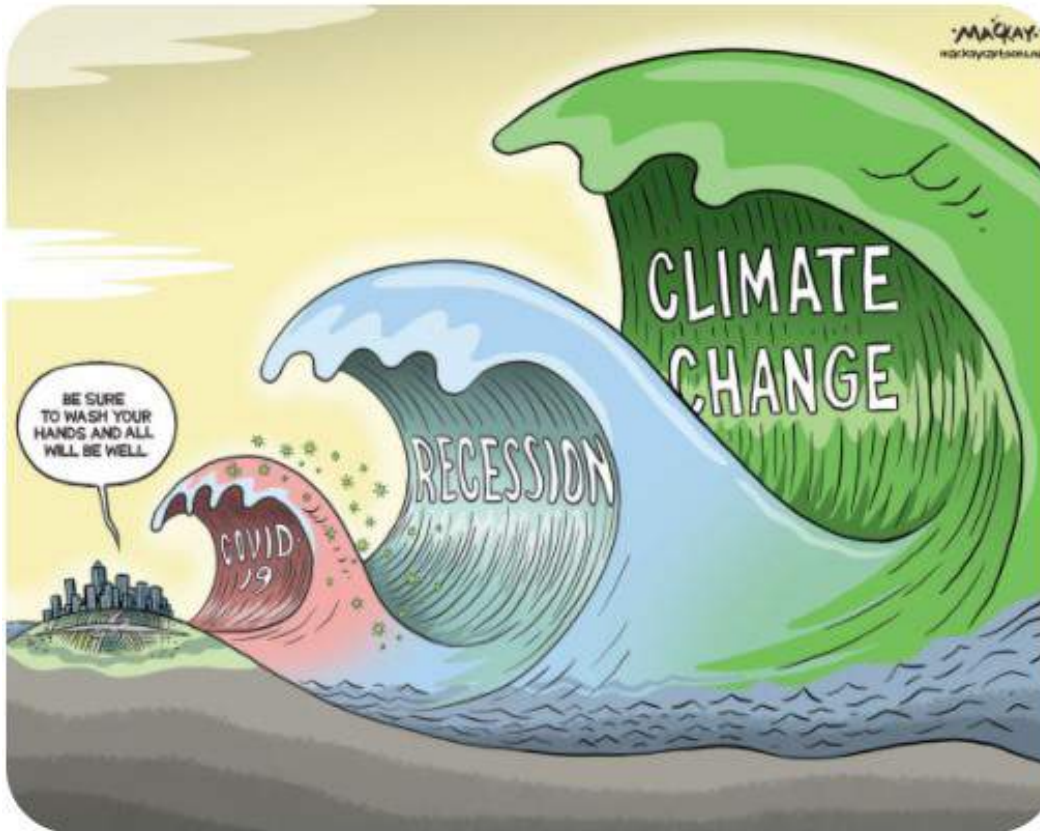
## **rEvERsE (UIC 2020 – 2022)**

**Thomas Schuh**

Sustainable Landuse Group - Chair



# The age of multiple crises - ANTHROPOCENE!



# 2015 – humanity agreed on a plan!

## SUSTAINABLE DEVELOPMENT GOALS



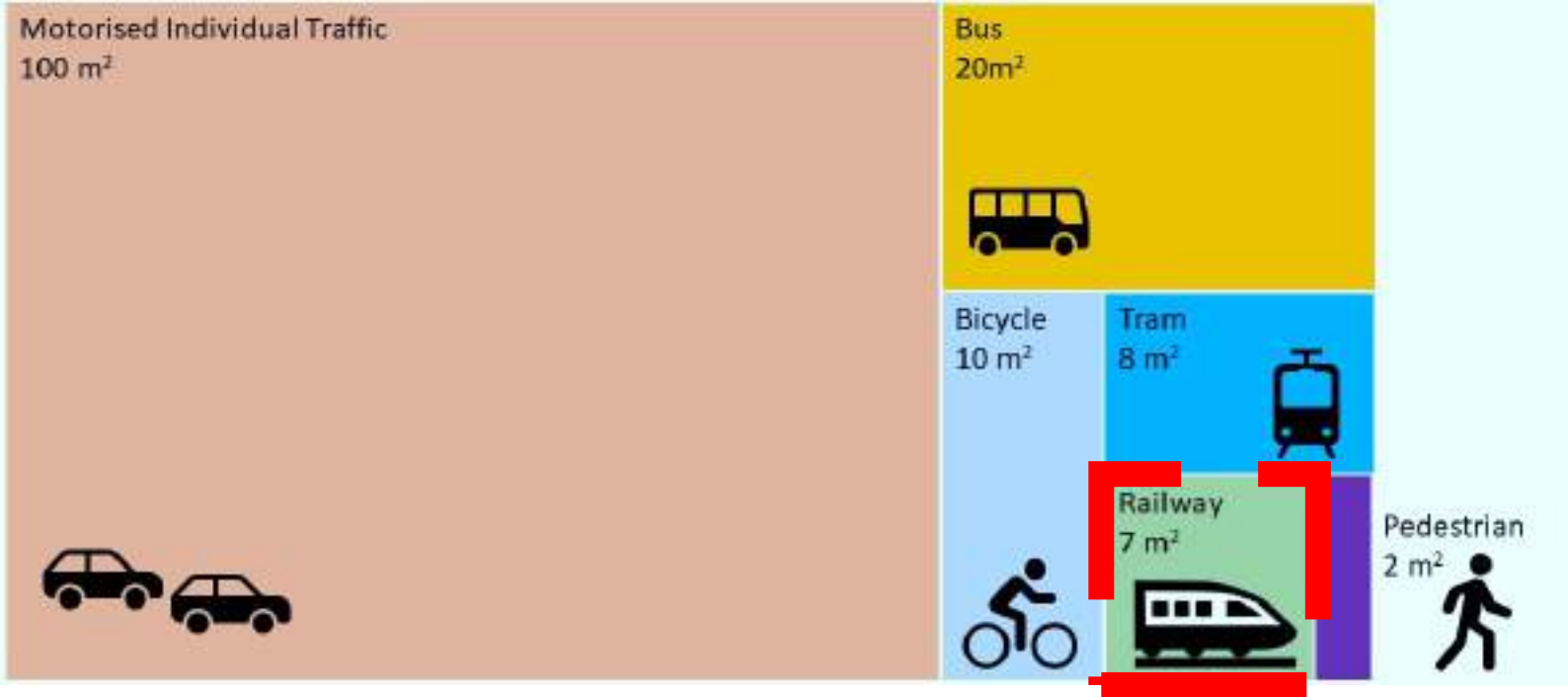
- <https://sustainabledevelopment.un.org/sdgs>



***Meet growing demand for  
mobility without further  
harming the environment!***



# Land Use Efficiency of Transport



Ref: Land use in squaremeter / transported person in city transport - Allianz pro Schiene, 2020

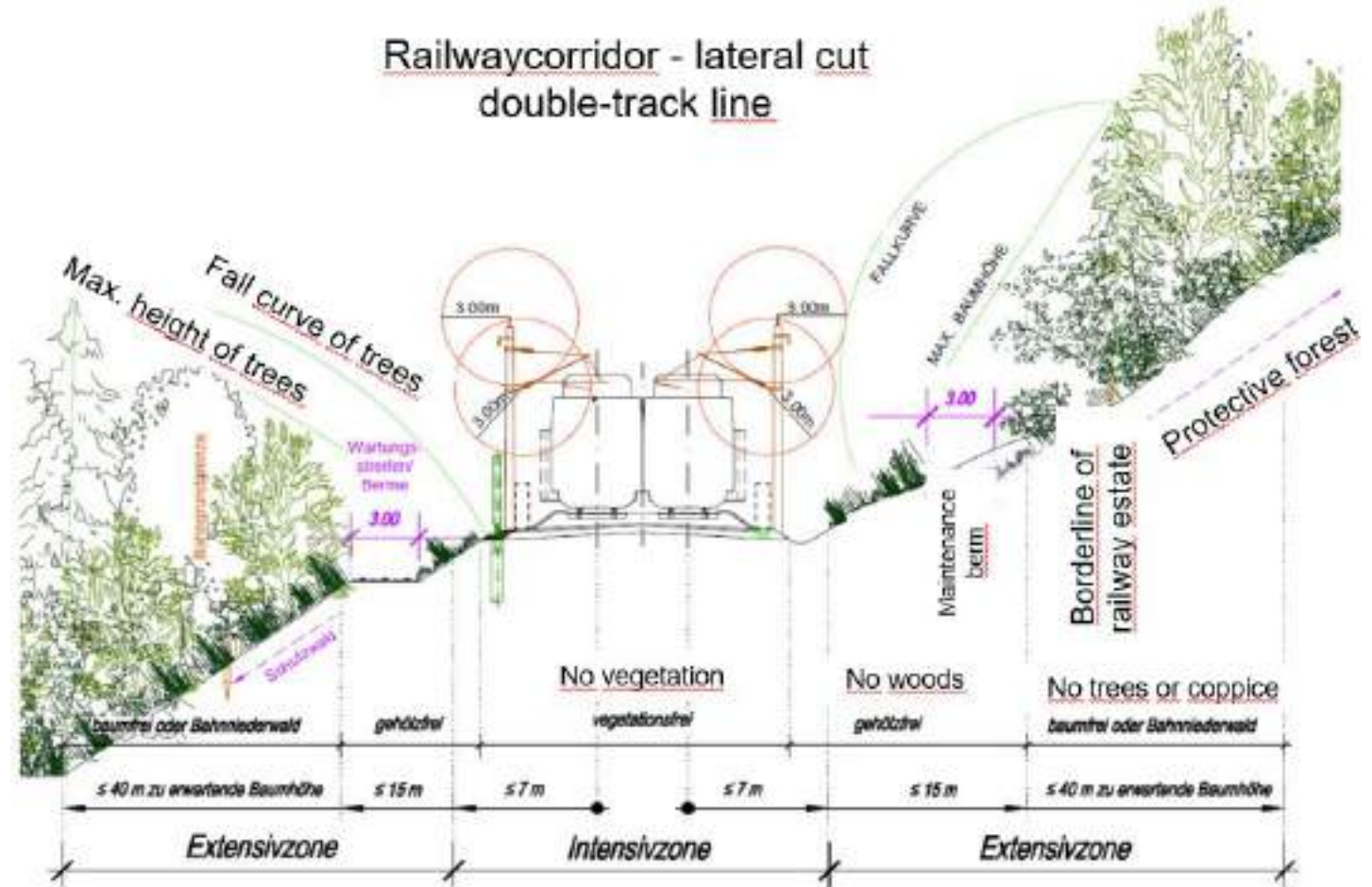


# Railways as a Green Corridor

**RAIL CORRIDORS CAN BE BOTH  
A HAZARD AND A LIFELINE FOR  
ECOSYSTEMS**



Railwaycorridor - lateral cut  
double-track line



Ref: ÖBB-Infrastruktur AG







# Railways as a Green Corridor

## Construction and maintenance often propagate pionier- and special habitats for fauna and flora

- Specific chemical-physical, **soil conditions** (old dams and embankments are very valuable!)
- Specific **microclimate** caused by light-, temperature-, and waterconditions
- Linear structures function as **habitat networks**
- Small pattern **habitatmix**, of nutrient-poor -, nutrient-rich, dry – wet, bright – shady, etc.
- Intermediate **disturbances** by construction- and maintainace
- **management of adjacent areas** – can support biodiversity (ditches, embankments, cuts,..)
- **Protection** of prosecution by collectors



Ref: [ÖBB-Infrastruktur AG](#)







# REVERSE – objectives

1. **Avoid** habitat fragmentation and enhance biodiversity on railways by sharing experiences and knowledge
2. **Identify** how railways are threatening the survival of wildlife in Europe and how these threats can be overcome
3. **Describe and promote** measures that could be a contribution to the UN SDGs
4. **Provide** a general understanding of the issue to meet global challenges



## We need to

- Share experiences and knowledges
- Motivate transportation planners
- Provide a general understanding



# REVERSE – first delivery



1. Biodiversity Policy in Europe and its nations
2. European Railways and their importance for Biodiversity
3. Management to protect and enhance Biodiversity on European Railways
4. Monitoring Biodiversity
5. Performance Measures
6. Stakeholder Engagement
7. What`s next for Railways?
8. Case studies



<https://shop.uic.org/en/other-documents>



# STRATEGIC GOALS & ACTION GUIDE



**Develop a vision for railways and biodiversity**  
Set out ambitions and commitment to conserving and enhancing biodiversity accompanied by a timeline to deliver changes. This will contribute to rail becoming the most environmentally friendly mode of transport.



**Enable a cultural change to prioritise nature and the environment**  
Embed conservation and enhancement of biodiversity at every business level, alongside safety, performance and other environmental targets, such as achieving net zero greenhouse gas emissions.



**Recognise the positive role railways have in conserving biodiversity**  
Engage with policy makers to ensure the beneficial role railways can have on biodiversity is recognised and incorporated into national and European Union nature conservation policies.



**Value biodiversity and natural assets**  
Monitor and manage the status and condition of habitats and biodiversity associated with railways.



**Put in place the specialist skills**  
Acquire specialist capabilities and competencies in ecology to fully understand these assets and deliver appropriate management actions.



**Establish management plans to protect and enhance biodiversity**  
Develop innovative approaches to managing biodiversity assets, taking account of both the in-aside and interactions with the wider landscape, and including nature-based solutions specific to railways.



**Implement the biodiversity mitigation hierarchy**  
Limit the negative impacts of railway development activities by following the principles of avoiding, minimising, restoring or offsetting impacts on biodiversity.



**Monitor the outcomes of biodiversity management**  
Adopt consistent and repeatable approaches to monitoring the outcomes of land use management to conserve and enhance biodiversity. This is key to setting ambitious targets for biodiversity assets and improving their management, and for corporate accountability.



**Take collective action for biodiversity**  
Work together to deliver landscape-scale benefits for biodiversity through the provision of wildlife corridors and enhanced landscape permeability for species movement.



**Make a commitment to biodiversity net gain**  
Set ambitious targets for conserving and enhancing biodiversity, with no net loss of biodiversity by 2030, and net gain by 2050, with progress assessed through regular monitoring.



**Partnership working**  
Seek partnerships with stakeholders to deliver benefits to biodiversity at scale and in the long term.



**Share best practices**  
Publish and share best-practice guidelines for managing and conserving biodiversity management with one another and with stakeholders to improve their effectiveness.



**Improve communications**  
Use a wide range of communication tools to openly communicate plans for, and approaches to, biodiversity management with employees, passengers, society and neighbours, and to disseminate progress and achievements.



Customer Railways Strategy and Action for Biodiversity  
Strategic Objectives and Policies on Wildlife (SOW) Project  
120, London Road, May 2022





# Put in place the specialist skills

*Case Study: ÖBB-Infrastruktur AG*

*Railway Ecology course - part of internal environmental training*



Reforestation with elementary school students



## Key-constrains faced by the sector on biodiversity management

LACK OF RESOURCES, SKILLS, AND KNOWLEDGE



Training in regulatory frameworks and standards for ecology, to build knowledge of the workforce



- Improve data management and reporting (e.g. **designated sites and protected species**)
- Reinforce information regarding habitat management procedures and guidelines



# Analyses and KPIs

✓ Common approaches for vegetation management by railway companies

## NOT YET FOR BIODIVERSITY

Table 4: Suggestions for Performance Indicators (PIs) for biodiversity management

Objective	PI	Examples of appropriate measurements	Possible benchmark
Expanding the amount of wildlife habitat associated with the rail infrastructure	Increasing the proportion of natural habitat created or restored along the network, either de novo or as mitigation against loss of existing habitat. Increasing area of alien species management	Area of biodiverse habitat created or restored	An appropriate benchmark might be achieving the same proportion of natural habitat as found in the surrounding region
Increasing the connectivity of habitats along and adjacent to the network	Increasing connectivity as measured by consistent landscape connectivity measures	Positive trend in habitat connectivity indices	An appropriate benchmark might be achieving the same connectivity found in nearby high nature-value landscapes
Protection of rare species and habitats	Increasing population trends for target species that occur along the network over five years Also, see below 'Reduction in number of animals killed along the network'	Active monitoring of rare and threatened species and habitats Positive trend in population size or extent of habitat	A benchmark might be to compare trends on the railway to regional or national trends for rare or protected species
Reduction in number of animals killed along the network	Increasing length of track with measures to increase permeability to wildlife, such as green bridges and culverts, and which reduces deaths via wire strikes or entrapment between rails Active targeting of these measures to wildlife hotspots	(Wild) animal collisions: % of identified hot spots or identified line length (km) equipped with protection measures Permeability – number of culverts per km Bird protection at the overhead lines of tracks: % of track network or linetrack length (km) equipped with bird protection measures	The ideal benchmark here would be zero animals killed along the network, which is something to aim for but not feasible
Management of invasive alien species	Proportion of habitat from which invasive species have been removed	Areas of invasive (plant) species treatment	Zero tolerance of species listed on the EU's Invasive Alien Species of Union concern: <a href="https://ec.europa.eu/environment/nature/invasivealien/index_en.htm">ec.europa.eu/environment/nature/invasivealien/index_en.htm</a>

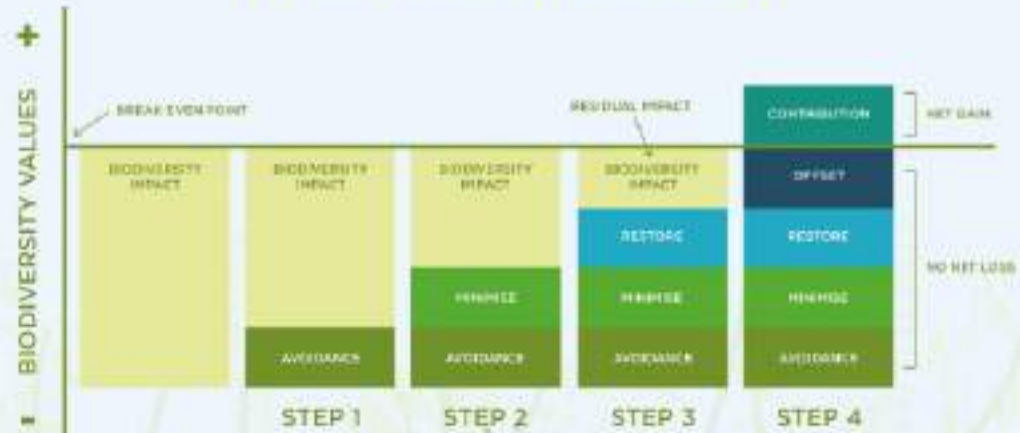


New Standards approaching:  
CSRD – ESRS E4 Biodiversity and ecosystem services



# Management plan and mitigation hierarchy

## MITIGATION HIERARCHY



Value biodiversity & natural assets

Beneficial / Harmful Effects



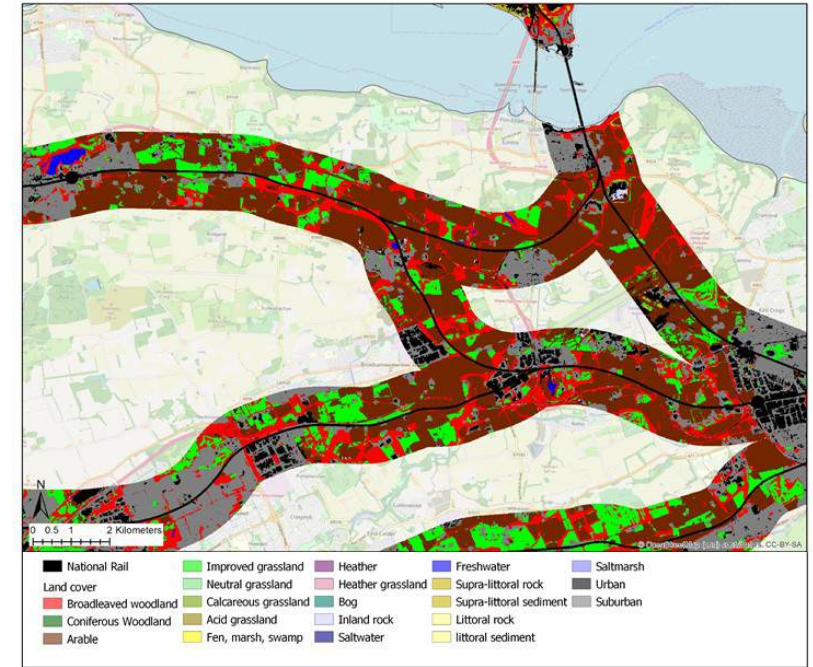




# Monitor the outcomes

*Case Study: Remote sensing data to provide an inventory of habitat types and how they have changed ©Network Rail*

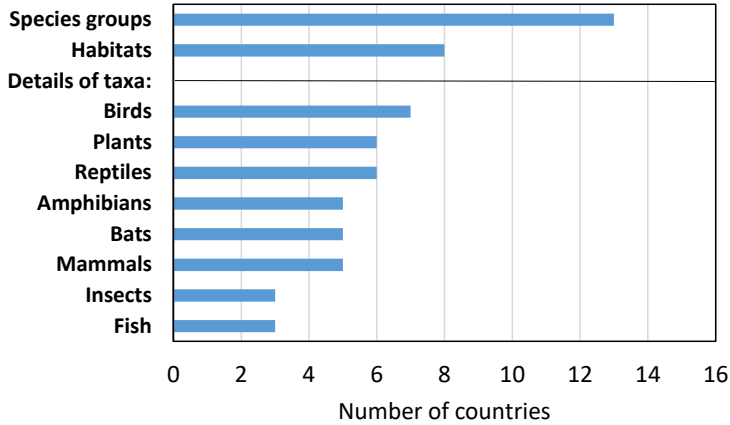
*Case study: Spatial data layer in Irish Railway GIS-based mapping for biodiversity assets © CIE*



*Habitat mapping of 1 km either side of the rail corridor in Scotland*



## Digitalisation on EU Railways



*Case study: Tool for the detection and management of invasive alien species at DB Netz AG*





# REVERSE – second delivery



## UIC Guidelines on Managing Railway Assets for Biodiversity

*Mid-2023*



Contents

[1. INTRODUCTION](#)

[2. SCOPE, DEFINITIONS AND LIMITATIONS OF THIS GUIDANCE](#)

[3. THE MITIGATION HIERARCHY AS A FRAMEWORK](#)

[4. GUIDELINES FOR DIFFERENT ASSETS](#)

[4.1. HOW THIS GUIDANCE IS STRUCTURED](#)

[4.2. TRACK BED WITH SLEEPERS AND RAILS](#)

[4.3. DRAINAGE](#)

[4.4. BRIDGES AND TUNNELS](#)

[4.5. OVERHEAD POWER LINES](#)

[4.6. COMMUNICATION AND CABLE CHANNELS](#)

[4.7. FENCING AND BOUNDARIES](#)

[4.8. STATIONS AND LINESIDE BUILDINGS](#)

[4.9. LINESIDE HABITATS](#)

[5. CONCLUSIONS](#)

[6. GLOSSARY](#)

[7. ACKNOWLEDGEMENTS](#)

[8. REFERENCES](#)





# REVERSE – Best Practise Examples (ÖBB-Infra)



Discs to make overhead line visible for water fowl



Selective mowing to enhance biodiversity at a station



Artificial roof and nests for swallows



Insect-friendly design



Lining wall made of natural stone



Wetland created of excavation material



Glass markings to prevent bird collisions



Green roof



# Conclusion

*A well-managed green infrastructure will bring biodiversity benefits and helps to support safer and more reliable railway operations.*

*New UIC project on Ecosystem Valuation for Railways (ECOV4R)*

**Stay in touch with UIC:  
[www.uic.org](http://www.uic.org)**



**#UICrail**

**#BISON  
#WILDINGRAILWAYS  
#MORETRAINS  
#UICSUSTAINABILITYACTIONWEEK**

**Thank you for your attention.**



# **BIODIVERSITY MONITORING, REPORTING AND ENHANCEMENT**

**SYLVAIN MOULHERAT  
HERVÉ LE CAIGNEC  
JULIA BAKER**



INTERNATIONAL UNION  
OF RAILWAYS



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*





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## **SYLVAIN MOULHERAT**

**TerrOïko Founder**

**Union Professionnelle du Génie Ecologique (UPGE)  
Representative in H2020 BISON Project**

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# **BISON**

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**BISON**

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FOR EUROPEAN TRANSPORT NETWORKS



**HERVÉ LE CAIGNEC**

**CEO of LISEA**

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An aerial photograph of a quarry site. The central feature is a large, kidney-shaped pond with strikingly turquoise water. The pond is surrounded by a light-colored, rocky embankment. In the background, there are several smaller ponds and a dense forest with trees showing autumn colors. The foreground shows green agricultural fields.

**Lisea**



**MANAGEMENT & MONITORING  
OF BIODIVERSITY**

**SEA Rail High Speed Line**



# LISEA

- 340 km of new railways
- Commercial services started July 2nd 2017

**Railway domain** 2,200 ha

**Unused areas** 1,600 ha

**Environmental offsets** 3,776 ha

**Reforestation** 2,200 ha





01

# ENVIRONMENTAL MEASURES

---

## MITIGATING AND MONITORING THE IMPACT OF THE LINE ON BIODIVERSITY

---

- Avoid, Reduce, Offset : the **ARO** methodology
  - In order to limit the environmental and human impact of the line, adverse impacts have to be **avoided** to the greatest extent possible, or else **reduced**
  - Any residual adverse impacts has to be **offset** : LISEA has taken measures taken to compensate for residual impacts
- **Long term** offset programme : 50 years
- To carry out and sustain this compensation programme, LISEA has set up a **long-term collaboration** with naturalist associations, scientists, chambers of agriculture and landowners
  - Take into account the specific ecological characteristics of each territory
  - Share objectives and expertise
- **LISEA Environmental Observatory** has several objectives: to evaluate the effectiveness of these environmental actions over the long term, to increase knowledge and feedback and to improve practices related to the ARO approach

**4 natural habitats**  
**223 protected species**





## 4 NATURAL HABITATS

---



## WETLANDS



## CHALK GRASSLAND



3,776 ha mutualized for the 223 species

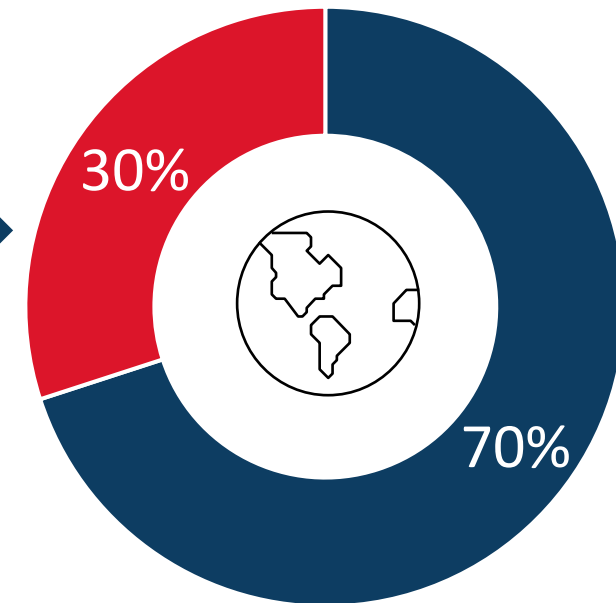
329 sites of offsets

256 *via* agreements with land owners or farmers  
(70%)

73 *via* acquisition (30%)

750 ha  
of wetlands

48 km  
of riverbanks



■ Agreements ■ Acquisition



# ECOLOGICAL CONTINUITY STRUCTURES

**842** structures to ensure ecological continuity







02

MONITORING

---

# ENVIRONMENTAL OBSERVATORY

## STAKES & GOAL

---



### STAKES & GOALS

- **Enrich** environmental knowledge and practices
- **Feedbacks** for future infrastructures projects
- **Assess** offset measures functionality
- **Redirect** natural management if needed



### MEANS

**Based on monitoring reports**  
capitalisation, analysis and dissemination of data



### GOVERNANCE

**1 Chairman**  
**1 Scientific Committee**

# ENVIRONMENTAL OBSERVATORY: 6 TOPICS



● **INVASIVE PLANTS**



● **WATER**



● **LANDSCAPE**



● **OFFSET AFFORESTATION**



● **LAND USE**



● **FAUNA, FLORA & NATURAL ENVIRONMENTS**



# ENVIRONMENTAL OBSERVATORY'S PARTNERS

	Roles	Entities
<b>Scientific</b>	<ul style="list-style-type: none"> <li>Guarantee the robustness of the scientific approach (statistical methodology, research, analysis,... ).</li> </ul>	
<b>Associations</b>	<ul style="list-style-type: none"> <li>Bring the specific knowledge of the protected species (#223) and habitats</li> <li>Carry out ecological monitoring</li> </ul>	
<b>Institutional</b>	<ul style="list-style-type: none"> <li>Coordinate actions with local actors (land owners...)</li> </ul>	
<b>Consultants</b>	<ul style="list-style-type: none"> <li>Apply technical protocols</li> </ul>	

### 1 CONTROL



### Monitoring in 3 levels, from general to specific

#### Objective

- to make sure that land owner/farmers with whom we have an agreement are applying the environmental management specification they're supposed to.
- 1/3 of the sites are controlled every year.
- Around 98% of conformity

### 2 ASSESS THE FUNCTIONALITY OF HABITATS

### 3 BIOLOGICAL MONITORING

1 CONTROL

2 ASSESS THE  
FUNCTIONALITY  
OF HABITATS



## Monitoring every 5 years

### Goal

- assessing the evolution of habitats regarding our offset objective on each site. It enables us to ensure we are going in the right direction or if we need to redirect our environmental management

3 BIOLOGICAL  
MONITORING



## 1 CONTROL

## 2 ASSESS THE FUNCTIONALITY OF HABITATS

## 3 BIOLOGICAL MONITORING



### About 40 monitoring each year | More than 200 since 2012

- At this stage, conclusions of very encouraging, although positive effects on environment shall be assessed on the long run.

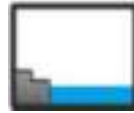
### Given the 340 sites managed, we had to make samples.

- Sampling methods, protocols and final samples are verified and approved, step by step by associations and State services.

### Ten-year monitoring programming

- Relevant time step for each taxon
- Representativeness of sites sampled along the HSL

# Ecological follows up : demonstration of the efficiency of crossing structures



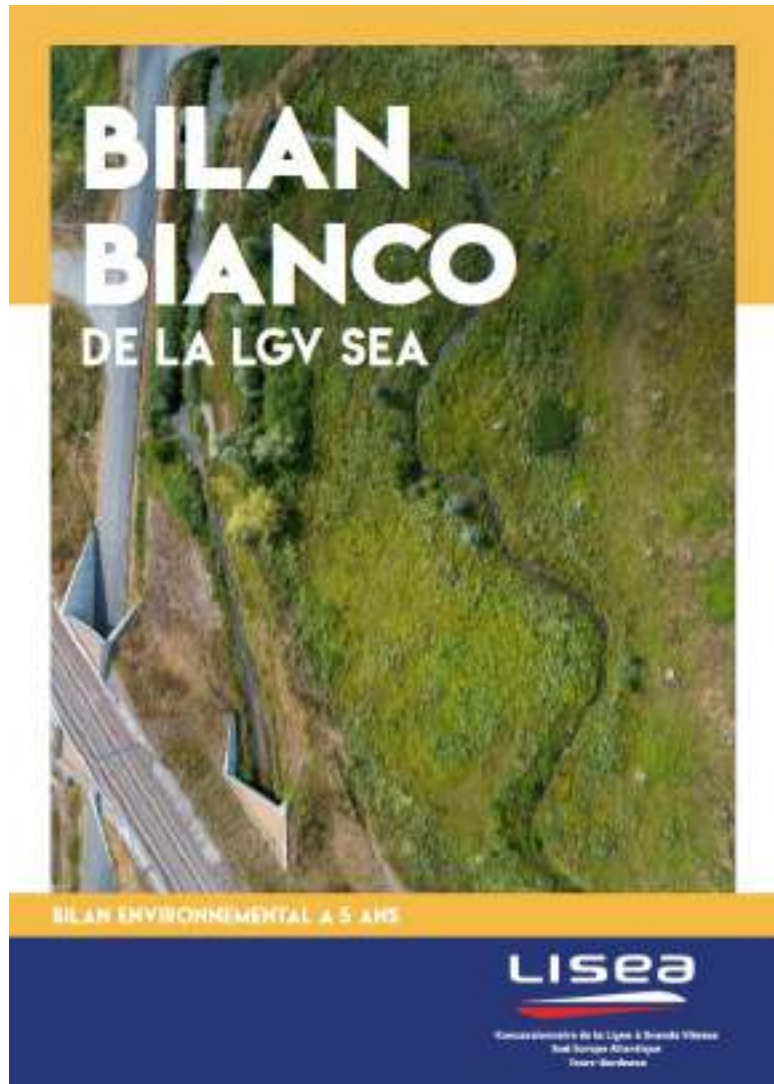


03

REPORTING  
KNOWLEDGE SHARING

---





- **Mid-2023** : publication of full environmental review (the « Bilan BIANCO ») 5 years post commissioning
- **2023** : organization of a seminar to share the conclusions of the « Bilan BIANCO »
- **2033** : overview report on offset measures effectiveness after 20 years

# COMPENSEA: AN INNOVATIVE APP TO MANAGE OFFSET MEASURES

## • Goal

- In order to report on the fulfilment of its commitments and the proper execution of measures, LISEA is involving its stakeholders in the development of an application for recording and managing compensatory measures: **CompenseA**. This application allows government departments and naturalist associations to consult, in real time, all the ecological, land and cartographic data for each of the sites concerned.
- Manage the scale and complexity of all the data of offsets monitoring until 2061
- Demonstrate compliance with obligations

## • Functions

- Technical sheets for all 340 sites, with all the ecological, land, cartographic and administrative data
- Multi-criteria search engine (species, land-control, departments, regulatory files, type of ecological measure, etc...)
- Reports, Data exports
- Map



**Full overview of our offset measures in real time, shared with State services, associations, consultants, Chambers of Agriculture, etc.**





**THANK YOU**





[Watch at UIC's  
YouTube Channel](#)



**BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS



## **JULIA BAKER**

**Technical Director of Nature Services at Mott MacDonald**

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#UICSUSTAINABILITYACTIONWEEK**



INTERNATIONAL UNION  
OF RAILWAYS



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An aerial photograph of a rural landscape. A railway line runs diagonally from the top left towards the bottom right. To the left of the railway is a large field of green crops, possibly corn. To the right of the railway is a dirt road, and further right is a paved road with a line of trees. The sky is not visible.

# Railways & Biodiversity Net Gain?



# Biodiversity Net Gain

Biodiversity value of on-site habitats is at least 10% higher

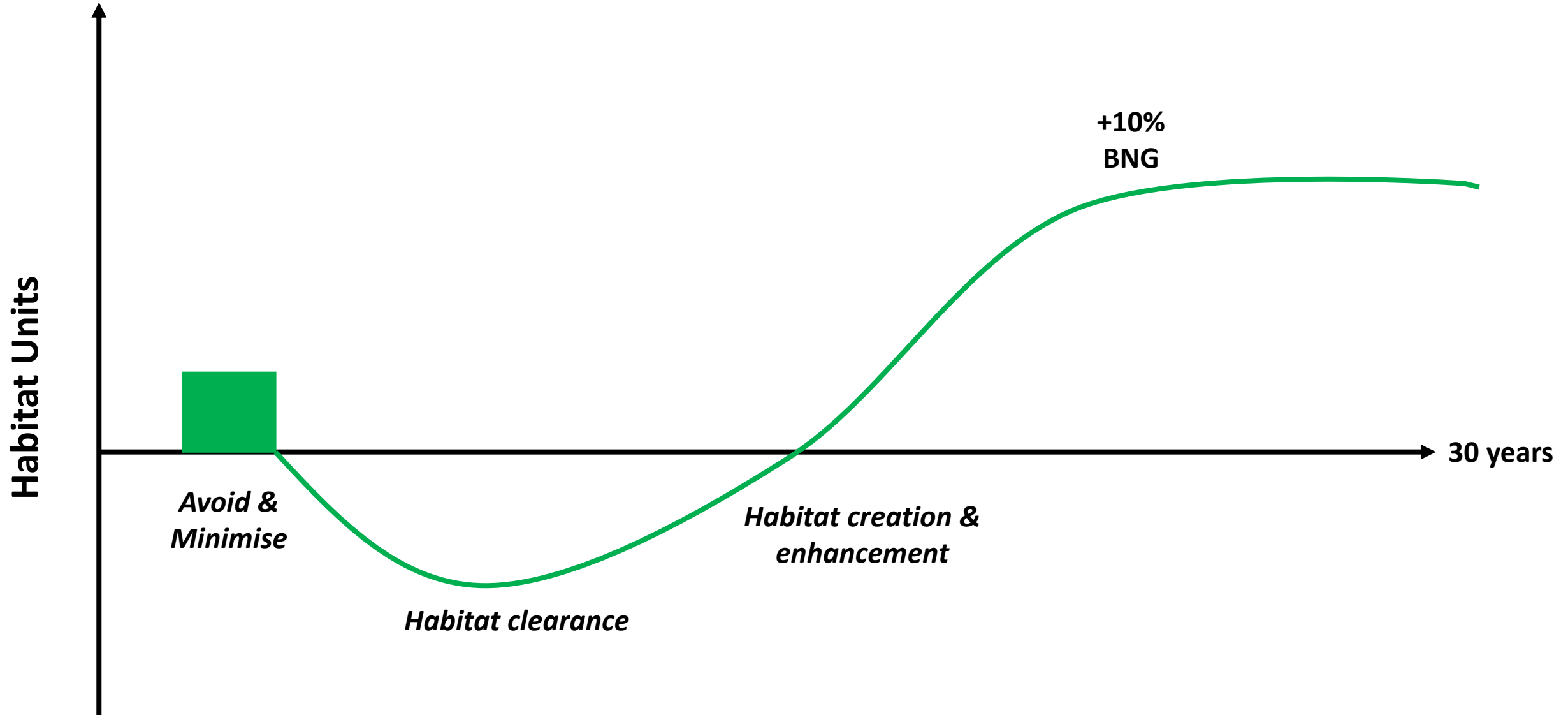


The Biodiversity Metric 3.1  
auditing and accounting for biodiversity  
**Calculation Tool**  
[Open Tool](#)  
2020 225-1-7834-803-8

Ref	Habitats and areas			Distinctiveness		Condition	
	Broad Habitat	Habitat Type	Area (hectares)	Distinctiveness	Score	Condition	Score
1	Heathland and shrub	Hazel scrub	1	Medium	4	Moderate	2
2	Woodland and forest	Other woodland, broadleaved	1.2	Medium	4	Poor	1
3	Grassland	Other neutral grassland	0.8	Medium	4	Good	3
4	Grassland	Modified grassland	0.3	Low	2	Poor	1



# Mandatory BNG requires data on habitats is that enough to succeed?



**We will fail**







BNG that is resilient to climate change effects





**Run climate modelling data for BNG site**

	Mean Temp (Degrees C)				
	Baseline (1981-2000)	RCP6		RCP8.5	
		Change from baseline	Final	Change from baseline	Final
Winter	2.9	1.2	4.1	1.8	4.7
Spring	6.8	1.1	7.9	1.7	8.5
Summer	13.6	1.6	15.2	2.5	16.1
Autumn	8.5	1.4	9.9	2.2	10.7

- **Baseline 1981-2000 to 2060**
- **RCP6: medium emissions scenario**
- **RCP8.5: high emissions scenario**

**Site-specific BNG design & adaptative management**

**Climate resilience measures for direct impacts & interactions**

## Climate Change Adaptation Manual

Evidence to support nature conservation in a changing climate

2nd edition published 2020

[www.gov.uk/natural-england](http://www.gov.uk/natural-england)



An aerial satellite-style photograph of a rural landscape. A large, dense green forest occupies the central-left portion of the image. To its right is a large, brown, rectangular field, possibly a fallow field or a field of dry crops. Further right is a green field. The landscape is crisscrossed by roads and paths. In the bottom center, there is a small cluster of buildings. The top left corner shows a date '1/2020'. The bottom right corner has the 'Google Earth' logo.

**Habitats sequester  
carbon & act as  
carbon sinks in the  
landscape**





**Does BNG payback  
this loss of Carbon  
Sinks & the  
decrease in Carbon  
Sequestration?**

***Carbon  
sequestration data***

environmentanalyst

**Does Biodiversity Net Gain help to address climate  
change, or make it worse?**

WEDNESDAY, JANUARY 18 2023 AT 1:01 PM (GMT)



# Net Zero Carbon Emissions

Category	Item	Material/Product	Input Unit	Material Type	Carbon Factor	Carbon Factor Units	Conversion Factor	Methodology
Transport factors	Laden	Van	km	Energy and Fuel	5.8E-04	tCO <sub>2</sub> e/t.km		Carbon factor taken directly from Government Carbon Factors 2022: Freighting Goods > Average van > Diesel > tonne/km.
		HGV	km	Energy and Fuel	1.0E-04	tCO <sub>2</sub> e/t.km		Carbon factor taken directly from Government Carbon Factors 2022: Freighting Goods > Average HGV > Average laden > tonne/km.
		Rail	km	Energy and Fuel	2.8E-05	tCO <sub>2</sub> e/t.km		Carbon factor taken directly from Government Carbon Factors 2022: Freighting Goods > Rail > tonne/km.
		Ship	km	Energy and Fuel	1.3E-05	tCO <sub>2</sub> e/t.km		Carbon factor taken directly from Government Carbon Factors 2022: Freighting Goods > Cargo Ship > General Cargo > Average > tonne/km.
	Unladen	Van	km	Energy and Fuel	2.3E-04	tCO <sub>2</sub> e/km		Carbon factor taken from Government Carbon Factors 2022: Delivery Vehicles > Average van > Diesel > km. Assumed average load is 1 tonnes to calculate number of return journeys.
		HGV	km	Energy and Fuel	7.8E-04	tCO <sub>2</sub> e/km		Carbon factor taken from Government Carbon Factors 2022: Delivery Vehicle > Average HGV > 0% laden > km. Assumed average load is 7.5 tonnes to calculate number of return journeys.
		Rail	km	Energy and Fuel	0.0	tCO <sub>2</sub> e/t.km		Assumed rail transport returns laden for purposes not related to the reporting contract and thus a zero carbon factor is applied.
		Ship	km	Energy and Fuel	0.0	tCO <sub>2</sub> e/t.km		Assumed ship transport returns laden for purposes not related to the reporting contract and thus a zero carbon factor is applied.



An aerial satellite-style photograph of a rural landscape. The image shows a mix of green fields, brown plowed land, and a large, dense forest. A road or path runs through the scene, and there are some small structures or buildings visible in the upper left. The overall scene is a typical agricultural or semi-rural area.

**Net Zero?**



# Net Zero



**Tree planting to offset residual carbon emissions**





- **Mandatory BNG can be a driving force for good**
- **But biodiversity data alone is not enough**
- **As a Railway industry, let's lead the way to**
  - **overcome significant gaps in Carbon & Biodiversity Accounting**
  - **integrate Net Zero, BNG & Climate Resilience for a truly sustainable railway**

# COFFEE BREAK



**SEE YOU IN 30 MINUTES AT 15:15**



**BISON**

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS

**#BISON  
#WILDINGRAILWAYS  
#MORETRAINS  
#UICSUSTAINABILITYACTIONWEEK**



**INTERNATIONAL UNION  
OF RAILWAYS**



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.*

# VEGETATION MANAGEMENT

**MICHAEL BELOW**  
**BAPTISTE BONZON & JEAN-PIERRE PUJOLS**



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FOR EUROPEAN TRANSPORT NETWORKS



## MICHAEL BELOW

**Deutsche Bahn AG, Sustainability and Environment.  
Responsible in the GUU division for strategy development  
in biodiversity and climate resilience**

**UIC Sustainable Land Use Sector Chair**

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# UIC Project TRISTRAM 2019-2020

## within the Sustainable Land Use Sector

**Dr. Michael Below**  
Sustainability Land Use Group, Chair

27/02/2023

# The „Transition Strategy on Vegetation Management“, TRISTRAM – a step stone to more sustainability

Railways face major challenges to meet all the sustainability demands:

- ❖ United Nations (UN) resolution “The 2030 Agenda for Sustainable Development” (incl. 17 Sustainable Development Goals (SDGs) and 167 targets).
- ❖ European Commission (EC) respond to the environmental challenges through the EU Green Deal and its EU Biodiversity Strategy for 2030.
- ❖ Railways are frontrunners in global climate action, but they are also aware of their impacts on nature, landscape and natural habitats.
- ❖ Therefore, the sector must engage its activities towards “cleaner, inexpensive and healthier forms of private and public transport”.





# The main goal for railways: Avoid the use of chemicals in vegetation control



Alternative methods



Optimisation of herbicide use



Standards

*Main goal: Avoid the use of chemicals wherever possible and minimise environmental impacts and risks to human health.*



New contracts



Application technologies



Digital tools

# Need to develop alternative (non-chemical) Methods



## Alternative methods

- ❖ the most promising alternative methods for vegetation control (like hot water or electro weeding beside constructive measures) are not yet ready for operational, large-scale application in track areas due to speed, efficiency e.g.
- ❖ consequently, development, optimisation and adaptation for this area of application must be pursued.



# The optimised use of herbicides must still be an option



## Optimisation of herbicide use

- ❖ Application of herbicides will retain their importance in the short to medium term.
- ❖ Optimisation and reduction of quantities required - e.g. through automatic plant detection /application systems on spray trains and two-way vehicles.
- ❖ Development /approval of sustainable herbicides for the track area.





# Existing standards have to be evaluated



## Standards

- ❖ The current paradigm of "zero vegetation in the track allowed" needs to be (re)evaluated and,
- ❖ if necessary, replaced by a new, standardised approach.



# Method combination improves flexibility



## Application technologies

- ❖ Development of technology-independent concepts like combinations of methods for vegetation control on one carrier (hybrid solution):
  - allows flexible and efficient coverage of the network,
  - improve automation and flexibility.
- ❖ robotic platforms offer a high degree of automation.



in combination with



and/or



and/or



and/or ...

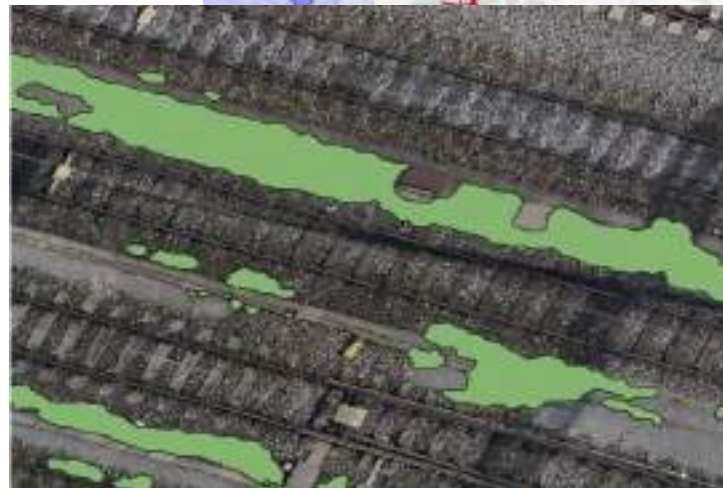


# Digital tools support the future technical and economic performance



## Digital tools

Digital tools such as geographic information systems (GIS) and databases in combination with automatic GPS-supported plant recognition /application offer numerous functions for the processes of planning, implementation and documentation as well as evaluation.





# Promote alternative methods by new tender concepts



Promote alternative methods for vegetation control and create demands (possibly through incentive schemes) by new tender concepts:

- ❖ including railway lines /sections to be treated with non-chemical methods (water protection areas e.g.) or
- ❖ tendering a whole network for vegetation control without defining specific methods (including lines with restrictions or bans of herbicides), but a certain track quality /degree of vegetation coverage.

**Tenders for vegetation management**

Tracks

Safety path

Tender 1: main tracks → mowing train

Tender 2: secondary tracks (planting yards, ...)  
→ alternative and chemical methods

Alternative methods:

- a. mowing
- b. pulling out
- c. hosing

Tender 3: main tracks outside the danger area  
→ mechanical and manual methods

**INFR/ABEL**

	Chemical methods	Biological methods	Thermal methods		
<b>DB</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>DBF</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 11</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 12</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 13</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 14</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 15</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 16</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 17</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 18</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 19</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used
<b>Infra 20</b>	Conventional chemical methods, biological methods	Herbicide-free	Not used	Herbicide-free	Not used



# The future of Vegetation Control on Railtrack starts now...

201

## UIC Strategy on the Future of Vegetation Control

**... follow us on this way:**

The railways are actively developing a holistic approach to integrated vegetation management on railway track.

The objective is to progress from a single method-based concept - spraying of conventional chemical herbicides - to an integrated, flexible, multi-method-based approach.

This new approach allows treatment to be fine-tuned to a large variety of conditions.



# Sustainable Land Use Group

says a special thanks to the members for their support



## Project participants

### Project Members

- Austria/ ÖBB:
  - Thomas SCHUH  
Chairman of the Sustainable Land Use Network
- Belgium/ SNCB-NMBS:
  - Sven VAN DRIESSCHE
- Belgium/ Infrabel:
  - Pascale HEYLEN
  - Stéphane DUFOUR
  - Jean-Pierre DEFORET
- Czech Republic/ SZDC:
  - Bohumir TRAVNICEK
- Finland/ FTA:
  - Susanna KOIVUJARVI
- France/ SNCF:
  - Jean-Pierre PUJOLS

### Project Guests

- Norway/ Bane Nor:
  - Gry DAHL
- Portugal/ Infraestruturas de Portugal:
  - Ana PELLETIER SEQUEIRA

### Consultant

- Germany/ IZT Institute for Futures Studies and Technology Assessment:
  - Roland NOLTE
  - Karolina PIETRAS-COUFFIGNAL

Collaboration with CER/Belgium: Ethem FEKIN

UIC TRISTRAM Project Manager  
Pinar YILMAZER  
Senior Advisor of the Sustainable Land Use Network

# TRISTRAM

TRANSITION STRATEGY ON VEGETATION MANAGEMENT

- Germany/ DB:
  - Michael BELOW  
Chairman of the Sustainable Land Use Network
- Italy/ FS:
  - Antonio RANUCCI
  - Serena CUZZOLA
- Netherlands/ ProRail:
  - Jeff DIKS
- Spain/ ADIF:
  - Pedro PEREZ
  - Maria RUIZ
- Sweden/ Trafikverket:
  - Carol BIRGERSSON
- Switzerland/ SBB:
  - Gunter ADOLPH



<https://uic.org/projects/article/tristram#Project-information>

<https://uic.org/IMG/pdf/uic-strategy-on-the-future-of-vegetation-control.pdf>





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## **BAPTISTE BONZON**

**Vegetation control unit of SNCF Réseau**

**In charge of research about synthesis  
phytosanitary product alternatives**

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# BISON

BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES  
FOR EUROPEAN TRANSPORT NETWORKS



## JEAN-PIERRE PUJOLS

**Vegetation control unit of SNCF Réseau**

**In charge of the formulation of the maintenance policy  
for the weeding of the platform and the maintenance  
of the green surroundings  
(technical and environmental aspects)**

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SNCF RÉSEAU  
—  
RENEWAL OF TRACK WEEDING PRODUCTION

UIC BISON MEETING  
27-02-2023

# HOW WE MANAGED GLYPHOSATE EXIT

- BE READY TO STOP ITS USE BY THE END OF 2021 ,
- ADAPT THE WEEDING TO INCREASING REGULATORY RESTRICTIONS





# BE READY FOR THE END OF GLYPHOSATE USE BY THE END OF 2021

## Main actions



### REPLACEMENT OF WEEDING TRAINS

**Purchase of weeding unit or existing trains updating** : vegetation detection, biocontrol adaptation, no-treatment areas management



### NEW PRODUCT MIX

**Mix of pelargonic acid and anti-germinative (sulfonylurea)**



### NEW SECURITY EQUIPMENT

**Increase mechanical weeding work efficiency** with a high security standard for people working near the running train area.



### YEARLY CUTTING OF "CLOSE STRIPS"

**Reinforce vegetation management close to the track** to compensate the lower efficacy of the new product and the more and more strict regulation about use of products



## A NEW PRODUCT MIX, WITH A BIOCONTROL PRODUCT REPLACING GLYPHOSATE

→ 3 alternatives products available based on acid with a contact effect with a low durability over time needing a combination with anti-germinative products (sulfonylureas).

### CAPRYLIC ACID



Dosage of 80L/ha not compatible with our weeding trains

### ACETIC ACID



Lead to rail corrosion

### PELARGONIC ACID



Only 20 days efficacy used alone during our first trials.  
Supposed to be unsuitable for railway spraying (needing "fog")



### SULFONYLUREA

Mainly Flazasulfuron  
(Iodo-sulfuron, Prosulfuron)



Antigerminative products already used at the start of the weeding season

2017 → **First trials** in small plots

2018 → Trials with weeding trains, state services dialogue to accelerate **approval for railway use of the pelargonic acid** (March 2019)

2019 → large scale trials to confirm the solution and **decision to adapt our industrial model**



**At least 60 days efficacy observed during trials combined with anti-germinative product** (to 120 days in the best conditions)

# A NEW PRODUCT MIX : RESULTS EXAMPLE OF 2020 TRIALS

Nothern part of France



Control area

Sprayed area

D+7 (26/05/20)

D+30 (18/06/20)

Control area

Sprayed area



Control area

Sprayed area

D+90 (19/08/20)





# A NEW PRODUCT MIX : RESULTS EXAMPLE OF 2022 PRODUCTION AT D+45





# A NEW PRODUCT MIX : RESULTS EXAMPLE OF 2022 PRODUCTION AT D+70



## Overall comparisons with glyphosate:

- Underwhelming effect on grasses due to contact effect → Shorter efficacy than glyphosate
- Late treatment on tall vegetation ineffective as glyphosate
- Only a little brake development for wooden stratum as glyphosate

# NEW MATERIAL FLEET : A 3 YEARS RUSH TO BE READY ON 2022

REGIONAL TRAINS for service tracks  
and single tracks (16)

+ MODERNIZED LIGHT VEHICLES  
Quads and trucks on service tracks

NATIONAL TRAINS for main tracks (5)



Treatments up to 60 km/h



- Direct injection up to 4 products (no mixture)
- Adapted to pelargonic acid (viscosity, acidity,...)
- Untreated areas : automatic cuts
- Traceability: registration of treatment data via GPS.
- Weed detection
- Controlled drift

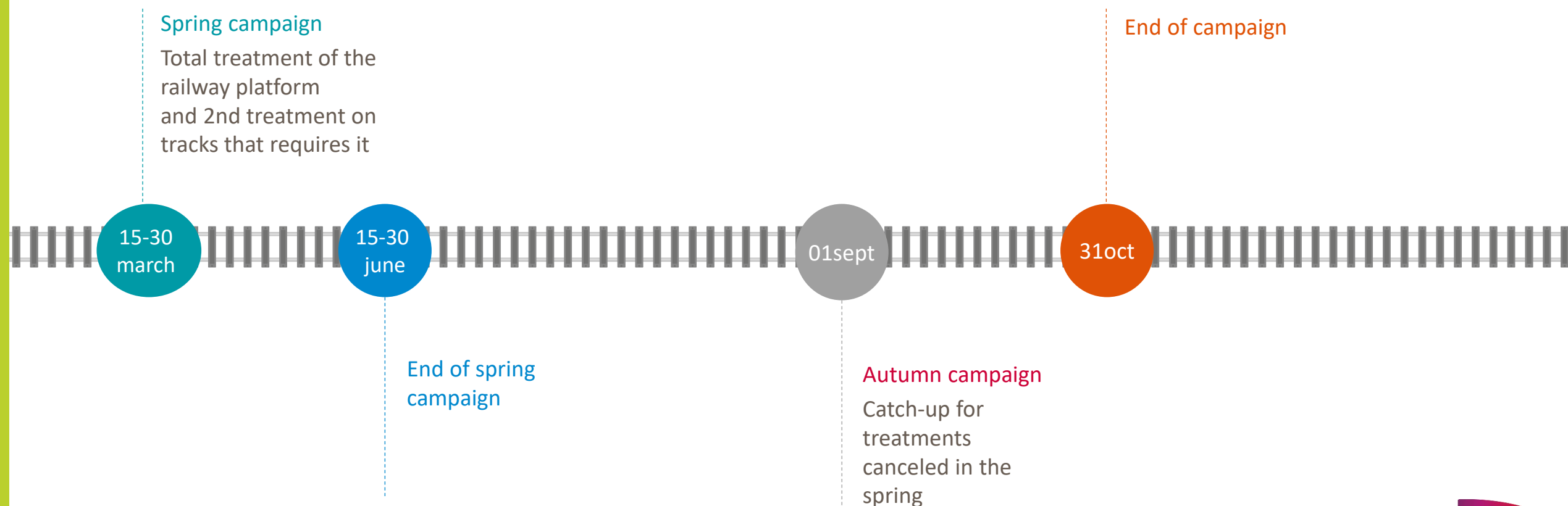


Treatments up to 45 km/h



# WEEDING ON TRACKS AND SAFETY PATHS FROM 2022

- **2 weeding campaigns** : 100% of the network in the spring + 50% on the most "degraded" network due to a lower efficacy of products without glyphosate





# REGULATORY MANAGEMENT

75 000 UNTREATED AREAS ON THE FRENCH NETWORK

1

**SUPERFICIAL WATERS** 1200km  
INCLUDING HYDRAULIC STRUCTURE  
ON SAFETY PATHS  
Around 10% of tracks

2

**UNDERGROUND WATERS**  
600km

3

**BUILDINGS HOUSING  
VULNERABLE PEOPLE**



4

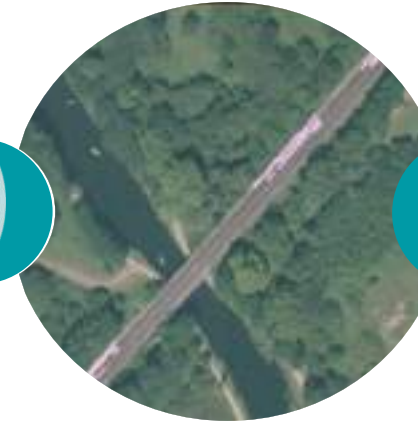
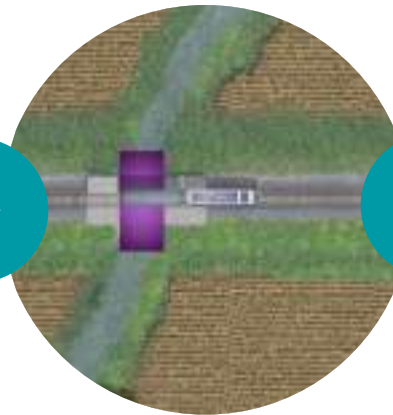
**ALL BUILT AREAS\*** (SAFETY DISTANCES  
ALONG RESIDENTS PROPERTIES)  
4500km of tracks reducible to  
2200km depending on drift  
performance



*\*New untreated areas  
integrated in 2021 with  
the residents protection  
law*

DATABASE OF **UNTREATED AREAS** INTEGRATED TO LOCALISATION AND  
ENSLAVEMENT SYSTEM OF WEEDING

# REGULATORY MANAGEMENT



A complete chain from the production of the regulations **adapted to the new spraying system and the detection**

## 1. MODELLING

Untreated areas

## 2. GPS INCORPORATING

## 3. TREATMENT'S CUT

## 4. RECORD OF TRACEABILITY

→ Surface treated reduced on average by 50% ;

→ From 2021 to 2022, the use of synthetic PPP by SNCF Réseau was divided by 8 and represents 0.005% of total volume used in France.



*Real surface treated (mostly safety paths)*

# PREVENT A NEW REGULATORY RISK AT EUROPEAN LEVEL FOR THE USE OF PPP





# PROJECT OF EUROPEAN REGULATION « SUR »

→ **Review PROJECT of the directive EU 2009/128/CE about the use of PPP to replace it by a regulation (with a direct application in all EU countries) :**

- Minimizing or replacing the use of phytosanitary products classified as toxic for aquatic life which represents a risk for root action product use.
- Banning « chemical » phytosanitary products within all “sensitive areas” including protected areas (Natura 2000, ZICO, natural reserve) which represents 40% of the French national railway network (11 780km linear)

➤ **More than 5 years of research by European railway IMs (steam, electricity, UV, waves, etc.) have demonstrated the lack of an industrial alternative to chemical weed control.**

➤ **Need to defend, by the CER to the European Commission, a common position of the infrastructure managers to consider the risk for the security of the infrastructures**

**Baptiste BONZON - Jean-Pierre PUJOLS**

Vegetation Unit

[baptiste.bonzon@reseau.sncf.fr](mailto:baptiste.bonzon@reseau.sncf.fr) - [jean-pierre.pujols@reseau.sncf.fr](mailto:jean-pierre.pujols@reseau.sncf.fr)

MERCI



# DEVELOPING TOOLS FOR ECOSYSTEM SERVICES

**SILA HUSAR (ONLINE)**  
**NEIL STRONG**



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## **SILA HUSAR**

**Postdoctoral researcher, Marie Skłodowska-Curie Fellow**

**Project Leader at Slovak University of Technology**



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**SLOVAK UNIVERSITY OF TECHNOLOGY**

**SPECTRA CE EU**

**DEVELOPING TOOLS FOR ECOSYSTEMS SERVICES**

**E-LEARNING PLATFORM**

**Sila Ceren Varis Husar, Ph.D.**

*WP2 STUBA Contact, Researcher*



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# SPECTRA – Centre Of Excellence EU – Member of BISON consortium

The Centre with its activities contributes to economic, social and cultural integration in Europe. By permanent research and proposals of the solutions for optimisation of spatial structures of settlements it helps to meet the objectives of sustainable spatial development, management and planning as well as to balancing regional disparities, improving quality of life and strengthening of social equity in Europe.

Consists of 5 subcentres representing thematic focus of R&D and Education

Awarded by the status of the “Centre of Excellence of the EU” in 2002 and in 2009

Holder of international awards for excellent projects including the best practice in UNEP UNO report



CENTRE FOR  
STRATEGIC  
PLANNING



CENTRE FOR  
SMART  
STRUCTURAL  
DEVELOPMENT



U R B A N  
S A F E T Y  
C E N T R E



SPECTRA CE  
LIVING LAB



SPECTRA CE  
C H I N A



# OBJECTIVES OF THE E-LEARNING PLATFORM

- To raise **awareness of the stakeholders** about the need, potentials and limits to harmonise the transport infrastructure and biodiversity protection
- To develop **user friendly access** to relevant information (from BISON outputs) addressing particular interest groups based on their interest on particular issues and/or on their belonging to stakeholders group
- To provide **proper access to selected data** for **active engagement** of particular stakeholders groups
- To **guide** particular interest groups through the **big pool of data and knowledge** accumulated by BISON consortium
- To safeguard **sustainable access to the know-how** on harmonisation of the transport infrastructure and biodiversity protection
- To **interlink** the BISON valuable outputs with the outputs from other EU funded projects

# TARGET GROUPS OF THE E-LEARNING PLATFORM

## ○ **Origin of the stakeholders (Stakeholder blocks)**

- EU and National level of government
- Regional and Local Governance
- Infrastructure management companies and authorities
- Planners, designers and infrastructure professionals
- Academia and scientific community
- NGOs and civil society

## ○ **Interest of the stakeholders (Thematic blocks)**

- SEA/EIA (Strategic Environmental Assessment / Environmental Impact Assessment)
- Planning and decision-making
- Design
- Development of infrastructure (roads, railways, waterways, airports, ports, or energy transport networks)

# E-LEARNING PLATFORM

- Exploitation of results
- **Bison Learning Management System**
- <https://bison.priestoroveplanovanie.sk/>



## Thematic Blocks



## Stakeholder Blocks





# MATRIX

Themes Stakeholders	Strategic Environmental Assessment	Planning the infrastructure	Designing the infrastructure
Planners			
NGOs			
Local governments			
Infrastructure companies			
...			

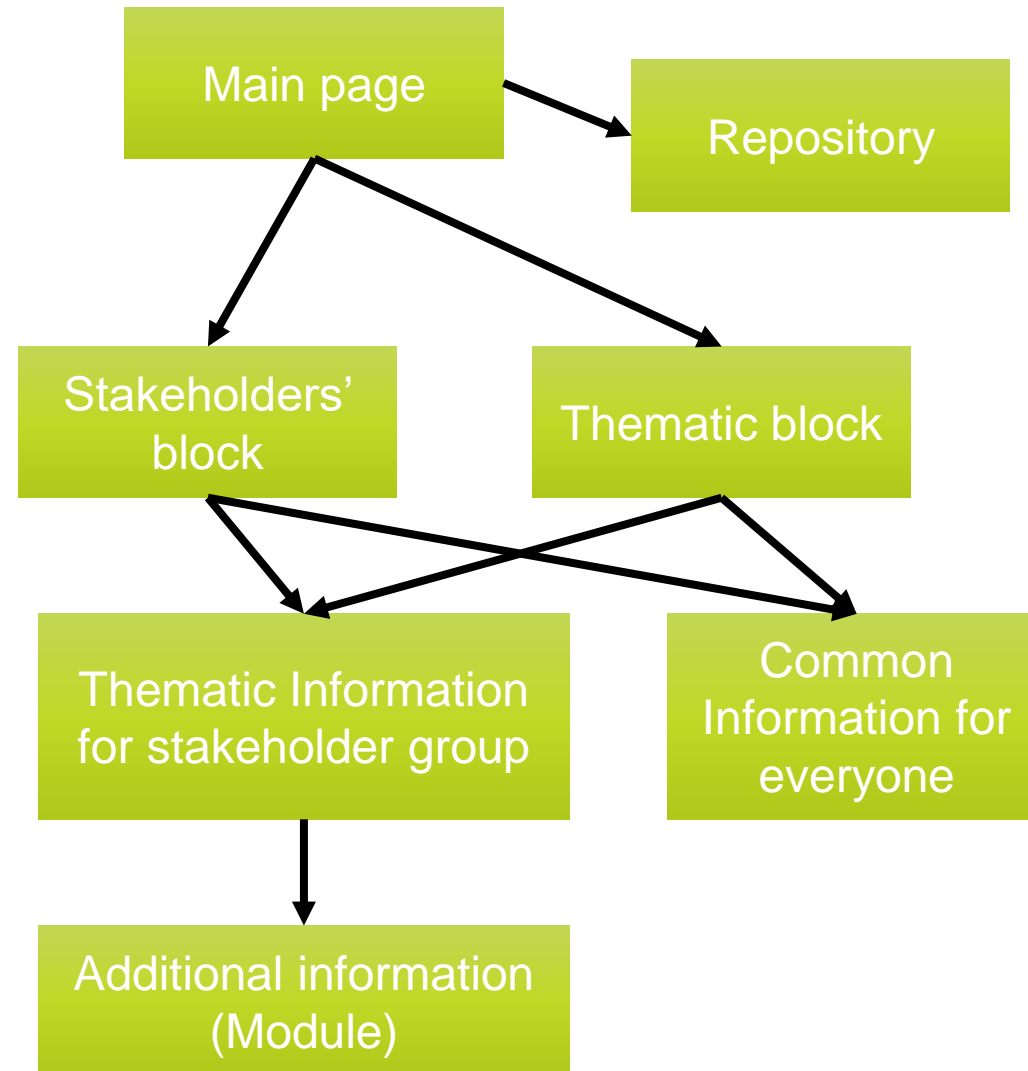
## Module for NGOs:

Includes selected knowledge across all thematic blocks related to the transport development and biodiversity protection addressing specifics of each theme relevant for NGOs

## Module on SEA:

Includes comprehensive knowledge on SEA related to the transport and biodiversity protection addressing those, who are interested specifically on SEA

# HOW DOES IT WORK?



# THANK YOU



*Sila Ceren Varis Husar, Ph.D.*

*[sila.husar@stuba.sk](mailto:sila.husar@stuba.sk)*







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**NEIL STRONG**

**Biodiversity strategy manager at Network Rail**



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# ECOSYSTEM VALUATION FOR RAILWAYS

Dr Neil Strong



# ECOSYSTEM SERVICES































# WHAT ARE THESE ACTUALLY WORTH?



## WORK PACKAGES

1. Define the requirements and look at good practice
2. Define a typical railway ecosystem
3. Collect data from a range of project and operational sites
4. Carry out analysis
5. Deliver a framework to monetise the valuation on the railway





# THANK YOU



Dr Neil Strong  
[neil.strong@networkrail.co.uk](mailto:neil.strong@networkrail.co.uk)



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**Thank you for your attention.**



# COFFEE BREAK



**SEE YOU IN 10 MINUTES AT 16:25**



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# CLOSING REMARKS

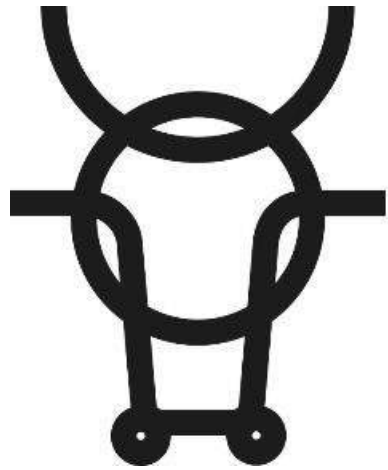
Flatland



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<https://bison-transport.eu/>



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**Thank you for your attention.**

