D1.3 Initial project handbook, data & risk management plans

Deliverable for the Horizon Europe Project BirdWatch

Version 1.0

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Document Information

GA Number	101082634		**Type of Action**	Horizon-IA
Full Title	BirdWatch - a Copernicus-based service for the improvement of habitat suitability of farmland birds via satellite-enabled monitoring, evaluation and optimisation of CAP greening measures			
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Lead Beneficiary	LUP - Luftbild Umwelt Planung GmbH			
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History of Changes

Version	Issue Date	Stage	Description	Comments	Contributors
1.0	28.07.2023	Draft	1st Draft of D1.3		Nastasja Scholz - LUP Sascha Gey - LUP Nejc Vessel - Sinergise Alexander Jacob - EURAC Ine Rosier - VITO Levin Wiedenroth - UP

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Introduction

BirdWatch's aim is to provide an EU-wide service supporting the monitoring and improvement of farmland habitat suitability for bird species which breed or forage on agricultural land.
The BirdWatch service will consist of an Earth Observation (EO) data-based monitoring service which evaluates the habitat suitability of farmland parcels for specific bird species as well as of an optimisation workflow, serving as a decision-support for the identification of appropriate eco-schemes.

The Project Handbook documents the BirdWatch consortium's approach for implementing the project goals. It lists the key controlling processes to be used, the project policies and rules, the overall management approach, conducted and foreseen communication and dissemination activities, as well as modalities on data, risk and quality management.
The Project Handbook will thus present the basis for managing the project throughout its lifetime and is an important point of reference for all project members. It will be kept up-to-date throughout the project and will become an important point of reference for the Project-End Review Meeting.
The Project Handbook (PH) also aims to raise the awareness of the importance of both the Grant Agreement (GA) and Consortium Agreement (CA), especially for consortium members who join after the project start. In terms of authority, the PH is lower in rank than the GA and CA (i.e., *GA > CA > PH*).

In setting up the project handbook, we partly followed and slightly adapted recommendations of the PM² Project Management Methodology[1]. The respective passages are indicated throughout this document.

[1] https://pm2.europa.eu/index_en

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General Project Information

Project Summary

The Horizon Europe -funded BirdWatch project will develop a monitoring tool of farmland bird habitat suitability. The service will be based on rigorous species distribution modelling combined with satellite data-derived geospatial features generated for different spatial scales, from individual farmland parcels up to habitat and landscape level.
Apart from monitoring, the project will set the farmland bird habitat requirements against the requirements of local stakeholders, including their budgetary and operational constraints. To determine pathways for the improvement of the habitats along with the most appropriate choice of agri-environmental interventions, BirdWatch will optimise for the benefits of both bird species and stakeholders, thus providing decision support for financial and operational planning.
The monitoring of farmland habitat suitability, the estimation of the impact of CAP eco-schemes and the evaluation of different choices of agri-environmental interventions also makes BirdWatch an important tool in ecological, agricultural and environmental policymaking.

Main Project Goals

BirdWatch aims to

- provide different stakeholders with satellite data-derived maps of farmland bird habitat suitability in order to better monitor and predict the development of biodiversity in their agricultural regions.
- provide stakeholders with an access to a new web-platform which allows the mapping and monitoring of the suitability of agricultural areas regarding both habitat structure and habitat extent.
- help to identify the appropriate agri-environmental measures by considering both the associated economic consequences and the habitat preferences of the local farmland birds.
- strengthen farmers' capacities to employ more sustainable, efficient farming methods.
- support actors in nature conservation and environmental NGOs in the education and communication of best practices to farmers.
- provide administrative and supervisory institutions with the oversight and the tools to evaluate compliance with agri-environmental CAP regulations.
- provide policymakers with evidence of the impacts of guidelines on eco schemes and greening measures, helping them to decide on policies accordingly.
- contribute to the increase in biodiversity and the improvement of farmland ecosystem health in Europe.
- promote sustainable farming practices which contribute to the resilience of our society.

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An overview of BirdWatch's stakeholders is given in Table 1.

Stakeholder Group	Description
Individual Farmers	Small-scale agricultural producers who own or operate their own farms. They typically work independently, growing crops and raising livestock for their own consumption or for sale in local markets. They may also engage in agri-tourism, farm-stay programs or other value-added activities to supplement their income. They are in charge of implementing agri-environmental measures and interventions.
Farmers Organisations	Groups of individuals or entities who work together to promote the interests of farmers and advance the development of agriculture. These organisations can be local, regional, national, or international in scope, and may include both producers and other stakeholders in the agriculture sector, such as input suppliers, processors, and distributors.
Supervisory Institutions	These include paying and environmental agencies, i.e., organisations or government bodies which are responsible for overseeing and regulating specific industries or sectors. These institutions are typically established to ensure that the organisations or individuals within a particular industry are following laws, regulations, and ethical standards, and to protect consumers or other stakeholders from harm. Paying agencies, for example, need to examine if interventions, as stated by a claimant, have actually been carried out.
Policymakers	Individuals or organisations who formulate policies on regional, national or international level, including agri-environmental interventions or the CAP's eco schemes.
Nature Conservation Organisations	Institutions which advocate for environmental, ecological or climate-relevant causes. These can be governmental, non-governmental or private organisations.
Research & Academia	These include universities and research institutions, dedicated to both purely academic and policy-relevant research.

Table 1: BirdWatch's stakeholders

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Summary of the Work Plan, Deliverables and Milestones

The BirdWatch project consists of the following work packages:
WP1000 - Management: it consists of project management and spans the entire project lifetime. An overarching steering committee will be put in place, consisting of individuals from different consortium partners. This committee will ensure the setup and internal communication of guidelines and identify potential bottlenecks and the appropriate mitigation and workaround strategies.
WP2000 - Features & Requirements: this work package serves as an identifier and "monitor" of the requirements to be taken into account and their corresponding EO data-based features. The relevant features for the service are determined algorithmically and updated iteratively in close cooperation with WP3000, WP4000 and WP5000.
WP3000 - EO-DataCube and farmland features: this work package focuses on satellite imagery exploration and the definition of the appropriate remote sensing data preparation in order to serve as an input to the species distribution modelling. This includes the understanding of the effects of different scales, the potential role of different spectral bands and texture measurements, possible sensor combinations and different land classification schemes. The resulting EO data and EO data -derivatives are inputs for both the SDMs and the optimisation algorithms of WP4000 and WP5000.
WP4000 - Species distribution modelling: appropriate SDMs for the individual selected farmland bird species and the respective regions will be developed. This will occur in detail within the four selected test areas to also understand the effects of different scales, structural elements, crops, and other external constraints on bird habitat. Tests of cross-region transferability will inform about appropriate European-wide upscaling.
WP5000 - Birdwatch optimisation algorithm: this work package focuses on the adaptation of the current MooV optimisation capabilities to meet the BirdWatch requirements i.e. allow for the algorithmical optimisation of the farmland in respect to suitability indicators for farmland birds within a frame of economic constraints.
WP6000 - Service Development: this work package consists of the implementation of the web-based platform and the integration of data as well as modelling and optimisation services.
WP7000 - Demonstration and user uptake evaluation: this work package accompanies the web-service developments in exchange with regional stakeholders and serves the continuous evaluation and sanity checking of the individual service components in close interaction with stakeholders.

The Gantt Chart with the temporal distribution of the individual work packages can be seen below.

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The following two tables list BirdWatch's deliverables and milestones.

No.	Name	WP	Short name of WP Lead	Type	Dissemination level	Delivery month
D1.1	Kick-off Meeting Report	1000	LUP	R	PU	1
D1.2	Launch of Project Website together with our Logo	1000	LUP	DEC	PU	1
D2.1	Target Bird Species List	2000	LUP	DATA	PU	1
D2.2	Bird Species Requirements List	2000	LUP	DATA	PU	4
D2.3	List of Stakeholder Requirements - Flanders	2000	LUP	DATA	SEN	5 (initially 4)
D1.3	Initial project handbooks and data and risk management plans	1000	LUP	DEM/ DMP	PU	6
D3.1	Geospatial Database	3000	EURAC	DATA	PU	6
D3.2	Dynamic tools to integrate harmonised Sentinel-2 and Landsat timeseries in the modelling workflow	3000	SIN	DATA	SEN	6
D3.3	Dynamic tools to integrate harmonised Sentinel-1 in the modelling workflow	3000	EURAC	DATA	SEN	6
D2.4	User and System Requirements Specification	2000	LUP	DEM	PU	8 (initially 6)
D1.4	Video published on website	1000	LUP	DEC	PU	9
D4.1	Data, algorithms and workflows for SDM	4000	UP	DATA/ OTHER	PU	10
D1.5	Initial Exploitation & Business Plan	1000	LUP	DEM	SEN	12
D6.1	BirdWatch Backend Database	6000	LUP	OTHER	PU	12
D2.5	Parcel-based farmland features maps - Flanders	2000	LUP	DATA	SEN	13
D4.2	Ensemble & joint species distribution models for first study area	4000	UP	OTHER	PU	18
D5.1	Description of land use allocation algorithm	5000	VITO	DEM	SEN	18
D5.2	Description of work plan for the study cases	5000	VITO	DEM	PU	18
D6.2	First implementation of web-based platform	6000	LUP	OTHER	PU	18

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D3.4	Farmland maps for demonstration areas	3000	SIN	DATA	PU	24
D7.1	Gathered data and information for demonstrator areas	7000	NPA	DEM	SEN	24
D7.2	Plan for demonstrator activities at all four regions	7000	ADS	DEM	PU	27
D2.6	Parcel-based farmland features maps - all demonstrator areas	2000	LUP	DATA	SEN	28
D4.3	Ensemble & joint species distribution models for all study areas	4000	UP	OTHER	PU	28
D6.3	Web-service performance report	6000	LUP	R	PU	28
D5.3	Summary report on optimisation algorithm for four test areas	5000	VITO	R	SEN	32
D5.4	Optimised maps for four test areas	5000	VITO	DATA	SEN	32
D6.4	Technical Report on Testing	6000	LUP	R	PU	33
D1.6	Final version of the project handbooks and data and risk management plans	1000	LUP	DEM/ DMP	PU	36
D1.7	Final Exploitation and Business Plans	1000	LUP	DEM	SEN	36
D4.4	Validated habitat suitability models for entire Europe	4000	UP	OTHER	PU	36
D6.5	BirdWatch platform user manual	6000	LUP	DEM	PU	36
D7.3	Accomplished demonstrator activities for all four regions	7000	NPA	OTHER	PU	36
D7.4	Evaluation and Feedback Reports for all four regions	7000	ADS	R	PU	36
D7.5	Accomplished training workshops all four regions	7000	ADS	OTHER	PU	36

Table 2: List of BirdWatch's deliverables (the quarterly reports are excluded from this list)

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Number	Name	Related WP(s)	Due	Verification
M1.1	Project Kick-off	1000	M1	Minutes of Kick-off Meeting
M2.1	Requirements and Features Handbook	2000	M5 (initially M4)	Accomplished deliverables D2.1 to D2.3
M1.2	Deliveries of the initial Project and Quality Handbook, the Dissemination & Communication, Risk Management Plan and DMP	1000	M6	Accomplished deliverable D1.3
M3.1	Access to satellite data and derived products is provided to all partners	3000	M6	Accomplished deliverables D3.1-D3.3
M4.1	SDM Data and Workflow Preparation	4000	M10	Accomplished deliverable D4.1
M5.1	BirdWatch polygon-based land use allocation algorithm	5000	M18	Fit for purpose and stakeholder satisfaction check [via demonstration activities]
M6.1	Implementation of the initial version of the BirdWatch platform	6000	M18	Web-based platform online
M3.2	Spatial datasets characterising farmland areas are available to all partners	3000	M24	Accomplished deliverable D3.4
M2.2	Parcel-based farmland feature maps for all four study areas	2000	M28	Fit for purpose and stakeholder satisfaction check [via demonstration activities]
M4.2	Ensemble SDMs for all four demonstrators	4000	M28	Accomplished deliverable D4.3
M7.1	Demonstrator activities are planned and prepared	7000	M30	Accomplished deliverables D7.1 and D7.3
M5.2	Resulting maps for exploitation platforms (4 cases)	5000	M32	Fit for purpose and stakeholder satisfaction check [via demonstration activities]
M1.3	Deliveries of final plans and handbooks including the business plan	1000	M36	Accomplished deliverables D1.5 and D1.6
M4.3	SDM Regional Transferability	4000	M36	Fit for purpose and stakeholder satisfaction check [via demonstration activities]
M6.2	Official launch of the BirdWatch Platform	6000	M36	Platform is launched and inline
M7.2	Stakeholder Training Workshops	7000	M36	Stakeholder training accomplished

Table 3: List of BirdWatch's milestones

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Project Management Overview

Grant and Consortium Agreements

The Grant Agreement (GA) forms the legal basis for the implementation of the project and provides the project's terms and conditions (this is the core contract):

Annex 1 - Description of the action (DoA)
Annex 2 - Estimated budget for the action
Annex 3 - Accession Forms
Annex 4 - Model for the financial statements
Annex 5 - Model for the certificate on the financial statements
Annex 6 - Model for the certificate on the methodology

Although the core contract is signed between the EU and the Project Coordinator (PC) of the project, all partners have become individual contract partners with the commission by signing the Accession Forms.
The Grant Agreement must be kept by all partners and should be provided to the auditor in case of an audit.

During the project, circumstances may arise to ask the EU for an amendment of the GA. Among the changes necessitating an agreement are:

- Change of partner(s)
- Change of legal entity
- Changes in the Budget (EU GA: Annex 2)
- Changes in the DoA (EU GA: Annex 1).

In case an amendment is required, the PC will submit such a request after reaching a decision together with the project's Steering Committee. Amendments may be requested by any of the project partners.
After the approval of the amendment the PC will distribute the revised Grant Agreement to the partners, replacing former versions.
Budget changes that do not affect the content of DoA can be taken care of by the Consortium itself, through a decision by the Steering Committee and informing the Project Officer (PO).

Whereas the GA is signed between the EU and the partners, the *Consortium Agreement* (CA) is signed between all consortium partners.
It arranges in more detail the provisions of the GA, such as but not limited to: financial issues, payments, management, decision making, conflict resolution, intellectual property rights and liability.
The CA must also be kept by the partners and must be shown in case of audits.

Roles and responsibilities

Project Coordinator (PC)
The PC has the overall responsibility for the achievement of the project objectives and acts as the intermediary between the Consortium and the European Commission.
Specifically, the PC

- chairs the Steering Committee and is responsible for organising its meetings and the management and communication concerned.
- monitors the project progress, assures quality control of all project deliverables and is responsible for liaising with the Project Officer to negotiate any necessary changes to the project structure.
- ensures the fulfilment of reporting obligations and the timely completion of project deliverables to the Project Officer as well the implementation of the gender action plan.
- ensures consent to the contract by the project partners and other contractors.
- owns the project risks and assures proper project outcomes are in-line with the project objectives and priorities.
- mobilises the necessary resources for the project in accordance with the budget.
- coordinates resolution of issues and conflicts.

Steering Committee (SC)
The SC consists of at least one representative of each consortium member and decides on all elements of relevance to the Consortium, as informed by the PC. The PC chairs the SC.
SC members are authorised to decide on all matters listed in the CA, in alignment with the responsibilities stated in the GA and CA, following a voting procedure.
The SC may initiate proposals and take decisions on all relevant issues related to:

- The successful execution of the project at a strategic level, including keeping the project focused towards its scope, providing high level monitoring and control of the project.
- content, finances and intellectual property rights
- adherence to organisation policies and directions
- the approval of the budgetary strategy, including the assessment of 3rd party financing options
- the evolution of the Consortium, including appointments
- the authorisation of deviations of the project plan, scope changes with high project impact and decides on recommendations
- the arbitration on conflicts and negotiates solutions to escalated issues.

Work Package (WP) Leaders
Every WP has a WP leader (WL). The WL

- is responsible for delivery of required outputs of the WP
- coordinates, monitors and controls the activities for the respective WP

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- makes the Consortium, especially the PC, aware of any evolving risks and issues
- decides, in consultation with representatives of involved partners, on technical and organisational issues arising from everyday work, and takes care of current tasks and deliverables
- is responsible for collecting WP deliverables and for carrying out an initial review of deliverables, prior to submission for final review and approval
- ensures that time schedules, resources, and costs are properly maintained on a WP level

Core Team

The core team performs the work necessary to accomplish the project. Members of the core team

- contribute in the elaboration of the project scope and the planning of the project activities
- perform the project tasks according to the project work plan and schedule
- produce project deliverables
- provide information to the WL regarding the progress of tasks and report any emerging issues
- participate in project meetings as needed and contribute to the resolution of issues
- participate in the Project-End Meeting to derive and document useful lessons learned for the organisation

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Project Output Quality Management

In general, quality management aims to ensure that a project will meet the expected results in the most efficient way and that the project results will be accepted by its relevant stakeholders.
In the BirdWatch project, focus lies on the quality of the deliverables which reflect the quality of the project output described in or represented by the deliverables.
This includes the quality of the:

- data and models used or generated within BirdWatch
- system architecture (including front- and backend structure) of the BirdWatch platform
- representation of stakeholder and user requirements in the BirdWatch platform
- system and user testing activities
- communication and dissemination activities
- demonstrator and workshop activities
- business plan and exploitation activities

To ensure deliverable acceptance, the quality management needs to assure that:

- the scope of the deliverable meets the requirements as stated in the GA
- the deliverable is ready and submitted according to schedule
- any costs generated during the tasks associated with this deliverable are within budget

This also implies that a proper risk management is in place (see last section).

Deliverables are drafted in a common workspace for project output. The documents are written using Google Docs[2], supporting version control and the transparency necessary to keep the Consortium informed on the state and content of a deliverable.
Once a draft is ready, either the whole or parts of the Consortium are asked to review, depending on the scope of the deliverable. The PC performs the final review before handing the deliverable over to the PO and the reviewers.

[2] https://www.google.com/docs/about/

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Dissemination and Communication

Communication and dissemination are vital throughout the entire lifetime of the project and beyond. It requires planning of a widespread dissemination of the overall work and results of the project.
Especially, the dissemination activities aim at enhancing public awareness and ensure the involvement of targeted stakeholders. Main focus of dissemination and communication activities target the stakeholders listed in Table 1 but also the public.

For all communication and dissemination activities, the EU emblem[3] must be displayed, along with the following text:
"*This project is funded by the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101082634.*"

Dissemination is foreseen to have three main phases:

Phase	Focus/Main objectives	Key dissemination activities and tools
Project initiation and requirements definition (M1-M18)	Reaching out to potential stakeholders and to participants for the demonstration phase.	Website, newsletters, social media, direct communication
Demonstration and validation phase (M18-M33)	Platform validation; workshops and demonstration events target all stakeholders, relevant industry associations and local communities; business case exploration	Demonstration and validation activities in close interaction with stakeholders
Promotion phase (M33 - M36 & beyond)	Business case validation	Focused publications of success stories, lessons learnt, standardisation activities.

Table 4: Dissemination phases of the BirdWatch project

BirdWatch's main dissemination channels are:

Channel / Activity	Specification
Promotional Material	Brochures, factsheets, posters; This material will be used, e.g., in conferences, demonstration events or workshops and uploaded to the website

[3] https://europa.eu/european-union/about-eu/symbols/flag_en

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Website	BirdWatch's website (https://birdwatch-europe.org/) represents the main interface for communication with the public. It contains information related to the objectives and goals and will be updated with relevant project information. This will include publications, information on demonstration activities, events, workshops, and project results
Project Video	A project video will be produced as part of Deliverable D1.4. and made available on the website, communicated, e.g., via social media and presented in project events.
Newsletter	A newsletter will be released three times per project year, detailing the latest project activities and developments. The newsletters will be uploaded on the project website and distributed a list of recipients. Partners may also promote the newsletter through their channels.
Social Media	Enables to reach a broader target audience
External channels	BirdWatch will be presented at conferences, external workshops and in external newsletters.
Policy Briefings	Policy briefings will be generated and distributed in significant networks, conferences, workshops and on the website.
Stakeholder workshops	On-site and online workshops on local, national and EU level.
Demonstration events	Several demonstrators will be held, in order to test and validate iterations of the BirdWatch platform with stakeholders in the four demo regions.
Scientific publications	Open access publications in peer-reviewed scientific journals, e.g., Landscape Ecology[4] or Biological Conservation[5]

Table 5: Dissemination channels of the BirdWatch project

Interaction with other relevant projects and networks is actively pursued and a list of past, planned and potentially interesting (marked as "TBD" in the table below) events will be kept.

Project	Focus	Potential (co-)benefit
In contact		
BioMonitor4CAP	Horizon Europe Project Focus lies on the evaluation of CAP measures	Training & Validation data Potential source for bird observation data

[4] https://www.springer.com/journal/10980

[5] https://www.sciencedirect.com/journal/biological-conservation

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CLEAR	The project explores landscape-level collaborative planning approaches for improved agrobiodiversity and resilience. The project is funded via SusCrop and focuses mainly on Germany and the UK.	Training data; Access to diverse set of potential stakeholders; Evaluation and validation possibilities;
DAKIS	DAKIS: Digital Agricultural Knowledge & Information System Focuses on the use of digitisation and field robotics to integrate ecosystem services and biodiversity into modern planning processes, production and marketing. The project is funded by the German Federal Ministry of Education and Research.	Training data; Access to diverse set of potential stakeholders; Evaluation and validation possibilities; Potential future link to DAKIS' mobile app;
FAIRPACHTEN	Project of the German NGO NABU; Advice and information for everyone who leases agricultural land. Landowners can find out from fair leases how more nature conservation can be implemented on arable land, meadows and pastures in consultation with farmers. A strong focus lies also on the protection of farmland birds.	Access to diverse set of potential stakeholders; Source to constrain socio-economic parameters of the CAP measures; Evaluation and validation possibilities
LIFE Nardus & Limosa	LIFE Project on the restoration and preservation of Nardus grasslands, in conjunction with the habitat restoration and protection of the Black-tailed Godwit (*Limosa limosa*)	Bird observation data Knowledge exchange Access to nature conservation organisations
Space4Agriculture	German network to connect stakeholders from different backgrounds who are interested in agriculture	Access to diverse set of potential stakeholders; Potential multiplicator
Planned		
Copernicus Support Office	Networking support of Copernicus, the Earth Observation component of the European Union's space programme:	Increase of awareness of the project, e.g., via the news channels of the Copernicus Support Office
F.R.A.N.Z. project	FRANZ: Future Resources, Agriculture & Nature Conservation: Develops nature protection measures that can be integrated into normal farming practice. Environmentalists and farmers are working	Access to diverse set of potential stakeholders; Source to constrain socio-economic parameters of the CAP measures;

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	together to trial conservation measures on ten representative (demonstration) farms in Germany. These measures should promote biodiversity, but at the same time be practicable and economically viable for the farm. Successful measures will be communicated and promoted in the farming community. Another focus is providing policy recommendations to the benefit of biodiversity and farmers.	Evaluation and validation possibilities
Result-based payment network	A EU-wide network and point of information with the focus on result-based schemes in agricultural policy.	Access to a diverse set of stakeholders; Information on socio-economic aspects and experiences with agri-environmental interventions
TBD		
Bioagora	Collaborative Horizon Europe which aims to connect research results on biodiversity to the needs of policy making in a targeted dialogue between scientists, other knowledge holders and policy actors.	Access to policymakers, scientists; Knowledge exchange
Biodiversa	A European Biodiversity Partnership supporting excellent research on biodiversity with an impact for society and policy.	Access to policymakers, scientists; Knowledge & data exchange
Birds@Farmland	An initiative from the European Commission that aims at supporting Member States in the conservation of bird species of agricultural landscapes through the creation of 22 farmland bird conservation schemes.	Access to policymakers, scientists; Knowledge exchange
EuropaBON	Europa Biodiversity Observation Network	Access to policymakers, scientists; Knowledge and data exchange
European Network of Living Labs	The European Network of Living Labs (ENoLL) is the international, non-profit, independent association of benchmarked Living Labs.	Access to diverse set of potential stakeholders; Evaluation and validation possibilities

Table 6: BirdWatch's network

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Internal Communication

Good communication between project partners underlies all aspects of a successful project. In BirdWatch, the Consortium's communication paths are kept short, made possible by its relatively small size.
Project-accompanying meetings are the main pathways for decision making, progress monitoring and the handling of emerging issues or risks. To move the important project decisions on service implementation forward as quickly as possible, it was decided early on to hold weekly meetings on software development and stakeholder aspects. The meeting frequency will be decreased only when all details regarding the necessary requirements and their integration into the platform are clear.
The following meeting schedule has been established for the different project bodies.

Consortium Body	Meeting Frequency	Extracurricular Meetings
Steering Committee	At least once a year	At any time upon written request by members of the Steering Committee
Consortium Meeting	Initially at least twice a year, to define the target requirements and set up project's workflows accordingly	On Demand
Stakeholder Focus Group	Several times per month	On Demand
Software Focus Group	Several times per month	On Demand
Work Package Leaders	On Demand	

Table 7: Meeting schedules in BirdWatch projects

Apart from the recurring and extracurricular meetings, e-mail is the most frequently used means for internal communication. To manage contacts and their associations with various work packages, use cases etc., a contact list has been established and is kept up-to-date throughout the project.

Important: the PC is responsible for the communication with the Commission and the PO.

Knowledge management and co-drafting of deliverables employ cloud-based services. Drafts are generated via Google Docs, while deliverables, documents, minutes and presentations, which have been finalised, are kept in LUP's project cloud folder.

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Data Management Plan

The main purpose of the data management plan (DM) is to lay down the rules on how to handle generated and re-used data and how to ensure compliance with the FAIR principles[6], i.e. on how to make data findable, accessible, interoperable and reusable.
In the following, the data management will be described as it is foreseen for the time period until the end of the project. Data will be collected and generated mainly in preparation for the demonstration cases in Flanders, Germany, Lithuania and South Tyrol. The DMP is thus a document which might undergo some changes throughout the project as the Consortium reflects lessons learnt or new standards or technologies in the DMP.
The final version of the DMP will be available in M36.

The DMP in BirdWatch addresses the following aspects:

- Data summary
- Findability of data
- Accessibility of data
- Interoperability of data
- Re-usability of data
- Necessary resources
- Data security
- Ethical aspects
- Other issues

[6] European Commission, (26 July 2016), Guidelines on FAIR Data Management in Horizon 2020, Version 3.0

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Project Management (WP1)

DMP Component	Contact list of project partners
Data summary	Contact details are stored as tabular data in the LUP's internal project cloud folder. The file contains Name Organisation Email address The file size will be < 1MB.
Findability of data	The contact information of the project partners will not be findable by anyone outside the project consortium.
Accessibility of data	The contact details of the consortium members will not be publicly available.
Interoperability of data	N/A
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project. The handling of the data will respect the General Data Protection Regulation (GDPR).
Ethical aspects	N/A
Other issues	N/A

DMP Component	Contact list of BirdWatch's network - stakeholders and other interested parties
Data summary	As part of the communication, dissemination and exploitation activities, BirdWatch's network will become larger throughout the project's lifetime. These contact details are stored as tabular data and are stored in the LUP's internal project cloud folder. The file contains Name Organisation Email address

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	The file size will be < 1MB.
Findability of data	The contact information of BirdWatch's network will not be findable by anyone outside the project consortium.
Accessibility of data	The contact details of BirdWatch's network will not be publicly available.
Interoperability of data	N/A
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project. The handling of the data will respect the GDPR.
Ethical aspects	N/A
Other issues	N/A

DMP Component	**Meeting presentations and minutes**
Data summary	Apart from the general consortium meetings, frequent meetings are held to discuss the internal workings of the BirdWatch platform as well as the aspects concerning stakeholder integration. For each meeting a protocol with the meeting minutes is produced as a word file (.docx) and stored in the LUP's internal project cloud folder Any presentations accompanying each meeting, stored as .pptx-files, are also kept in LUP's internal project cloud folder. The folder size is expected to reach 1 or 2 GB by the end of the project.
Findability of data	The meeting minutes and presentations will not be findable by anyone outside the project consortium. Both minutes and presentations are stored on LUP's project cloud folder.
Accessibility of data	The minutes and presentations will not be publicly available and only be accessible by the Consortium.
Interoperability of data	N/A
Re-usability of data	N/A

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Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project.
Ethical aspects	N/A
Other issues	N/A

DMP Component	Project deliverables
Data summary	The project deliverables are produced by the Consortium members according to timeline listed in Table 3 and the Gantt Chart. The size of all deliverables (PDF) is expected to remain below ~300 MB.
Findability of data	In the drafting stage, the deliverables are kept in a project folder on Google Drive. Once accepted, the deliverables are stored as .pdf-files on LUP's project cloud folder with under: D{WP_number}. {deliverable_number}_{Name_of_Deliverable}_{Version_number}.pdf
Accessibility of data	The project folder on Google Drive and the LUP project cloud folders are only accessible to the Consortium. Deliverables which are deemed to be public will be made available to everyone, including via the website (see column "Dissemination Level" in Table 3).
Interoperability of data	N/A
Re-usability of data	The public deliverables will be accessible for reuse.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	Data will be collected for internal use only and is not intended for long-term preservation.
Ethical aspects	N/A
Other issues	N/A

DMP Component	Statistics on media outreach
Data summary	The data that will be collected will be statistics related to the project website and social media for tracking the progress and improving the communication

	and dissemination activities. Furthermore, email addresses for newsletter deliveries will be collected. The information is collected as part of the quarterly reporting and stored in the excel sheet which is part of each quarterly report. The size of the data will be < 1MB.
Findability of data	The data will only be available to the project partners.
Accessibility of data	The data will be accessible only to the project partners.
Interoperability of data	N/A
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	No personal information is stored and data will be collected for internal use and is not intended for long-term preservation.
Ethical aspects	N/A
Other issues	N/A

DMP Component	Communication and Dissemination activities list
Data summary	Lists on activities (planned, conducted, suggested) related to the communication and dissemination will be stored on Google Doc and kept up to date throughout the project's lifetime. The file size is neglectable.
Findability of data	As the communication and dissemination activities list will grow throughout the project, it is kept in a project folder on Google Drive.
Accessibility of data	The project folder on Google Drive is only accessible to the Consortium.
Interoperability of data	N/A
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	No personal information is stored and data will be collected for internal use and is not intended for long-term preservation.

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Ethical aspects	N/A
Other issues	N/A

DMP Component	Data for the Business Plan
Data summary	The business plan will support the commercialisation and exploitation of the BirdWatch platform. The data that will be used to define the business plan will include foreground knowledge, experiences collected during the project implementation, demonstration (intangible data) and results of the project, such as stakeholder feedback, market research. The file size of this data is not foreseeable at this point.
Findability of data	The data for the generation of the business plan will be stored on LUP's project cloud folder.
Accessibility of data	The data for the generation of the business plan will not be made publicly available and be accessible only by the consortium members via LUP's project cloud folder.
Interoperability of data	N/A
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	Data will be collected for internal use and is not intended for long-term preservation. The handling of the data will respect the GDPR.
Ethical aspects	N/A
Other issues	N/A

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Features and Requirements (WP2)

DMP Component	Bird Species Requirements List
Data summary	The bird species requirements are collected as part of the requirements analysis in WP2. They consist of the habitat requirements which can either be directly measured or inferred via EO and auxiliary data. The requirements list is the result of research of species-specific literature and communication with ecologists and ornithologists. They are input for the selection of the geospatial features to be derived (WP3), the habitat models to be developed (WP4) and the parameters to be optimised (WP5). The data is kept in tabular format (.csv) The size of the data is < 1 MB.
Findability of data	The bird species requirements list is stored on LUP's project cloud folder.
Accessibility of data	The bird species requirements list is open to the public and accessible via the Deliverable *D2.2 - Target Bird Species Requirements List*.
Interoperability of data	The data is kept in .csv-format and is easily implementable into code.
Re-usability of data	The Deliverable *D2.2 - Target Bird Requirements List* is publicly available.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	N/A
Ethical aspects	No information is stored which could point to the location of specific birds.
Other issues	N/A

DMP Component	Answers to the questionnaires
Data summary	WP2 will gather the stakeholder and user requirements addressing six different stakeholder types (individual farmers, farmers organisations, supervisory institutions, policymakers, nature conservation organisations, research and academia) and possibly other end users of the BirdWatch platform using online-based questionnaires using Google Forms[7]. This will provide the developers with a set of requirements and needs important for WP3, WP5 and WP6. The answers to the questionnaires are summarised in one Google Form per

[7] https://www.google.com/forms/about/

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	stakeholder type. The total size of the summarised answers will remain < 10 MB.
Findability of data	The answered questionnaires will not be findable by anyone outside the project consortium.
Accessibility of data	The answered questionnaires will not be publicly available.
Interoperability of data	N/A
Re-usability of data	The results of the stakeholder analysis are not meant for the public.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project. The handling of the data will respect the GDPR.
Ethical aspects	The questionnaires also address potential gender-related requirements or considerations, e.g., regarding usability aspects of the platform. No personal information can be inferred from the responses and the responses will be used purely for statistical analyses.
Other issues	N/A

DMP Component	Stakeholder Requirements
Data summary	WP2 will gather the stakeholder requirements addressing six different stakeholder types (individual farmers, farmers organisations, supervisory institutions, policymakers, nature conservation organisations, research and academia). The stakeholder requirements list is a result of - Answers to online-based questionnaires - Direct interviews - Literature review The data is stored as tabular data (.xlsx) on Google Drive for as long as the stakeholder requirements analysis is still ongoing. After that, it will be moved to LUP's project cloud folder. The file size will remain < 10 MB.
Findability of data	The stakeholder requirements will not be findable by anyone outside the project consortium.
Accessibility of data	The stakeholder requirements will not be accessible to anyone outside the project consortium.

	The project folders on Google Drive and LUP's cloud are only accessible to the Consortium.
Interoperability of data	The data will be a list of requirements and statistics that will be analysed and reported in a tabular format.
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project. Data regarding gender considerations were collected in an anonymised manner. The handling of the data will respect the GDPR.
Ethical aspects	N/A
Other issues	N/A

DMP Component	User and System Requirements
Data summary	The user and system requirements translate the collected stakeholder requirements and feedback into requirements for the BirdWatch platform, including functional, non-functional, security, interoperability, storage, performance and usability aspects. The data is foreseen to be kept as .xlsx on Google Drive as long as it has not reached its final version. The size of the data will remain < 10 MB.
Findability of data	As the user and system requirements will evolve throughout the project, they are kept in a project folder on Google Drive. After that, they will be stored on LUP's project cloud folder. The user and system requirements are also described in D2.4 - User and System Requirements.
Accessibility of data	The project folder on Google Drive and on LUP's cloud is only accessible to the Consortium. The user and system requirements are also described in D2.4 - User and System Requirements, which is a public document.
Interoperability of data	The data will be a list of requirements in a tabular format.
Re-usability of data	As part of D2.4, the user & system requirements are available to be reused.

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Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project. The handling of the data will respect the GDPR.
Ethical aspects	N/A
Other issues	N/A

EO datacubes (WP3)

DMP Component	Land parcel information system (LPIS)
Data summary	Multi-year LPIS data, covering Flanders, Germany, Lithuania and South Tyrol, are provided by the respective project partners from the national authorities curating the data. The LPIS data will deliver the parcel boundaries necessary for defining our areas of interest and be used for training and validating the machine learning (ML) algorithms. They will be available in a vector format (shapefile, .shp) as a collection of polygons depicting parcel boundaries. The estimated size of the files per region is: • For Flanders: The parcel data has about 65 MB • For Germany: The parcel data has about 1690 MB • For Lithuania: The parcel data has about 317 MB • For South Tyrol: The parcel data has about 528 MB
Findability of data	The LPIS data will be available to all technical partners through sFTP, hosted in a common data folder on the server of the consortium partner EURAC.
Accessibility of data	As LPIS data are only in part available open-source, the LPIS files necessary for the project will be kept closed until the end of the project and will not be allowed and disclosed to be used by any third party. The content of the LPIS data and their geographic relation will be described in the openly available deliverables.
Interoperability of data	The LPIS data will be harmonised to comply with the metadata information requirements of the platform to ensure a successful database query; vector multi-polygon files in .shp form with valid geometry and compatible projection system.
Re-usability of data	The LPIS data and their origin will be described in the deliverable *D3.1 - Geospatial Database*.
Necessary resources	The resources for this data are covered by the WP budget.

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Data security	The data will be collected for internal use and is not intended for long-term preservation. The servers are managed by the IT department. They are regularly backed up and secured.
Ethical aspects	N/A
Other issues	N/A

DMP Component	Vector base grid
Data summary	EUSTAT's vector grid[8] is used as a reference grid for all demonstrator regions and downsampled to a resolution of 200 m by 200 m (i.e., the assumed average habitat size). Geospatial features will be calculated based on this grid which will then feed into the habitat models. The files, covering the demonstrator areas, will be stored as .shp files. The estimated size of the files per region is: • For Flanders: A vector grid has about 355 MB • For Germany: A vector grid has about 9200 MB • For Lithuania: A vector grid has about 1720 MB • For South Tyrol: A vector grid has about 192 MB
Findability of data	The vector data will be available to all technical partners through sFTP, hosted in a common data folder on the server of the consortium partner EURAC.
Accessibility of data	EUSTAT's vector grid is open-source. In BirdWatch, the vector grid will only be used by the technical team as a reference grid for the derivation of the EO features. It will not be made available to the public.
Interoperability of data	The vector base grid data will be harmonised to comply with the metadata information requirements of BirdWatch to ensure a successful database queries; with a compatible projection system.

[8] https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/grids

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Re-usability of data	EUSTAT's vector grid is open-source, with a resolution of 1 km.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. The servers are managed by the IT department. They are regularly backed up and secured.
Ethical aspects	N/A
Other issues	N/A

DMP Component	**Raster-based remote sensing features**
Data summary	The raster-based remote sensing feature data will be derived from Sentinel-1 and Sentinel-2 images, covering Flanders, Germany, Lithuania and South Tyrol. The raster-based remote sensing features necessary as an input for the habitat models are vegetation indices, landscape elements, grassland mowing detection markers, soil moisture and structural parameters as well as their respective time-series. The products which will be generated during these tasks, will cover the needs to implement and validate all BirdWatch's value propositions. The raster data will be available in .GTiff format and serve as input for WP2 and WP4. The raster-based remote sensing features will be either computed on the-fly (using Sentinel Hub) or pre-computed and stored on cloud storage and made accessible through Sentinel Hub's Bring Your Own Data capabilities (i.e. for grassland mowing events). The years and number of timesteps for which raster data are needed are dependent on the available bird observation data. Thus, a minimum of one timestep per demonstration region will be collected. With the evolution of the demonstration cases, the numbers below will be updated. Depending on the satellite sensor and the necessary processing steps to derive a parameter, the ground resolution of the data will lie between 10m and 30m. The estimated size of the files per region is: • For Flanders: A raster file with 10m clipped to the region has about 800 MB A raster file with 30m clipped to the region has about 90 MB • For Germany:

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	A raster file with 10m clipped to the region has about 20700 MB A raster file with 30m clipped to the region has about 2300 MB • For Lithuania: A raster file with 10m clipped to the region has about 3900 MB A raster file with 30m clipped to the region has about 430 MB • For South Tyrol: A raster file with 10m clipped to the region has about 434 MB A raster file with 30m clipped to the region has about 48 MB
Findability of data	The raster data will be stored on a cloud storage provider (CDSE, AWS, or equivalent) and made available through Sentinel Hub, where products can be uniquely identified through a combination of collection id, product name, area of interest and date. Only the development and technical teams will have access to the data. Raw satellite data that will be used for remote sensing feature calculation will not be stored on the BirdWatch platform, only the derivative products. The output will be accessible only to the registered partners who made the request and it will be available as two layers in a Geoserver's web mapping service (WMS). The Spatio-Temporal Asset Catalog (STAC) standard is used to store metadata for all the EO-based geospatial products generated during BirdWatch's lifetime. All EO raster data, value added raster-products, code and metadata will be stored in a web server and will be available through RESTful API and WMS. PostGIS, Open Data Cube, Mapserver and Geoserver tools will be used for management of the EO information.
Accessibility of data	At the time of writing, the collected imagery, generated indices and extracted features is not foreseen to be available outside of the Consortium. The technical team of BirdWatch will access the data via PostGIS, Open Data Cube, Mapserver and Geoserver tools through the common API openEO, allowing for standardised access.
Interoperability of data	The output data will be available in GeoTiff with associated metadata for findability. The STAC-standard for geospatial data will be used for metadata descriptors. It will also be available through Sentinel Hub, which supports a variety of OGC compliant services.
Re-usability of data	An appropriate licensing agreement will need to be chosen for data access after the project's conclusion and defined during the course of the project. The EO-based products will be usable by third parties through RESTful API, but

	only for those parties who are part of the project and during the lifespan of the project.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. The servers are managed by the IT department. They are regularly backed up and secured.
Ethical aspects	N/A
Other issues	N/A

Habitat Models (WP4)

DMP Component	Bird observation data
Data summary	This data will be bird species-specific and will usually include a timestamp and location coordinates. Bird observation data will be required to establish the habitat models (WP4) and as input for the optimisation (WP5). Currently foreseen data sources are: -European Breeding Bird Atlas[9] -Dachverband Deutscher Avifaunisten e.V.[10] -Ornitho[11] (Citizen Science Data) The size of the data will remain < 10 MB.
Findability of data	The bird observation data will be stored on the server of the Institute of Biochemistry and Biology of the University of Potsdam. The bird observation data will not be findable by anyone outside the project consortium.
Accessibility of data	The bird observation data will not be publicly available.
Interoperability of data	Source formats will be different and include .csv, .txt, .xls, .xlsx, and .shp formats. The data format will be made interoperable with the other BirdWatch components (e.g., for visualisation purposes, as input for the optimisation workflow).
Re-usability of data	The bird observation data will not be publicly available.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation.
Ethical aspects	This data is not going to be open-source as one could identify where rare bird species occur.
Other issues	N/A

[9] https://ebba2.info/
[10] https://www.dda-web.de/
[11] https://www.ornitho.de/

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DMP Component	Climate data
Data summary	This data will be an input for the development of the habitat models and support the differentiation between farming-related and climate-related stressors. Currently foreseen data sources are: -Climatologies at high resolution for the earth's land surface areas (Chelsa)[12] The size of the files is not yet foreseeable as it depends on the importance of each climate variable on habitat suitability which will be explored in the course of the project.
Findability of data	The climate data will be stored on the server of the Institute of Biochemistry and Biology of the University of Potsdam.
Accessibility of data	The source data is openly available via the website of Chelsa. The climate data will be used as an input for the habitat models and therefore not made public.
Interoperability of data	The data is in the .GTiff format which is an input type for habitat models.
Re-usability of data	The data will be described in the deliverables of WP4 and can be downloaded via Chelsa's website.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation.
Ethical aspects	N/A
Other issues	N/A

DMP Component	Response curves
Data summary	The response curves are an output of the habitat models and will be species-specific and tell us the impact of a habitat factor on the species. The size of the data will remain < 10 MB.
Findability of data	The response curves will be stored on the server of the Institute of Biochemistry and Biology of the University of Potsdam. The future storage location will be explored throughout the project's lifetime. The data will only be available to the consortium.

[12] https://chelsa-climate.org/

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Accessibility of data	The data will only be available to the consortium.
Interoperability of data	The data format is .csv and serves as an input for further analyses (e.g., WP5).
Re-usability of data	The response curves will not be publicly available.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation.
Ethical aspects	N/A
Other issues	N/A

DMP Component	**Habitat suitability maps**
Data summary	The habitat suitability maps belong to BirdWatch's major output. It is based on the Species Distribution Modelling, calculating the likelihood that a specific species is found in the region of interest given certain habitat parameters, such as landscape elements, crop type, or texture features. The resolution of the output rasters is 200 m (i.e., the assumed average size of the habitats of the farmland bird species). The estimated size of the files per region is: • For Flanders: The output raster has about 6 MB • For Germany: The output raster has about 157 MB • For Lithuania: The output raster has about 30 MB • For South Tyrol: The output raster has about 3 MB
Findability of data	The raw habitat suitability data will only be available to the consortium and be stored on the server of the Institute of Biochemistry and Biology of the University of Potsdam. The future storage location will be explored throughout the project's lifetime.
Accessibility of data	The raw habitat suitability data will not be publicly available. The habitat

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	suitability maps will be accessible via the BirdWatch platform. Details regarding accessibility are still to be determined.
Interoperability of data	The output will be in .csv format and serves as an input for further analyses (e.g., WP5).
Re-usability of data	The raw habitat suitability data will not be publicly available. The habitat suitability maps will be accessible via the BirdWatch platform. Details regarding accessibility are still to be determined.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation.
Ethical aspects	N/A
Other issues	N/A

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Optimisation (WP5)

DMP Component	Optimisation target and constraints
Data summary	The goal of optimisation in BirdWatch is to derive pathways for the improvement of farmland habitat suitability. This can be translated into optimisation targets, such as a specific value for the increase in habitat size for a specific species. From the bird species and stakeholder requirements the constraints for the optimisation can be derived, e.g., the size of potentially available habitat or limitations in a farmer's budget to realise specific agri-environmental measures. Targets and constraints are stored in one .xlsx file for each demonstrator region. The file size for each demonstrator region will not exceed 10 MB.
Findability of data	The data will only be available to the employees of VITO.
Accessibility of data	The data will be stored on the SharePoint document management system. Access to these input files is restricted to employees of VITO.
Interoperability of data	The files will serve as input for the optimisation workflow and thus are readable by the relevant software.
Re-usability of data	The data will be collected for internal use and is not intended for long-term preservation.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	By using a cloud storage system, a data security system is put in place for data recovery, while the restricted access to these cloud storage files ensures a secure storage. The handling of the data will respect the GDPR.
Ethical aspects	The constraints might involve data specific to individuals. The data is only available by employees of VITO who are involved in the project.
Other issues	N/A

DMP Component	Optimisation algorithm
Data summary	The code for the optimised resource allocation will be developed during the project and will be used to derive optimal configurations of resources (e.g., habitat parameters, budget, etc.) to improve habitat suitability. The code is stored as .py files and does not exceed 10 MB.

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Findability of data	The code will only be available to the employees of VITO.
Accessibility of data	The MooV habitat optimisation model code will be saved on a version-controlled cloud storage system to which the access is restricted to members of the MooV-team within VITO.
Interoperability of data	The code will interact only with the VITO's MooV-shell.
Re-usability of data	The code will only be reusable by members of the MooV-team within VITO.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	By using a cloud storage system for both the data and the model, a data security system is put in place for data recovery, while the restricted access to these cloud storage files ensures a secure storage.
Ethical aspects	N/A
Other issues	N/A

DMP Component	**Optimised habitat parameters**
Data summary	The MooV habitat optimisation model code produces scenarios for possible pathways to improve habitat suitability. The scenarios are optimised values for the parameters. The MooV habitat optimisation output will be stored as a .csv file (one file per scenario and per region) The files will not exceed 10 MB.
Findability of data	The data will only be available to the employees of VITO.
Accessibility of data	The data will be stored on the SharePoint document management system. Access to these output files is restricted to employees of VITO.
Interoperability of data	The maps will be stored in -csv format, with one of the columns in the output csv files corresponding to a unique ID of the parcels in the agricultural parcel layer (LPIS) used as input data for the model. It is possible to link the output csv to the agricultural parcel layer using this unique ID for visualisation.
Re-usability of data	The data will only be reusable by members of the MooV-team within VITO.
Necessary resources	The resources for this data are covered by the WP budget.

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Data security	By using a cloud storage system for both the data and the model, a data security system is put in place for data recovery, while the restricted access to these cloud storage files ensures a secure storage. The handling of the data will respect the GDPR.
Ethical aspects	The optimised parameters might involve data specific to individuals. The data is only available by employees of VITO who are involved in the project.
Other issues	N/A

Service Development (WP6)

DMP Component	Definition of the IT System Architecture
Data summary	The description of IT system architecture will include data management, functional and non-functional components, technical capabilities, components descriptions and dependencies, Application Programming Interface (API) descriptions, information flow diagrams, internal and external interfaces, software and hardware requirements and data related to the testing procedures, specified and validated during the BirdWatch project's lifetime. Technical requirement reports will be created during the demonstration phase and serve as input for future modifications of the IT architecture. The size of the file will not exceed 10 MB.
Findability of data	The description of the IT architecture and the technical reports will be stored on LUP's project cloud folder and will not be directly accessible apart from the Consortium. The description of the initial and final service architecture will be made available in the deliverables D2.4 and D6.5.
Accessibility of data	The description of the IT architecture and the technical reports will be stored on LUP's project cloud folder, only accessible to the consortium
Interoperability of data	N/A
Re-usability of data	The description of the initial and final service architecture will be made available in the deliverables D2.4 and D6.5.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation.
Ethical aspects	N/A
Other issues	N/A

DMP Component	BirdWatch Platform Data
Data summary	The BirdWatch Platform will ingest, generate and export various kinds of data which will be saved in BirdWatch's central database. All user actions (login, logout, platform visits, visualisation of maps, etc.) will be logged and kept in the form of .txt files for debugging purposes.

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	The size of the ingested and generated data is not yet foreseeable.
Findability of data	Data on the platform will not be accessible outside of the Consortium but will be described in the deliverables D2.4 and D6.5. Actions on the platform will produce metadata, including time and date of data creation or data amendments and will be saved along the services results.
Accessibility of data	Only registered users and administrators will have access to the platform. The underlying databases will only be accessible by the authorised technical team.
Interoperability of data	The integration of the BirdWatch service into other applications will be explored in the course of the project's lifetime. The raw data will not be publicly available.
Re-usability of data	The data will be collected for internal use and is not intended for long-term preservation.
Necessary resources	The resources for this data are covered by the WP budget.
Data security	All platform generated data will be saved on the LUP's server. Encryption will be used to protect personal user data like emails and passwords. Appropriate licensing and backup storage options are still to be explored. All servers will be hosted behind firewalls inspecting all incoming requests against known vulnerabilities such as SQL injection, cookie tampering and cross-site scripting. Finally, IP restriction will enforce data security. The handling of the data will respect the GDPR.
Ethical aspects	N/A
Other issues	N/A

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Demonstrator activities (WP7)

DMP Component	Participant contact list
Data summary	The preparation of the demonstrator cases will require the contacting of representatives for BirdWatch's stakeholders. Contact lists (.csv / .xlsx) will be used to store individual's contact information, their organisations and roles. The size of the files will likely not exceed 10 MB.
Findability of data	The participant data collected in WP7 will not be made publicly available as it might include confidential and personal data. It will be stored on LUP's project cloud folder.
Accessibility of data	The lists with participator contact data will not be made publicly accessible as it might include confidential and personal data. The list will be accessible by the consortium members only.
Interoperability of data	N/A
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project. The handling of the data will respect the GDPR.
Ethical aspects	N/A
Other issues	N/A

DMP Component	Demonstrator Preparation
Data summary	Demonstrator preparation will include the identification of all the requirements to perform the demonstrations, such as the specifications of each use case and the indicators to measure success. The main documents and formats that will be used in order to collect and generate the necessary data will be generated using Google Docs and the final versions will be stored on LUP's project cloud folder. All data will be in doc./ docx. and pdf format. The files will likely not exceed 10 MB.

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Findability of data	The preparation data collected in WP7 will not be made publicly available as it might include confidential and personal data. The data will be available to the consortium only.
Accessibility of data	The preparation data collected in WP7 will not be made publicly accessible as it might include confidential and personal data. The preparation data will be accessible by the consortium members and stored on Google Drive and LUP's project cloud folder.
Interoperability of data	N/A
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project. The handling of the data will respect the GDPR.
Ethical aspects	N/A
Other issues	N/A

DMP Component	Demonstrator Evaluation
Data summary	Demonstrator evaluation will consist of stakeholder and user feedback and serve to improve and further validate the services of the final BirdWatch platform. The main documents and formats that will be used in order to collect and generate the necessary data will be generated using Google Docs and the final versions will be stored on LUP's project cloud folder. All data will be in doc./ docx. and pdf format. The size of the data will likely not exceed 10 MB.
Findability of data	The evaluation data collected in WP7 will not be made publicly available as it might include confidential and personal data. The results derived from the evaluation data will be made available via the deliverable D7.4.
Accessibility of data	The evaluation data collected in WP7 will not be made publicly accessible as it might include confidential and personal data. The evaluation data will be accessible by the consortium members and stored on Google Drive and LUP's project cloud folder.

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Interoperability of data	N/A
Re-usability of data	N/A
Necessary resources	The resources for this data are covered by the WP budget.
Data security	The data will be collected for internal use and is not intended for long-term preservation. No personal information will be kept after the end of the project. The handling of the data will respect the GDPR.
Ethical aspects	N/A
Other issues	N/A

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Risk Management Plan

This section consists of a general overview on the risk management within the BirdWatch project and presents the first iteration towards a full risk management plan (RMP).
The RMP serves as a guideline to:

- identify risks that might impact BirdWatch negatively, including the quality of the output and the continuation of BirdWatch beyond the project's lifetime.
- classify risks according to probability and severity of impact.
- define evaluation scales and tolerances.
- monitor identified risks and identify newly evolving risks.
- define measures for mitigation and prevention.
- define measures for escalation and impact minimisation.

With proper processes in place, the aforementioned objectives can guarantee that all emerging risks can be kept under control.
The RMP will be an evolving document throughout the project's lifetime. Accordingly, risks are continuously identified throughout the project, with an initial risk list as a starting point.
In setting up the approach, we followed and slightly adapted recommendations of the PM² Project Management Methodology[13].

Risk monitoring approach

An approach to determine the severity of the risk is to evaluate the potential consequences of a specific risk and its likelihood and to combine this information into a measure of the risk (i.e., the *risk level*). This measure should allow for drawing conclusions on the importance of this risk and on the appropriate mitigation measures. Based on the nature of the risk and its potential impact, countermeasures then have to be defined. The main components of risk management are:

1. Identification of potential risks

Knowledge of potential risks which could impact the project. The identification of possible adverse events is performed, e.g., by a desk study, looking at all different aspects of the project or by the review of other projects' lessons learned. Many risks are not project-specific, including questions of data availability or problems in initiating stakeholder interaction.

2. Assessing the consequence of risks

The next step is to assess the likelihood and impact of the identified risks in terms of their influence on the project objectives. This assessment is based on the likelihood of occurrence and the severity of the impact on project objectives. The product of likelihood and impact defines the level of the risk, which is then used as a reference for the prioritisation and risk response development. Depending on evaluation scales, tolerances can also be defined.

[13] https://pm2.europa.eu/index_en

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3. Definition of the risk response

This step is to select the best risk response strategy as well as to identify and plan the actions to control the risks. The strategy will be based on the risk level, the type of risk, on the effects on the overall project objectives (e.g. schedule and costs), as well as on the cost of the strategy and its benefits.

After the strategy for each risk has been determined, specific actions to implement the strategy will be defined, described, scheduled and assigned, while a so-called risk owner assumes the responsibility for its implementation.

4. Controlling risk

Finally, continuous monitoring throughout the project needs to be conducted to identify risks, initiate measures for mitigation or impact reduction and ensure the risk event has been handled appropriately. The project coordinator is also in charge of ensuring the implementation of the contingency plans and communicating to the steering committee accordingly.

If an adverse event is detected by the project coordinator or any of the consortium members and deemed as potentially high risk, this will be reported to the project's steering committee, together with the status of the risk.

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Risk identification, monitoring and assessment

BirdWatch uses the following 25 risk levels, calculated by multiplying likelihood with impact for any specific risk item (Table 8).

		Impact				
		1=very low	2=low	3=medium	4=high	5=very high
Likelihood	5=very high	5	10	15	20	25
	4=high	4	8	12	16	20
	3=medium	3	6	9	12	15
	2=low	2	4	6	8	10
	1=very low	1	2	3	4	5

Table 8: Matrix with risk levels used in BirdWatch

Following the approach of PM², the individual categories in Table RX are:

Likelihood:

- **Very low**: less than 5% probability
- **Low**: between 5% and 10% probability
- **Medium**: between 10% and 25% probability
- **High**: between 25% and 50% probability
- **Very high**: more than 50% probability

Impact:

- **Very low**: less than 1% of project budget affected, or/and other project baselines are nearly not impacted, or/and few individuals affected (only internal to project team), or/and no reputational impact or/and easy and quick capacity to react and resolve the issue.

- **Low**: 1% to 2% of project budget affected, or/and low impact in other project baselines, or/and only one milestone affected, or/and projects stakeholders may be affected, or/and reputational impact in the organisation or unit or/and sufficient project competencies to resolve the issue (if risk occurs).

- **Medium**: 2% to 5% of project budget affected, or/and medium impact in other project baselines, or/and one or more milestones affected, or/and projects stakeholders

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will be to some extent affected, or/and project objectives may be affected, or/and reputational impact amongst technical staff in other organisations or units, or/and formal complaints, or/and limited project competencies to resolve the issue (if risk occurs).

- **High**: 5% to 10% of project budget affected, or/and high impact in other project baselines, or/and several milestones affected, or/and projects stakeholders will be affected/concerned, or/and project objectives will be affected, or/and reputational impact in several organisations or units, or/and formal and legal complaints, or/and insufficient project internal competencies to resolve the issue (if risk occurs).

- **Very high**: more than 10% of project budget affected, or/and very high impact in other project baselines, or/and several milestones affected, or/and projects stakeholders will be very affected/concerned, or/and the overall project will be affected, or/and external reputational impact, or/and significant formal and legal complaints, or/and external competencies are needed to address the issue (if risk occurs).

According to Table 8, the following thresholds for the risk levels are used:

- **Green**: risk level <=2
- **Yellow**: risk level >=3 and <=16
- **Red**: risk level >=20

In BirdWatch, a risk log will be kept which will support the monitoring of the management of a risk once it is detected. Below, the template for the risk log is shown.

Risk Log	
ID	The risk identifier
Category	Risk category related to the area affected by the risk
Title	A short title
Description	A description of the risk, its causes, the kinds of problems that it could result in (potential effects), and risk dependencies.
Status	**Proposed:** initial status - risk is still being specified **Assessing:** initiate an assessment **Waiting for Approval:** request approval **Approved:** set once the risk possibility has been accepted **Rejected:** risk was rejected as not relevant **Closed:** risk has been managed (e.g. mitigation actions have been implemented) and it is not a risk for the project anymore

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Identified by	The person who identified the risk
Identification date	The date on which the risk was identified
Risk Assessment	
Risk Level (Likelihood*Impact)	The risk level is determined by Table 11
Risk owner	The person accountable for managing and monitoring the risk
Escalation	Whether or not the risk is to be escalated to the Steering Committee (**Yes** or **No)**
Risk Response	
Risk response Strategy	**Avoid:** modify the project or project plan to eliminate the conditions or activities that introduce the risk **Reduce:** proactive implementation of risk reduction activities **Accept:** contingency plans should be defined in case the risk occurs (active acceptance) **Transfer/Share:** transfer or share the risk with other entities
Action details (effort & responsible)	Description of the mitigation action(s), including its objective, scope, deliverables and estimated effort needed
Target date	The date on which the action is expected to be implemented
Traceability/Comments	The ID(s) of the tasks (in the Project Work Plan) that implement the risk response actions, and/or the IDs of related changes, issues or decisions (log entries). Also, any additional information/comments related to the risk

Table 9: Necessary information in the risk log

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Escalation and risk response

As BirdWatch has a relatively small consortium, the communication channels can be kept short. Additionally, weekly software / stakeholder meetings represent an opportunity to address emerging risks, especially with medium risk levels or higher.
In general, while risk levels are low, risks will be handled by the individuals responsible for the affected Work Package (WP) or in collaboration with responsible individuals of other affected WPs. If a risk level is classified as “medium” or higher, the project coordinator is contacted and, if deemed necessary, an extra meeting with the responsible persons is conducted.

The following table describes the risk response approach in BirdWatch.

Scenario	**Risk Response Strategy**
Very high impact & high or very high likelihood or high or very high impact & very high likelihood	Avoid **or** implement an immediate reduction
Very high impact & very low likelihood	Transfer/Share
All other risk levels	Reduce
Low or very low likelihood & very low impact or very low likelihood & low impact	Accept (monitor and plan contingency if deemed necessary)

Table 10: Risk responses to be implemented in BirdWatch

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Risks and risk categories in BirdWatch

BirdWatch has the following risk categories:

- Data
- Quality
- IT
- Project Management
- Business
- People
- External

Table 11 lists the potential risks which could occur during the BirdWatch project which can be foreseen so far.
The list below will be updated if new types of risk are identified. These will be included in the final risk management plan of Deliverable D1.6.

Risk	Likelihood	Impact	Risk Level	Mitigation
Data				
Optimisation constraints insufficient	2	4	8	Direct contact of stakeholders or other individuals who can provide the information on constraints.
Insufficient bird obs data to constrain habitat models	3	4	12	Bird observation data will be gathered from professional sources, curated by ornithologists as well as citizen science platforms.
Insufficient remote sensing data	1	4	4	Fusion of EO data (optical, radar) to avoid gaps coverage (e.g. due to high cloud coverage)
Data privacy breach	1	5	5	Implementation of rigorous data protection standards, such as the GDPR. All participants in surveys, workshops, demonstration events, etc. will be asked for informed consent. Personal data is anonymised and aggregated after collection. After the finalisation of the project, the data will be deleted or fully anonymised.

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Quality				
Insufficient data quality	4	4	16	Established data sources with diverse and high-quality data will be used, along with data gathered from stakeholders. The quality of gathered data will be elaborated, analysed and reported periodically. Buffer time has to be foreseen in the implementation of the demo activities, in order not to delay the achievement of project set objectives
Accuracy of results is too low	3	5	15	Evaluation of what data could improve accuracy and recalculation.
Challenging analyses due to complex or opposing requirements	3	3	9	Data fusion will aid knowledge extraction. The data and methods plan will be kept flexible enough to react to potential insufficiencies
IT				
Insufficient processing resources	2	4	8	Careful planning of the necessary technical resources. Consortium partners have appropriate technical resources. Additionally, external computational resources are available which have proven their capabilities in similarly data-rich projects (e.g. DIAS, Code-DE)
Business				
Not enough representatives of a stakeholder type participate in demonstrators	3	5	15	Dialogue and openness in the interaction with stakeholders and the general public. Asking participants at demonstration activities to issue a Letter of Interest to ensure the collaboration and support needed to carry them out; Incentives to participate will be explored (e.g., free licence to use BirdWatch for a specific period)
Misuse /	1	3	3	Direct communication

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misunderstanding of results				Extensive documentation (stakeholder-targeted in language)
Misunderstanding / misinterpretation of stakeholder requirements	1	4	4	Continuous, iterative validation procedures; Increased involvement of stakeholders to jointly identify corrective measures
Results of BirdWatch are not interesting to stakeholders	2	4	8	BirdWatch targets a diverse set of stakeholders which decreases the likelihood that there is no interest in the results.
Antagonism regarding IT	3	3	9	Careful planning of communication and of demonstration activities for removal of barriers and resistance; active involvement of stakeholders
Low responses to stakeholder surveys	3	3	9	Additional communication actions to reach out to a wider public and receive further responses
Poor communication and dissemination returns	2	4	8	In the case of non-satisfactory results, the responsible WP coordinator will proceed immediately to increase outreach activities. Partners will be asked to widen their network contacts.
Exploitation and project impact not in line with expectations	2	4	8	Close communication with stakeholders; including local partners. Implementing more efficient processing capabilities, if production costs are too high. New activities will be scheduled, and actions with a low performance indicator will be reshaped, including new channels for dissemination/exploitation. Rigorous quality management throughout the whole project
Project Management				
Deliverables, milestones, tasks are delayed	2	4	8	In case a partner is underperforming, internal evaluation which action is to be taken, including the possibility of a reallocation of tasks and resources.

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				If this is not possible, another partner will be identified and invited to join the project. Additionally, the consortium has redundancies in expertise and is thus flexible to shuffle work package tasks.
Financial over-expenditure	2	4	8	In case of a significant over-spending, a negotiation process will be started to adhere to the agreed project conditions, potentially reallocating some of the activities and part of the budget to other project partners and in the worst case removing the partner from the project consortium.
Tasks require more budget than planned	2	4	8	Reallocate some of the activities and part of the budget to other project partners.
People				
Loss of key project personnel	2	3	6	The consortium has redundancies in expertise and can shuffle tasks. If this is not possible, another partner will be identified and invited to join the project. Additionally, the consortium has redundancies in expertise and is thus flexible to shuffle work package tasks.
External				
Adverse economic conditions lead to low stakeholder interest	3	5	15	Diversification of BirdWatch's stakeholder types
Adverse geopolitical conditions lead to low stakeholder interest	3	5	15	Diversification of BirdWatch's stakeholder types

Table 11: Potential risks of the BirdWatch project

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