



CHARTER Data Management Plan Version 1.0

CHARTER Deliverable 7.5.

Grant Agreement Number: 869471 Project Acronym: CHARTER Project title: Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity Starting Date: 01/08/2020 Project Duration: 48 months Project Officer: Alberto Zocchi Project Coordinator: Bruce Forbes / LAY Author(s): CHARTER coordination team / LAY Contributing partners: FMI, LBHI, AWI, UHAM, NMBU Due Submission Date: 31/01/2021 Actual Submission Date: 5/02/2021

The Data Management plan will be updated latest on project month 34 (31.05.2023).

Status	
Draft	
Final	Х

Туре				
R	Document, report	х		
DEM	Demonstrator, pilot, prototype			
DEC	Websites, patent fillings, videos, etc.			
OTHER				

Dissemination level				
PU	Public	Х		
CO	Confidential, only for members of the			
	consortium (incl. the Commission services)			





Revision history

Date	Lead author(s)	Comments
10.10.2020	Sirpa Rasmus	1 st draft version
18.11.2020	Isabel Barrio	2 nd draft version
21.1.2021	Sirpa Rasmus, Heidrun Matthes,	3 rd draft version, circulated for
	Anna Kontu, Leena Leppänen	comments within the CHARTER
		consortium
4.2.2021	Teresa Komu, Otto Habeck, Andrei	4rd draft version, work done on
	Marin, Florian Stammler, Roza	ethical aspects, circulated again for
	Laptander, Kirill Istomin	comments
5.2.2021	CHARTER coordination team	Final version 1.0, submitted





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About the Data Management Plan

Sharing and storing data is an important part of the dissemination and exploitation of the CHARTER project, particularly for the cross-cutting themes "Tools and data for Arctic Strategies", and "Public dialogue on the Arctic". CHARTER follows the H2020 Guidelines on Data Management, and complies with international standards and ethical principles for research and dissemination. The Data Management Plan (DMP) describes in detail the exact procedures for data processing, sharing and storing within the CHARTER project. To ensure that CHARTER follows the FAIR principle (making data findable, accessible, interoperable and reusable), the DMP details:

- the handling of research data during and after the end of the project
- what data will be collected, processed and/or generated
- which methodology and standards will be applied
- whether data will be shared/made open access and
- how data will be curated and preserved (including after the end of the project)

The DMP is developed to guide the Consortium in managing data quality and protection issues that will arise along the project life. The plan identifies the type of data that will be generated by the project team, as well as the standards that will be used to ensure their quality and scientific relevance, whilst avoiding data overproduction. As well, the DMP guides the collection, storage, transfer, protection and anonymisation of data during the project lifetime and beyond the end of the project, and provides a clear description of procedures for safe and ready-formatted transfer and long-term preservation of the datasets. DMP addresses ethical guidelines for publishing open access digitally recorded and visual materials from project participants, whilst observing the principles of data protection (General Data Protection Regulation, GDPR) and open access to data generated by the project. The DMP addresses some Intellectual Property Rights (IPRs) issues but for more thorough consideration, see the PEDR plan.

The DMP has been developed as part of CHARTER's WP7 during the first 6 months of the project and will be regularly updated at project mid-term and at the end of the project. Such updates are necessary to adapt the DMP to the actual datasets generated during the project and for the different uses identified and collectively supported by all project partners.





1. DATA SUMMARY

1.1 Data collected and generated by the project

CHARTER is a multidisciplinary project that will collect, process, share and store large amounts of data, both quantitative and qualitative. The project will use a variety of methods from different scientific disciplines to collect and generate research data, from social and human sciences to climate modelling, ecological field methods and paleoecology. Data to be collected during this research will be physically and digitally recorded and stored according to the data management plan specified in this document.

Data to be collected include physical samples of sediments and wood, observational data, remotely sensed imagery and digitally captured audio / video recordings of interviews and narratives. Other forms of data include photographs, field notes, and qualitative questionnaires. The types of data collected and generated by the project include:

- Digital data of interviews (audio / video files)
- Transcriptions of interviews
- Translations of interview summaries
- Summaries of stakeholder workshops
- Manual and automated observational data (datasheets, text files, images)
- Field notes
- Photographs
- Samples of sediments and wood
- Model output (raw data, NetCDF files, hdf5 files, maps and figures)
- Images from wildlife monitoring cameras
- Satellite data and products (images, text files)
- Drone data (images, text files)
- Scripts for statistical analyses
- Qualitative questionnaires
- Map-based surveys

Generally, it is suggested to use the most commonly used data formats for storing data to ensure effective usability. Text data (field notes and interview transcriptions) will be stored in file formats such as .txt, .doc or, .pdf format, recorded interviews and video material as .mp3 files, images in .png or .jpg format, and datasheets with quantitative data in .csv format. Observational measurement data will be processed from raw voltage values to measured parameters. Raw data will be stored in text files (.txt) and processed data in a database. Permissions for





using, publishing and sharing observational data (such as snow observations) collected from herders will be asked during the data collection.

Storing non-digital data such as samples (wood and sediment) will be the responsibility of the partner collecting the samples. Social and human science research will be conducted in WP3 and WP6 (ethical and privacy issues regarding these data are clarified in Section 5). Such data and results will be made as open as possible, but access to certain information will be kept anonymous, as specified in CHARTER's ethical guidelines and in consultation with stakeholders and end users. In addition, further processing of previously collected personal data (secondary use) may occur with regard to interviews with land users, e.g., reindeer herders, their household members and local administrators conducted by researchers in previous years.

Newly collected interviews will be conducted on the basis of free prior, and informed consent. Personal information of individual interviewees will be treated confidentially, observing the principles of the General Data Protection Regulation (GDPR). Saved data is anonymised or pseudonymised unless specifically requested by the research partners that their name will be used for honoring their authorship of the data. Digital data (audio and video files), photographs and transcriptions are stored by the researcher who has produced the data. Translated summaries of stakeholder workshops, field notes and interviews will be stored on a limited-access platform for use within the work package and, when agreed upon, with the whole consortium. Minutes of stakeholder workshops, field notes and interviews collected in Nenets, Komi, Finnish, Norwegian, Swedish, Sámi or Russian language will be equipped with summaries in English; besides that, their transcripts will be accompanied by keywords in English specifying themes touched on in corresponding parts of the texts. Each research partner (i.e. informant person participating in the research) will be informed of their right to refuse to participate. The consent can be later withdrawn and each participant is given the necessary contact information to the research team. If a research partner (informant) wishes to have further information regarding how their personal data will be processed in the study they will be given the privacy notice. The privacy notice is archived in the Registry Office of University of Lapland according to the EU General Data Protection Regulation Art. 13 and 14, and is available in English and in Finnish. This document also will be translated into Russian.

Personal information collected in the questionnaires or map-based surveys will be treated confidentially, observing the principles of the General Data Protection Regulation (GDPR). Digital data will be stored on a limited-access platform and beyond that level all data will be anonymous.





Only the generalised summaries of workshops, interviews and field notes will be preserved in data repositories, making them available for other researchers and for teaching and learning purposes. Original confidential data, which needs to be saved, are accessible only to the researchers who have produced the data. Researchers may agree among themselves to share audio and video files or interview transcriptions, but only if the sharing of data with other researchers has been consented by the respective research partner (informant).

All shared data is distributed under Creative Commons Attribution 4.0 International license (CC BY 4.0), unless stated otherwise. Archived data are not in the public domain and their use is restricted for specific purposes after user registration of the researchers of this research consortium. The data accessible to external users of this project consortium will be defined by the project consortium and cultural repository organizations. The research partners (informants) will be made aware as to who has the access to their data and to what kind of data.

1.2 Re-used existing data sets

CHARTER researchers can re-use existing data sets for CHARTER research purposes

- Optical and microwave satellite data and products (Landsat, MODIS, Sentinel, Quikscat, JAXA, etc.)
- Observational data (e.g. weather, snow, vegetation, reindeer herding statistics)
- CMIP6 climate projections
- Interviews from previous projects (with certain limitations)

All project partners have already determined any existing data ("Background") they will submit to the project within the Consortium Agreement. Any details concerning the access rights to Background for the duration of the project have also been defined in the Consortium Agreement.

1.3 Data consistency and quality

The quality of the data generated by the CHARTER project will be ensured in each phase of the research process (data collection, data entry and data checking) by assigning clear roles and responsibilities and by developing suitable procedures before data gathering begins. Data will be documented in a systematic manner using clear and descriptive file titles, version control and separate folders to ensure that datasets and files can be discovered, retrieved, used and properly cited. The use of standardized methods and protocols for documenting observations in written notes and testing technical instruments and equipment before collecting data will ensure





collection of high-quality data. Further, requiring systematic and consistent exact level transcription of all textual data and following file naming guidelines and conventions will ensure the consistency of the data. All quality assurance processes adopted within the CHARTER project will be documented by metadata (see below, Section 2.1).

1.4 Data ownership

Ownership remains with the party producing the data (making the interview, producing measurement data, processing new product, etc.). The Consortium or Project do not have collective ownership of the data. See also the Consortium Agreement and the PEDR plan about rules for dissemination, exploitation and ownership of results.

2. FAIR DATA

2.1 Making data findable, including provisions for metadata

Non-confidential digital data collected and generated by CHARTER project participants will be stored and shared already during the project and kept open and accessible well beyond the project lifetime. Re-used data sets will be not shared, but download information will be available under FMI's litdb.fmi.fi website. Sharing large data sets (such as drone imagery, wildlife monitoring camera imagery and raw data from model outputs) and data collected jointly with other projects will be considered case by case. For data sets that cannot be published, metadata will be made available. All documentation of the CHARTER project data will be done according to the <u>H2020 Guidelines for Data Management</u> as regards metadata requirements. These requirements include:

- description of the implementation of the research: original intended use, authors, producers, data gathering, etc.
- details on the instruments used for gathering data
- file descriptions: file name, directory, file size, file format, date of production, file version, etc.
- information on availability
- description of variables (where applicable)

CHARTER will follow the common scientific standards in data storage formats and will develop a metadata-file for data sets saved as a separate text file, that will describe the collection, processing and other attributes of the respective dataset.





Metadata will also include keywords to enable indexing, discovery and retrieval, to ensure the discoverability of the data. Data will be securely stored in services managed by CHARTER partners and using the advanced data archiving software of FMI and AWI (see Section 4.1 Data storage and back-up, below).

A single website listing all available data sets produced and used by the project will be collected under FMI's litdb.fmi.fi site. Information on download location will be included for re-used data sets such as satellite data and model projections. This page will contain links to data sources allowing easy access for all project-related data.

2.2 Making data openly accessible

Open access publishing of the results, especially of the project's research related outcomes, including academic publications and education materials, is highly relevant to the end users of the CHARTER project. Most of CHARTER's research data will become open through several data networks and other data sharing and information channels which our researchers regularly use (e.g. Arcus/Witness the Arctic or NOAA, Arctic Report Cards). CHARTER will publish its research outcomes in green open access journals, gold and hybrid open access publishing. This includes publishing (or indicating, in case of confidential data) all data required to reproduce and/or corroborate the results of the publication. For scientific publications, the Consortium will apply the general principle on Open Access in H2020 according to the official EC Guidelines to the Rules on Open Access, which requires that scientific peer reviewed publications (machine-readable electronic copy of the published version) be deposited in an institutional repository. Where this is not available to partners, an alternative repository will be identified so that all scientific publications are included in the European research e-infrastructure of OpenAIRE (Open Access Infrastructure for Research in the Europe). In cases where Open Access publishing is not possible, self-archiving of publications will be ensured through the digital platforms that the project employs. Publishing scientific articles in open access scientific journals and making other publications available through repositories ensures that publications are readily accessible and have higher visibility. CHARTER is part of the ORDP: Open Research Data Pilot. The Plan for Exploitation and Dissemination of Results (PEDR) also discusses some data-sharing aspects and IPR issues.





Public access to data

Produced non-confidential research data associated with metadata and other project results of CHARTER will be shared using existing networks and portals, as well as advanced data sharing and delivery software provided by the project partners. Size of some data sets (such as drone imagery, wildlife monitoring camera imagery, and raw data from model outputs) is too large for the data bases and access to the data can be granted upon request. Data will be made open access through repositories providing DOIs as much as possible. Some data are directly openly available after collection (e.g. weather station data), but part of the data will be openly available only after an embargo period from the end of data collection (after analysis has been done or results have been published). Sharing location information of geospatial data will be considered case by case. Sharing data collected jointly with other projects will be considered case by case. We encourage external partners to make data open accessible.

FMI will provide advanced data sharing services and delivery software, including open databases litDB (litdb.fmi.fi) for observations and NSDC (National Satellite Data Centre, nsdc.fmi.fi) for satellite data and products. In litDB, any registered user can download data, but only specific FMI employees have access to upload and manage the data and web site. Data are stored in a PostgreSQL data-base (direct download from litdb.fmi.fi) or an S3 system (for larger data sets, available by request via e-mail to litdb-support@fmi.fi). Data in litDB are distributed under Creative Commons Attribution Non-Commercial 4.0 International license (CC BY-NC 4.0), unless stated otherwise. NSDC systems allow storage of satellite data and products in a specified server environment. Newly generated satellite products can be stored and distributed through NSDC. A user can view data in GeoServer system to select a suitable data format, area of interest and time period, and then download selected data. Only specified FMI employees have access to managing the systems. Raw output from climate and snow models will be stored at the respective supercomputing facilities in long-term data archives. AWI and the German Climate Computing Center (Deutsches Klimarechenzentrum DKRZ; AWI is one of the shareholders) will also provide data sharing services for the project. Model data produced by AWI are stored at DKRZ super-computing facility, archiving data through their system (at least 10 years). After publishing open access, material can be made openly accessible.

Other available methods for data distribution, such as PANGAEA, NEOTOMA or Zenodo will be used when applicable. For example, some drone data could be stored to PANGAEA but solutions will be discussed together with other initiatives such as IASC T-MOSAiC remote-sensing working group and HiLDEN project. Palaeoecological data gathered from relatively inaccessible sources such as paper-





based archives will be submitted to NEOTOMA with the permission of the data owners. Other large data sets, such as wildlife monitoring camera images, could be stored on databases such as PANGAEA. Model outputs can be stored also into databases like PANGAEA, where it can be easily found. Access to the data can be granted upon request, as the size of complete model output in raw format is too big for the data-base.

Social and human science research data will be made as open as possible. However, access to certain information will be kept anonymous as specified in our ethical guidelines and in consultation with stakeholders and end users. Saved data is anonymised or pseudonymised unless in cases where research partners (informants) wish to be acknowledged as contributors of the data and co-authors of the findings, their identity will be honored and mentioned after their expressed desire and consent (to be recorded in written form, or audio/video tape). Digital data (audio and video files), photographs and transcripts will be shared only if agreed upon among the researchers, and only if the respective research partner (informant) has given their consent for sharing the data with other researchers. Translated, generalised summaries will be stored on a limited-access platform for use within the work package and the consortium. Archived data are not in the public domain and their use is restricted for specific purposes after user registration of the researchers of this research consortium. The data accessible to external users of this project consortium will be defined by the project consortium and cultural repository organizations.

2.3 Making data interoperable

Interoperability will be ensured by using common open file formats for saving the data. Each data set will have a machine-readable standard metadata file according to the H2020 Guidelines for Data Management as regards metadata requirements. CHARTER will follow the common scientific standards to develop a metadata-file for each data set saved as a separate text file, that will describe the collection, processing and other attributes of the dataset. Metadata files will follow existing standards and formats (such as JSON), which will be decided within the project partners. In addition, recommended standard vocabulary to identify metadata variables (such as GCMD) will be decided within the project partners. Results from stakeholder workshops, field notes and interviews in Nenets, Komi, Finnish, Norwegian, Swedish, Sámi or Russian language will be summarized in English.





2.4 Making data re-usable

Open available non-confidential digital data are for free re-use for anyone interested under the respective license. Data is distributed under Creative Commons Attribution 4.0 International license (CC BY 4.0), unless stated otherwise, to allow broad re-use of produced data. Some data are directly re-usable after collection (e.g. weather station data), but part of the data will be re-usable only after an embargo period from the end of data collection. Confidential data are not re-usable (compare Section 1.1 and Section 5.1). Metadata for all collected data sets will be shared, and data-set specific metadata will be associated with openly available data. Included metadata containing key information of data ensures efficient and easy re-usability. It is intended that the data will remain re-usable at least 10 years after the end of the project.

3. ALLOCATION OF RESOURCES

The resources needed for adhering to the FAIR principles for data management are made available through the Grant Agreement. For instance, €40,000 have been allocated in the budget for the purpose of open publication. Moreover, the time allocated by individual researchers for data management has been included in the project budget. A Project Lawyer will ensure that good data and IPR management practices are strictly followed.

Data management within the CHARTER project is the responsibility of the Consortium members and will be managed in collaboration by the Coordinator, institute contact points and work package leaders. The responsibilities include:

- To inform the Consortium of the types of data being generated and the methods of collection
- To ensure secure re-use of data within the Consortium
- To ensure secure storage and sharing of data
- To securely store and archive physical data

LAY, AWI and FMI will manage the CHARTER platforms (including the website, blogs, photo and video galleries, white papers and policy recommendations) and data storage. The platforms and data storages will be maintained well beyond the project lifetime (for a minimum of 10 years after the end of the project).





4. DATA SECURITY

4.1 Data storage and backing up

CHARTER adheres to rigorous data management practices that ensure secure storage and re-use possibilities of the new data gathered and generated during the project. CHARTER benefits from the expertise of some of its partners (e.g. AWI, FMI) in handling and securely storing large quantitative datasets. The data storage is thus organized in close collaboration between LAY, AWI and FMI. Data storage will include high-protection data storage on servers, external hard-drives and local computers with automatic back-ups and secure log-in with appropriate credentials that enable data retrieval in case of local data loss.

Data that cannot be digitized and/or stored in servers will be stored in safe places, e.g. in locked cabinets and/or password-protected files, to protect research integrity and the anonymity and rights of research participants. Personal data will not be shared or included in the long-term preservation of data. Data is anonymized or pseudonymized to ensure that no person can be identified from the data. Unless specifically agreed with the participants, such as when they are listed as coresearchers or as co-authors on dissemination products, all participants will be referred to with aliases to protect their identity.

4.2 Data security and access to data between project partners

CHARTER uses the shared Eduuni space to store and share documents. Eduuni can be used as a secure storage space, providing that the data is not sensitive. However, the storage space in Eduuni is limited, so sharing and storing of large files will be organized using other tools, such as explained above in section 4.1., or FUNET file sender (https://www.csc.fi/en/funet-filesender-tiedostonjakopalvelu). Secured access to the data will be ensured by granting access only to registered users that need to sign up with their email address to use the <u>Eduuni services</u>. Confidential information should not be shared in conversations in meeting software such as Zoom or Teams.

Groups with certain access rights have been created in Eduuni for CHARTER researchers, collaborators and coordinators. People on the CHARTER_researchers mail list have access to most of the CHARTER folders in Eduuni. Arto Vitikka (arto.vitikka@ulapland.fi) can help if there are technical problems. Junior scientists have opened a Teams space and some WPs have opened MS Teams or Slack or other





spaces for their work. The project encourages researchers to use the tools they find most flexible and useful.

Internal access to model outputs will be granted upon request using the Swift file sharing facility at DKRZ. This object storage system hosted at DKRZ offers a secure platform for saving and distributing data on a global scale. This system allows to create secure links to requested model data so that data can be easily accessed. Secured access to the data will be controlled by employing trusted and approved open data platforms by the University of Lapland. For secure and reliable data storage during the entire life of the research project, all data from personal hard drives have to be transferred to backed-up servers on a weekly basis and all data have to be transferred to the secure open data platform on a monthly basis. Passwords and security logins have to be regularly updated or changed to secure their integrity.

5. ETHICAL ASPECTS

CHARTER's research follows the European Code of Conduct for Research Integrity by ALLEA and relevant national guidelines, such as the guidelines of The Finnish Advisory Board on Research Integrity and the National Ethics Committee (Norwegian National Committees for Research Ethics- NESH), and the Norwegian Sámi Parliament on Sámi research ethics (NESH 2002: 15). All ethical issues in the social anthropological research will be handled in accordance with internationally accepted guidelines. Adherence to high ethical standards and rigorous data management practices guarantees the safety and re-use possibilities of the data. CHARTER is aware of an ongoing process in Finland to form ethical guidelines for research on Sámi and will closely monitor how the process unfolds.¹ The relevant ethical issues in the project relate to: 1) research involving work with human beings, including collection of personal data, 2) research involving animals and local resources, and 3) transfer of research data between EU and non-EU countries. A detailed description of Ethics management can be found in the CHARTER Grant Agreement.

5.1 Research involving work with human beings

CHARTER will use a code of good research practices that has been developed in past projects by project partners where local communities are involved in the research design phase. This code includes ethical guidelines, consent procedures and

¹ https://www.ulapland.fi/FI/Kotisivut/Saamelaisia-koskevan-tutkimuksen-eettiset-ohjeet-





explanatory videos on ethical issues to ensure fully informed understanding of the implications of participation, to help design tasks and activities that are ethically considerate. All participants will be informed of their right to refuse to participate and withdraw their consent at any point. Prior approvals of all relevant Ethical Councils will be sought. Before an interview, the research partner (informant) will be given an information sheet that describes the content of the research, its purpose as well as how the interviews are going to be used in publications, how the data will be managed in the course of the study, and the format in which the data will be stored and handled. The research partner (informant) will have the right to determine whether audio/video files and interview transcriptions produced with them can be shared with other researchers. The Coordinator is responsible for producing the information sheet, in close collaboration with the WP3 and WP6 leaders.

CHARTER research involves cooperating with indigenous peoples (Sámi, Nenets, and Komi), and follows the principle of "Free, Prior and Informed Consent (FPIC)" that requires consultation with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent. The principle of non-discrimination is also relevant, to ensure that no decisions relating directly to indigenous peoples are taken without their informed consent.

Details of the recruitment, inclusion and exclusion criteria and informed consent procedures:

The consortium partners will consult with representatives from appropriate and relevant group leaders, institutions and organisations to recruit participants. As recruitment procedures, the groups, institutions and organisations that represent the participants will be contacted by e-mail or phone. Letters and information sheets will be provided to introduce the research. The representatives or leaders will be referred to for their opinion, advice and suggestions with regards to conducting recruitment and appropriate procedures for inclusion and exclusion of participants, for example the appropriate scheduling, venue selection for the research, languages to be used, and other considerations, thus avoiding any discomfort or harm to participants. Together the researchers and representatives will ensure that the values, rights and interests of the research participants are protected. Inclusive and respectful bottom-up approaches (narrative processes, cocreation, participatory research) will guide interaction with participants. Results of the research will be shared with participants via a final research report, conference papers, journal articles and other representations as appropriate, such as digital outcomes that will form part of the exhibitions and on-line publications.





The project will not collect nor process personal sensitive data. The (re-used) data collected are not identifiable nor can be related to an individual. In cases where research partners (informants) wish to be acknowledged as contributors of the data and co-authors of the findings, their identity will be honored and mentioned after their expressed desire and consent (to be recorded in written form, or on audio/video tape).

Participants (i.e., research partners/informants) will receive the following information during meetings prior to data collection:

- Information sheet including details on the benefits of participation, the purpose of research and explanation of whom to contact for answers to pertinent questions
- Detailed introduction to the research in a form appropriate for the local partners
- Consent form (if applicable)
- Privacy notice (if applicable)

The consent process to be followed is:

- The consent will be recorded in written form. If that is not possible, the consent will be recorded on audio or video tape.
- The background and purpose of the study, the implications involved, and other information provided in the information booklet will be explained verbally. The purpose of the consent process will be explained to all participants before they agree, to ensure they understand the procedure.
- The researchers shall explain to potential participants that they are under no obligation to participate in the research. If any of the potential participants or participants want to withdraw from the ethnographic observations or the interviews at any stage, the researchers will see that no one who declines to participate or withdraws from participation will suffer any disadvantage. No reasons for their decision will be requested.
- Consent will also be sought to document data with digital video camera and photo camera and participants will be asked to indicate their consent for data documentation as part of the FPIC process.
- Finally, consent will also be sought from all participants for joint authorship of any group work that may eventuate from the activities of the research.





5.2 Research involving animals and local resources

Some tasks in the CHARTER project involve observing animals. Animal presence may be monitored with non-invasive methods, like automated cameras, which will be set up in accordance with local regulations. For the data on small rodents, CHARTER will use a data set of existing abundance estimates. Reindeer will be observed under natural conditions (while grazing), but researchers will not interfere with the animals, neither will they conduct experiments on animals. Small amounts of sediment and wood samples will be collected as part of WP4. Sampling will be done at sites where our researchers have long-term collaboration relationships and existing research permits. Local regulations are used when planning and conducting sampling.

Research may deal with endangered fauna and/or flora and/or protected areas. If interviewees point to endangered flora or fauna or suggest visiting protected areas, researchers will comply with pertinent legislation and regulations to secure environmental protection.

5.3 Transfer of research data between EU and non-EU countries

The transfer of data between EU and non-EU countries complies with the laws of the country in which the data were collected. The project does not plan to import personal data between non-EU and EU countries. Any data transferred between EU and non-EU countries will be anonymised or pseudonymised. For example, summaries of stakeholder workshops in Norway and Russia will be made available to audiences in Finland, Sweden and other EU countries, but only in generalised form (without mentioning the source of individual statements). For such datasets, we will provide details on the data exchanges and obtain the adequate authorizations from each partner. We will detail exact retention and destruction periods, anonymisation procedures, data security procedures and mechanisms to train project staff, including a section on misuse risks and mitigation strategies, and a separate section for each study location.

USEFUL RESOURCES

EC guidelines / Data Management: https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cuttingissues/open-access-data-management/data-management_en.htm