

SYMBIOSIS

Data Management Plan

D1.2

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25/03/2025

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Project details	
Project acronym	SYMBIOSIS
Project full title	SYstemic Mobilisation for Joint Biodiversity and Infrastructure
Grant Agreement no.	101177281
Call ID and Topic	HORIZON-ER-JU-2023-EXPLR-03
Project Timeframe	Sep 24 – Aug 27
Duration	3 years
Coordinator	UIC

Document details	
Title	Data Management Plan
Work Package	WP1
Date of the document	March 25, 2025
Version of the document	V3
Responsible Partner	UIC
Reviewing Partner	SCT and SC Members
Status of the document	Final
Dissemination level	Public

Document history		
Revision	Date	Description
01	18/12/2024	First Draft – drafted by Pinar Yilmazer
02	03/04/2025	Second draft, reviewed and updated based on feedback from SCT members
03	25/03/2025	Third draft, reviewed and updated based on feedback from SC members



CONSORTIUM - LIST OF PARTNERS

Partner no.	Short name	Name	Country
1	UIC	UNION INTERNATIONALE DES CHEMINS DE FER	FRANCE
2	FEHRL	FORUM DES LABORATOIRES NATIONAUX EUROPEENS DE RECHERCHE ROUTIERE FEHRLAISBL	BELGIUM
3	UPM	UNIVERSIDAD POLITECNICA DE MADRID	SPAIN
4	CERTH	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	GREECE
5	PGE-ENERGETYKA	PGE ENERGETYKA KOLEJOWA SPOLKA AKCYJNA	POLAND
6	MINUARTIA	MINUARTIA ESTUDIS AMBIENTALS SL	SPAIN
7	ITALFERR	ITALFERR SPA	ITALY
8	SLU	SVERIGES LANTBRUKSUNIVERSITET	SWEDEN
9	FFE	FUNDACION DE LOS FERROCARRILES ESPANOLES	SPAIN
10	CENTRALESUP ELEC	CENTRALESUPELEC	FRANCE
11	FC.ID	FCIENCIAS.ID - ASSOCIACAO PARA A INVESTIGACAO E DESENVOLVIMENTO DE CIENCIAS	PORTUGAL
12	SNCF	SOCIETE NATIONALE SNCF	FRANCE
13	SNCF-RESEAU	SNCF RESEAU	FRANCE
14	KONNEKTABLE	KONNEKT ABLE TECHNOLOGIES LIMITED	IRELAND
15	H&Z	HZ UNTERNEHMENSBERATUNG AG	GERMANY
16	RPS	OCHRANA DRACOV NA SLOVENSKU ZDRUZENIE	SLOVAKIA
17	IFEU	FEU - INSTITUT FUR ENERGIE- UND UMWELTFORSCHUNG HEIDELBERG GGMBH	GERMANY



18	UKCEH	UK CENTRE FOR ECOLOGY & HYDROLOGY	UNITED KINGDOM
19	ICSI	RESILIENCE RISING UK	UNITED KINGDOM
20	UNIVLEEDS	UNIVERSITY OF LEEDS	UNITED KINGDOM
21	NETWORK RAIL	NETWORK RAIL INFRASTRUCTURE LIMITED	UNITED KINGDOM



EXECUTIVE SUMMARY

The aim of the Data Management Plan, in short DMP, is to manage data used and generated within the SYMBIOSIS project. It describes how data will be collected, processed, stored and managed from the perspective of external accessibility and long-term archiving. It takes account of the particular characteristics of the SYMBIOSIS project, which has features such as diverse data sources and formats and greater initial uncertainties typical of coordination and support actions. The DMP is therefore designed for flexibility to meet emerging needs.

The DMP plays a key role in achieving the core objectives of the SYMBIOSIS project, which include:

- Establishing a multidisciplinary observatory for biodiversity management.
- Aligning its outputs with existing roadmaps for linear infrastructure development, encompassing rail, road, and energy sectors, to support their improvement and updating.
- Advocating for rail to serve as the backbone of European linear infrastructure development.

Moreover, SYMBIOSIS aims to gather data that contextualise its findings within the scope of related Research & Innovation Actions (RIA) and Coordination and Support Actions (CSA), such as BISON, MINERVE and REVERSE while reviewing other related projects. As a CSA, SYMBIOSIS seeks to strengthen the leadership of European Member States in biodiversity management, while supporting sustainable linear infrastructure development.

More precisely, the DMP addresses the following points for each of the project's Work Packages (WP):

1. Type of data to be utilised and generated within SYMBIOSIS. This section identifies and describes the (existing) input data that will be used and the output data to be generated by the project.
 2. Standards to be used, metadata and quality issues. GDPR and compliance issues are covered as appropriate.
- How data are exploited and shared/accessed for their verification and reutilisation. The exploitation of data will follow the strategies of each partner concerning their business potential, in accordance with the Grant Agreement for WP 3, WP 4 and WP 5, and in accordance with the access to data by the partners specified in the Consortium Agreement. Specific restrictions and confidentiality aspects are clarified.
 - Data storage and conservation. Where the data will be stored and the arrangements and responsibilities for managing, updating and maintaining the data.

This structured approach ensures that SYMBIOSIS effectively manages its diverse data landscape, supporting its overarching aims while adhering to ethical and legal standards. The plan's flexibility enables it to adapt to the dynamic requirements of the project as it progresses.



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ABBREVIATION AND ACRONYMS

DMP	Data Management Plan
WP	Work package
FAIR	Findable, Accessible, Interoperable, Reusable
CSA	Coordination and Support Action
GDPR	General Data Protection Regulation
UIC REVERSE	The Ecological Effects of Railways on Wildlife (REVERSE) project, UIC
EU-BISON	EU-financed Biodiversity and infrastructure synergies and opportunities for European transport networks.
ERJU	Europe's Rail Joint Undertaking



INTRODUCTION

This document outlines the Data Management Plan (DMP) for the SYMBIOSIS project, a 36-month Coordination and Support Action (CSA) that aims to improve biodiversity management in the context of linear infrastructure development, focusing on the rail sector. SYMBIOSIS is aligned with Europe's Rail Joint Undertaking (ERJU), contributing to the development of an interoperable European railway system. This DMP is a crucial management tool for ensuring effective data collection, preservation, sharing, and accessibility, supporting the project's goals and fostering long-term impacts within the transport and energy sectors.

The SYMBIOSIS project consists of 21 partners across 13 countries and diverse disciplines, necessitating an effective approach to data management. This DMP is designed to ensure that the project's data is managed efficiently, adhering to relevant standards, and supports the broader objectives of the rail sector, aligning with ERJU's social, economic, and environmental goals

The DMP establishes the principles, responsibilities, and processes for managing SYMBIOSIS's data in accordance with the FAIR principles (Findable, Accessible, Interoperable, and Reusable). This includes defining datasets, ensuring accessibility, protecting privacy, and balancing open dissemination with concerns related to market exploitation and patents.



1. DATA MANAGEMENT AT PROJECT LEVEL

1.1. DATA COLLECTION

Data for the SYMBIOSIS project will be collected through various methods, including:

- Online Surveys: Data collected through online surveys hosted on the project platform.
- Workshops/Seminars: Interactive workshops organised throughout the project for data gathering and stakeholder engagement.
- Bilateral Discussions: Direct discussions with relevant stakeholders and advisory board members.
- Existing Project Outcomes: Leveraging datasets from existing projects, including previous surveys.

Each Work Package (WP) leader and task leaders are responsible for collecting, validating, and documenting datasets relevant to their work. The WP leader is responsible for ensuring that datasets meet quality standards and are regularly reviewed and updated, particularly during the project's periodic reports to the European Commission.

1.2. DATA ARCHIVING & PRESERVATION

The project will use the SYMBIOSIS Extranet (Members Area) and a SharePoint system for archiving and preserving data. These platforms offer secure storage, real-time protection, and access control for consortium members. Data uploaded will be compliant with GDPR regulations and UK Data Protection Legislation¹ and stored in a manner ensuring the preservation of its integrity throughout the project's duration.

- Extranet and SharePoint: Secure member areas will be used for document and data sharing, including meeting minutes, deliverables, presentations, and other project-related files.
- Data Retention: Data will be stored securely and deleted once no longer necessary for the project's objectives, complying with applicable data protection laws.

1.3. COMPUTER FILE FORMATS

Data formats for archival purposes are defined to ensure compatibility and ease of use:

- Text Documents: Word (.docx)
- Spreadsheets and Databases: Excel (.xlsx), CSV (.csv)
- Presentations: PowerPoint (.pptx)
- Reports and Official Documents: PDF (.pdf)
- Images: JPEG, PNG
- Videos: AVI, MP4
- Compressed Files: ZIP (.zip)

¹ <https://ico.org.uk/for-organisations/data-protection-and-the-eu/data-protection-and-the-eu-in-detail/the-uk-gdpr/international-data-transfers/>



- Templates: Word and Powerpoint (.dotx) (.potx)

Files with .dotx and .potx extensions are template files created in Microsoft Word and PowerPoint, respectively, and are used to generate pre-formatted .docx and .pptx files. Aggregated survey results should be extracted using Microsoft Forms or a similar platform identified by Work Package (WP) leaders and compiled in one of the following formats: .txt, .xls, .xlsx, or .pdf

1.4. FILE NAMING CONVENTIONS

A standardized naming convention for documents ensures consistency across the project:

- Format: [Project] – [Domain] – [Type] – [Owner] – [Number] – [Filename]
 - [Project] is SYMBIOSIS for all SYMBIOSIS documents;
 - [Domain] is the relevant domain in the project (SCT, SC, AB or WP/Task);
 - [Type] is one letter defining the document category;
 - [Status] is one letter defining the document category (Draft, Final, Submitted);
 - [Owner] is the trigram of the deliverable leader organisation;
 - [Number] is an order number allocated by the publisher when the document is created (date_hour);
 - [Version] required to be renumbered when major modification is completed.
- Example : SYMBIOSIS-T1.3-D1.3-D-UIC-20241024-1700-v1

1.4.1. DOCUMENT TYPES

This information will be used to set up the identification code. Documents are classified among the following types:

Table 1: Document classification

Letter	Name	Description
A	Administrative	Any administrative document except contractual documents
C	Communication materials	Meeting Agenda, Presentation or Minutes
D	Deliverable	Deliverable identified as such under the Grant Agreement
DA	Dataset	Dataset identified as such in the Data Management Plan
E	EC documents	Document provided by EC (general rules, guidelines or EC experts documents)
L	Legal documents	Consortium Agreement, Grant Agreement and their approved amendments



<i>M</i>	Model (template)	MS-Office document templates including SYMBIOSIS visual identity
<i>P</i>	Periodic Report	All periodic reports except those listed as deliverables. May be a WP intermediate report or a project intermediate report requested by the Grant Agreement but not listed as deliverable.
<i>R</i>	Risk Sheet	Excel document for risk register in line with Prince2 methodology
<i>T</i>	Technical contribution	Technical document contributing to a task/deliverable but not part of the deliverable
<i>W</i>	Proposal	Proposal for changes to the Consortium Agreement or Grant Agreement
<i>X</i>	External Document	Document produced by non-members of the consortium (e.g., papers, reports, external public deliverables, etc.) that, upon authorisation of the author(s), are shared with the project due to its relevancy.
SEN	Sensitive	Only for members of the consortium (including EU-RAIL and European Commission Services)
PUB	Public	Project deliverables will be made public.

2. DMP OF WP1: PROJECT MANAGEMENT AND COORDINATION

2.1. DATA TYPES

The SYMBIOSIS concept builds upon, and extensive range of knowledge and outcomes generated by a number of key EU- and nationally funded, collaborative projects (indicated in the Grant Agreement Section 1.2.3) including, BISON, MINERVE, REVERSE, LIFE Danube Free Sky, LIFE Energy, FORESEE, BOOGIE BOP, WOODNET, REFORM, MAMBO, NaturaConnect, RESIST, Energien Gesetz. The SYMBIOSIS consortium does not control datasets from these previous projects.

Table 2: Existing Data used in WP1

Code	Description of Dataset / Digital Output Units	Format	Size	Ownership
<i>SYMBIOSIS-WP1-DA1</i>	EU-financed BISON Project	Excel	<1GB	CERTH
<i>SYMBIOSIS-WP2-DA2</i>	UIC REVERSE Project	Excel	<1GB	UIC
<i>SYMBIOSIS-WP2-DA3</i>	SYMBIOSIS Events	Excel, Video data	Unknown - likely >1Gb	UIC



2.1.1. EU-FINANCED BISON PROJECT

This survey focused on integrating biodiversity into the development of national transport infrastructure across all transport modes. Its goal was to assess the maturity, gaps, and needs of European Member States at policy, legislative, and implementation levels.

Target Stakeholders:

- Decision-makers (e.g. National Transport Infrastructure and Environmental Agencies)
- Practitioners (e.g. private/public transport and environmental companies)
- Scientific community and European Technology Platforms
- Associations and civil societies (e.g. NGOs active in transport and environment)

Key Topics:

- Policies, legislation, and regulations on biodiversity in transport infrastructure
- Gaps and barriers to mainstreaming biodiversity
- National and EU transport planning strategies
- Integration of Green Infrastructure
- Biodiversity-friendly transport expectations and proposals
- Infrastructure project stages and management practices
- Ecological connectivity and defragmentation measures
- Digitalisation in transport infrastructure
- Emerging trends and future prospects

The survey consists of two parts:

1. **Strategic Part** – Focuses on maturity at policy and legislative levels using multiple-choice, yes/no, and open questions. *Example: What policy tools are planned to integrate biodiversity and Green Infrastructure into National Transport Policies?*
2. **Technical Part** – Explores good practices, tools, and innovations in project management and biodiversity integration, from planning to construction and maintenance. *Example: Can you provide a best-practice example of integrating biodiversity in SEA, EIA, or impact mitigation measures?*

The collected data (SYBIOSIS-WP1-DA1) provides valuable insights into biodiversity integration strategies, innovative practices, and challenges, helping to guide future improvements in biodiversity-friendly transport infrastructure. For more information, please visit <https://bison-transport.eu/questionnaire/>.

2.1.2. UIC REVERSE PROJECT

The International Union of Railways (UIC) explored solutions and best practices for managing rail line sides in an environmentally responsible manner. The Ecological Effects of Railways on Wildlife (REVERSE) project, which ran until 2023, aimed to enhance understanding of the impact of railways on biodiversity. In collaboration with the UK Centre for Ecology and Hydrology (UKCEH), UIC and its members developed a “Strategy and Actions for Biodiversity (International Union of Railway (UIC), 2023) (UIC Sustainability, 2022)



and “UIC Guidelines on Managing Railway Assets for Biodiversity” to help railway operators and managers support, protect, and enhance our natural heritage.

Through a systematic literature review on railways and biodiversity, REVERSE built knowledge of current approaches to biodiversity among UIC partners and examined the relevant policy frameworks (company, national, and international) in which they operated. The survey (SYBIOSIS-WP2-DA2) played an important role in gathering this information and associated literature. For more information, please visit. <https://uic.org/events/REVERSE-survey>

2.2. STANDARDS, METADATA AND QUALITY ISSUES

Not applicable.

2.3. DATA SHARING AND MANAGEMENT RESPONSIBILITIES

Table 3: Data Sharing in WP1

Code	Description of Dataset / Digital Output Units	Name of Responsible
SYMBIOSIS-WP1-DA1	The questionnaire is publicly accessible on the BISON website and will also be available for project participants to access.	CERTH
SYMBIOSIS-WP2-DA2	The questionnaire is publicly accessible on the REVERSE project webpage and will also be available for project participants to access. Anonymized data will be provided by UIC.	UIC

2.4. ARCHIVING AND PRESERVATION

Table 4: Archiving and preservation of the data in WP1

Code	Archiving and preservation
SYMBIOSIS-WP1-DA1	SYMBIOSIS TEAMS folder.
SYMBIOSIS-WP2-DA2	SYMBIOSIS TEAMS folder.



3. DMP OF WP2 : COMMUNICATION, DISSEMINATION & EXPLOITATION

3.1. DATA TYPES

Workshops and seminars complement the data generated through surveys, providing additional sources of information. The existing data used in this work package includes the following datasets:

Table 5: Existing Data used in WP2

Code	Description of Dataset / Digital Output Units	Format	Size	Ownership
SYMBIOSIS-WP2-DA1	EU-financed BISON Project	Excel	<1GB	CERTH
SYMBIOSIS-WP2-DA2	SYMBIOSIS Webinars - Event	Excel, Video data	Unknown - likely >1Gb	FEHRL/FFE/ICSI
SYMBIOSIS-WP2-DA3	Images: Images and logos from partners participating in the project.	.eps, .ai, .png, .jpeg	Variable	The owner gives permission to UIC as coordinator and to FEHRL as WP2 leader to use images for dissemination purposes of SYMBIOSIS.
SYMBIOSIS-WP2-DA4	Data from capacity-building activities	variable	Variable	ICSI

As part of Task 2.2, brainstorming sessions are organized with consortium members and the SYMBIOSIS Advisory Group. The data collected from these workshops and seminars, primarily oral input from stakeholders, will be anonymized and used to prepare the following deliverables:

Table 6: Deliverables of WP2

N°	Deliverable name	Data access level	Data type	Responsible	Due
D2.1	Communication, dissemination & Exploitation plan	Available for public	Report in .pdf	FEHRL	6
D2.2	Knowledge Transfer and Capacity Building Strategy	Available for public	Report in .pdf	ICSI	18
D2.3	Stakeholder analysis and recommendations	Available for public	Report in .pdf	FFE	34
D2.4	Communication, dissemination & exploitation report	Available for public	Report in .pdf	FEHRL	36



D2.5	Report on the R&I strategic recommendations	Available for public	Report in .pdf	FEHRL	36
D2.6	Knowledge & Learning Hub	Available for public	Report in .pdf	ICSI	36

3.2. STANDARDS, METADATA AND QUALITY ISSUES

Images and logos will be stored in common formats such as vector image formats and compressed picture standards. FEHRL will manage the collection and processing of personal data (e.g., name, email address, and other contact information) related to event organizations in WP2, in compliance with GDPR. Registration forms will include the following information:

- The data will be processed in accordance with GDPR (EU) 2016/679.
- The information will not be shared outside the SYMBIOSIS Project, except as required by law.
- Participants can access, rectify, or erase their data at any time. For requests, please contact [insert contact information].

3.3. DATA SHARING

The following data sharing practices apply within WP2:

Table 7: Data Sharing in WP2

Code	Description of Dataset / Digital Output Units	Name of Responsible
<i>SYMBIOSIS-WP2-DA1</i>	Data collected for event logistics will be processed by FEHRL only and will not be shared outside the consortium.	FEHRL
<i>SYMBIOSIS-WP2-DA2</i>	Images and logos from partners participating in the project will not be shared outside the consortium.	FEHRL/UIC
<i>SYMBIOSIS-WP2-DA3</i>	Data from capacity-building activities	ICSI/FEHRL

3.4. ARCHIVING AND PRESERVATION

Data collected and processed within WP2 will be preserved according to the following principles:

- **Long-Term Preservation:** All datasets, including personal data and event-related information, will be stored in secure SYMBIOSIS TEAMS repositories for one year and in the Members area (Extranet) indefinitely, with appropriate access controls. UIC and FEHRL will be responsible for ensuring the secure storage of data during and after the project's completion.
- **Data Retention:** Personal and sensitive data will be retained only for the period necessary to fulfill the project's objectives. Once the data is no longer required, it will be anonymized or securely deleted in accordance with the GDPR's retention guidelines.



- Metadata: All datasets will be documented with metadata to facilitate long-term discovery and reusability, ensuring that the data can be understood and used beyond the project.

3.5. DATA MANAGEMENT RESPONSIBILITIES

The following roles and responsibilities are assigned for managing data throughout the project:

- FEHRL: As WP2 leader, FEHRL is responsible for overseeing all data management activities within WP2, ensuring adherence to the data management plan and GDPR compliance. This includes reviewing and approving data access and sharing policies, as well as managing the collection, processing, and storage of event registration data.
- ICSI: ICSI will oversee the preservation of data generated from capacity-building activities and other related outputs. This includes ensuring proper archiving and long-term preservation, as well as ensuring compliance with data sharing policies.
- FFE: FFE will oversee the activities of the SYMBIOSIS Stakeholder Engagement and Advisory Group, which provides guidance on the collection and processing of stakeholder data from webinars and workshops.
- All WP2 Partners: All partners are expected to follow the data management practices outlined in this plan. This includes proper documentation of datasets, including metadata, and ensuring compliance with GDPR and other relevant data protection regulations. Regular monitoring will be conducted to identify any data management issues, ensuring that data access, security, and compliance are maintained throughout the project.
- Regular Monitoring: Data management practices will be reviewed regularly to ensure adherence to the plan. Any issues related to data security, access, or compliance will be promptly addressed.

4. DMP OF WP3: OPERATIONAL TOOLKIT

4.1. DATA TYPES

The existing data used in this WP3 includes the following datasets:

Table 8: Existing Data used in WP3

Code	Description of Dataset / Digital Output Units	Format	Size	Ownership
SYMBIOSIS-WP1-DA1	EU-financed BISON project	Excel, Questionnaire Data	<1GB	CERTH
SYMBIOSIS-WP3-DA1	Biodiversity and Infrastructure. A handbook for Action, produced at the BISON	Online website	Variable – N.A.	MINUARTIA



	project and currently managed by IENE			
SYMBIOSIS-WP3-DA2	'Guidelines to reduce large mammal and traffic conflicts' produced at the LiFE Safe Crossing.	PDF, Document	< 1GB	MINUARTIA
SYMBIOSIS-WP3-DA3	T3.1. Experiences in Environmental Assessment for Linear Infrastructures	Variable, likely PDF	Variable – N.A.	UPM
SYMBIOSIS-WP3-DA4	SYMBIOSIS Webinars - Event	Excel, Video data	Unknown - likely >1Gb	UPM/Minuartia

If additional data is generated within this WP, updates to this DMP will be made accordingly. The data collected from workshops and seminars, primarily oral input from AB members and project participants, will be anonymized and used to prepare the following deliverables:

Table 9: Deliverables of WP3

N°	Deliverable name	Data access level	Data type	Responsible	Due in Month
D3.1	Impact Assessment Tools for Linear Infrastructures	Available for public	Report in .pdf	UPM	20
D3.2	Harmonised methodology to prioritise NbS for Climate-Resilient Infrastructure	Available for public	Report in .pdf	MINUARTIA	30
D3.3	Decision support Guidelines to reinforce Blue and Green Infrastructure on transport and energy infrastructure	Available for public	Report in .pdf	MINUARTIA	34
D3.4	Biodiversity-CO2 calculator for the railway sector. Methodology, case studies and its evaluation.	Available for public	Report in .pdf	UPM	34

4.2. STANDARDS, METADATA AND QUALITY ISSUES

All data generated or used in WP3 will be stored in standard formats (e.g., PDF for reports, Excel for surveys, and any specialized formats for tools or calculators). The format choices ensure accessibility and usability for long-term storage. Data will be standardised according to the project's guidelines for quality, including version control and consistency in metadata documentation.



UPM will manage the collection and processing of personal data (e.g., name, email address, and other contact information) related to event organizations in WP3, in compliance with GDPR. Registration forms will include the following information:

- The data will be processed in accordance with GDPR (EU) 2016/679.
- The information will not be shared outside the SYMBIOSIS Project, except as required by law.
- Participants can access, rectify, or erase their data at any time. For requests, please contact [insert contact information].

Participants were informed at the beginning of any technical questionnaire: "Answers will be treated confidentially, and results will be aggregated," ensuring that the participants were aware of how their answers would be treated and used.

4.3. DATA SHARING

Data that is publicly available will be published on the project website and other relevant platforms, ensuring compliance with FAIR principles. The dissemination will be conducted in line with WP3 deliverables, committing to FAIR principles. A balanced strategy will be implemented to ensure widespread dissemination while protecting privacy, market exploitation, and patenting considerations. Restricted data, such as survey results or project-specific information, will be shared within the project consortium and with stakeholders within SYMBIOSIS TEAMS server and members area (Extranet).

Table 10: Data Sharing in WP3

Code	Description of Dataset / Digital Output Units
SYMBIOSIS-WP1-DA1	The questionnaire is publicly accessible on the BISON website and will also be available for project participants to access.
SYMBIOSIS-WP3-DA1	Publicly available at https://www.biodiversityinfrastructure.org/ .
SYMBIOSIS-WP3-DA2	will be provided by Minuartia.
SYMBIOSIS-WP3-DA3	TBD - UPM
SYMBIOSIS-WP3-DA4	Data collected for event logistics will be processed by UPM only and will not be shared outside the consortium.

4.4. ARCHIVING AND PRESERVATION

Data collected and processed within WP3 will be preserved according to the following principles:

- Long-Term Preservation: All datasets, including personal data and event-related information, will be stored in secure SYMBIOSIS TEAMS repositories or Members area (Extranet) with appropriate access controls. UPM will be responsible for ensuring the secure storage of data during and after the project's completion.



- **Data Retention:** Personal and sensitive data will be retained only for the period necessary to fulfill the project's objectives. Once the data is no longer required, it will be anonymized or securely deleted in accordance with the GDPR's retention guidelines.
- **Metadata:** All datasets will be documented with metadata to facilitate long-term discovery and reusability, ensuring that the data can be understood and used beyond the project.

4.5. DATA MANAGEMENT RESPONSIBILITIES

The following roles and responsibilities are assigned to ensure effective data management throughout WP3:

- **UPM:** As WP3 leader, UPM will oversee the overall data management activities, ensuring that all data collection, processing, and sharing comply with the project's DMP and GDPR. UPM will ensure that all deliverables are produced in accordance with data quality standards and FAIR principles.
- **MINUARTIA:** MINUARTIA will be responsible for ensuring that datasets related to biodiversity, guidelines, and methodologies are properly archived, preserved, and accessible for future use. MINUARTIA will also support the integration of the datasets into the project website and other platforms as needed.
- **All WP3 Partners:** All partners involved in WP3 will be responsible for following the project's DMP, ensuring compliance with data sharing protocols and metadata standards, and assisting in the archiving and long-term preservation of relevant datasets.
- **Regular Monitoring:** Data management practices will be reviewed regularly to ensure adherence to the plan. Any issues related to data security, access, or compliance will be promptly addressed.

5. DMP OF WP4: STANDARDISING BIODIVERSITY DATA COLLECTION AND INTEGRATION

5.1. DATA TYPES

Existing data used in this WP4 include the following data types:

Table 11: Existing Data used in WP4

Code	Description of Dataset / Digital Output Units	Format	Size	Ownership
SYMBIOSIS-WP1-DA1	EU-financed BISON survey	Excel, Questionnaire Data	<1GB	CERTH
SYMBIOSIS-WP2-DA2	UIC REVERSE Project's survey	Excel	<1GB	UIC



SYMBIOSIS- WP4-DA1	Land Cover Maps (2021-2024): These maps provide 10m classified pixel data for Great Britain (GB) and Northern Ireland (N. Ireland) for the years 2021, 2022, 2023, and 2024. The data covers land cover classification, available for use in the SYMBIOSIS project and related research initiatives.	Variable	Unknown - likely >1Gb	UK Centre for Ecology & Hydrology (UKCEH) https://eidc.ceh.ac.uk/licences/lcm-raster/plain https://doi.org/10.5285/7727ce7d-531e-4d77-b756-5cc59ff016bd
SYMBIOSIS- WP4-DA2	Background data: Includes GIS data (e.g., biodiversity data layers), railway infrastructure data related to biodiversity (e.g., wildlife crossing lists), vegetation data, monitoring data (e.g., animal collisions on French and UK railway lines)	Variable	Unknown - likely >1Gb	SNCF & NetworkRail
SYMBIOSIS- WP4-DA3	Background data: Species dispersal modeling, numerical processing, GIS data management, IFC files processing, high-performance computing, machine learning algorithms in engineering, knowledge management, and datalake design/implementation	Variable	Unknown - likely >1Gb	CentraleSupélec
SYMBIOSIS- WP4-DA4	SYMBIOSIS Webinars - Event	Variable, Excel, Video	Unknown - likely >1Gb	UKCEH and CentraleSupélec
SYMBIOSIS WP4-DA5	SYMBIOSIS Questionnaire on Biodiversity monitoring and management on EU and UK Railway Assets.	Excel, CSV	< 1GB	UKCEH

Additionally, the following open-source software will be used by CentraleSupélec and UKCEH:

- RangeShifter (<https://rangeshifter.github.io/>)
- Python (<https://www.python.org/>)
- R (<https://www.r-project.org/>)
- QGIS (<https://www.qgis.org/en/site/>)

If additional data is generated within this WP, updates to this DMP will be made accordingly. Data collected from workshops and seminars, primarily oral input from Advisory Board (AB) members and project participants, will be anonymized and used to prepare the following deliverables.



Table 12: Deliverables of WP4

N°	Deliverable name	Data access level	Data type	Responsible	Due
D4.1	Report on 'Transformative Insights and Strategies for Biodiversity Monitoring in European Railway'	Available for public	Report in .pdf	UKCEH	12
D4.2	Advancements in Automated Biodiversity Monitoring for European Railways	Available for public	Report in .pdf	UKCEH	25
D4.3	Assessment of the benefits and challenges to integrating real-time biodiversity data into rail infrastructure GIS and BIM alongside data on economic performance and carbon emissions	Available for public	Report in .pdf	CENTRALESU PELEC	30
D4.4	Recommendations for new approaches for standardised biodiversity monitoring.	Available for public	Report in .pdf	UKCEH	36

5.2. STANDARDS, METADATA AND QUALITY ISSUES

All data generated or used in WP4 will be stored in standard formats such as GeoTIFF, shapefiles, excel and CSV, to ensure accessibility and long-term usability on SYMBIOSIS TEAMS. The use of open data standards, such as OGC (Open Geospatial Consortium) will be promoted to facilitate interoperability. The format choices ensure accessibility and usability for long-term storage. Data will be standardised according to the project's guidelines for quality, including version control and consistency in metadata documentation.

UKCEH and CENTRALESUPELEC will manage the collection and processing of personal data (e.g., name, email address, and other contact information) related to survey and event organizations in WP4, in compliance with GDPR and UK Data Protection Legislation². Registration forms will include the following information:

- The data will be processed in accordance with GDPR (EU) 2016/679 and UK Data Protection Legislation.
- The information will not be shared outside the SYMBIOSIS Project, except as required by law.
- Participants can access, rectify, or erase their data at any time. For requests, please contact [insert contact information].

² <https://ico.org.uk/for-organisations/data-protection-and-the-eu/data-protection-and-the-eu-in-detail/the-uk-gdpr/international-data-transfers/>



Participants were informed at the beginning of any technical questionnaire: "Answers will be treated confidentially, and results will be aggregated," ensuring that the participants were aware of how their answers would be treated and used.

5.3. DATA SHARING

Data that is publicly available will be published on the project website and other relevant platforms, ensuring compliance with FAIR principles. The dissemination will be conducted in line with WP4 deliverables, committing to FAIR principles. A balanced strategy will be implemented to ensure widespread dissemination while protecting privacy, market exploitation, and patenting considerations. Restricted data, such as survey results or project-specific information, will be shared within the project consortium and with stakeholders within SYMBIOSIS TEAMS server and members area (Extranet).

Table 13: Data Sharing in WP4

Code	Description of Dataset / Digital Output Units
<i>SYMBIOSIS-WP1-DA1</i>	The questionnaire is publicly accessible on the BISON website and will also be available for project participants to access. Anonymized survey responses may be requested from CERTH (BISON Consortium Leader) after identifying the relevant questions.
<i>SYMBIOSIS-WP1-DA2</i>	The questionnaire is publicly accessible on the REVERSE project webpage and will also be available for project participants to access. Anonymized data will be provided by UIC.
<i>SYMBIOSIS-WP4-DA1</i>	During the SYMBIOSIS project, data can be integrated into digital twin projects or used in other research initiatives. Access to these background resources for exploitation purposes by parties outside the SYMBIOSIS project requires legal consent from the data owner (UKCEH Licensing). For any exploitation or commercial use beyond the project, explicit approval must be obtained in accordance with the conditions outlined in the Consortium Agreement and UKCEH Licensing.
<i>SYMBIOSIS-WP4-DA2</i>	These datasets and methodologies are integral to the SYMBIOSIS project and are used for internal development, analysis, and implementation. Access to these resources is granted solely for project-related activities. Any exploitation or commercial use outside the project requires explicit legal consent from the data owner. Approval of such use must be obtained in accordance with the conditions outlined in the Consortium Agreement.
<i>SYMBIOSIS-WP4-DA3</i>	These datasets and methodologies are integral to the SYMBIOSIS project and are used for internal development, analysis, and implementation. Access to these resources is granted solely for project-related activities. Any exploitation or commercial use outside the project requires explicit legal consent from the data owner. Approval for such use must be obtained in accordance with the conditions outlined in the Consortium Agreement.



SYMBIOSIS-WP4-DA4

Data collected for event logistics will be processed by UKCEH and CENTRALESUPELEC only and will not be shared outside the consortium

SYMBIOSIS-WP4-DA5

Data collected through questionnaires will be processed by UKCEH only and will not be shared outside the consortium.

5.4. ARCHIVING AND PRESERVATION

Data collected and processed within WP4 will be preserved according to the following principles:

- Long-Term Preservation: For datasets with significant long-term value, they will be deposited in project's data repositories on TEAMS and members area.
- Data Retention: Personal and sensitive data will be retained only for the period necessary to fulfill the project's objectives. Once the data is no longer required, it will be anonymized or securely deleted in accordance with the GDPR's retention guidelines.
- Metadata: All datasets will be documented with metadata to facilitate long-term discovery and reusability, ensuring that the data can be understood and used beyond the project.

5.5. DATA MANAGEMENT RESPONSIBILITIES

The following roles and responsibilities have been defined to manage data throughout its lifecycle:

- UKCEH: The WP4 Leader is responsible for the overall coordination of data management activities, ensuring that all data collection, validation, storage, and sharing processes are in accordance with the DMP. The Data Manager will oversee the creation of metadata, ensure data is properly archived, and manage access to datasets.
- Each partner in WP4 responsible for data collection (e.g., UKCEH, CentraleSupélec, FCID) from SNCF and Network Rail will ensure that data is collected according to agreed-upon standards, processed accurately, and shared according to the project's data sharing policies. The team will also be responsible for the initial validation of the data to ensure its quality.
- WP4 Partners: Each project partner is responsible for managing the data they generate, ensuring it is documented, validated, and shared according to the project's guidelines.
- Regular Monitoring: Data management practices will be reviewed regularly to ensure adherence to the plan. Any issues related to data security, access, or compliance will be promptly addressed.



6. DMP OF WP5: ASSESSMENT OF SOCIETAL CHALLENGES IN SUSTAINABLE TRANSPORT DEVELOPMENT

6.1. DATA TYPES

Existing data used in this WP5 include the following data types:

Table 14: Existing Data used in WP5

Code	Description of Dataset / Digital Output Units	Format	Size	Ownership
SYMBIOSIS-WP5-DA1	EU-financed BISON survey	Excel, Questionnaire Data	<1GB	CERTH
SYMBIOSIS-WP5-DA2	“Status of national policy, legislation and implementation tools and recommendations for the integration of the EU SGI into transport infrastructure development” at the BISON project	PDF, Document	< 1GB	CERTH
SYMBIOSIS-WP5-DA3	“Recommendations for policy/strategy harmonization” at the BISON project	PDF, Document	< 1GB	CERTH
SYMBIOSIS-WP5-DA4	Biodiversity and Infrastructure. A handbook for Action, produced at the BISON project and currently managed by IENE	Online website	Variable – N.A.	IENE coordinated by MINUARTIA
SYMBIOSIS-WP5-DA5	Toolkit for Ensuring Sustainable Use and Management of Green Infrastructure in Strategic Environmental Assessments (SEA), DS and Environmental Impact Assessments (EIA), SaveGREEN project	PDF, Document	< 1GB	EPC, Environmental Consulting SRL, Romania
SYMBIOSIS-WP5-DA6	Development and use of the European Defragmentation Map, BISON project	PDF, Document	< 1GB	IENE coordinated by BfN
SYMBIOSIS-WP5-DA7	Background data, including environmental impact metrics, economic data, demographic and socioeconomic data, policy	Variable	Unknown - likely >1Gb	CERTH



	and regulatory data, health and safety data, etc.			
<i>SYMBIOSIS-WP5-DA8</i>	SYMBIOSIS Webinars - Event	Variable, Excel, Video	Unknown - likely >1Gb	CERTH
<i>SYMBIOSIS-WP5-DA9</i>	Publicly available data on sustainability policies/indicators from private organisations, collected in, but not limited to, organisations' sustainability reports.	Variable	Unknown - likely >1Gb	ITALFERR
<i>SYMBIOSIS-WP5-DA10</i>	Data related to sustainability reporting of linear infrastructure companies, from primary and secondary sources, collected also through questionnaires and interviews to relevant stakeholders	Variable	Unknown - likely >1Gb	ITALFERR

If additional data is generated within this WP, updates to this DMP will be made accordingly. Data collected from workshops and seminars, primarily oral input from Advisory Board (AB) members and project participants, will be anonymized and used to prepare the following deliverables.

Table 15: Deliverables of WP5

N°	Deliverable name	Data access level	Data type	Responsible	Due
D5.1	Analysis report on assessing societal priorities on sustainable transport development.	Available for public	Report in .pdf	CERTH	23
D5.2	Recommendations for enhancing cross-cutting biodiversity and climate policies on railway infrastructure.	Available for public	Report in .pdf	FFE	30
D5.3	Recommendations on environmental impact assessment of the cumulative effects of pairing infrastructure development.	Available for public	Report in .pdf	CERTH	36
D5.4	Recommendations for mainstreaming biodiversity within the procurement process, as well as for improving the disclosure regarding biodiversity in the supply chain in compliance with the new standards	Available for public	Report in .pdf	ITALFERR	36



6.2. STANDARDS, METADATA AND QUALITY ISSUES

All data generated or used in WP5 will be stored in standard formats (e.g., PDF for reports, Excel for surveys, and any specialized formats for tools or calculators) to ensure accessibility and long-term usability on SYMBIOSIS shared point. Data will be standardised according to the project's guidelines for quality, including version control and consistency in metadata documentation.

CERTH, FFE and ITALFERR will manage the collection and processing of personal data (e.g., name, email address, and other contact information) related to data collection and event organizations in WP5, in compliance with GDPR. Registration forms will include the following information:

- The data will be processed in accordance with GDPR (EU) 2016/679.
- The information will not be shared outside the SYMBIOSIS Project, except as required by law.
- Participants can access, rectify, or erase their data at any time. For requests, please contact Matina Loukea, CERTH – mloukea@certh.gr.

Participants will be informed at the beginning of any relevant data acquisition activity (e.g., questionnaire, focus groups, etc.): "Answers will be treated confidentially, and results will be aggregated," ensuring that the participants will be aware of how their answers would be treated and used.

6.3. DATA SHARING

Data that is publicly available will be published on the project website and other relevant platforms, ensuring compliance with FAIR principles. The dissemination will be conducted in line with WP5 deliverables, committing to FAIR principles. A balanced strategy will be implemented to ensure widespread dissemination while protecting privacy, market exploitation, and patenting considerations. Restricted data, such as survey results or project-specific information, will be shared within the project consortium and with stakeholders within SYMBIOSIS TEAMS server and members area (Extranet).

Table 16: Data Sharing in WP5

Code	Description of Dataset / Digital Output Units
SYMBIOSIS-WP1-DA1	The questionnaire is publicly accessible on the BISON website and will also be available for project participants to access. Anonymized survey responses may be requested from CERTH (BISON Consortium Leader) after identifying the relevant questions, with communication facilitated between BISON partners for collaboration.
SYMBIOSIS-WP5-DA1	Publicly available. Available at https://bison-transport.eu/wp-content/uploads/2023/07/D5.2_Recommendations-for-policystrategy-harmonization.pdf and https://bison-transport.eu/wp-content/uploads/2022/06/BISON_WP5_-DelivetableD5.1_Final295841.pdf . CERTH and FFE will leverage the data from these BISON reports, along with the resulting outcomes and recommendations, to support their efforts in addressing societal challenges related to sustainable transport development (T5.1) and examining the regulatory and policy implications, interactions and



	impacts of rail infrastructure and transport on biodiversity and climate change (T5.2). For any exploitation or commercial use beyond the project, explicit approval must be obtained in accordance with the conditions outlined in the Consortium Agreement.
<i>SYMBIOSIS-WP5-DA2</i>	These datasets and methodologies are essential components of the SYMBIOSIS project, serving as a foundation for its development, analysis, and implementation processes in the context of WP5. Access to these resources is strictly limited to activities directly related to the project, ensuring their use aligns with the initiative's objectives and scope. For any exploitation or commercial use beyond the project, explicit approval must be obtained in accordance with the conditions outlined in the Consortium Agreement.
<i>SYMBIOSIS-WP5-DA3</i>	Data collected for event logistics will be processed by CERTH, FFE and ITALFERR only and will not be shared outside the consortium.
<i>SYMBIOSIS-WP5-DA4</i>	Data within Task 5.4 will be processed by ITALFERR and will not be shared outside the consortium. Only aggregated data will be used for Symbiosis related publications and deliverables.
<i>SYMBIOSIS-WP5-DA5</i>	Publicly available.
<i>SYMBIOSIS-WP5-DA6</i>	Publicly available.
<i>SYMBIOSIS-WP5-DA7</i>	Publicly available.
<i>SYMBIOSIS-WP5-DA8</i>	Data collected for event logistics will be processed by CERTH and will not be shared outside the consortium.
<i>SYMBIOSIS-WP5-DA9</i>	Publicly available.
<i>SYMBIOSIS-WP5-DA10</i>	Data collected will be processed by ITALFERR and will not be shared outside the consortium.

6.4. ARCHIVING AND PRESERVATION

Data collected and processed within WP5 will be preserved according to the following principles:

- Long-Term Preservation: For datasets with significant long-term value, they will be deposited in project's data repositories on TEAMS and members area.
- Data Retention: Personal and sensitive data will be retained only for the period necessary to fulfill the project's objectives. Once the data is no longer required, it will be anonymized or securely deleted in accordance with the GDPR's retention guidelines.
- Metadata: All datasets will be documented with metadata to facilitate long-term discovery and reusability, ensuring that the data can be understood and used beyond the project.

6.5. DATA MANAGEMENT RESPONSIBILITIES

The following roles and responsibilities are assigned to ensure effective data management throughout WP3:



- **CERTH:** As WP5 leader, CERTH will oversee the overall data management activities, ensuring that all data collection, processing, and sharing comply with the project's DMP and GDPR. CERTH will ensure that all deliverables are produced in accordance with data quality standards and FAIR principles. CERTH will also support the integration of the datasets into the project website and other platforms as needed.
- **CERTH, FFE and ITALFERR,** as Task leaders, will be responsible for ensuring that datasets, guidelines, recommendations and methodologies from each Task are properly archived, preserved, and accessible for future use.
- **FFE** will oversee the activities of the SYMBIOSIS Stakeholder Engagement and Advisory Group, which provides guidance on the collection and processing of stakeholder data from webinars and workshops.
- **All WP5 Partners:** All partners involved in WP5 will be responsible for following the project's DMP, ensuring compliance with data sharing protocols and metadata standards, and assisting in the archiving and long-term preservation of relevant datasets.
- **Regular Monitoring:** Data management practices will be reviewed regularly to ensure adherence to the plan. Any issues related to data security, access, or compliance will be promptly addressed.

CONCLUSIONS

The purpose of the Data Management Plan is to support the data management life cycle for all data that will be collected, processed or generated by the SYMBIOSIS project. For this particular project, the DMP is more important than usual because data are at the heart of delivering the outputs and they are to be sourced from a diverse range of origins.

The DMP is not intended to be a static document but is designed to allow for its own evolution during the lifespan of the project to take account of emerging needs. This flexibility is important because the transversal project itself is far-reaching, with diverse and potentially complex data that are yet to be identified. This document is therefore expected to mature during the project; more developed versions of the plan could be included as additional revisions of this deliverable at later stages. The DMP will be updated at least after the mid-term and final reviews to finetune it to the data generated and the uses identified by the consortium since not all data or potential uses are defined at this stage of the project.

REFERENCES

- International Union of Railway (UIC). (2023). *UIC Guidelines on Managing Railway Assets for Biodiversity*.
- UIC Sustainability. (2022, May). *European Railways: Strategy and Actions for Biodiversity*. Retrieved 2023, from https://uic.org/IMG/pdf/uic_reverse_strategy_and_actions_for_biodiversity.pdf