BISON

"BIODIVERSITY AND INFRASTRUCTURE":

AN ONLINE HANDBOOK FOR PROMOTING COOPERATION AND TRANSFORMATIVE CHANGE

POLICY BRIEF

EXECUTIVE SUMMARY

Sustainable transport infrastructure is fundamental for economic and social progress. To achieve this, we must embrace new innovative solutions while replicating best practices that benefit nature. Alongside increasing infrastructure resilience and safety, we need transformative changes in transport infrastructure development that go beyond prioritising decarbonisation and digitalisation, and seek to restore nature, safeguard biodiversity and produce positive outcomes for human societies.

"Biodiversity and infrastructure: a handbook for action", developed in cooperation with Infrastructure & Ecology Network Europe (IENE) and based on the "Wildlife and Traffic handbook", is a key tool for achieving such goals. It is designed to enhance knowledge transfer and capacity building, empowering the transport and ecology sectors to work together to achieve sustainable infrastructure development. It provides access to concise, up-to-date and essential information, presenting clear technical instructions for the planning, design and maintenance of effective measures to protect biodiversity in infrastructure development aligned with global and European biodiversity policies.

KEY POLICIES RECOMMENDATIONS

In 2022, the Kunming-Montreal Global Biodiversity Framework emerged from significant progress in global environmental policy. This framework prioritises safeguarding the integrity of all ecosystems, including those altered by human activities. The United Nations Decade for Ecosystem Restoration goes further, making restoration a major nature-based solution for achieving sustainable development goals. In Europe, the "EU Biodiversity Strategy 2030" and the Nature Restoration Law set out an ambitious and detailed plan to safeguard nature and combat the degradation of ecosystems.

In the field of transport infrastructure, the handbook **"Biodiversity and infrastructure"** offers major guidance for achieving these political goals. Its key policy recommendations are the following:

- Integrate biodiversity within the life-cycle of infrastructure projects
- Apply the mitigation hierarchy
- Implement solutions to reduce impacts and benefit people and wildlife
- Monitor and evaluate applied solutions
- Maintain ecological assets on infrastructure operation.

INTRODUCTION

In 2022, political progress on biodiversity at the global level led 193 countries to sign the Kunming-Montreal Global Biodiversity Framework. This framework gives priority to strengthening the integrity, connectivity and resilience of all ecosystems. In Europe, restoring ecosystems and enhancing biodiversity is the cornerstone of the European Green Deal. Ensuring healthy ecosystems and combating climate change are intrinsically linked. The European Biodiversity Strategy and the Nature Restoration Act propose that Member States implement national adaptation strategies that promote nature-based solutions and ecosystem-based adaptation to restore ecosystems and cope with climate change.

The handbook **"Biodiversity and infrastructure"** has been designed in cooperation with IENE to help build resilient, efficient and sustainable infrastructure. It also meets the need to rethink transport itself and to change policies, investments and behaviours to reduce unnecessary transport demand.

The time for a transformative change in transport development has come. One that pursues positive outcomes for biodiversity from the outset, while still delivering on risk management and adaptation to climate change. To successfully implement this change, it is essential to engage all stakeholders in mainstreaming biodiversity at every stage of the infrastructure life-cycle (Figure 2).
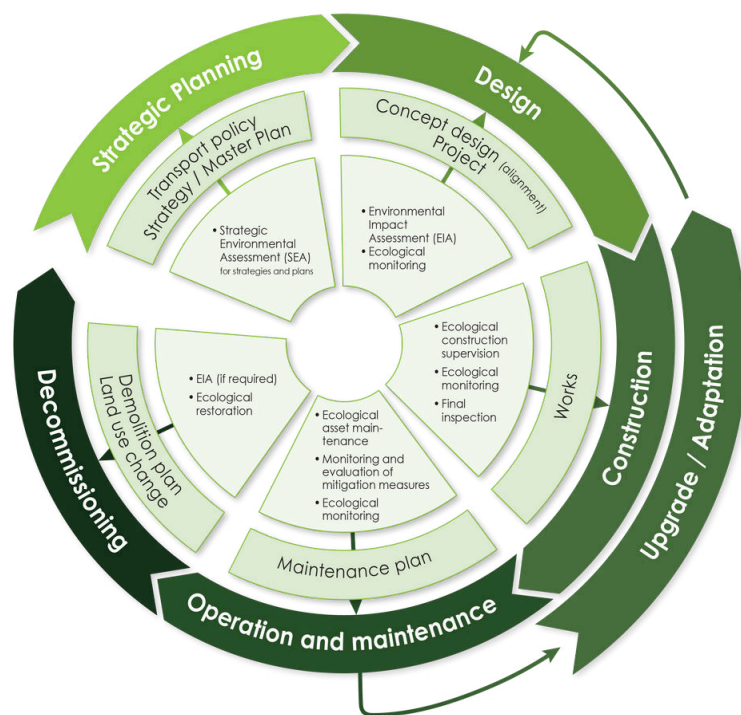

Figure 2: Biodiversity must be integrated through the entire life-cycle of the infrastructure. The handbook provides recommendations for actions to be undertaken, particularly in the design, operation and upgrade phases (Source: BISON - IENE Biodiversity and Infrastructure, Rosell et al eds, 2023)

The most relevant recommendations to develop policies that promote biodiversity-friendly infrastructure development and operational practices are highlighted below. By integrating these guidelines into decision-making processes, policymakers, practitioners and stakeholders can collectively work towards creating a transport network that harmonises with nature, fosters resilience and has a positive effect on biodiversity.

LESSONS FOR POLICY AND PRACTICE

With regard to environmental governance on a global and European scale, lessons that decision-makers and practitioners can draw from the knowledge compiled in the handbook **"Biodiversity and infrastructure"** are the following:

INTEGRATING BIODIVERSITY WITHIN THE LIFE-CYCLE OF INFRASTRUCTURE PROJECTS

In line with **Target 1** of the Kunming-Montreal Global Biodiversity Framework, **all areas should be planned or managed to bring the loss of areas of high biodiversity importance close to zero**. The handbook **"Biodiversity and infrastructure"** provides the following recommendations:

- **Identify needs and constraints** for both transport and biodiversity, to find appropriate solutions before any development is undertaken.

- **Develop synergic solutions that tackle both climate change adaptation of infrastructures and nature restoration opportunities**. As nature restoration will make a major contribution to climate objectives, the EU Biodiversity Strategy foresees that a significant part of the 25% of the EU budget dedicated to climate action should be spent on biodiversity and nature-based solutions.

- **Upgrade existing infrastructure by implementing innovative, sustainable, nature-based solutions** that integrate biodiversity, contain pollution, mitigate barrier and mortality effects, restore ecological connectivity, and enhance green infrastructure in the landscape. As outlined in the EU Biodiversity Strategy, the promotion of healthy ecosystems, green infrastructure and nature-based solutions should be systematically integrated into urban planning, including public spaces, infrastructure, and the design of buildings and their surroundings.

- **Ensure effective cooperation amongst stakeholders throughout the entire life-cycle of infrastructure projects,** from plans and programmes to design phases – and beyond to maintenance and decommissioning.

- **Include meaningful consultations with local communities and other relevant stakeholders when planning infrastructure**, especially during the strategic planning and design phases.

APPLYING THE MITIGATION HIERARCHY

In line with the European **directive on environmental liability regarding the prevention and remedying of environmental damage** [1], the handbook **"Biodiversity and infrastructure"** provides the following recommendations:

- **Apply the mitigation hierarchy ('avoidance-reduction-compensation') when assessing and addressing the impacts of transport on nature** across all stages of the infrastructure life-cycle. This applies to direct, indirect and cumulative effects, and at both strategic and project level (Figure 3).

- **Focus on avoidance, as the only measure that guarantees the absence of impact**. The aim is to strengthen biodiversity considerations in the execution of Strategic Environmental Assessments (SEA) to influence subsequent Environmental Impact Assessments (EIA). A strategic approach also allows better consideration of ecological connectivity and cumulative impacts in the application of the mitigation hierarchy.

- **Consider the interaction between avoidance, reduction and compensation measures in** strategic landscape planning to achieve biodiversity No Net Loss and Net Gain goals.

- **Define the compensation approach in consultation with local communities**, by identifying targets for compensation and desired outcomes, as well as equivalency principles, appropriate currencies and metrics to implement and monitor compensation.
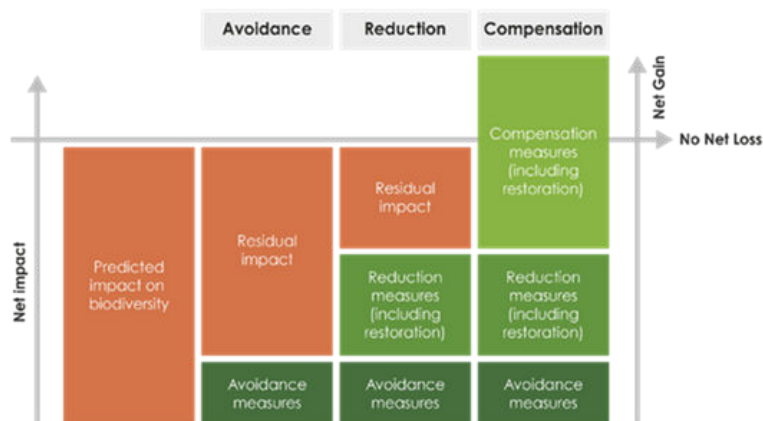

Figure 3: Balance between predicted impact of a project and net gains produced by implementing the mitigation hierarchy (Source: Adapted from BBOP, BISON - IENE Biodiversity and Infrastructure, Rosell et al eds, 2023)

IMPLEMENTING SOLUTIONS TO REDUCE IMPACTS AND BENEFIT PEOPLE AND WILDLIFE

The European Nature Restoration Law requires EU countries to develop plans that take into account the pressures, threats and drivers of biodiversity loss, and to cooperate to ensure restoration and connectivity. To meet these requirements, the handbook **"Biodiversity and infrastructure"** provides the following recommendations:

- **Preserve and/or restore ecological connectivity** across infrastructures, allowing animal movement and providing safe crossing structures (Figure 4). This will reduce the infrastructure barrier effect and help to restore ecosystems, particularly in ecological corridors connecting protected areas. Such actions will contribute to the long-term persistence of wildlife populations, improving their opportunities for climate change adaptation.

- **Apply evidence-based mitigation measures to reduce the risk of wildlife mortality** and to increase infrastructure safety and functionality. Examples of mortality that can be avoided include animal-vehicle collisions, animal drownings in waterways, bird strikes at airports, bird collisions or electrocutions with railways catenaries or powerlines, bird collisions with transparent screens, or animals being trapped in any parts of the infrastructure.

- **Apply Nature-based Solutions (NbS) to drainage systems, verges, and other green and blue areas design and maintenance, helping to reduce the climate risk events** which cause negative impacts on both infrastructure and surrounding habitats and urbanised areas (e.g. floods, forest fires or erosion) (Figure 5). This recommendation is encouraged by the **Green Infrastructure Strategy** [2], which also points out that green infrastructure that enhances resilience to disasters is also an integral **part of EU policy on disaster risk management** [3].

Figure 4: Wildlife passages allow to reduce habitat fragmentation and reinforce green infrastructure (Photo by Minuartia)

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32004L0035
[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52013DC0249
[3] https://civil-protection-humanitarian-aid.ec.europa.eu

- **Implement early awareness and control measures to prevent the spread of Invasive Alien Species (IAS),** which may threaten native habitats and species, pose problems for infrastructure maintenance, and even increase health risks to people. **Regulation on the prevention and management of the introduction and spread of invasive alien species** [4] requires Member States to identify and manage pathways for the introduction and spread of these species.

- **Benefit species which provide essential ecosystem services** and in particular, contribute to the recovery of pollinators by applying appropriate maintenance to green and blue areas associated with transport infrastructure.
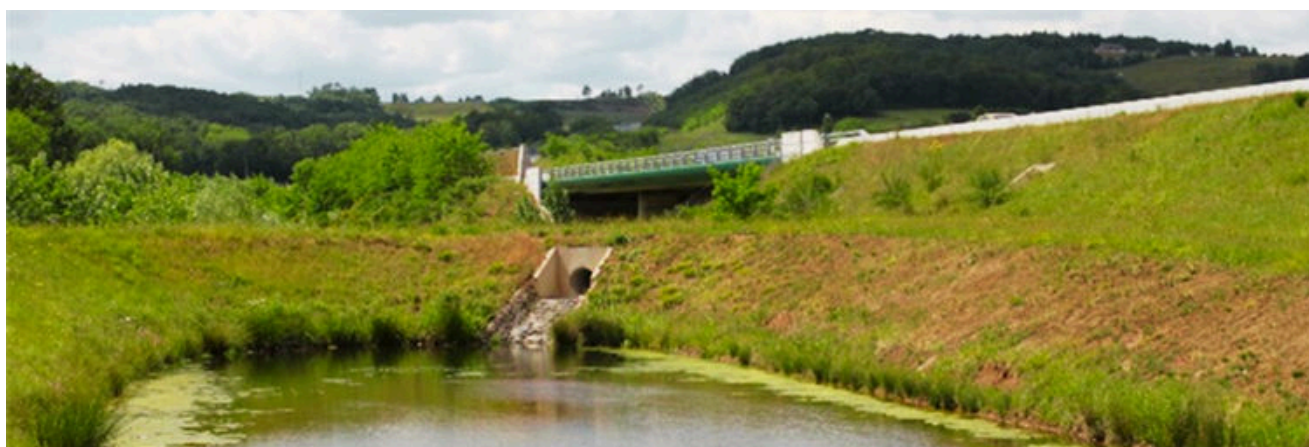

Figure 5: Nature-based Solutions can be applied on infrastructure green areas and drainage systems to provide quality safe habitats for wildlife (Photo by: Minuartia).

MONITORING AND EVALUATING APPLIED SOLUTIONS

In line with **Target 15** of the Kunming-Montreal Global Biodiversity Framework, businesses **should assess and disclose biodiversity dependencies, impacts and risks, and reduce negative impacts on biodiversity**. The handbook **"Biodiversity and infrastructure"** provides the following recommendations:

- **Define clear objectives for monitoring and evaluation,** and specify which impacts, biodiversity elements and mitigation measures are the focus of monitoring.

- **Develop indicators, metrics and tools to monitor the achievement of objectives;** design clear and robust methods and apply adequate techniques to ensure results are replicable and reliable.

- **Propose a sampling design and evaluate its feasibility within the available budget.**

- **Establish a robust baseline for the condition of natural habitats and species in the study area** before project construction.

- **Apply adaptative management principles** by changing mitigation measures when monitoring shows that mitigation objectives are not being met.

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014R1143

MAINTAINING ECOLOGICAL ASSETS ON INFRASTRUCTURE OPERATION

According to Goal A of the Kunming-Montreal Global Biodiversity Framework which aims **"to maintain, enhance or restore the integrity, connectivity and resilience of all ecosystems"**, the handbook provides the following recommendations:

- **Follow a PDCA (Plan-Do-Check-Act) approach** to develop, implement and improve maintenance strategies for ecological assets. Taking an adaptive approach to ecological asset maintenance is particularly important due to temporal variation in species and ecosystems, and increasing extreme events related to climate change.

- **Develop a maintenance plan for ecological assets** following these seven key phases:
  1) Define elements to be maintained;
  2) Compile and organise information;
  3) Draft maintenance plan;
  4) Apply a cooperative approach;
  5) Train technical staff and field crews;
  6) Monitor, evaluate and report performance;
  7) Adapt maintenance according to monitoring and evaluation results.

- **Develop maintenance practices for each ecological asset following the guidelines included in maintenance plans and using maintenance task sheets** to manage every ecological asset. This includes creating a detailed inventory of elements to be maintained, clearly scheduling inspection and maintenance tasks, setting standards to be met, establishing and applying procedures to manage conflicts or deviation from standards, carrying out training of maintenance staff, monitoring and evaluating results, and modifying the maintenance plan to apply corrective measures.

info@iene.info

www.biodiversityinfrastructure.org