



Microplastics In Europe's Freshwater Ecosystems:
from sources to solutions

DATA MANAGEMENT PLAN (PRELIMINARY)

DELIVERABLE 7.1

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LimnoPlast: Microplastics in Europe’s Freshwater Ecosystems: from sources to solutions

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Table 1. Document Factsheet

Document Factsheet	
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Table 2. Document History

Document History			
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Draft 2	25.05.2020	Input included	B8 (NTNU)
Final Draft	29.05.2020	Feedback UBT included	B8 (NTNU)
Final	02.06.2020	Approved by coordinator	B1 (UBT)

Abbreviations

DMP: Data Management Plan

DoA: Description of Action

EC: European Commission

ESR: Early Stage Researcher

IPR: Intellectual Property Rights

MP: Microplastic

WP: Work package

Beneficiaries

#	Short Name	Full legal name
1	UBT	Universität Bayreuth
2	AAU	Aalborg Universitet
3	ENPC	Ecole Nationale des Ponts et Chaussees
4	EVONIK	Evonik Technology & Infrastructure GmbH
5	Fraunhofer	Fraunhofer UMSICHT
6	HHL	HHL Gemeinnützige GmbH
7	KI (NIC)	Kemijski institut (National Institute of Chemistry)
8	NTNU	Norges Teknisk-Naturvitenskapelige Universitet
9	UGOT	Goteborgs Universitet
10	UiB	Universitetet i Bergen
11	UoP	University of Plymouth
12	VUA	Stichting VU (Vrije University Amsterdam)

Publishable Summary

Deliverable 7.1 represents the Data Management Plan (DMP) of the LimnoPlast project. The DMP describes which type of data will be generated during the project and how it will be handled, processed and made available. This is the first version of the DMP that will be regularly updated.

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PREAMBLE – WHAT IS A DATA MANAGEMENT PLAN?

The Data Management Plan (DMP) is a document that describes the data management starting from its collection, including its processing and handling during the LimnoPlast project and, finally, its later archiving and dissemination. It is a living document in which information can be made available on a finer level of granularity through updates as the implementation of the project progresses and when significant changes occur.

The document helps project participants to determine how the data can be managed efficiently and effectively and reduce the risk of data loss and conflicts. Ethical issues and data security are also briefly discussed within the document. Finally, the DMP ensures consistent resource and budgetary planning for data management related costs.

DMP lists the types and specifications of data that is and will be collected, generated, processed or generally used during the project. The specifications include detailed descriptions of data handling methodologies and used standards both within the project team and outside. Moreover, the DMP includes information on handling the research data both during the project and after it is finished.

According to the guidelines provided by the Horizon 2020, the project data must be FAIR (Findable, Accessible, Interoperable and Reusable) as much as it is possible, except when there are substantial reasons to keep the data confidential. Among other aspects, the DMP also describes the possible levels of data openness within the LimnoPlast project, the differences in their handling and compliance with the Intellectual Property Rights (IPR).

(adapted from DOI: 10.5281/zenodo.1438300)

The format of the plan follows the Horizon 2020 template and is created using DMPonline (<https://dmponline.dcc.ac.uk>).

1 DATA SUMMARY

1.1 Purpose of the data collection/generation

The LimnoPlast project will collect and generate data to achieve its goals, namely, to train a new generation of scientists to tackle the "wicked problem" of plastic pollution. As this requires a multidisciplinary approach, the project will create a very heterogeneous set of data originating from environmental, natural, technical and social sciences. This data will not only be used to innovate solutions to the problem of microplastics pollution in freshwater ecosystem but also train the early stage researcher (ESRs) in the process of data collection, generation and interpretation.

1.2 Relation to the objectives of the project

LimnoPlast has the following scientific objectives:

- *Provide the first comprehensive assessment of the sources, pathways and impacts of freshwater MP. Based on the analysis of three major urban areas, LimnoPlast will generate unique data needed to prioritise prevention and mitigation measures and inform European decision makers and stakeholders. As urbanisation is a key driver of pollution, we will use Aarhus, Amsterdam, and Paris as case studies for MP sources and impacts. Regarding effects of MP, LimnoPlast will provide the first comprehensive data set on chronic toxicity of biodegradable in comparison to conventional plastics.*

The data generated to achieve this objective will be mainly descriptive in nature and mainly relate to the quantification and characterization of MP sampled from freshwater systems, including drinking water, in the three urban areas. This work has a modelling aspect in which the transport and fate of MP in the freshwater systems will be predicted. In addition, toxicological data will be generated to characterize the biological impacts of different synthetic polymers, including ones that are on the market and ones that are developed during the project.

- *Innovate technological solutions to the plastics issue. In contrast to current initiatives, LimnoPlast will go beyond describing the status quo by developing novel solutions to reduce MP emissions. This covers the development of new processes to remove MP from wastewater as well as novel, environmentally sound polymers.*

The data generated to achieve this objective will mainly be technical developments, including the design and testing of an electroseparation technique to remove MP from wastewater and of new, biodegradable polymers. This involves technical designs, prototypes and chemical synthesis. Additional data will be created on the performance of the developed technologies and materials, including the removal of MP from wastewater (similar data to above) and the degradability of the polymers (physico-chemical properties).

- *Evaluate the social and ecological impacts of freshwater MP, recommend intervention options and combine the knowledge about sources, fate and impacts of MP to develop a holistic assessment. In addition, the policy framework will be considered to assess regulatory options. Moreover, the societal perceptions and behavioural aspects of MP will be analysed against the background of acceptability of solutions and to better communicate the risks of MP.*

In addition to the data created on sources and fate of MP in freshwater systems (see first objective), social/behavioural, economic and legal data will be collected to achieve this objective. The former will be survey data from interviews and focus groups, including personal data on the participants, to understand risk perception and mental models on MP. The latter will mainly include data collected from public sources, specifically legal and policy documents. For the economic aspects, life-cycle assessments will be designed and populated with data from dedicated databases.

- *Transform the scientific knowledge generated by LimnoPlast into guidance on specific solutions, including (I) the prioritisation of actions based on the sources and impacts of MP, development of (II) better polymers and removal processes and (III) risk communication strategies and societal interventions promoting behavioural change as well as recommendations on (IV) effective policy and legislative interventions.*

- *Enable and promote action on freshwater MP by transferring the LimnoPlast outcomes and solutions to European decision makers, stakeholders and the public. In line with the 'Science with and for Society' objective, this will be based on a targeted dissemination and communication strategy.*

To achieve these two objectives, the scientific data generated by LimnoPlast will be synthesized and translated to a format accessible for the relevant stakeholders. This will largely be done by creating and disseminating public reports on the main project results and their interpretation.

1.3 Types and format of data generated in LimnoPlast

LimnoPlast will generate the following types of data:

- Survey data (WP1 and WP4) based on interviews, recordings, feedback and questionnaires of participants (ESRs, interview/focus group participants)
- Experimental data (WP2 and WP3) based on the characterization of the performance of existing and novel technologies and polymers (e.g., removal and degradability), toxicity data describing the adverse impacts of MP exposure in vitro and in vivo, chemical data on the synthesis, composition and physico-chemical properties of polymers
- Descriptive data (WP2) based on the characterization of MP in the aquatic environment and drinking water (concentration, physico-chemical properties of detected MP)
- Modelling data based on the transport and fate models used in WP2, this may also include the development of new models or the adaption of existing models
- Data on physical samples and prototypes for the newly developed polymers and electroseparation technology (WP3)
- Data collected from available sources, including policy and legal documents and life-cycle assessment databases.

An overview of the data collected and generated during LimnoPlast is provided in Table 1.

Table 1. Overview of data collected and generated in the LimnoPlast project.

WP	Type	Format	Del.	Beneficiaries	Size	Comment
1 TRAIN	Career Development Plans	rtf	D1.1	all	100 MB	Confidential
1 TRAIN	Feedback on training quality	rtf	-	all	100 MB	Confidential
1 TRAIN	PhD theses	pdf	D1.3	all	500 MB	Open on the institutions' library servers
2 ENV	Harmonized method to sample and analyze microplastics	rtf	D2.1	AAU, ENPC, UBT, VUA	10 MB	Open on Zenodo (M8)
2 ENV	Data set on sources of MP in urban areas (quantitative data on	csv	D2.2	AAU, ENPC, VUA	100 MB	Open on Zenodo (M30)

	concentrations and characteristics of MP at specific locations in Aalborg, Paris and Amsterdam)						
2 ENV	Data on quantification and characterization of MP (FTIR etc.)	spe, dmd	-	AAU, ENPC	5 TB	Agilent data files, siMPle data files, open with corresponding publication	
2 ENV	Transport and fate model (model description and outputs)	mdf	D2.3	AAU, DEL	ENPC,	100 MB	Delft3d model available at https://oss.deltares.nl , Outputs open on Zenodo (M36)
2 ENV	Toxicity data (dose response data on multiple types MPs in multiple species)	csv	D2.4	NTNU, UGOT	UBT,	500 MB	Open on Zenodo with corresponding publication (M30)
2 ENV	Data from the non-target chemical analysis	mzXML	-	NTNU		500 GB	Open on Zenodo with corresponding publication
2 ENV	Human exposure to MP (concentrations and characteristics of MP in drinking water and food, meta-analysis for exposure assessment)	csv	D2.5	VUA		100 MB	Open on Zenodo (M30)
3 TECH	Standard Operation Procedure for testing polymer degradation	rtf	D3.1a	KI		10 MB	Open on Zenodo (M12)
3 TECH	Data set comparing the degradability of conventional and biodegradable polymers	rtf, csv	D3.1b	KI		100 MB	Open on Zenodo with corresponding publication (M30)
3 TECH	Degradation data, characterization of the physico-chemical properties of degraded polymers	csv	-	KI		100 MB	Open on Zenodo with corresponding publication
3 TECH	Report on the newly developed biodegradable polymers	rtf	D3.2	UBT		10 MB	Open on Zenodo with corresponding publication (M30)
3 TECH	Data on synthesis and characterization of new biodegradable polymers	rtf	-	UBT		20 MB	Open with corresponding publication (M30)

3 TECH	Data set on the removal performance of wastewater treatment technologies	misc	D3.3	ENPC	100 MB	Open on Zenodo with corresponding publication (M30)
3 TECH	Data on the characterization of MP in wastewater (FTIR etc.)	misc	-	ENPC	500 MB	Open on Zenodo with corresponding publication
3 TECH	Brief report on the novel electrostatic separation process	rtf	D3.4	EVONIK	10 MB	Confidential (M30)
3 TECH	Blueprints, designs of the separation process	pdf	-	EVONIK	5 MB	Confidential (M30)
4 SOC	Report on current risk perceptions and mental models	rtf	D4.1	UiB	10 MB	Open on Zenodo with corresponding publication (M30)
4 SOC	Review of behaviour change interventions applicable to urban areas	rtf	D4.2a	UoP	10 MB	Open on Zenodo with corresponding publication (M20)
4 SOC	Results of a range of intervention pilot schemes	rtf	D4.2b	UoP	10 MB	Open on Zenodo with corresponding publication (M20)
4 SOC	Results from the interviews and focus groups (personal data)	rtf	-	UiB, UoP	100 MB	Highly confidential
4 SOC	Legal framework of freshwater MP	rtf	D4.3	HHL	100 MB	Open on Zenodo with corresponding publication (M30)
4 SOC	Legal data and interpretation	rtf	-	HHL	500 MB	Open on Zenodo with corresponding publication
4 SOC	Policy framework of freshwater MP	rtf	D4.4	Fraunhofer	100 MB	Open on Zenodo with corresponding publication (M30)
5 SOL	Benchmarking report on the sources of MP in urban areas	rtf	D5.1	AAU	100 MB	Open on Zenodo (M40)
5 SOL	Benchmarking report on wastewater treatment technologies	rtf	D5.2	ENPC	100 MB	Open on Zenodo (M40)
5 SOL	Benchmarking report on the performance of polymers	rtf	D5.3	UGOT	100 MB	Open on Zenodo (M40)

5 SOL	Recommendations on communication and behaviour change strategy	rtf	D5.4	UoP	100 MB	Open on Zenodo (M40)
5 SOL	Recommendation on political and legal intervention options	rtf	D5.5	Fraunhofer	100 MB	Open on Zenodo (M40)
6 MGMT	Establishment of a Data Management Plan	rtf	D6.5	NTNU	10 MB	Open on Zenodo (M6, 18, 30)

1.4 Reuse of existing data and its origin

In WP4 and 5, the participants HHL and Fraunhofer will reuse existing legal and policy documents from the public domain. In addition, Fraunhofer will mine existing databases to parameterize their life cycle assessments.

1.5 Expected size of the data

Based on our preliminary estimated the total size of data will not exceed 5 TB. Specific estimates of data size are provided in Table 1.

1.6 Data utility: to whom will it be useful

The data collected and generated by LimnoPlast will be useful for the academic communities involved in microplastics research. Data on the quantification and characterization of MP can be re-used by environmental scientists for meta-analyses and exposure assessments. In addition, spectral databases generated in WP2 may be re-used by academics for the identification of MP. The same is true for the toxicity and chemical data created in WP2.

The electroseparation technology developed by EVONIK in WP3 will be confidential and proprietary. It will, thus, only be used by that participant. However, the novel polymers developed by UBT in WP3 will be in the public domain and can be further advanced by other polymer scientists.

The social/behavioural data collected by UiB and UoP in WP4 will be confidential as long as it is not fully anonymized. After that, other behavioural scientists may re-use the data for meta-analyses or follow-up studies. The data collected by HHL and Fraunhofer are from the public domain and thus openly available. Their collection, synthesis and interpretation may be relevant for other legal and economic scholars as well as stakeholders.

The benchmarking reports and recommendations developed in WP5 will be publicly available and most relevant for stakeholders and policymakers working on the MP problem. The reports will be publicly available.

1.7 Data handling in LimnoPlast

As no common guidelines exist on the handling of (meta)data on microplastics, the WP leaders will, in the beginning of LimnoPlast, set up joint information requirements and appropriate templates for data collection for their WPs taking into account the specifics detailed below.

LimnoPlast will use OSF (<https://osf.io/>) or Sharepoint (<https://www.microsoft.com/de-de/microsoft-365/sharepoint/collaboration>) for depositing data that has been classified as public, internal or confidential. Confidential data will be encrypted. Highly confidential data (personal data in WP4) will be stored on dedicated servers using secure systems (at UiB: SAFE (<https://www.uib.no/en/it/131011/safe-secure-access-research-data-and-e-infrastructure>)). Once the consortium has finalized the respective deliverable listed in Table 1 or published a study, the associated data will be made openly available unless marked as confidential (e.g., for IPR reasons).

1.7.1 WP1 (TRAIN)

In WP1 data on the quality of the training and supervision will be collected either as survey data (questionnaires) or written feedback. In addition, the ESRs and their supervisors will write individual Career Development Plans that will be updated regularly. As both types of information are personal, they will be treated as confidential and only processed internally. Aggregated and anonymized data may be communicated to the EC in reports.

The 15 PhD theses as well as Bachelor's or Master's theses produced within LimnoPlast will be publicly available on the library servers of the institution that awards the degree.

1.7.2 WP2 (ENVIRONMENT)

Quantification and characterization of microplastics. Metadata on the quantification and characterization of MP in aquatic systems, drinking water and food will include specifics on the sample type, location (GPS data) and time, sampling method, sample preparation method, analytical methodology (detection limits, resolution) and quality assurance and quality control measures. This will be described in D2.1 which will be openly available on Zenodo (<https://zenodo.org/>).

Data should include at least the numerical and if possible, mass concentration of microplastics reported per volume of water (for water samples) and per dry weight of sediment (for sediment samples). To make both data sets comparable providing sediment volumes or densities should be considered. Additional data should include the individual physico-chemical characteristics of the detected MP, including size, shape, color and material (e.g., type of polymer or natural material). The same information should be provided for blank samples used for quality assurance and control.

Other relevant data and products generated in that process include

(I) the results of the validation studies with spiked water and sediment samples. These will be made public in conjunction with the associated publication.

(II) spectral libraries used to identify MP. If these have been developed during LimnoPlast, the respective owner will make the libraries openly available to the scientific community (e.g., as interoperable csv file according to the example of Primpke et al. 2018, 10.1007/s00216-018-1156-x)

(III) software for automated MP analysis and identification. AAU are involved in the development of siMPle that is openly available on www.simple-plastics.eu. UBT uses MPfinder (not openly available).

Fluxes and fate modelling. The outputs of the substance flow analysis (SFA) and the deterministic modelling (Delft3D) will be made openly available upon publication of the respective study on Zenodo. The models are freely available at <https://oss.deltares.nl/web/delft3d/download>.

Toxicity data. The groups performing toxicity studies will agree on a common reporting format that includes metadata on the animal/in vitro model (origin, culturing conditions), concentrations of MP used (both as numerical and mass-based concentrations per water volume or sediment mass) and the physico-chemical properties of the MP used (origin, polymer type, size, shape, surface charge), experimental conditions (exposure route, duration, feeding etc.) and outcomes (endpoints, metrics etc.). The reporting of metadata will take into account the SciRAP guidelines available at <http://www.scirap.org>.

The toxicity data will be publicly available as raw data (original measurement per replicate) in csv files that accompany the corresponding publications.

Chemical data. The raw data, feature lists and aggregated data from the chemical analysis of polymers will be made openly available on Zenodo in conjunction with the corresponding publication.

Degradation data. To be added by KI during the revision of the DMP.

1.7.3 WP3 (TECHNOLOGY)

Development of novel polymers. Synthetic procedures will be established and made open to use by others in the form of open-access publications. Physico-chemical characterization data in terms of spectra will be collected.

Comparison of advanced wastewater treatment. Basically, the same procedures as described in 1.7.2 for the aquatic environment will apply. Specific additional data recorded will include the type of wastewater treatment

under investigation and specific water quality parameters routinely recorded to characterize the performance of a wastewater treatment plant.

Development of an electroseparation technology. Experimental work as well literature research will be done. The data of the parameter studies in the experimental work will be recorded. The summary of the literature research will be recorded, too. Based on this data, a new apparatus will be designed. The concept and the design of the new apparatus will be described.

1.7.4 WP4 (SOCIETY)

Mental models. Survey work (interviews, questionnaires, focus groups) as well as literature research will be conducted. The raw materials of the data collection and literature reviews will be stored in repositories; the results will be published in scientific outlets.

Legal framework. To be added by HHL during the revision of the DMP.

Socio-economic assessment. To be added by FRAUNHOFER during the revision of the DMP.

1.7.5 WP5 (SOLUTIONS)

WP5 will not generate new data but produce a range of benchmarking reports and recommendations for communication/behavioral change strategies and policy/legal interventions. These will be publicly available on Zenodo and the projects website.

2. FAIR DATA

2.1 Making data findable, including provisions for metadata

Discoverability: The metadata reported in each LimnoPlast WP are described in 1.7. Each dataset will be accompanied with a readme text file or a similar description that provides the relevant metadata.

Identifiability: All published data will have a DOI, either via the publisher, repository or institutional servers used for data deposition. In addition, each LimnoPlast researcher will be identifiable via an ORCID ID.

Naming conventions: All file names will be standardized. This applies to data files, the statistical analyses and the reports.

- Program title: LimnoPlast (LP) followed by the task number (e.g. LP2.4)
- Experiment name: e.g., EXP1 (experiment 1)
- Optional for research data: Date file (YYMMDD)
- Type of files: e.g., DATA for any data file, STATS for statistical analyses, REPORT/DEL for reports and deliverable, RM for readme files
- Version: format: vX.Y
- Extension: The standard extension specific to the software Example: LP2.4_EXP3_DATA_210305_v3.2.CSV

Keywords: The file headers or description of each dataset will clearly relate to the LimnoPlast project and contain the term "microplastics". The plural is common practice in microplastics research. The terms "microplastic", "nanoplastic" and "nanoplastics" may be used as keywords to make the content findable. Subject and content specific keywords will be added. The funding by the European Commission will be acknowledged as described in the Grant Agreement.

Versioning: All internal data will have a version control either via the software (e.g., Sharepoint) used or via the file names. In the file names, the first digit represents major changes (e.g., after feedback on a report) and the

second digit represent minor changes (e.g., changes by the author). Public data will be versioned via the platform it is deposited on (e.g., Zenodo, peerJ (<https://peerj.com/>), bioRxiv (<https://www.biorxiv.org/>) etc.).

Standards for metadata creation are currently unavailable for microplastics research. However, we will use an adapted version of the SciRAP guidelines for reporting toxicity metadata.

2.2 Making data openly accessible

Which and how data will be made openly available. LimnoPlast follows the H2020 principle of “as open as possible and as closed as necessary”. Accordingly, open access to all relevant research, publications and theses will be the standards. Relevant data sets and reports are described in Table 1 and will be made open. The participants generating/collecting the data decide on the time at which this happens. As an example, key data sets and reports that are LimnoPlast deliverables will be made open once they are delivered to the European Commission.

The LimnoPlast participants aim at making pre-peer-review versions of their publications openly available using the appropriate preprint servers (e.g., bioRxiv, peerJ) before submission to a journal. All publications that have been (partly) funded by LimnoPlast will be published as Gold or Green Open Access¹. Hybrid Open Access publications are acceptable but Gold/Green OA should be given priority. Data associated with these publications (esp. raw data) will be published using Zenodo or comparable public repositories. The authors will apply the “as open as possible and as closed as necessary” principle and make as much of the relevant data open.

Confidential data will not be available publicly. This is to (1) safeguard privacy in case those contain personal data (e.g., career development plans, surveys of training quality, interview data) or (2) protect intellectual property rights of the LimnoPlast participants (e.g., prototypes of materials or technologies). The data considered confidential are labelled in Table 1. This table will be updated regularly, and participants are obliged to flag any additional confidentiality issues that occur during LimnoPlast.

Methods or software tools needed to access the data. Most raw data produced by LimnoPlast will be made public as comma separated values (csv files) that can be accessed using multiple software tools. Specific data, such as FTIR data and chemical data will be made public using open formats. For instance, mass spectroscopy data from the chemical analysis will be published as mzXML format that can be accessed using multiple open software tools (e.g., MZmine2).

Where data and associated metadata, documentation and code are deposited. Unless specialized repositories for a discipline are available, the LimnoPlast researcher will rely on their local, institutional repositories to publish data sets or theses. Preprints will be published on bioRxiv, peerJ, or preprint servers available for other disciplines. Data sets and reports will be published on Zenodo. Presentations will be published on Figshare (<https://figshare.com/>).

Access in case there are restrictions. Confidential personal data will remain confidential. Access can be provided to fully anonymized data on request to the LimnoPlast researcher that generated the data. Data that is confidential to protect intellectual property will remain confidential. Upon request, the owner of the property decides which parts of the data can be made available and which rules to apply to access that data (e.g., confidentiality agreements).

2.3 Making data interoperable

Interoperability of your data. There are no specific vocabularies, standards or methodologies in microplastics. Most data will, however, be interoperable as generic and open file formats will be used.

2.4 Increase data re-use

Licensing. All data and publications that are public will be licensed using Creative Commons licenses. The standard license will be CC BY-NC-SA which allows others to remix, adapt and build upon the LimnoPlast work

¹ Gold OA: Published makes all publications freely available via their website; Green OA: The authors are allowed to publish a version of the publication (often the pre-print version) on a public and open repository (e.g., bioRxiv, peerJ).

non-commercially, as long as they credit the LimnoPlast researcher who created the data and license their new creations under the identical terms. If required, LimnoPlast researcher will consult <https://creativecommons.org/choose> to decide which CC license to use for their work specifically.

Re-use. The data will be made available for reuse once it is published in a repository or a journal. A data embargo is not foreseen in LimnoPlast. The data stored in public repositories will be available for re-use after the end of LimnoPlast without restriction.

Data quality assurance processes. All data that will be made public will be quality assured using the following procedure: The creator of the raw and interpreted data (usually the ESR) will document their work in electronic (lab) notebooks according to what is common practice in the discipline and produce versioned protocols of the methods they apply. They will produce the raw data files and the results of the interpretation/analysis (e.g., statistics) that will be verified by the supervisor before it can be made public. Deliverables will be produced by the responsible beneficiary, assessed for quality by the respective WP leader and approved by the coordinator before publication.

3. ALLOCATION OF RESOURCES

Costs for making data open and FAIR. OA fees for publications are covered by institutional costs of each beneficiary or by institutional OA contracts with publishers. The repositories used for data deposition are free of charge.

Responsibility for data management. The individual beneficiaries and partner institutions are responsible for the local management of data. They will make sure that all data is securely stored, backed up and made public in due time. NTNU will handle the consortium-wide data management, including the updates of the DMP and solving potential data management issues.

Long-term data preservation. All data published in public repository will be available as long as the repository allows. In case of restrictions, data can be transferred to NTNU's Research Data @NTNU for long-term storage. This will not incur additional costs.

4. DATA SECURITY

Storage and backup. All data will be stored on local computers and immediately backed up using the institution's cloud service. Each LimnoPlast participant ensures that this cloud backup is secure and backed up in at least one other copy. Another copy of all data is backed up on an external hard drive in regular intervals, at best continuously, least once per week. The individual LimnoPlast researcher that created the data is responsible for data recovery in case of loss.

Sensitive data. All confidential and sensitive data will be encrypted and stored on specifically secured servers that have a two-factor identification for access control. Only the LimnoPlast researchers immediately involved in creating and interpreting this data will have access. If sensitive or confidential data is to be transferred to another LimnoPlast participant, encryption and secure transfer must be ensured.

5. ETHICAL ASPECTS

Personal data. To be covered in the context of the ethics review, ethics section of DoA and ethics deliverables. Include references and related technical aspects if not covered by the former. All data collection by UiB will conform to the regulations of the Data Protection Authority at the Norwegian Centre for Research Data (NSD, <https://nsd.no/nsd/english/index.html>). In the case of sensitive data, we will consult the local data protection officer and register the study in the internal system for risk and compliance for research and student projects at UiB (RETTE).

Intellectual property. To be added by EVONIK during the revision of the DMP.