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.
<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
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</thead>
<tbody>
<tr>
<td>9:00 – 9:30</td>
<td>Welcome Remarks</td>
</tr>
<tr>
<td>9:30 – 10:30</td>
<td>THINK TANK DISCUSSIONS (<em>for in person participants</em>)</td>
</tr>
<tr>
<td>10:30 – 10:45</td>
<td>COFFEE BREAK</td>
</tr>
<tr>
<td>10:45 – 12:15</td>
<td>POLICIES AFFECTING LAND USE MANAGEMENT</td>
</tr>
<tr>
<td></td>
<td>LAND COVER, SEALED SURFACES AND NATURE BASED SOLUTIONS</td>
</tr>
<tr>
<td>12:15 – 13:30</td>
<td>LUNCH</td>
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<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:30 – 14:45</td>
<td>RELATIONSHIPS WITH NEIGHBOURING COMMUNITIES AND BIODIVERSITY STRATEGIES</td>
</tr>
<tr>
<td></td>
<td>BIODIVERSITY MONITORING, REPORTING AND ENHANCEMENT</td>
</tr>
<tr>
<td>14:45 – 15:15</td>
<td>COFFEE BREAK</td>
</tr>
<tr>
<td>15:15 – 16:15</td>
<td>VEGETATION MANAGEMENT</td>
</tr>
<tr>
<td>16:15 – 16:25</td>
<td>COFFEE BREAK</td>
</tr>
<tr>
<td>16:25 – 16:40</td>
<td>CLOSING REMARKS</td>
</tr>
</tbody>
</table>

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INTRODUCTION

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

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

CHRISTINE VANOPPEN
LINEAS (BE)
UIC SUSTAINABILITY PLATFORM
CHAIR

THIERRY GOGER
FEHRL (BE)
GENERAL SECRETARY
H2020 BISON PROJECT LEADER

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006661.
A New Era for Rail: More Trains for More People

UIC Sustainable Action Week

February 27, 2023
## Safety and Security Briefing

<table>
<thead>
<tr>
<th>Emergency Preparation</th>
<th>Evacuation</th>
<th>Situational Awareness</th>
<th>Health and Welfare</th>
<th>Security</th>
<th>Cybersecurity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our physical address is</td>
<td>Communicate the need to evacuate</td>
<td>Proactively identify and mitigate hazards</td>
<td>Wellness is a priority</td>
<td>See something, say something: call 800-331-0008 / text APD at 27311</td>
<td>Pay attention to phishing traps in emails</td>
</tr>
<tr>
<td>Who will call 911, and who is their backup?</td>
<td>Follow facility evacuation plan</td>
<td>Always be aware of surroundings</td>
<td>Take seasonal precautions</td>
<td>Active Shooter: Flee, Hide, Fight</td>
<td>Don’t click on links or attachments from unknown sources</td>
</tr>
<tr>
<td>Who is CPR/AED qualified?</td>
<td>Assist those who may need help evacuating</td>
<td>Follow rules and policies</td>
<td>Isolate if sick</td>
<td>Display and verify proper ID on Amtrak property</td>
<td>Report all suspicious email and cyber incidents</td>
</tr>
<tr>
<td>Emergency equipment location</td>
<td>Wait for permission to re-enter the facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evacuation plan</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

- Wellness is a priority
- Take seasonal precautions
- Isolate if sick
- 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
- 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

- 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
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.
(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.
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.
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 ILJA 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:**

**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:**

**MEASURING SUCCESS:**
- Criteria has been developed for prioritizing adaptation 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!
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006661.
The World needs approximately $94 trillion in infrastructure investment by 2040 to meet sustainable development needs and ensure that no one is left behind.

75% of infrastructure required in developing countries by 2030 is yet to be built. This presents a significant opportunity for countries to scale up activities on sustainable procurement of infrastructure.

Public procurement makes up a significant portion of public budgets (average of 12% of GDP in OECD countries).

12% of new roads network by 2050 (60 million 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
WHAT DOES INFRASTRUCTURE AND BIODIVERSITY RESEARCH REALLY REPRESENT TODAY?

- Global infrastructure fundings
  90T$ until 2040
  +/- 3000 B$/year (OECD 2021)

- Environmental impact assessment
  +/- 150 B$/year (OECD 2019) (5%)

- Biodiversity assessment
  +/- 50B$/year (CBD 2018) (1,5%)

- Research on infrastructure and Biodiversity +/- ?
**ORIGIN OF THE BISON PROJECT**

**European Linear Transport Infrastructure (TI) Development**

**General facts**
- 43 Countries
- 23 million km²
- 845 million people

**TI facts**
- Roads (34 countries): 4.6 million km
- Railways (30): 0.4 million km
- Waterways (33): 0.04 million km
- Pipelines (33): 0.04 million km
- Powerlines (33): 0.6 million km

**Infrastructure Length (Europe)**

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.
Evolutions of research in infrastructure and biodiversity

More than 80% of research publications on infrastructure and biodiversity are based on road examples (Bison 2022)
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\(^{st}\) January 2021

**Duration:** 30 months (end date 30\(^{th}\) 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

- WP1 - PROJECT MANAGEMENT
- WP3 - EXISTING AND FUTURE SYNERGY BETWEEN INFRASTRUCTURE AND BIODIVERSITY
- WP4 - TOWARDS A RESEARCH AGENDA FOR EUROPE
- WP5 - TOWARDS DEPLOYMENT
- WP2 - COMMUNICATION, DISSEMINATION AND EXPLOITATION OF RESULTS TO STRENGTHEN PARTNERSHIPS

SRDA
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
EXEMPLES 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.
• **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

Global
Regional /EU
National

Current potential of knowledge: a challenge to cross borders

Joint actions to break silos and coordinate actors

Potential of future needs to optimise resources
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
THANK YOU FOR YOUR ATTENTION

Visit us at http://bison-transport.eu
Coffee Break & Think Thank

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

#BISON
#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK
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

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

SEE YOU IN 15 MINUTES AT 10:45

#BISON
#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK
POLICIES AFFECTING BIODIVERSITY STRATEGIES AND LAND USE TOPICS

YANNICK AUTRET
ETHEM PEKIN

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

Research and Innovation Department of the French Ministry of Ecological Transition

H2020 BISON Project Leader

Watch at UIC’s YouTube Channel

#BISON
#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK
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
What does infrastructure and biodiversity research really represent today?

- Global infrastructure fundings: +/- 90T$ until 2040, +/- 3500 B$/year (OECD 2022)
- Environmental impact assessment: +/- 150 B$/year (OECD 2019)
- Biodiversity assessment: +/- 50B$/year (CBD 2018)
  75-95B$/year (OECD 2020)
- Research on infrastructure and 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.
A paradox: more complex needs but less disruptive research and innovation
Mobility and biodiversity at a nexus of challenges for policies

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
ETHEM PEKIN

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

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#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK

Watch at UIC’s YouTube Channel
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 km²
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

Protect Nature

Enable Transformative Change

Restore Nature

EU For An Ambitious Global Agenda
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
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
Opportunities

- 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:

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For regular updates on CER activities, visit our website: www.cer.be
or follow @CER_railways | CER | LinkedIn
LAND COVER, SEALED SURFACES AND NATURE-BASED SOLUTIONS

CARME ROSSELL
THOMAS SCHAUPPENLENHER

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

Senior Research Consultant at Minuartia
Researcher at University of Barcelona (UB)
BISON WILDING RAILWAYS

Biodiversity and Infrastructure synergies for railways

Land cover, sealed surfaces and nature-based solutions

Carme Rosell – Minuartia, EU BISON Project

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## THE BISON PROJECT

### HORIZON 2020

<table>
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<th><strong>BISON</strong></th>
<th>Biodiversity and Infrastructure Synergies and Opportunities for European Transport Networks</th>
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<tr>
<td><strong>Consortium</strong></td>
<td>44 partners - 16 countries</td>
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<tr>
<td><strong>Budget</strong></td>
<td>~ 3 M€</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Jan 2021 – Jun 2023</td>
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*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 Deployement
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

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

Biodiversity loss

‘Living Planet Index’ 1970 - 2020

Source: www.ipcc.ch/report/ar6/wg1/
Transport: ‘decarbonization’, electric, automated, connected, shared
Railways plays a key role
• **Infrastructure**: Adapt infrastructure to climate change to increase resilience, upgrade existing infrastructure, apply new technologies
Biodiversity - Invasive species

Invasive species call for management plans and require high maintenance investments.
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.

Carver et al., 2021
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)
• **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.
- **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
‘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 - crosell@minuartia.com

MINUARTIA  BISON Project

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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

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#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK
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
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

- 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

<table>
<thead>
<tr>
<th>Invasive alien species</th>
<th>Costs</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow-leaved ragwort (Senecio inaequidens)</td>
<td>€ 100,000-</td>
<td>on rail tracks</td>
</tr>
<tr>
<td>Summer lilac (Buddleja davidii)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Giant hogweed (Heracleum mantegazzianum)</td>
<td>€ 53,000-</td>
<td>In vulnerable areas of the railroad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>€ 2,3 Mio.</td>
</tr>
<tr>
<td>Japanese knotweed (Fallopia japonica)</td>
<td>€ 2,4 Mio.</td>
<td>on rail tracks and dams</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>€ 4,853 Mio</strong></td>
<td></td>
</tr>
</tbody>
</table>
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
- 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
- Energy production
  - Combination of grazing and photovoltaics
- Communication
  - Information of local population
  - Education
- Conflicts
  - Dogs
  - Fence crosses walking tracks

- Area guideline through long-term GPS tracking

- Energy production
- Combination of grazing and photovoltaics
- Communication
- Information of local population
- Education
- 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

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

#### Parameter

<table>
<thead>
<tr>
<th>Parameter für die Berechnung des PV-Potentials auf Grönland</th>
<th>Werte</th>
<th>Beschreibung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grenzwert PV-Module</td>
<td>300</td>
<td>Mindestmodulzahl für die Potenzialabschätzung (Stück)</td>
</tr>
<tr>
<td>Grenzwert Fläche</td>
<td>10000</td>
<td>Mindestgröße der Fläche (m²)</td>
</tr>
<tr>
<td>Wirkungsgrad</td>
<td>20.00%</td>
<td>monokristallin: 20 - 22 % polykristallin: 15 - 20 %</td>
</tr>
<tr>
<td>Nutzbare Freifläche</td>
<td>60.00%</td>
<td>Abschätzung des Abdeckungsgrades der Fläche mit PV-Modulen</td>
</tr>
<tr>
<td>Modulgröße</td>
<td>1,78 m² (380W)</td>
<td></td>
</tr>
<tr>
<td>Einspeisungsrabatt</td>
<td>€ 0,199</td>
<td>Mittelwerte Stromverbraucher Österreich</td>
</tr>
<tr>
<td>Strompreis</td>
<td>€ 0,140</td>
<td>Der Preis für eine Kilowattstunde (€/kWh) Strom liegt österreichweit zwischen 0,17 und 0,22 Euro (e-control.at); Unternehmen sind teilweise weit darunter (6-7 Ct)</td>
</tr>
</tbody>
</table>

#### Kohlenstoffäquivalente je Produktionsform

<table>
<thead>
<tr>
<th>CO2e_PV (gCO2e/kWh)</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2e_WASSER</td>
<td>97</td>
</tr>
<tr>
<td>CO2e_WIND</td>
<td>4</td>
</tr>
<tr>
<td>CO2e_BIOmass</td>
<td>98</td>
</tr>
<tr>
<td>CO2e_GAS</td>
<td>78</td>
</tr>
<tr>
<td>CO2e_COAL</td>
<td>109</td>
</tr>
</tbody>
</table>

#### Ergebnisse

<table>
<thead>
<tr>
<th>Anzahl Module (1,7m², 380W)</th>
<th>602.675 Stück</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximale Modulanzahl auf einer Fläche</td>
<td>29.104 Stück</td>
</tr>
<tr>
<td>Stromproduktion pro Jahr</td>
<td>238.127.460 kWh</td>
</tr>
<tr>
<td>Einkünfte bei Einspeisung</td>
<td>€ 23.812.746,05</td>
</tr>
<tr>
<td>Einsparungen bei Direktverbrauch</td>
<td>€ 33.337.844,47</td>
</tr>
</tbody>
</table>

#### CO2e Einsparungspotenzial

<table>
<thead>
<tr>
<th>CO2e Einsparungen gegenüber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasser</td>
</tr>
<tr>
<td>Wind</td>
</tr>
<tr>
<td>Biomasse</td>
</tr>
<tr>
<td>Gas</td>
</tr>
<tr>
<td>Kohle</td>
</tr>
</tbody>
</table>

- 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
- Resource for potential analysis towards sustainable development goals and site management addressing social, ecological and economical aspects
- Estimation of areas for renewable energy development
- Estimating SDG contributions
THE POTENTIAL OF RAILWAYS ASSOCIATED AREAS

UIC Sustainability Action Week
Paris, 27.02.2023

Thank you!

Thomas Schauppenlehner
BOKU University of Natural Resources and Life Sciences
thomas.schauppenlehner@boku.ac.at
LUNCH BREAK

SEE YOU AT 13:30

#BISON
#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK

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

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

Chief Executive of Clinton Devon Estates

Chair of the “Varley Review”

Ex Board Member of the UK Environment Agency

#BISON
#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK
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
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
Follow Sandra Laville

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 other methods to prevent the problem.
RECORDED INCIDENTS INVOLVING TREES OR BRANCHES
JO JOHNSON MP – RAIL MINISTER 2018
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
NO ONE WAS HAPPY...

The Rail industry

Community groups, NGOs and public
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.

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
ABBEY 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 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
THOMAS SCHUH
Sustainability Coordinator at ÖBB-Infrastruktur AG
UIC Sustainable Land Use Sector Chair

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#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK

Watch at UIC’s YouTube Channel

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ECOLOGICAL EFFECTS OF RAILWAYS ON WILDLIFE

rEvERsE (UIC 2020 – 2022)

Thomas Schuh
Sustainable Landuse Group - Chair

UIC – Sustainable Action Week 2023, BISON – WILDING RAILWAYS, 27.02.2023, UIC HQ Paris
The age of multiple crises - ANTHROPOCENE!
2015 – humanity agreed on a plan!

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

Railway corridor - 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

[https://uic.org/projects/article/reverse](https://uic.org/projects/article/reverse)
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 competences 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 lifestyle 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, avoiding 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.
Put in place the specialist skills

Case Study: ÖBB-Infrastruktur AG
Railway Ecology course - part of internal environmental training

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

Reforestation with elementary school students
Analyses and KPIs

✓ Common approaches for vegetation management by railway companies

NOT YET FOR BIODIVERSITY

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

Ref: UIC – European Railway Strategy and Actions for Biodiversity, 2022
### Zone Terminology Description

<table>
<thead>
<tr>
<th>Zone</th>
<th>Terminology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Ballast bed</td>
<td>Part of the track bed made of ballast or gravel, including embedded sleepers and rails.</td>
</tr>
<tr>
<td></td>
<td>Slab track</td>
<td>Concrete track bed structure. Different concrete track bed structure types are possible and, in some cases, may include a ballast shoulder.</td>
</tr>
<tr>
<td>C</td>
<td>Transition area</td>
<td>Part of the track bed abutting the slope on both sides of the ballast bed and including a footpath for maintenance/inspections, as well as walkways and spacing areas between tracks in the case of double or multiple tracks. In some cases, drainage ditches are also constructed in area C.</td>
</tr>
<tr>
<td>C1</td>
<td>Spacing area</td>
<td>The area outside of the tracks.</td>
</tr>
<tr>
<td>C2</td>
<td>Side walkways</td>
<td>Slopes alongside the track adjoining Area C, in which vegetation may affect the operational envelope.</td>
</tr>
<tr>
<td>B</td>
<td>Ballast shoulder</td>
<td>The area outside of the tracks. Power stations, service facilities, unsealed paths, areas around substations, unsealed areas around railway stations, forest land, meadows and unsealed fallow land.</td>
</tr>
<tr>
<td>D</td>
<td>Lineside (cuttings or embankments)</td>
<td>Slopes alongside the track adjoining Area C, in which vegetation may affect the operational envelope.</td>
</tr>
<tr>
<td>E</td>
<td>Unsealed area outside of the tracks</td>
<td>Power stations, service facilities, unsealed paths, areas around substations, unsealed areas around railway stations, forest land, meadows and unsealed fallow land.</td>
</tr>
</tbody>
</table>

### Value biodiversity & natural assets

**Beneficial / Harmful Effects**
Monitor the outcomes

Digitalisation on EU Railways

<table>
<thead>
<tr>
<th>Species groups</th>
<th>Habitats</th>
<th>Details of taxa:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds</td>
<td>Plants</td>
<td>Reptiles</td>
</tr>
<tr>
<td>Amphibians</td>
<td>Bats</td>
<td>Mammals</td>
</tr>
<tr>
<td>Insects</td>
<td>Fish</td>
<td></td>
</tr>
</tbody>
</table>

Number of countries

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

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

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

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

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#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK

Thank you for your attention.
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006661.
SYLVAIN MOULHERAT

TerrOïko Founder

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

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#WILDINGRAILWAYS
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Watch at UIC’s YouTube Channel
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MANAGEMENT & MONITORING OF BIODIVERSITY

SEA Rail High Speed Line
LISEA

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

<table>
<thead>
<tr>
<th>Domain</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railway domain</td>
<td>2,200</td>
</tr>
<tr>
<td>Unused areas</td>
<td>1,600</td>
</tr>
<tr>
<td>Environmental</td>
<td>3,776</td>
</tr>
<tr>
<td>offsets</td>
<td></td>
</tr>
<tr>
<td>Reforestation</td>
<td>2,200</td>
</tr>
</tbody>
</table>
**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 NATURALS HABITATS

WETLANDS

GRASSLANDS, CROPS

CHALK GRASSLAND

FORESTS
OFFSET AREAS

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
ECOLOGICAL CONTINUITY STRUCTURES

842 structures to ensure ecological continuity
02

MONITORING
ENIRONMENTAL 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
### ENVIROMENTAL OBSERVATORY’S PARTNERS

<table>
<thead>
<tr>
<th>Roles</th>
<th>Entities</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Guarantee the robustness of the scientific approach (statistical methodology, research, analysis, ...).</td>
<td><img src="image" alt="Scientific Partners" /></td>
</tr>
<tr>
<td>▪ Bring the specific knowledge of the protected species (#223) and habitats</td>
<td><img src="image" alt="Associations Partners" /></td>
</tr>
<tr>
<td>▪ Carry out ecological monitoring</td>
<td><img src="image" alt="Institutional Partners" /></td>
</tr>
<tr>
<td>▪ Coordinate actions with local actors (land owners ...)</td>
<td><img src="image" alt="Consultants Partners" /></td>
</tr>
<tr>
<td>▪ Apply technical protocols</td>
<td><img src="image" alt="Entities" /></td>
</tr>
</tbody>
</table>
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
BIOLOGICAL MONITORINGS

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**
BIOLOGICAL MONITORINGS

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
DATA SPREADING AND 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
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006661.

JULIA BAKER
Technical Director of Nature Services at Mott MacDonald

#BISON
#WILDINGRAILWAYS
#MORETRAINS
#UICSUSTAINABILITYACTIONWEEK

Watch at UIC’s YouTube Channel
Railways & Biodiversity Net Gain?

Dr Julia Baker
Biodiversity Net Gain

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

<table>
<thead>
<tr>
<th>Ref</th>
<th>Broad Habitat</th>
<th>Habitat Type</th>
<th>Area (hectares)</th>
<th>Distinctiveness</th>
<th>Score</th>
<th>Condition</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Heathland and shrub</td>
<td>Hazel scrub</td>
<td>1</td>
<td>Medium</td>
<td>4</td>
<td>Moderate</td>
<td>2</td>
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<tr>
<td>2</td>
<td>Woodland and forest</td>
<td>Other woodland, broadleaved</td>
<td>1.2</td>
<td>Medium</td>
<td>4</td>
<td>Poor</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Grassland</td>
<td>Other neutral grassland</td>
<td>0.8</td>
<td>Medium</td>
<td>4</td>
<td>Good</td>
<td>3</td>
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<td>4</td>
<td>Grassland</td>
<td>Modified grassland</td>
<td>0.3</td>
<td>Low</td>
<td>2</td>
<td>Poor</td>
<td>1</td>
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</tbody>
</table>
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

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

<table>
<thead>
<tr>
<th>Season</th>
<th>Baseline (1981-2000)</th>
<th>RCP6 Change from baseline</th>
<th>Final</th>
<th>RCP8.5 Change from baseline</th>
<th>Final</th>
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</thead>
<tbody>
<tr>
<td>Winter</td>
<td>2.9</td>
<td>1.2</td>
<td>4.1</td>
<td>1.8</td>
<td>4.7</td>
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<tr>
<td>Spring</td>
<td>6.8</td>
<td>1.1</td>
<td>7.9</td>
<td>1.7</td>
<td>8.5</td>
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<tr>
<td>Summer</td>
<td>13.6</td>
<td>1.6</td>
<td>15.2</td>
<td>2.5</td>
<td>16.1</td>
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<tr>
<td>Autumn</td>
<td>8.5</td>
<td>1.4</td>
<td>9.9</td>
<td>2.2</td>
<td>10.7</td>
</tr>
</tbody>
</table>

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.pwuk/natural-england
rspb
Giving Nature a Home
Natural England
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
## Net Zero Carbon Emissions

<table>
<thead>
<tr>
<th>Category</th>
<th>Item</th>
<th>Material/Product</th>
<th>Input Unit</th>
<th>Material Type</th>
<th>Carbon Factor</th>
<th>Conversion Factor</th>
<th>Methodology</th>
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<tbody>
<tr>
<td><strong>Transport</strong></td>
<td><strong>Factors</strong></td>
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<td></td>
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<tr>
<td><strong>Laden</strong></td>
<td>Van</td>
<td>km Energy and Fuel</td>
<td>km</td>
<td></td>
<td>5.8E-04</td>
<td>tCO₂e/t.km</td>
<td>Carbon factor taken directly from Government Carbon Factors 2022: Freightings Goods &gt; Average van &gt; Diesel &gt; tonne/km.</td>
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<td>HGV</td>
<td>km Energy and Fuel</td>
<td>km</td>
<td></td>
<td>1.0E-04</td>
<td>tCO₂e/t.km</td>
<td>Carbon factor taken directly from Government Carbon Factors 2022: Freightings Goods &gt; Average HGV &gt; Average laden &gt; tonne/km.</td>
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<td>km Energy and Fuel</td>
<td>km</td>
<td></td>
<td>2.8E-03</td>
<td>tCO₂e/t.km</td>
<td>Carbon factor taken directly from Government Carbon Factors 2022: Freightings Goods &gt; Rail &gt; tonne/km.</td>
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<tr>
<td></td>
<td>Ship</td>
<td>km Energy and Fuel</td>
<td>km</td>
<td></td>
<td>1.3E-05</td>
<td>tCO₂e/t.km</td>
<td>Carbon factor taken directly from Government Carbon Factors 2022: Freightings Goods &gt; Cargo: Ship &gt; General Cargo &gt; Average &gt; tonne/km.</td>
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<tr>
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<td>Van</td>
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<td>km</td>
<td></td>
<td>2.9E-04</td>
<td>tCO₂e/km</td>
<td>Carbon factor taken from Government Carbon Factors 2022: Delivery Vehicles &gt; Average van &gt; Diesel &gt; km. Assumed average load is 1 tonnes to calculate number of return journeys.</td>
</tr>
<tr>
<td></td>
<td>HGV</td>
<td>km Energy and Fuel</td>
<td>km</td>
<td></td>
<td>7.8E-04</td>
<td>tCO₂e/km</td>
<td>Carbon factor taken from Government Carbon Factors 2022: Delivery Vehicle &gt; Average HGV &gt; 0% laden &gt; km. Assumed average load is 7.5 tonnes to calculate number of return journeys.</td>
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<tr>
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<td>Rail</td>
<td>km Energy and Fuel</td>
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<td>0.0</td>
<td>tCO₂e/t.km</td>
<td>Assumed rail transport returns laden for purposes not related to the reporting contract and thus a zero carbon factor is applied.</td>
</tr>
<tr>
<td></td>
<td>Ship</td>
<td>km Energy and Fuel</td>
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<td></td>
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</tr>
</tbody>
</table>
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

Julia.Baker@mottmac.com
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006661.

COFFEE BREAK

SEE YOU IN 30 MINUTES AT 15:15

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#UICSUStAINABILITYACTIONWEEK
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006661.
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”.

If transport is a part of the problem, railways are a part of the solution!
The main goal for railways:
Avoid the use of chemicals in vegetation control

Main goal: Avoid the use of chemicals wherever possible and minimise environmental impacts and risks to human health.
Need to develop alternative (non-chemical) 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

❖ 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

❖ 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

- 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.
Digital tools support the future technical and economic performance

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

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

https://uic.org/projects/article/tristram#Project-information
Stay in touch with UIC:

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#UICrail

Thank you for your attention.
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006661.

BAPTISTE BONZON
Vegetation control unit of SNCF Réseau
In charge of research about synthesis phytosanitary product alternatives

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Watch at UIC’s YouTube Channel
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)
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
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

**PELARGONIC ACID**

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

**ACETIC ACID**

- Lead to rail corrosion

**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

Northern part of France

Control area
Sprayed area

D+7 (26/05/20)

Control area
Sprayed area

D+30 (18/06/20)

Control area
Sprayed area

D+90 (19/08/20)
A NEW PRODUCT MIX: RESULTS EXAMPLE OF 2022 PRODUCTION AT D+45

Untreated area

Treated area

Untreated area
Interne SNCF Réseau

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

Elephant grass: no chemical solution
NEW MATERIAL FLEET: A 3 YEARS RUSH TO BE READY ON 2022

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

REGIONAL TRAINS for service tracks and single tracks (16)

- Treatments up to 45 km/h

+ MODERNIZED LIGHT VEHICLES
  - Quads and trucks on service tracks
2 weaving campaigns: 100% of the network in the spring + 50% on the most "degraded" network due to a lower efficacy of products without glyphosate.
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
1. MODELLING
Untreated areas

2. GPS INCORPORATING

3. TREATMENT’S CUT

4. RECORD OF TRACEABILITY

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

→ 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
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 - jean-pierre.pujols@reseau.sncf.fr
DEVELOPING TOOLS FOR ECOSYSTEM SERVICES

SILA HUSAR (ONLINE)
NEIL STRONG

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

SILA HUSAR

Postdoctoral researcher, Marie Skłodowska-Curie Fellow
Project Leader at Slovak University of Technology

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006661.
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
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 form 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/
<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Themes</th>
<th>Strategic Environmental Assessment</th>
<th>Planning the infrastructure</th>
<th>Designing the infrastructure</th>
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<tbody>
<tr>
<td>Planners</td>
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</tbody>
</table>

**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?

Main page

Repository

Stakeholders’ block

Thematic block

Thematic Information for stakeholder group

Common Information for everyone

Additional information (Module)
THANK YOU

Sila Ceren Varis Husar, Ph.D.
sila.husar@stuba.sk
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101006661.

NEIL STRONG

Biodiversity strategy manager at Network Rail

Watch at UIC’s YouTube Channel
ECOSYSTEM SERVICES

- Climate regulation
- Water regulation
- Erosion prevention
- Aesthetics
- Supporting
- Cultural
- Security
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

https://uic.org/projects/article/ecov4r
THANK YOU

Dr Neil Strong
neil.strong@networkrail.co.uk
Stay in touch with UIC:

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