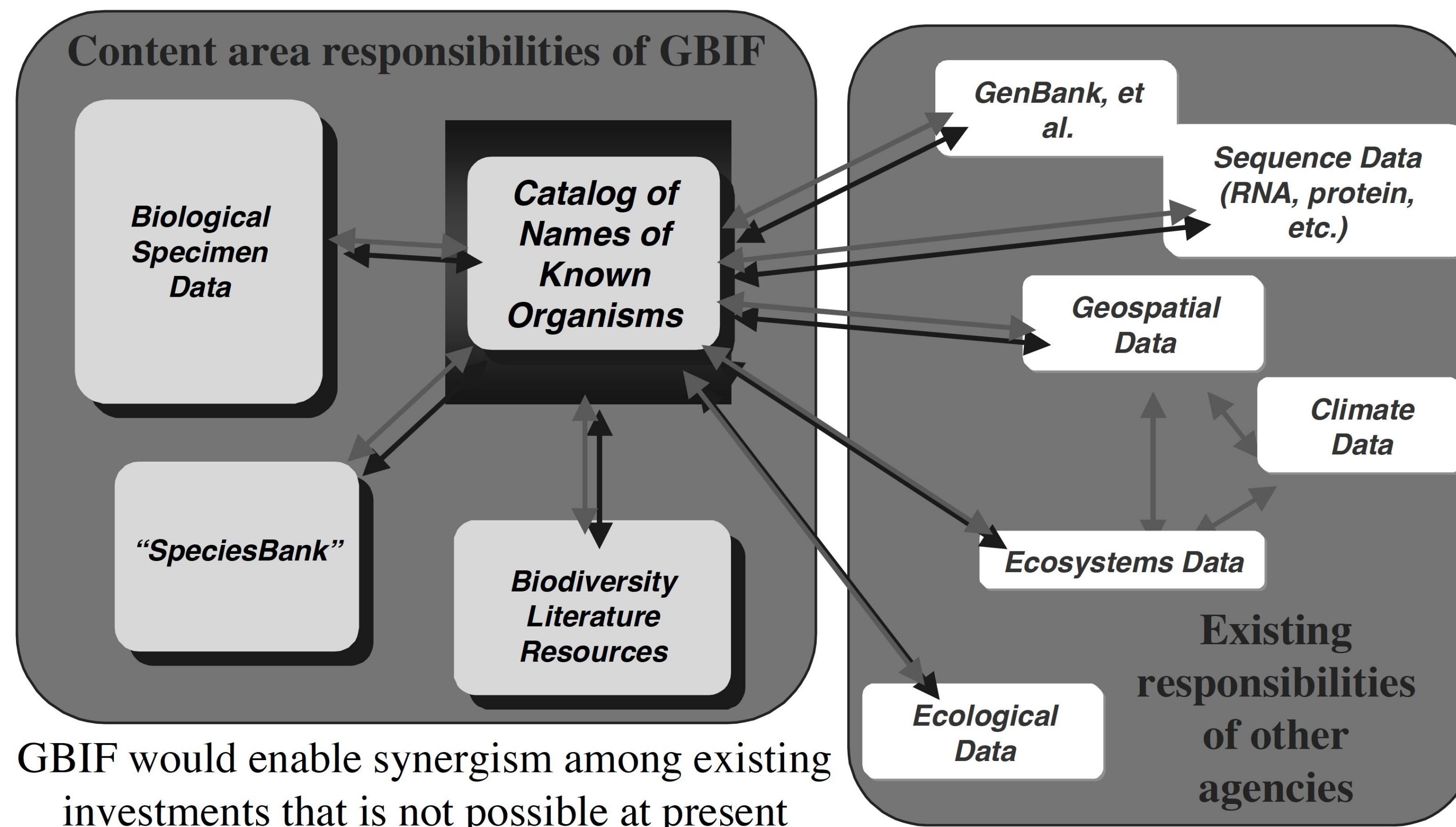


The Global Biodiversity Information Facility (GBIF)

Prof. Dr. Birgit Gemeinholzer/GBIF Science Committee Chair



1999 Recommendation of the OECD Biodiversity Working Group



Vision

A world in which the best possible biodiversity data underpins research, policy and decisions.



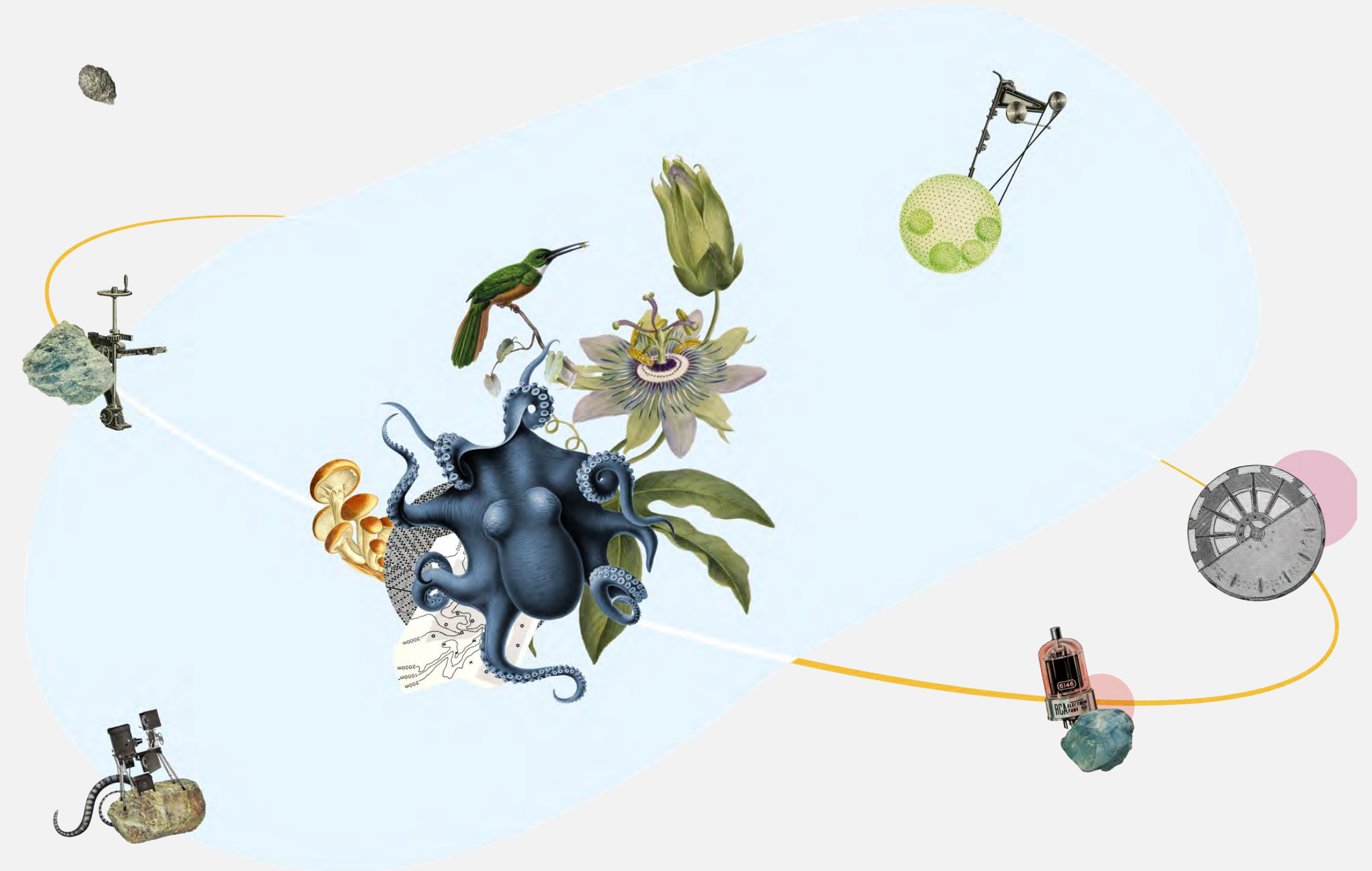
Mission

To mobilize the data, skills and technologies needed to make comprehensive biodiversity information freely available for science and decisions addressing biodiversity loss and sustainable development



Shared infrastructure

By embracing hosted and cloud-based environments, GBIF's infrastructure expands **easy access to biodiversity data**, promotes collaboration, facilitates data harmonization and fosters innovative research



● Datasets
103,568

● Country
Participants
63

● Organizational
Participants
43

● Publishers
2,202

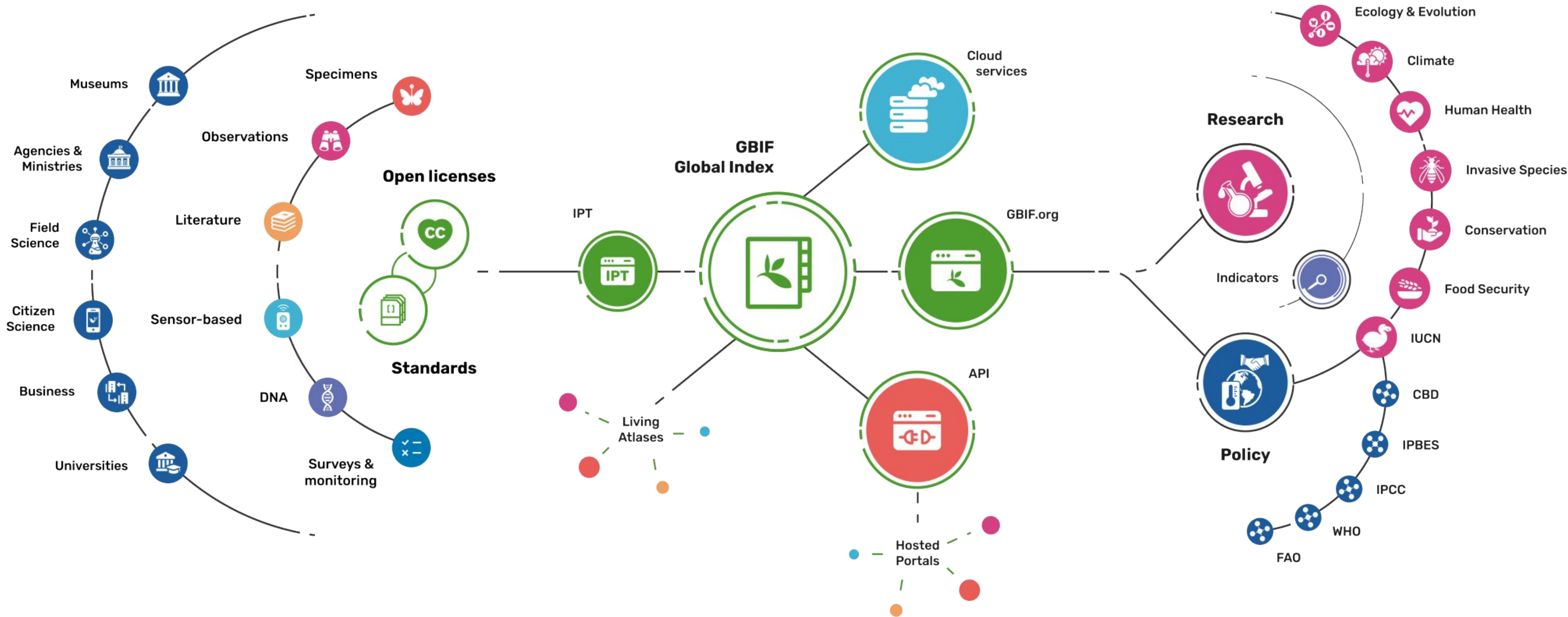
● Peer-review papers
using data
10,288

● Average records
downloaded per month (2023)
173.8 billion

● Species
occurrence records
2,690,679,082



Providing biodiversity evidence for research and policy



Create

*Combine sources
of evidence*

Share

FAIR and open access

Transform

Apply and use data



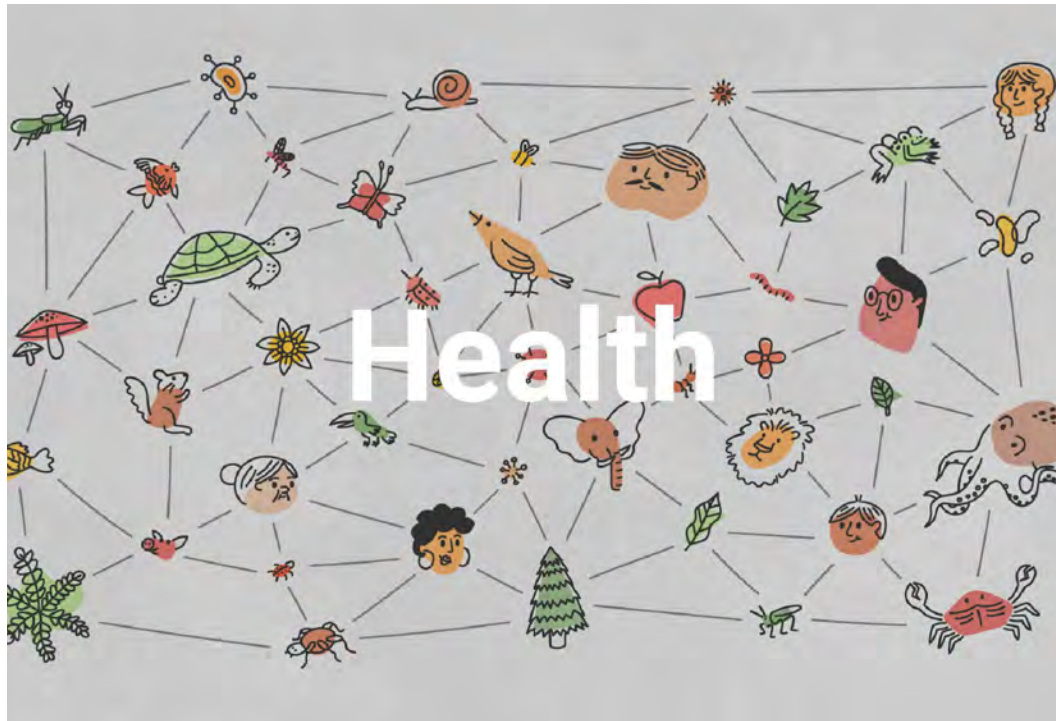
Thematic communities



Fostering **focused collaboration** and **knowledge exchange** among experts in specific biodiversity domains, these communities serve as dynamic hubs where **people come together** to address **shared challenges**.



GBIF's contribution to the Sustainable Development Goals



Flying foxes (*Pteropus* sp.) predict Nipah virus transmission risk

- Study maps the risks of Nipah infection in South and Southeast Asia using models confirmed by current outbreak in India.
- GBIF-mediated data resources used : 28,418 species occurrences
- Main risk factor is via human consumption of *Pteropus* urine or saliva-contaminated raw sap from date palm (*Phoenix dactylifera*)



Indian flying fox (*Pteropus giganteus*) by Hemant Kumar via iNaturalist. Photo licensed under CC BY-NC 4.0.



Evaluating trends in research uses

PNAS

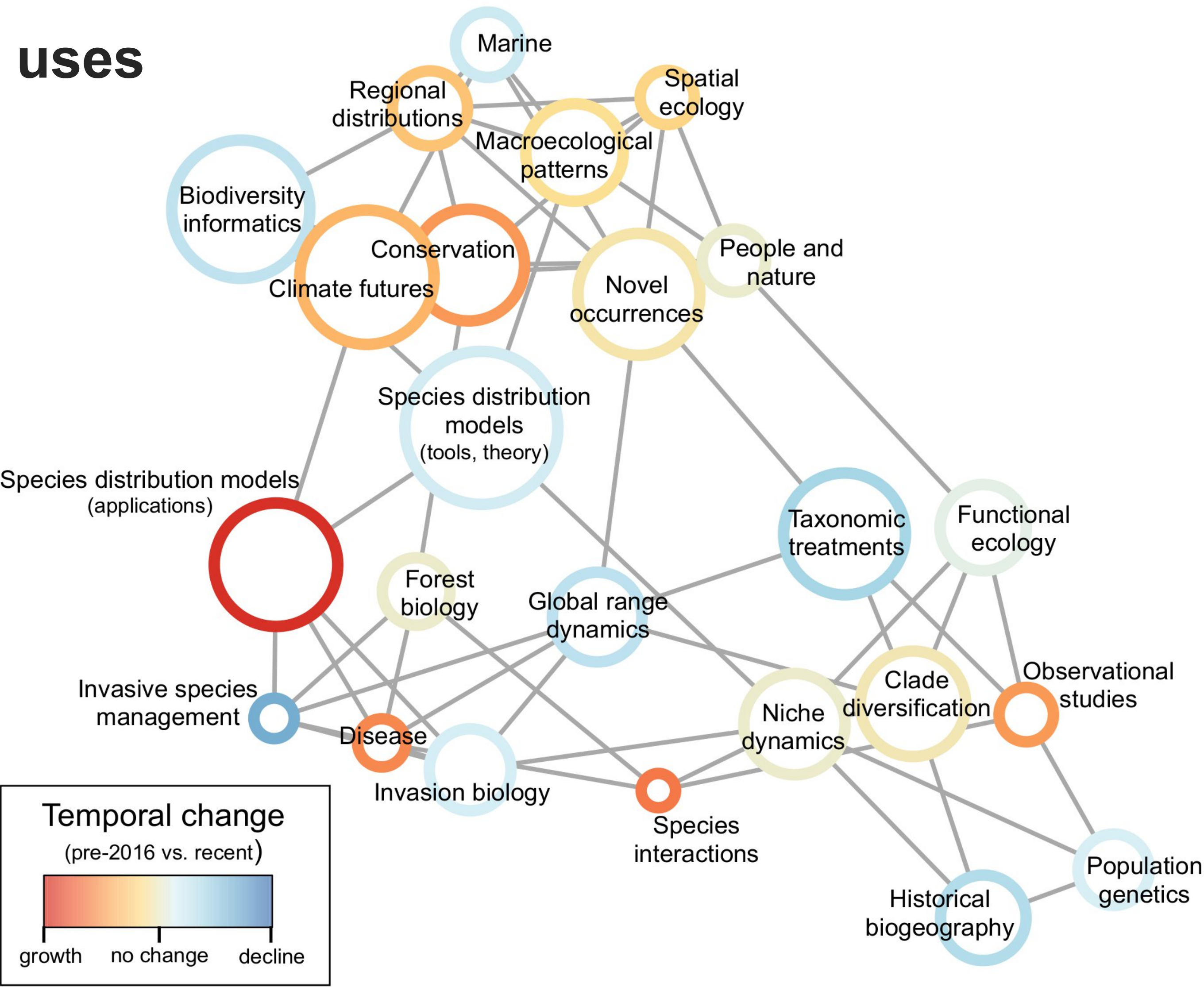
RESEARCH ARTICLE | BIOLOGICAL SCIENCES | 

Data integration enables global biodiversity synthesis

J. Mason Heberling , Joseph T. Miller , Daniel Noesgaard , , and Dmitry Schigel  [Authors Info & Affiliations](#)

Edited by Douglas E. Soltis, University of Florida, Gainesville, FL, and approved December 8, 2020 (received for review September 1, 2020)

February 1, 2021 | 118 (6) e2018093118 | <https://doi.org/10.1073/pnas.2018093118>



Evaluating trends in research uses

PNAS

RESEARCH ARTICLE | BIOLOGICAL SCIENCES | 

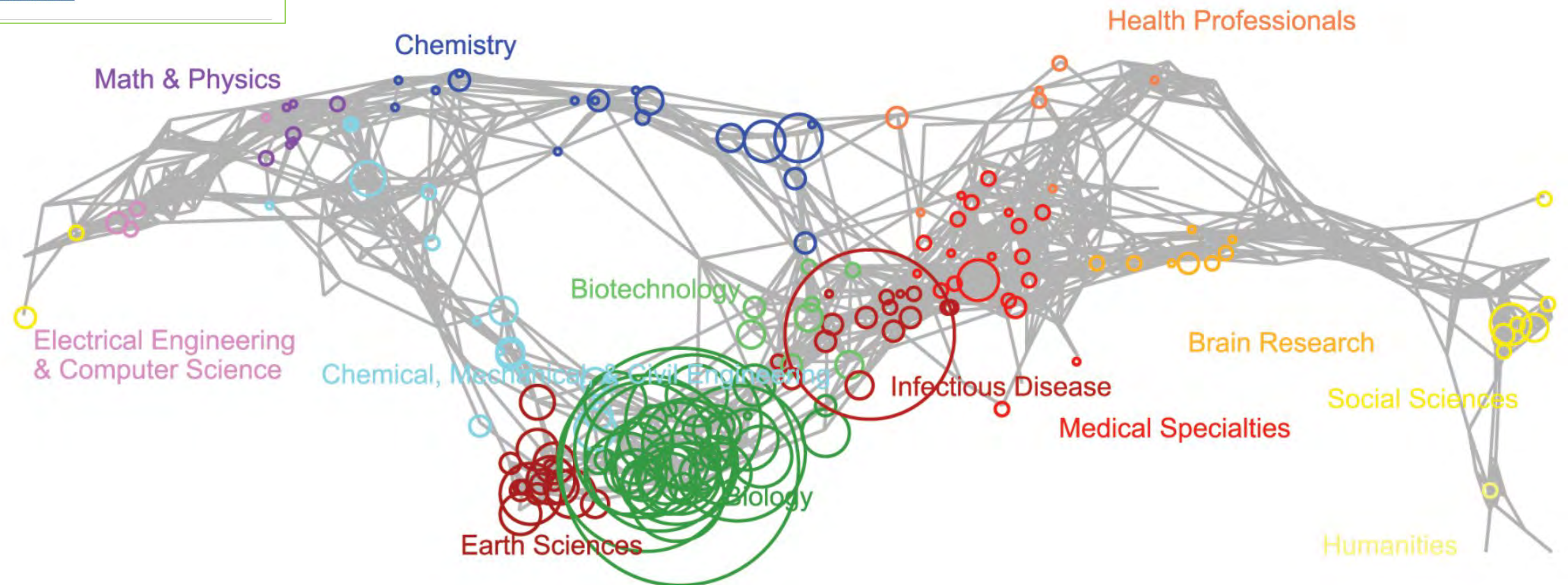


Data integration enables global biodiversity synthesis

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Geography of GBIF data use and authorship

PNAS

RESEARCH ARTICLE | BIOLOGICAL SCIENCES | 

Data integration enables global biodiversity synthesis

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Capacity enhancement



By **focusing on people**, GBIF recognises that the success of data sharing and conservation efforts relies on individuals' skills, knowledge, and engagement at various levels.

- providing documentation and learning resources
- capacity enhancement mentoring
- biodiversity open data ambassadors
- regional knowledge networks and a global community of practice



Research and policy

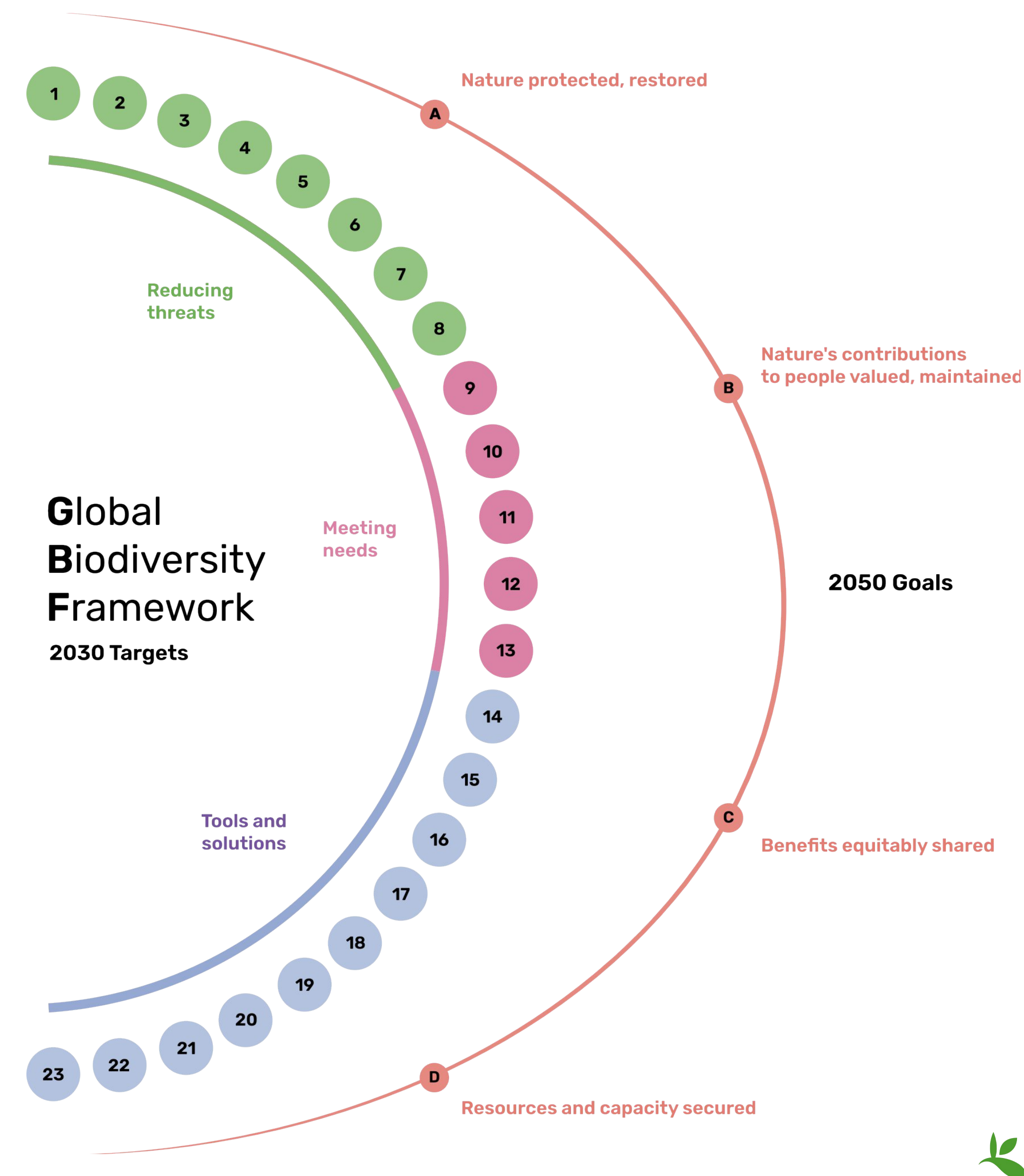
GBIF empowers its community of users to unlock new insights, enabling ground-breaking **scientific studies** and facilitating evidence-based **policy decision-making**.



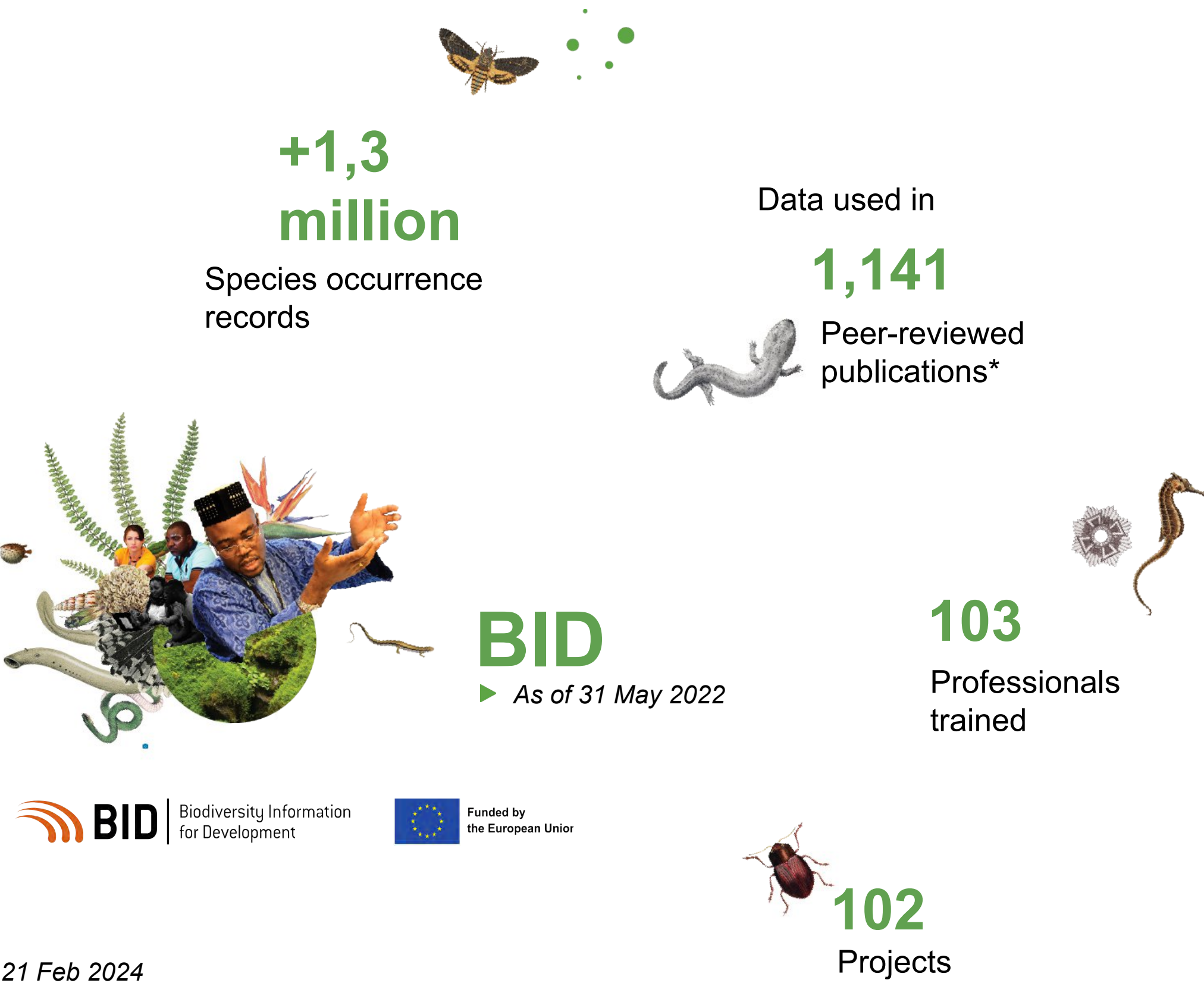


GBIF and the Kunming-Montreal global biodiversity framework

GBIF relevance (illustrative)	
Data to identify key biodiversity areas	1
Data to monitor restoration	2
Data to locate, monitor protected areas	3
Data for species conservation	4
Data on invasive species occurrence	6
Data to model climate change impacts	8
Platform for sharing EIA data	15
Capacity programmes for data mobilization and use	20
Making data available for implementation	21



Biodiversity Information for Development (BID)



A multi-year programme funded by the European Union led by GBIF with the aim of enhancing capacity for effective mobilization and use of biodiversity data in research and policy



BID 2

BID 2



Funded by
the European Union



global
environment
facility
INVESTING IN OUR PLANET

A multilateral family of funds dedicated to confronting biodiversity loss, climate change, and pollution, supporting land and ocean health. The partnership includes 186 member governments as well as civil society, Indigenous Peoples, women, and youth, with a focus on integration and inclusivity.



Economic dividend from GBIF-mediated data

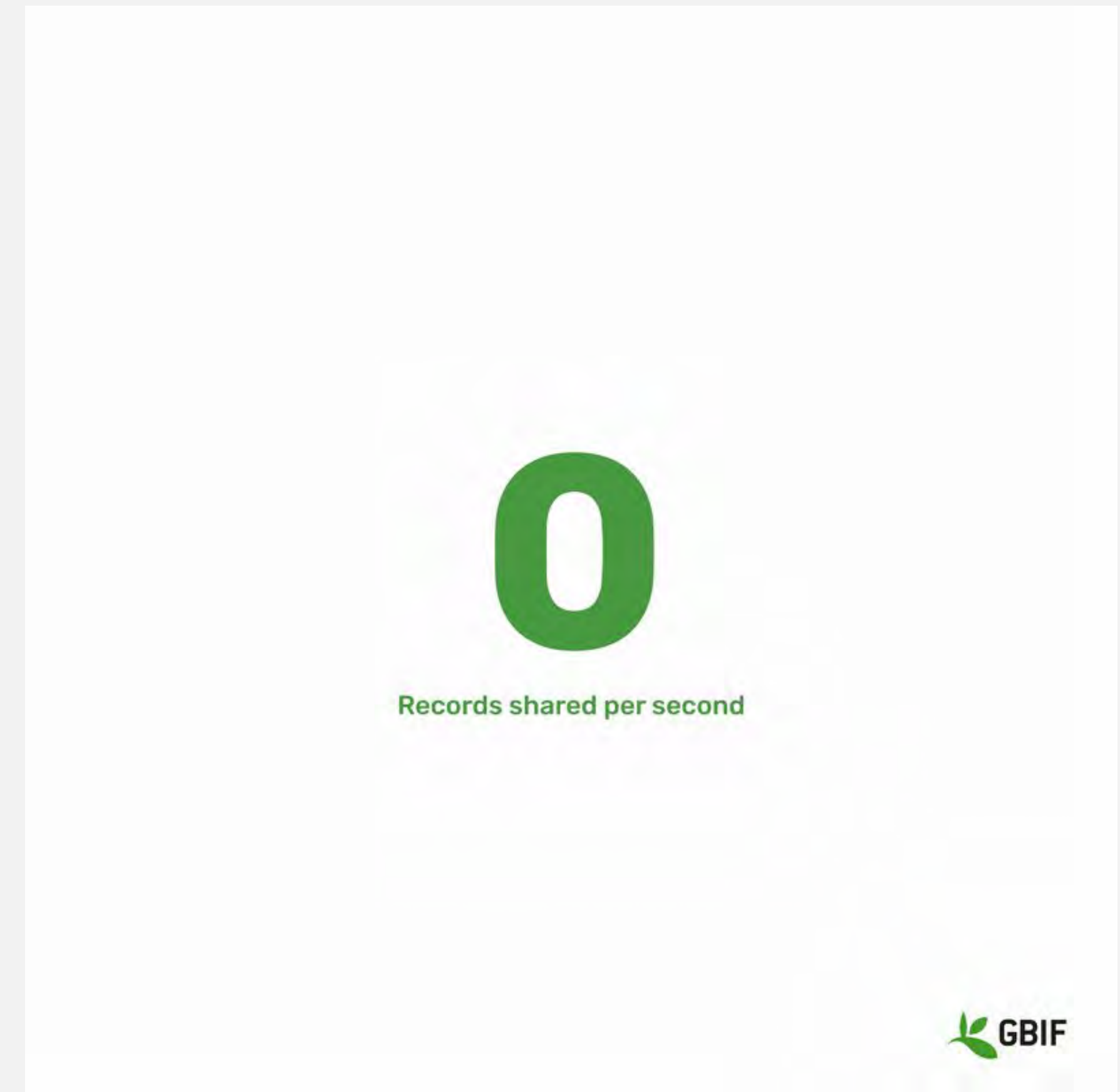


For every €1 invested in GBIF
there are €3 of benefits to users
and up to €12 to society



GBIF is “the most comprehensive, openly available, application-agnostic (most unbiased), **easiest-to-use, and modern access point** to known digital species occurrence data”

CoDATA Twenty-Year Review of GBIF



Thank you!

Prof. Dr. Birgit Gemeinholzer - GBIF Science Committee Chair



Open Science and Open Data

main principles and concepts

**RESEARCH INSTITUTE
NATURE AND FOREST**

Dimitri Brosens
Coördinator Flemish Biodiversity Portal



GBIF Belgium

0000-0002-0846-9116

Dimitri.brosens@inbo.be

2024/06/06



Data & Infrastructure Open data and Open Science

🏠 \ Research & results \ Data & Infrastructure \ Open data and Open Science

INBO aims to work as much as possible according to the methods of open and reproducible research - Open Science for short - in order to achieve solid and demonstrable scientific quality.

Open Science Goals as a guide

To concretise Open Science for INBO, we have drawn up Open Science Goals (OSDs) for projects. The Open Science Goals concretise for each phase of the research cycle how we want to apply Open Science: from design, through data collection, storage, management and analysis to publication, archiving and encouraging reuse.

Open Science Goals as a long-term perspective

The Open Science Goals offer an ideal picture for research at INBO. They came about through a participatory process within the organisation and paint a picture of where we want to go in the long term. We focus on incremental learning and growth to gradually apply these goals more broadly.





Vlaanderen
is wetenschap



Open Science bij het INBO: naar een kwaliteitsvolle en transparante onderzoekscyclus

Een overzicht van de INBO Open Science Doelen
voor projecten - versie 1.1

Floris Vanderhaeghe, Aaike De Wever, Lien Reyserhove, Peter Desmet, Thierry Onkelinx, Bart Goossens, Saskia Wanner, Gerrit Genouw, Lymke Janssens, Francis Turkelboom, Toon Van Daele

INSTITUUT
NATUUR- EN BOSONDERZOEK

English abstract

Open Science is **increasingly preferred** in scientific research. It results in high-quality and transparent research, paving the way to increased trustworthiness. Furthermore, Open Science provides the best potential for collaboration and a potentially faster application of the research results. These properties make it the most suitable research approach for public authorities.

By 'Open Science' we mean methods of **open and reproducible research**. At the Research Institute for Nature and Forest (INBO), the Open Science approach historically received much attention already. Through the INBO 'Open Science programme' it now gets even more **aligned with the whole research cycle**.

With this report we want to reach out to scientists within and outside INBO and:

- offer tangible leads to engage with Open Science methods in every research step;
- inspire to invest more in research quality and transparency.

More specifically, we list the **INBO Open Science Goals for projects**: in paragraph 2.2 and elaborated in appendix B. They are the idealized picture of how we want to proceed in every stage of the research cycle. The goals have arisen as a **bottom-up** process throughout the organization. We want to create a welcoming and stimulating environment, and establish gradual and long-lasting progress. We encourage everyone to learn by trial and error, and to disseminate knowledge and skills to others. In doing so, not all goals will be implemented at the same speed or extent: they rather serve as a roadmap.

At a higher level the **Flemish Open Science Board (FOSB)** encourages Flemish research organizations to increasingly apply Open Science. The FOSB appointed **data stewards** to accelerate the Open Science ideas within the Flemish Scientific Institutes, including INBO. At INBO the data steward helps in coordinating the Open Science Goals. The FOSB has put forward five objectives (treated as KPIs): ORCID iDs, Data Management Plans, FAIR data, open access and open data.

The screenshot displays the Flemish Biodiversity Portal, a web-based platform for biodiversity data. The top navigation bar includes links for 'FLEMISH BIODIVERSITY PORTAL', 'SPATIAL DATA', 'PARTICIPATE', 'DATA & PARTNERS', 'INFO', 'HELP', and 'MORE'. The main header features a large image of a ladybug with a search bar overlaying it. Below the header, there are two columns: 'THE FLEMISH BIODIVERSITY PORTAL' and 'OUR BIODIVERSITY DATA'. The left column contains a welcome message and four buttons: 'Occurrences', 'Species', 'Datasets', and 'Institutions'. The right column explains the portal's role in collecting and verifying biodiversity data. At the bottom, there is a detailed screenshot of the portal's interface, showing a map of Flanders with a data layer for 'VEN en VON gebieden'. A sidebar on the left allows for filtering and layer management. A pop-up window displays the 'Occurrence record (1 of 1)' for a specific location, showing details like date, coordinates, and species name.

37,945,582
Occurrences

1,318
Datasets

47
Countries and areas contribute data

443
Publishers

Generated 12 hours ago © OpenStreetMap contributors, © OpenMapTiles, © Mapbox

Any year 1300 - 2024

EXPLORE AREA

DATA FROM BELGIUM

47,385,603
Published occurrences

545
Published datasets

249
Countries and areas covered by data from Belgium

28
Publishers from Belgium



Biodiversity.be

This call, co-funded by the European Commission, focused on three (non-exclusive) key themes:

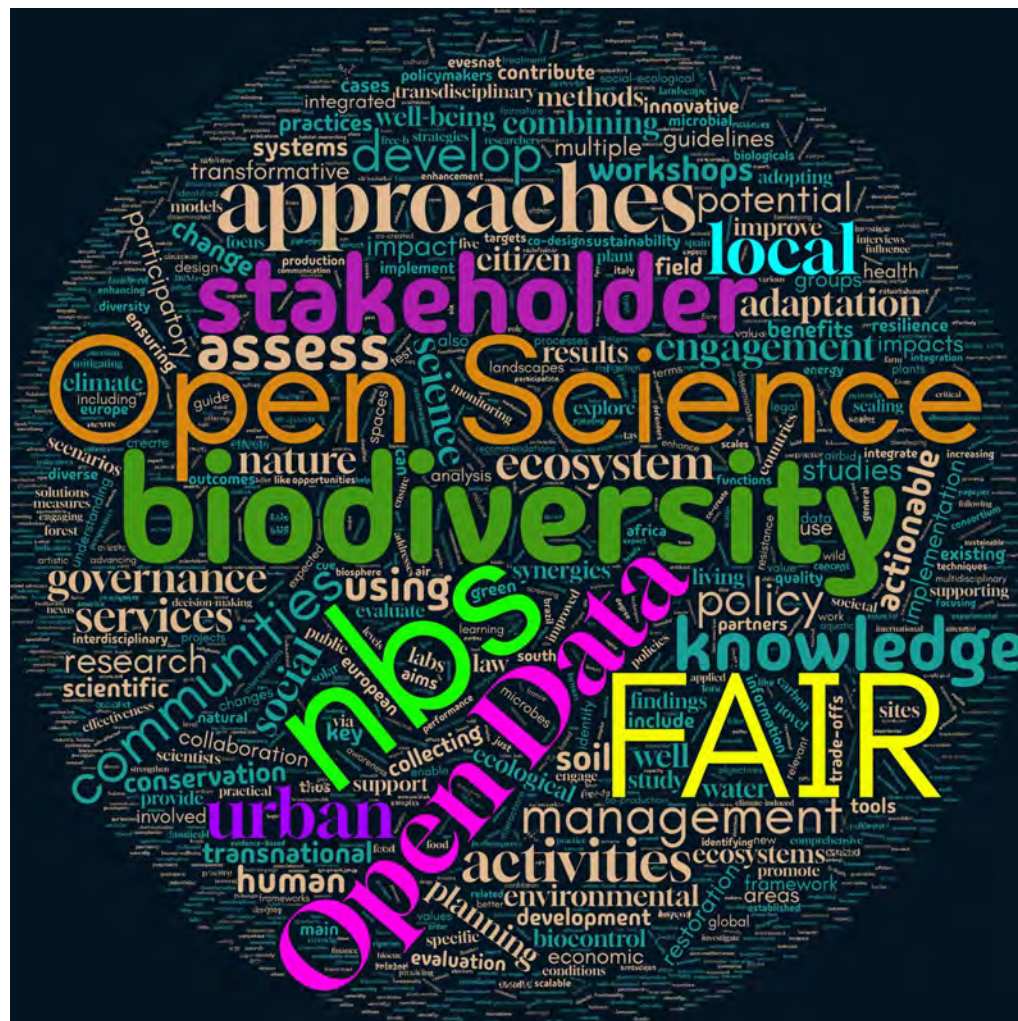
- 1 **THEME A:** Synergies and trade-offs of Nature-based Solutions in the context of human well-being
- 2 **THEME B:** Nature-based Solutions mitigating anthropogenic drivers of biodiversity loss
- 3 **THEME C:** The contribution of Nature-based Solutions for just transformative change

34 funded projects

- 1 **AirBio** – Airborne biological diversity shaped and modelled by Urban Green Elements (PT, SE, AT, DK, IT)
- 2 **ARE BEST NbS** – Aquatic and Riparian Ecosystems: Biodiversity and Economic Service Transformations from NbS (PT, DK, HU, NL, NO)
- 3 **BIOQUE** – Microbial biodiversity and Carbon Use Efficiency as Nature Based Solution for soil C stabilization (ES, ZA, DK, CH)
- 4 **BIOVEGETY** – Greening cities as nature-based solution and their impact on vectors and vector-borne disease risks (ES, FR, MA, NL)
- 5 **Biodiversity4Drugs** – Peptide Biodiversity: Advancing Human Health Through Nature's Pharmacological Treasures (ES, FR, BR, PT, SE, CA, AT, BE, DK, IT, NL, NO, CH)
- 6 **BioPlastics** – Discovering Brazilian Biodiversity-Driven Plastic Degradation through Omics Analysis (ES, FR, BR)
- 7 **BioReStem** – Anticipating Biological Succession in Rehabilitation of Long-Term Operated Nature-Based Solutions for Stormwater Treatment in Different Climate Zones (FR, EE, SE, CA)
- 8 **BioSolar** – Solar farms: an opportunity to recover biodiversity in farmlands (ES, PT, SE, CA, SI, PL, HU, IS)
- 9 **BRAYE** – Biological Invasions Resolved through Adaptable, Versatile, and Engaging Nature-Based Solutions (PT, SE, DK, IT, NO)
- 10 **EYESHAT** – Nature-based Solutions to meet EU Nature Restoration Targets: Evaluating synergies and trade-offs across Ecosystem Services for biodiversity conservation, climate change mitigation, and resilience and autonomy improvement (FR, IT, AT, CH)
- 11 **FairNature** – Developing NbS scaling approaches to achieve just transformative change (ES, FR, BE, DK, HU, NL)
- 12 **FITNESS** – Financing Transformative Nature-based Solutions for Equitable and just Sustainability Solutions (BR, BE, DK, NO)
- 13 **FOUNDATIONAL** – transFORMing rUral laNdscaPes And commuNities thROugh Nature-based solutions: integrating biodiversity conservation and human well-being at the nature-agriculture interphase (FR, BR, ZA, NL)
- 14 **FoodB** – Studying FREE-living honey Bee colonies in Europe: nature-based solutions to safeguard diversity, ensure resilience, and promote transformative change in beekeeping (FR, IE, PT, SE, PL)
- 15 **GREENHANCEnt** – Growing Resilience by Exploring Methods to Enhance Urban Agriculture for Human Well-being, Community and Biodiversity Enrichment (ES, SE, IT)
- 16 **inSALSA** – Increasing Sustainability of Agribiologicals by Living Labs in sub-Saharan Africa (ZA, SE, DK, IT, IS, CZ)
- 17 **NATUREBIOPROMO** – Hybrid NATURE-Based
- 18 **NBS4EU** – NBS Services Promoting Local Biodiversity, Well-being and Scalable Solutions (ES, EE, PT, SE, DK, NO)
- 19 **PhlarmatAll** – Planetary Health by Healing Forests as Nature Based Solution (PT, LT, SI, TW)
- 20 **PRESINMED** – Preserving the singularity of Mediterranean high-mountain biodiversity hotspots: a NBS approach (ES, PT, MA, IT)
- 21 **RESOLVE** – Nature based SOLUTIONS for sustainable use of high north marine biodiversity and ecosystems services (SE, DK, IS, NO)
- 22 **REVIVE** – River Conviviality: Advancing socio-environmentally just river restoration through nature based solutions (ES, FR, IT, NL)
- 23 **SaltyBEATS** – Salty symphonies: bringing back Biodiversity in marginal Saltlands (ES, PT, TN, IT, PL, NL)
- 24 **SOILQVINE** – Promoting Soil Quality and Biodiversity in Vineyard Ecosystems Through Nature-Based Solutions (ES, PT, IT, SI)
- 25 **SUNLODE** – Spontaneous Urban Nature and Local no net land take Policies (FR, BE, CH)
- 26 **TRANSForm** – Back to the future: Traditional agroforestry systems as NbS to face multiple societal challenges (ES, IT, PT, AT, LT, IL)
- 27 **UrbanBEE** – Promoting Biodiversity, Ecosystem Services and Societal Engagement Across Diverse Urban Ecosystems (ZA, AT, IT, HU)

Open Science?





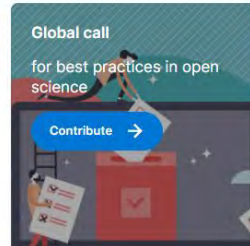
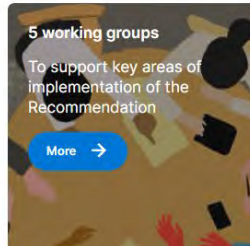






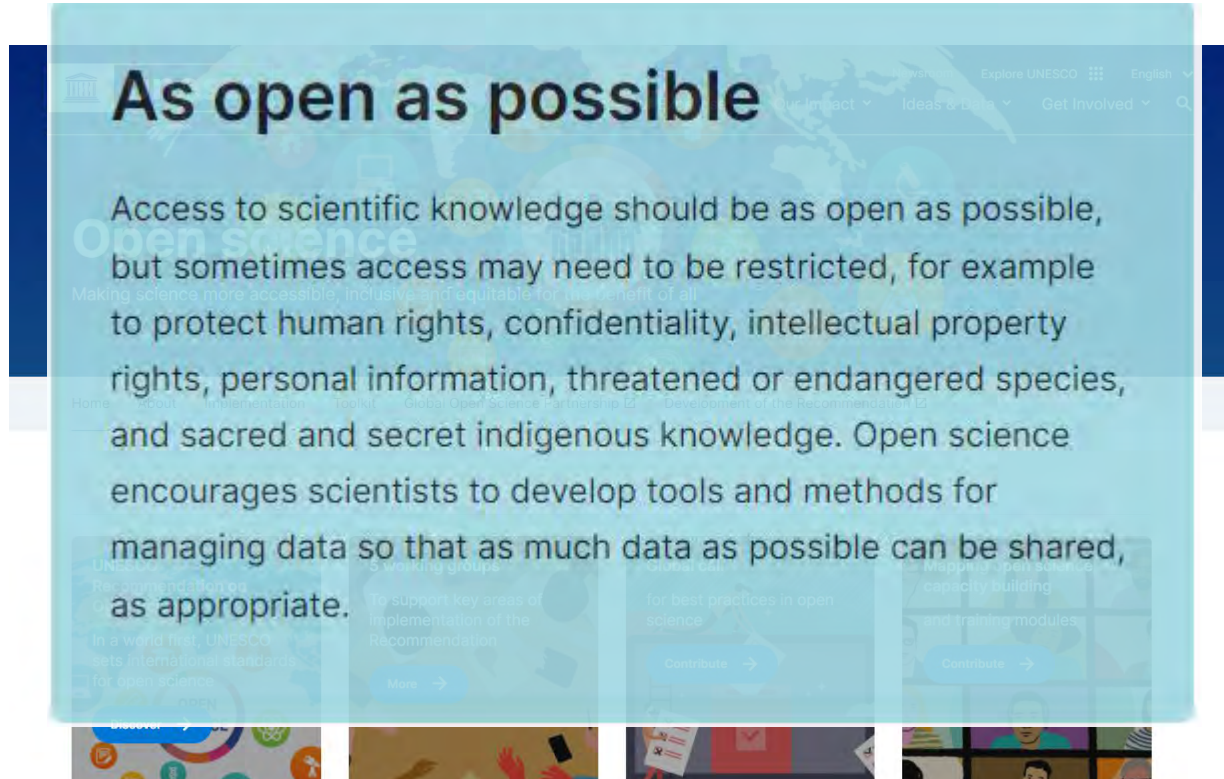
UNESCO Recommendation on Open Science

The UNESCO Recommendation on Open Science is the first international standard setting instrument on open science.



UNESCO Recommendation on Open Science

The UNESCO Recommendation on Open Science is the first international standard setting instrument on open science.



The image is a screenshot of the UNESCO Recommendation on Open Science website. The main heading is "As open as possible" in a large, bold, black font. Below it, a paragraph states: "Access to scientific knowledge should be as open as possible, but sometimes access may need to be restricted, for example to protect human rights, confidentiality, intellectual property rights, personal information, threatened or endangered species, and sacred and secret indigenous knowledge. Open science encourages scientists to develop tools and methods for managing data so that as much data as possible can be shared, as appropriate." The website has a light blue background with a world map. At the top, there is a navigation bar with links like "Home", "About", "Implementation", "Toolkit", "Global Open Science Partnership", "Development of the Recommendation", and "IG". There are also buttons for "Our Impact", "Ideas & Data", and "Get Involved". At the bottom, there are four columns of content, each with a title, a brief description, and a "Contribute" button. The columns are: "UNESCO Recommendation on Open Science", "5 working groups", "Global call for best practices in open science", and "Mapping open science capacity building and training modules".

As open as possible

Access to scientific knowledge should be as open as possible, but sometimes access may need to be restricted, for example to protect human rights, confidentiality, intellectual property rights, personal information, threatened or endangered species, and sacred and secret indigenous knowledge. Open science encourages scientists to develop tools and methods for managing data so that as much data as possible can be shared, as appropriate.

UNESCO Recommendation on Open Science

In a world first, UNESCO sets international standard for open science

5 working groups

To support key areas of implementation of the Recommendation

Global call for best practices in open science

Mapping open science capacity building and training modules

Contribute →

Contribute →

Contribute →



Open Science

Open science encompasses unhindered access to scientific articles, access to data from public research, and collaborative research enabled by ICT tools and incentives. [Broadening access to scientific publications and data is at the heart of open science](#), so that research outputs are in the hands of as many as possible, and potential benefits are spread as widely as possible:



- Open science promotes a more accurate verification of scientific results. By combining the tools of science and information technologies, scientific enquiry and discovery can be sped up for the benefit of society.
- Open science reduces duplication in collecting, creating, transferring and re-using scientific material.
- Open science increases productivity in an era of tight budgets.
- Open science results in great innovation potential and increased consumer choice from public research.
- Open science promotes citizens' trust in science. Greater citizen engagement leads to active participation in scientific experiments and data collection.

The OECD is working with member and non-member economies to review policies to promote open science and to assess their impact on research and innovation.

RECOMMENDATION OF THE OECD COUNCIL CONCERNING ACCESS TO RESEARCH DATA FROM PUBLIC FUNDING

The OECD Council adopted a [revised Recommendation on Access to Research Data from Public Funding](#) in January 2021. This legal instrument, in force since 2006, has been updated to address new technologies and policy developments.

REPORTS AND POLICY NOTES



OECD Policy Responses to Coronavirus (COVID-19)

Why open science is critical to combatting COVID-19

Updated 12 May 2020

[Open PDF](#)

Disclaimer

Search



Key messages

Achievements of open science initiatives
and commitments

Remaining challenges

The way forward: Resilient open science
policies

Further reading

Key messages

- In global emergencies like the coronavirus (COVID-19) pandemic, open science policies can remove obstacles to the free flow of research data and ideas, and thus accelerate the pace of research critical to combating the disease.
- While global sharing and collaboration of research data has reached unprecedented levels, challenges remain. Trust in at least some of the data is relatively low, and outstanding issues include the lack of specific standards, co-ordination and interoperability, as well as data quality and interpretation.
- To strengthen the contribution of open science to the COVID-19 response, policy makers need to ensure adequate data governance models, interoperable standards, sustainable data sharing agreements involving public sector, private sector and civil society, incentives for researchers, sustainable infrastructures, human and institutional capabilities and mechanisms for access to data across borders.

Research and innovation

[Home](#) > [Strategy on research and innovation](#) > [Strategy 2020-2024](#) > [Our digital future](#) > [Open Science](#)

Open Science

An approach to the scientific process that focuses on spreading knowledge as soon as it is available using digital and collaborative technology. Expert groups, publications, news and events.

PAGE CONTENTS

[The EU's open science policy](#)

[8 ambitions of the EU's open science policy](#)

[Future of open science under Horizon Europe](#)

[Tracking open research trends - Open Science Monitor](#)

[Documents](#)

[Latest](#)

[Events](#)

The EU's open science policy

Open science is a policy priority for the European Commission and the standard method of working under its research and innovation funding programmes as it improves the quality, efficiency and responsiveness of research.

When researchers share knowledge and data as early as possible in the research process with all relevant actors it helps diffuse the latest knowledge.

And when partners from across academia, industry, public authorities and citizen groups are invited to participate in the research and innovation process, creativity and trust in science increases.

That is why the Commission requires beneficiaries of research and innovation funding to make their publications available in open access and make their data as open as possible and as closed as necessary. It recognises and rewards the participation of citizens and end users.

Furthermore, the [European Open Science Cloud](#) EN *** will enable researchers across disciplines and countries to store, curate and share data.

89 ambitions of the EU's open science policy

- Open Data
 - FAIR and Open Data
- European Open Science Cloud (EOSC)
 - Store, share, process and reuse research digital objects
- New generation metrics
 - New indicators
- Alternative metrics and rewards
 - Research quality and impact
- Future of scholarly communication
 - Open access policy

The EU's open science policy

8 ambitions of the EU's open science policy

Future of open science under Horizon Europe

Tracking open research trends
- Open Science Monitor

Documents

Latest

Events

9 ambitions of the EU's open science policy

- Rewards
 - Recognise the diverse outputs, practices and activities
- Research integrity and reproducibility of scientific results
 - results of research and innovation activities should be reproducible
- Education and skills
 - All scientists in Europe should have the necessary skills and support to apply open science research routines and practices.
- Citizen science
 - The general public should be able to make significant contributions

The EU's open science policy

8 ambitions of the EU's open science policy

Future of open science under Horizon Europe

Tracking open research trends
- Open Science Monitor

Documents

Latest

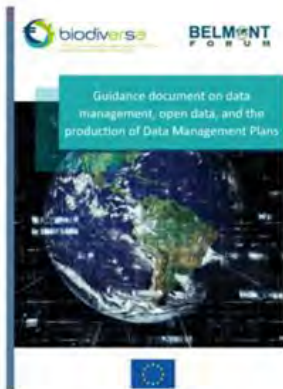
Events

Biodiversa+ and Open Science

- 1. Promotes Accessibility and Sharing of Data**
- 2. Encourages Collaborative Research**
- 3. Transparency in Research Processes**
- 4. Public Engagement and Citizen Science**
- 5. Funding and Policy Support**
- 6. Utilization of Open Access Journals and Repositories**



Guidance document on data management, open data, and the production of Data Management Plans



Biodiversa+ encourages open sharing of research data and digital outputs to stimulate new approaches to the collection, reuse, analysis, validation and management of data and information, thus increasing the transparency of the research process and robustness of the results.

- Applicants are thus requested to submit
 - Preliminary data management information in their pre-proposals
 - A first **Data Management Plan** in their full proposals

To help you, consult our guidance document & learn more about

- Main principles and policies for data management
- Existing tools and resources
- & Get advice on the writing of your data management plans



Transform to Open Science

Transform to Open Science (TOPS) is a \$40 million, 5-year mission, led by NASA's Science Mission Directorate's Open-Source Science initiative.



Open science lab for biodiversity

The Open science lab for biodiversity is an externally funded team at the Research Institute for Nature and Forest (INBO). It offers technical support to researchers of projects in which it participates (such as the Belgian Biodiversity Platform, LifeWatch, TriAS and GloBAM). This support is mainly focused on **open data publication** and **research software development**. Its approach is open by default, international, and community-oriented, with the goal of making biodiversity research more efficient and reproducible.

Indexed in

OpenAIRE

Publication date:

February 24, 2023

DOI:

DOI [10.5281/zenodo.7672934](https://doi.org/10.5281/zenodo.7672934)

Keyword(s):

[open science](#)

License (for files):

[Creative Commons Attribution 4.0 International](#)

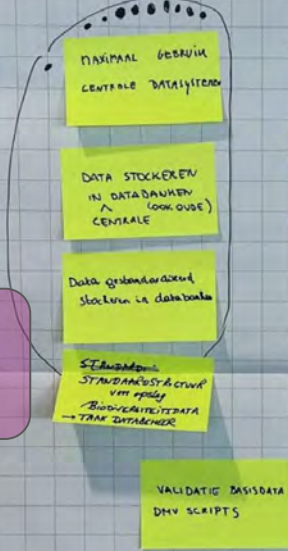


eosc

European Open Science Cloud

blijvend stimuleren / inspireren

Centralized data systems



DMP & protocol for new projects

FRAGMENTS: LEVEN - TOEGANG - EVALUATIE - SYSTEEMWISSELS

moet binnen het systeem (systeeminspectie)

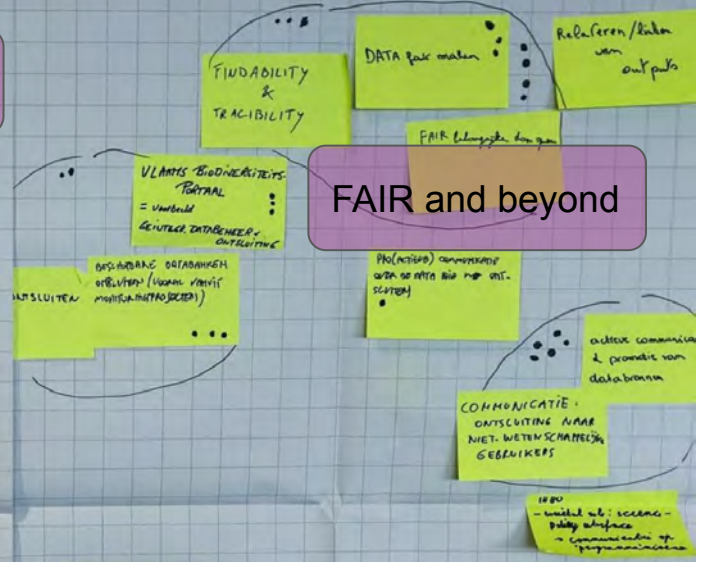
grijp je eigen - data - DMP - communicatie - ...

PROTOCOL VOOR NIEUWE PROJECTEN n.b. DATA-OPSLAG & BEHEER

GDPR PROTOCOL / NEDERLANDSE KWALITEITSCODE

GDPR

FAIR and beyond



REUSE of Data

Speerpunt > OSD acties?

*Potential spearhead: INBO: **integrated data management and retrieval***

- *How can we do more with long-term data and repurpose historical data for research?*
- *Can we develop data networks?*
- *How do we put more effort into European cooperation to align biodiversity monitoring?*
- *How do we encourage the application of open science objectives within INBO?*



What is open science?

- Open Science is not different to traditional science.
 - It just means that you carry out your research in a more **transparent** and **collaborative** way.
 - Open Science applies to **all research disciplines**.
-
- understand what Open Science means and why **you should care** about it
 - be aware of some of **the different ways** to go about making your own research more open over the research lifecycle
 - understand why **funding bodies** are in support of Open Science and what their basic requirements are
 - be aware of the **potential benefits of practicing open science**

Introductory Course

FOSTER consortium. (2018, November). What is Open Science? (Version 1.0). Zenodo.
<http://doi.org/10.5281/zenodo.2629946>



What is open science?

...the practice of science in such a way that others can **collaborate** and **contribute**...

where research data, lab notes and other research processes are **freely available**, under terms that **enable** reuse, redistribution and reproduction of **the research and its underlying data and methods**.



Why open science?

....Opening the research process supports **validation**,
reproducibility and reduces cases of academic misconduct....

It helps to maximise the **impact** of your research and provides
the foundations for others to build upon.

applying open science in your daily workflows is just part of good research practice!



Why open science?

In a nutshell, Open Science is transparent and accessible knowledge that is shared and developed through collaborative networks (Vicente-Sáez & Martínez-Fuentes 2018)

applying open science in your daily workflows is just part of good research practice!

Why open science?

Trusting on the shoulders of open giants? Open science increases trust in science for the public and academics

<https://doi.org/10.1093/joc/jqac017>

You do not currently have access to this article.

applying open science in your daily workflows is just part of good research practice!

Why open science?



Good for Research

Practicing open science means that research **outputs are accessible to all** – not stuck behind pay walls. This helps to ensure that all researchers, and other stakeholders, have access to information regardless of their location or economic situation. It means that the **research process can be accelerated** and **new knowledge can be more quickly generated and built upon** to help solve grand challenges.

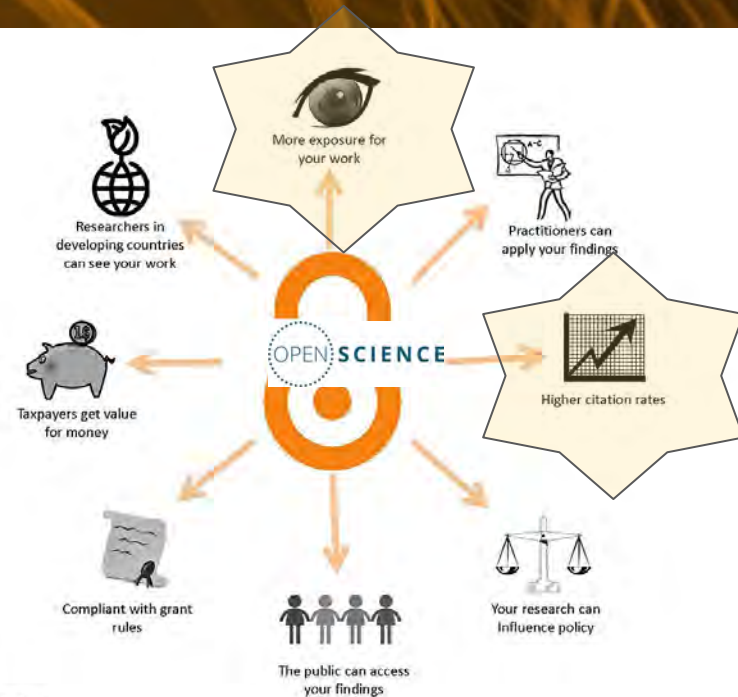
Why open science?



Good for Society

Open science offers a **better return on investment** from research funded by public money and contributes to better economic growth.

Why open science?

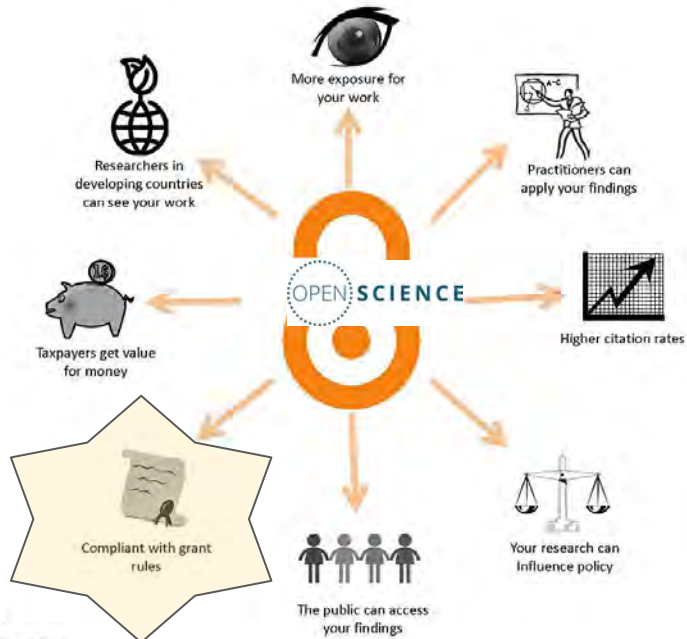


Good for You

By sharing your articles, data, code and methods, you are **multiplying the number of citable outputs**. Your research will be more visible and understandable to others, which may mean that you might see your citation rate increase. If people can find and access your research, **the potential impact increases**. In addition, practicing open science can foster new collaborations and research partnerships.

<https://www.enago.com/academy/open-access-publications-get-cited-more-often/>
<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.0040157>

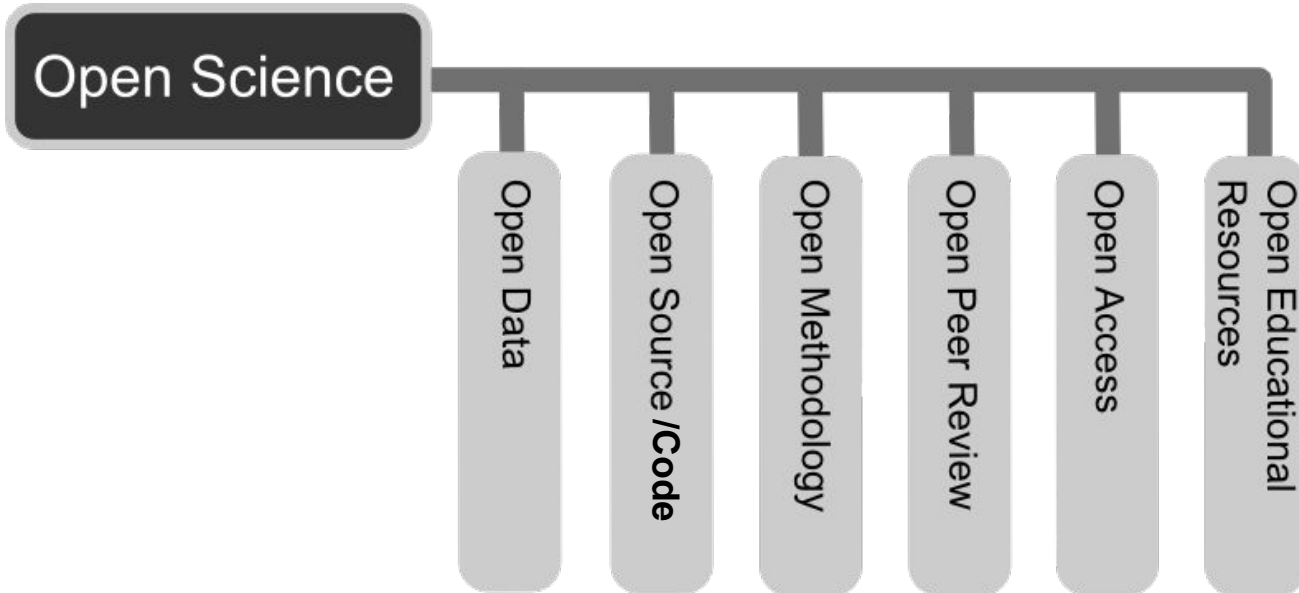
Why open science?



Compliant with grant rule....

Biodiversa+ strongly supports open science, including open sharing of research data and digital outputs to stimulate novel approaches to the collection, reuse, analysis, validation, and management of data and information, thus increasing the transparency of the research process and robustness of the results. Therefore, submitted projects are expected to make produced data, digital outputs, and supporting material (including metadata) **publicly available**, possibly after a short period of exclusivity, unless there are legitimate reasons to constrain access. In particular, raw data should be made **accessible** to allow for integrated data analysis across different datasets. Data and digital outputs must be **discoverable** through machine readable catalogues, information systems and search engines. Projects should generate FAIR4 data and knowledge products, particularly in the context of real-time data feeds, exploring workflows that can provide “**FAIR-by-design**” data, i.e., data that is FAIR from its generation, and building on and widening data availability in European Research Infrastructures federated under the European Open Science Cloud (**EOSC**). To this end, project proposals will need to develop and implement a **Data and Digital Outputs Management Plan**, which will also ensure ethical approaches and compliance with the Data Policy of this call .

Open Science - The pillars of Open Science

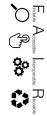


Open Science - more than just open access to publications!



...Share your **data**

the research data that underpins publications should also be **accessible** to support **validation** and **facilitate reuse**. In cases where data sensitivities won't allow open access, be sure to provide details on how someone could request authorised access.



Open Science - more than just open access to publications!

...Share your **data**

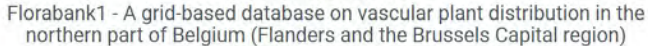
“Open means anyone can freely access, use, modify, and share for any purpose (subject, at most, to requirements that preserve provenance and openness).”



BOLD SYSTEMS



Open Science - more than just open access to publications!



Published by Research Institute for Nature and Forest INBO

Van Landuyt W • Brosens G

[DATASET](#) [METRICS](#) [ACTIVITY](#) [↓ DOWNLOAD](#) [≡ HOMEPAGE](#)

ARTS AND DISCOURTESIES

FloraBank is a database that contains distributional data on the wild flora indigenous species, anechophytes and naturalised aliens of Flanders and the Brussels Capital Region. It holds about 3 million records of vascular plants, dating from 1800 till present. Furthermore, it includes ecological data on vascular plant species, redlist category information, Ellenberg values, legal status, global distribution, seed bank etc. The database is an initiative of 'Flower' (<http://www.plantenrijk.be>). More

 Flora Databank

Publication date: May 10, 2021

Metadata last modified: May 10, 2021

Hosted by:

License: CC0 1.0

How to cite [10.5507/physkey.12.2849](https://doi.org/10.5507/physkey.12.2849)

4,729,918 Documents

4,729,918

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100%

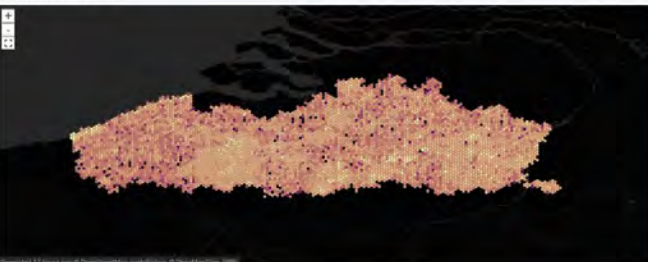
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729,834 CROSS-REFERENCED RECORDS



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Studies	
View Download Env DATA	
Study Details	
Study Name	White Stork Denmark
Contact Person	Jess Frøed / Jess Frederiksen
Principal Investigator	Anders P. Tøttrup/Kasper Thorup
Citation	
Acknowledgements	
Grants used	Storkene.dk
License Type	Custom
License Terms	not set
Study Summary	Migration routes of the small Danish population of white storks.
Study Reference Location	
Longitude	12.578
Latitude	55.607
Movebank ID	1578040076
Study Statistics	
Number of Animals	11
Number of Tags	8
Number of Deployments	11
Time of First Deployed Location	2021-06-19 09:00:23.000
Time of Last Deployed Location	2023-05-24 10:00:19.000
Taxa	Ciconia ciconia
Number of Deployed Locations	676823
Number of Records	Deployed (outliers) / Total (outliers)
Acceleration	299462 (0) / 349655 (0)
GPS	676823 (0) / 699524 (0)
About study details	
Processing Status	Up-to-date

Marine Biological Sample Database, JAMSTEC

URL	https://www.godac.jamstec.go.jp/lpt/resource/mjamstec_sample.db
Repository URL	https://www.godac.jamstec.go.jp/lpt/
Node	OBIS Japan
Published	2023-05-19 12:15
Abstract	This dataset contains data of biological samples which were collected during scientific missions of JAMSTEC ships (NATSUSHIMA, KAIYO, YOKOSUKA, KAIREI and MIRAI) and submarines. Data of this dataset is derived from the Marine Biological Sample Database of JAMSTEC. At the original database, you may search sample information such as number of individuals, preservation methods, sex, life stages, identification, collecting information and related literatures.
Citation	Japan Agency for Marine-Earth Science and Technology (2016 onwards). JAMSTEC Marine Biological Samples Database. https://doi.org/10.48518/00001 . Accessed on yyyy-mm-dd.
Rights	This work is licensed under a Creative Commons Attribution Non Commercial (CC-BY-NC) 4.0 license.
Keywords	Occurrence, Occurrence
Contacts	Creator Data Management Group, JAMSTEC Contact Data Management Group, JAMSTEC Metadata Provider Data Management Group, JAMSTEC

[About Study](#) [Source Data](#) [To Map](#)

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Gesäuse-Johnsbachtal - Austria, Soil base saturation

Basic Information

Related Site: Gesäuse-Johnsbachtal - Austria
Abstract: Soil base saturation data of the Gesäuse-Johnsbachtal site
Keywords: soil parameter
Contact: Reforall Landesforstsdirektion Steiermark
Owner/Creator: Reforall Landesforstsdirektion Steiermark
DOI: <https://doi.org/10.23728/b2share.61061c33100c4609bc67c5669885428>
UUID: 22332483-9c8a-4f5a-a3f4-f06b19e316a7

Dates

Date Range: Sun, 01/01/1989 - 12:00
Post date: Wednesday, May 17, 2023 - 10:40
Last modified: Monday, May 22, 2023 - 11:04

Downloads

Online Locator

Distribution Function: Web address (URL)
Distribution URL: [B2Share Landing Page](#)
Distribution Function: File for download
Distribution URL: [B2Share Download Link](#)

Geographic



Dataset: Chesapeake Bay Nutrients 2021

View Data: Data not available yet

Cite This Dataset

Temporal Extent: 2017-08-04 - 2021-08-03

Project: Nitrate Oxidation in Oxygen Minimum Zones (NO2Ox_OMZs)

Principal Investigator: Brian B. Ward (Princeton University)

BCO-DMO Data Manager: Shapson Bianchi (Woods Hole Oceanographic Institution, WHOI BCO-DMO)

Version: 1

Version Date: 2023-05-16

Restricted: No

Validated: No

Current State: Data not available

Chesapeake Bay Nutrients 2021

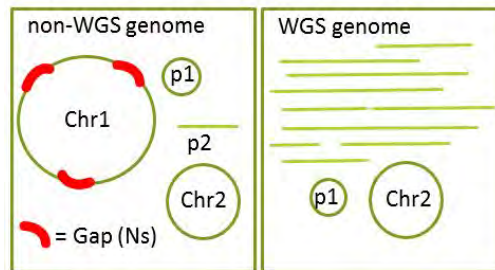
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BOLD SYSTEMS



Prokaryotic and Eukaryotic Genomes Submission Guide

Both WGS and non-WGS genomes, including gapless complete bacterial chromosomes, can be submitted via the Submission Portal. You will be asked to choose whether the genome being submitted is considered WGS or not. The differences for GenBank purposes are:



non-WGS

- Each chromosome is in a single sequence and there are no extra sequences
- Each sequence in the genome must be assigned to a chromosome or plasmid or organelle
- Plasmids and organelles can still be in multiple pieces.

WGS

- One or more chromosomes are in multiple pieces and/or some sequences are not assembled into chromosomes

In both cases

Specimens: [DWC](#) [XMLE](#) [TSV](#)
Sequences: [FASTA](#) [TRACE](#)
Combined: [XML](#) [TSV](#)
Map:

Results Summary

Found **412** published records,
with **412** records with sequences,
forming **8** BINs (clusters),
with specimens from **80** countries,
deposited in **18** institutions.

Of these records, **412** have species names, and represent **1** species.

Specimen Distribution



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zenodo



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May 30, 2021

DatasetOpen Access

A large-scale COVID-19 Twitter chatter dataset for open scientific research - an international collaboration

 Banda, Juan M.,  Tokuwaka, Ramiya, Wang, Guanyu, Ye, Jingyue, Lu, Yuxi, Ding, Yuhang, Artemova, Katya, Tutubalina, Elena,  Chowell, Gerardo

Version 64 of the dataset.

Due to the relevance of the COVID-19 global pandemic, we are releasing our dataset of tweets acquired from the Twitter Stream related to COVID-19 chatter. Since our first release we have received additional data from our new collaborators, allowing this resource to grow to its current size. Dedicated data gathering started from March 11th yielding over 4 million tweets a day. We have added additional data provided by our new collaborators from January 27th to March 27th, to provide extra longitudinal coverage. Version 10 added ~1.5 million tweets in the Russian language collected between January 1st and May 8th, graciously provided to us by: Katya Artemova (IRU MSE) and Elena Tutubalina (KFU). From version 12 we have included daily hashtags, mentions and emojis and their frequencies the respective zip files. From version 14 we have included the tweet identifiers and their respective language for the clean version of the dataset. Since version 20 we have included language and place location for all tweets.

The data collected from the stream captures all languages, but the higher prevalence are: English, Spanish, and French. We release all tweets and retweets on the full_dataset.csv file (1,098,118,400 unique tweets), and a cleaned version with no retweets on the full_dataset-clean.csv file (278,305,848 unique tweets). There are several practical reasons for us to leave the retweets, tracing important tweets and their dissemination is one of them. For NLP tasks we provide the top 1000 frequent terms in frequent_terms.csv, the top 1000 bigrams in frequent_bigrams.csv, and the top 1000 trigrams in frequent_trigrams.csv. Some general statistics per day are included for both datasets in the full_dataset-statistics.csv and full_dataset-clean-statistics.csv files. For more statistics and some visualizations visit: <http://www.panacealab.org/covid19/>

More details can be found (and will be updated faster at: https://github.com/thepanacealab/covid19_twitter) and our pre-print about the dataset (<https://arxiv.org/abs/2004.03688>)

As always, the tweets distributed here are only tweet identifiers (with date and time added) due to the terms and conditions of Twitter to re-distribute Twitter data ONLY for research purposes. They need to be hydrated to be used.

This dataset will be updated bi-weekly at least with additional tweets, look at the github repo for these updates.
Release: We have standardized the name of the resource to match our pre-print manuscript and to not have to update it every time.

89,594
views

106,721
downloads

[See more details](#)

Related to:



Publication date:

May 30, 2021

DOI:

[DOI: 10.5281/zenodo.5476538](https://doi.org/10.5281/zenodo.5476538)

Keywords(s):

social media

twitter

nlp

covid-19

covid19

Related identifiers:

Continued by

<http://www.panacealab.org/covid19/> (Other)

Supplement to

<https://arxiv.org/abs/2004.03688> (Preprint)

Alternate identifiers:

https://github.com/thepanacealab/covid19_twitter (Software)

Communities:

BioRxiv

Coronavirus Disease Research Community

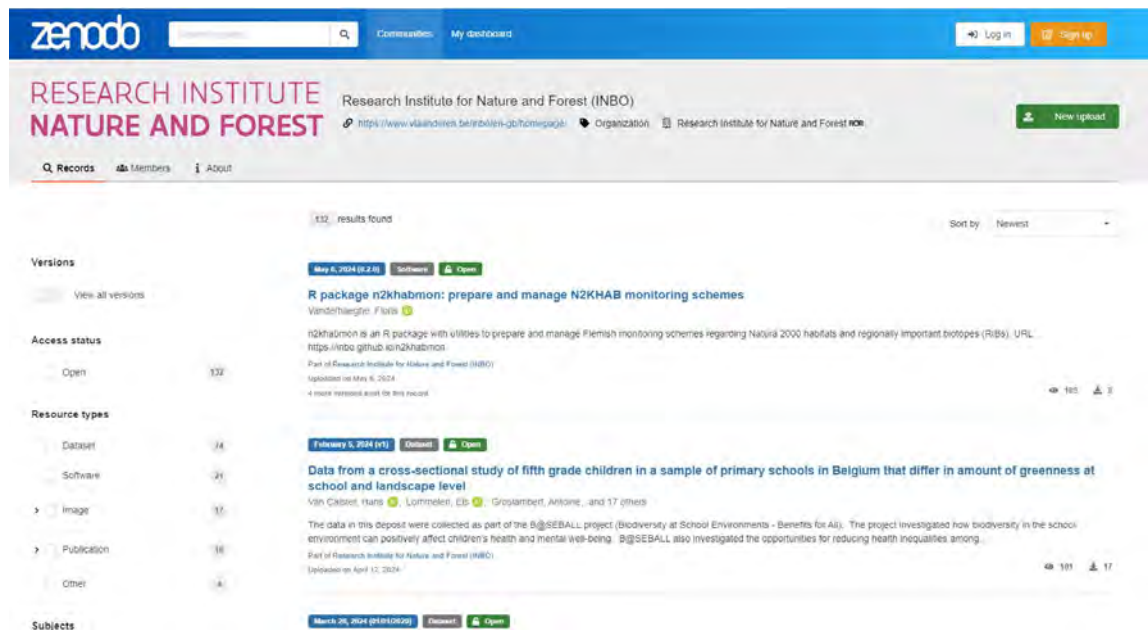
covid-19

Zenodo

License (for files):

CC-BY (Public Domain)

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The screenshot displays the Zenodo website interface. At the top, the Zenodo logo is on the left, followed by a search bar and links for "Create account" and "My dashboard". On the right, there are "Log in" and "Sign up" buttons. Below the header, the profile of the "RESEARCH INSTITUTE NATURE AND FOREST" (INBO) is shown, including its URL, organization name, and a "New upload" button. A navigation bar contains links for "Records", "Members", and "About".

The main content area lists research records. The first record is titled "R package n2khabmon: prepare and manage N2Khab monitoring schemes" by Vandenberghen, F. It is dated May 6, 2024 (v1.0), is a software package, and is marked as "Open". The description mentions it is an R package for Flemish monitoring schemes and provides a GitHub link. It also notes it is part of the INBO research and was updated on May 6, 2024.

The second record is titled "Data from a cross-sectional study of fifth grade children in a sample of primary schools in Belgium that differ in amount of greenness at school and landscape level" by Van Calster, Hans, Lormekers, E., Grootaert, Anke, and 17 others. It is dated February 5, 2024 (v1), is a dataset, and is marked as "Open". The description explains it is part of the BiSEBALL project, which investigates biodiversity in school environments and its impact on children's health and mental well-being. It also mentions the project's goal of reducing health inequalities. The record was updated on April 12, 2024.

On the left side of the records list, there are filters for "Versions", "Access status", "Resource types", and "Subjects". The "Versions" filter shows "View all versions". The "Access status" filter shows "Open". The "Resource types" filter shows "Dataset", "Software", "Image", "Publication", and "Other". The "Subjects" filter is currently empty.

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Data from: Latitudinal patterns of phenology and age-specific thermal performance across six Coenagrion damselfly species

Nilsson-Örtman, Viktor, Umeå University
Stoks, Robby, KU Leuven
Block, Marjan De, KU Leuven
Johansson, Frank, Umeå University
Publication date: October 15, 2014
Publisher: Dryad
<https://doi.org/10.5061/dryad.1q389>

Citation

Nilsson-Örtman, Viktor; Stoks, Robby; Block, Marjan De; Johansson, Frank (2014). Data from: Latitudinal patterns of phenology and age-specific thermal performance across six Coenagrion damselfly species. Dryad, Dataset, <https://doi.org/10.5061/dryad.1q389>

Abstract

Using a combination of computer simulations and laboratory experiments we test if the thermal sensitivity of growth rates change during ontogeny in damselfly larvae and if these changes can be predicted based on the natural progression of average temperature or thermal variability in the field. The laboratory experiment included replicated species from Southern, Central and Northern Europe. Although annual fluctuations in temperature represent a key characteristic of temperate environments, few studies of thermal performance have considered the ecological importance of the studied traits within a seasonal context. Instead, thermal performance is assumed to remain constant throughout ontogeny and reflect selection acting over the whole life cycle. The laboratory experiment revealed considerable variation among species in the strength and direction of ontogenetic performance shifts. In four species from Southern and Central Europe, reaction norms were steepest during early ontogeny, becoming less steep during later ontogenetic stages.

Search

Explore Data | About ▼ | Help ▼ | Login

Data Files

 Download dataset

October 15, 2014.

Related Works

Article

<https://doi.org/10.1890/12.1383.1>

Metrics

 146 views

 93 downloads

 1 citations

Keywords

Acclimatization

Coenagrion armatum

Coenagrion caeruleum

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STORM tropical cyclone wind speed return periods

[Cite](#)[Download all \(77.99 kB\)](#)[Share](#)[Embed](#)[Collect](#)

Version 2 Dataset posted on 30.09.2020, 14:44 by Nadia Bloemendaal, H. (Hans) de Moel, S. Muis, L.D. (Ivan) Haigh, J.C.J.H. (Jeroen) Aerts

Datasets containing tropical cyclone maximum wind speed (in m/s) return periods, generated using the STORM datasets (see <https://www.nature.com/articles/s41597-020-0381-2>). Return periods were empirically calculated using Weibull's plotting formula. The STORM_FIXED_RETURN_PERIOD dataset contains maximum wind speeds for a fixed set of return periods at 10 km resolution in every ocean basin. The STORM_FIXED_WIND_SPEED dataset contains return periods for a fixed set of maximum wind speeds at 10 km resolution in every ocean basin. The STORM_CITIES dataset contains return periods at fixed wind speeds and wind speeds at fixed return periods (on two separate sheets), occurring within 100 km from a selection of 18 coastal cities. The STORM_ISLANDS contains return periods at fixed wind speeds and wind speeds at fixed return periods (on two separate sheets), occurring within 100 km from the capital city of an island. We included the Small Island Developing States and a set of other islands.

HISTORY

- 13.05.2020 - First online date, Publication date
- 30.09.2020 - Submission date, Posted date
- 22.02.2021 - Revision date

PUBLISHER

4TU Centre for Research Data

USAGE METRICS

711
views

165
downloads

3
citations



Read the peer-reviewed publication

Generation of a global synthetic tropical cyclone hazard dataset using STORM

Nadia Bloemendaal

CATEGORIES

- Atmospheric Sciences
- Natural Hazards
- Atmosphere and Weather
- Climate and Climate Change

KEYWORDS

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...Open data should be FAIR data



Findable

- Persistent identifiers (DOI)
- Metadata
- Naming conventions
- Keywords
- Versioning



Accessible

- Choice of datasets
- Data repository
- Software, documentation
- Access status
- Retrievable data
- Metadata access



Interoperable

- Standards
- Vocabulary
- Methodology
- References



Reusable

- Licensing
- Provenance
- Community standards

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FAIR DATA PRINCIPLES



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Total across F.A.I.R

Findable

Does the dataset have any identifiers assigned?

Globally Unique, citable and persistent (e.g. DOI)

Is the dataset identifier included in all metadata records/files describing the data?

Yes

How is the data described with metadata?

Comprehensively (see suggestion) using a record

What type of repository or registry is the metadata record in?

Generalist public repository

Accessible

How accessible is the data?

Publicly accessible

Is the data available online without requiring specialised protocols or tools once access has been approved?

Standard web service API (e.g. OGC)

Will the metadata record be available even if the data is no longer available?

No

Interoperable

What (file) format(s) is the data available in?

In a structured, open standard, machine-readable

What best describes the types of vocabularies/ontologies/tagging schemas used to define the data elements?

Standardised open and universal using resolved

How is the metadata linked to other data and metadata (to enhance context and clearly indicate relationships)?

The metadata record includes URI links to related

Reusable

Which of the following best describes the license/usage rights attached to the data?

Standard machine-readable license (e.g. Creative Commons)

How much provenance information has been captured to facilitate data reuse?

Fully recorded in a machine readable format

Total across F.A.I.R

FAIR	Open data	Similarity	Difference
Findable: Data can be easily found by machines and humans.	Data must be available in its entirety and at a low reproduction cost.	Findability and accessibility in FAIR is quite similar to availability in open data, because it provides accessibility to the user.	Availability in open data refers to data integrity and does not mention other conditions. Open data focuses on no barriers to data accessibility, while accessibility in FAIR principles highlights the need for data protection and the conditions for access to be formulated to meet the specific circumstances that relate to the data.
Accessible: Authentication and verification is possible after the user accesses the data.			
Interoperable: Data can be integrated with other data and systems or workflows for analysis, storage and processing are interoperable.			Interoperability is promoted by the creation of machine-readable instances of ontologies that the data represent, linked to metadata in languages such as JASON or RDF, widely used for the Semantic Web.
Reusable: Metadata and data should be defined for reuse and can be replicated and/or mixed in different environments.	The data should be made available under the condition of reuse and redistribution.	Both principles have the purpose of making data reusable.	Open data does not mention metadata and focuses on redistribution neutrality.
	Anyone should be able to use, reuse and redistribute the data— there is no discrimination based on the purpose for which the data is to be used or the individuals/groups wishing to use it.		

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...Share your **code**

- many researchers now develop bespoke bits of code to help them analyse and/or visualise the data they have collected. Having access to this code is essential for supporting the validation of your findings and to help others to build upon your work.



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master 2 branches 0 tags

Go to file Add file Code Use this template

peterdsmet Add VMM dataset 32c3ca on 11 Mar 221 commits

- datasets Merge branch 'master' of https://github.com/mbo/mica-occurrences 3 months ago
- .gitignore Ignore all interim data 3 months ago
- LICENSE Initial commit 14 months ago
- README.md Add VMM dataset 3 months ago
- mica-occurrences.Rproj Rename repo 6 months ago

README.md

MICA occurrence datasets

Rationale

This repository contains the functionality to standardize several datasets of **Muskat** and **Coypu** occurrences to **Darwin Core** Occurrence datasets that can be harvested by GBIF. These datasets are published in the framework of the project **Management of Invasive Coypu and muskrat in Europe (MICA)**.

Datasets

Title (and GitHub directory)	IPT	GBIF
Muskat captures in Flanders, Belgium	mica-legacy-occurrences	https://doi.org/10.15468/pequ4z
MICA - Muskrat occurrences collected by RATO in East Flanders, Belgium	mica-rato-occurrences	https://doi.org/10.15468/5fps96
MICA - Muskrat and coypu occurrences collected by ...	mica-lvw-occurrences	https://doi.org/10.15468/qids4c

About

Darwin Core mapping for the aggregated Muskrat dataset

dataset gbif occurrences

Readme

MIT License

Releases

No releases published
Create a new release

Packages

No packages published
Publish your first package

Contributors 2

peterdsmet Peter Desmet
DimEvil Dimi Brosens

master mica-occurrences / datasets / mica-agouti-occurrences / src / dwc_mapping.Rmd

Go to file

peterdsmet Correctly assign vernacular name and rank for dogs Latest commit 3d783c on 3 Mar History

1 contributor

361 lines (158 sloc) 7.6 KB

Raw Blame

```
1 ---
2
3 title: "Darwin Core Mapping"
4 subtitle: "MICA - Muskrat and Coypu camera trap occurrences collected in Belgium, the Netherlands and Germany"
5 authors: "Dimi Brosens, Peter Desmet"
6 date: "R Sys.Date()"
7 output: html_document
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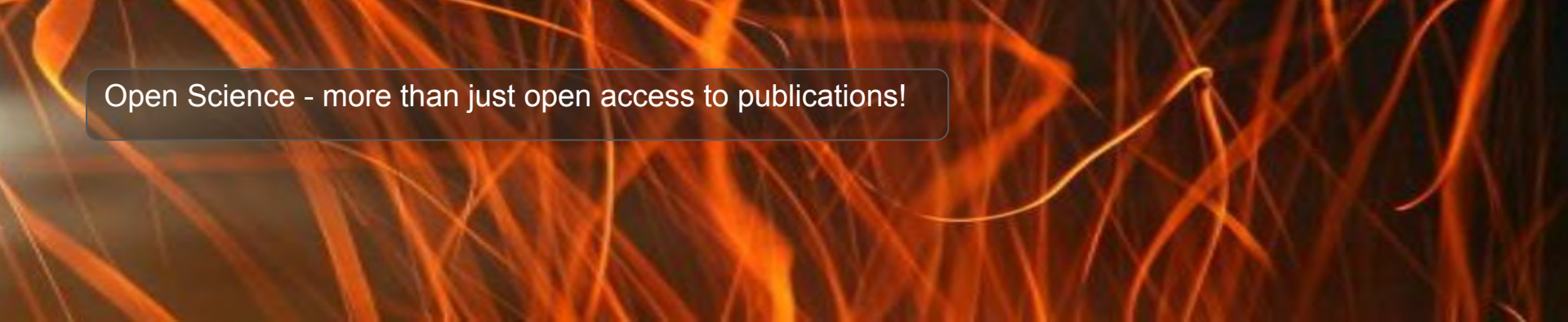
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Private documents



Open Science - more than just open access to publications!

...Open **peer review**

Open peer review (also called "public peer review", "transparent peer review") denotes several, closely related forms of scholarly peer review: Open-identity or attributed peer review (as opposed to anonymous peer review)

Open-disclosure or public peer review, where the **peer review contents are publicly available**.

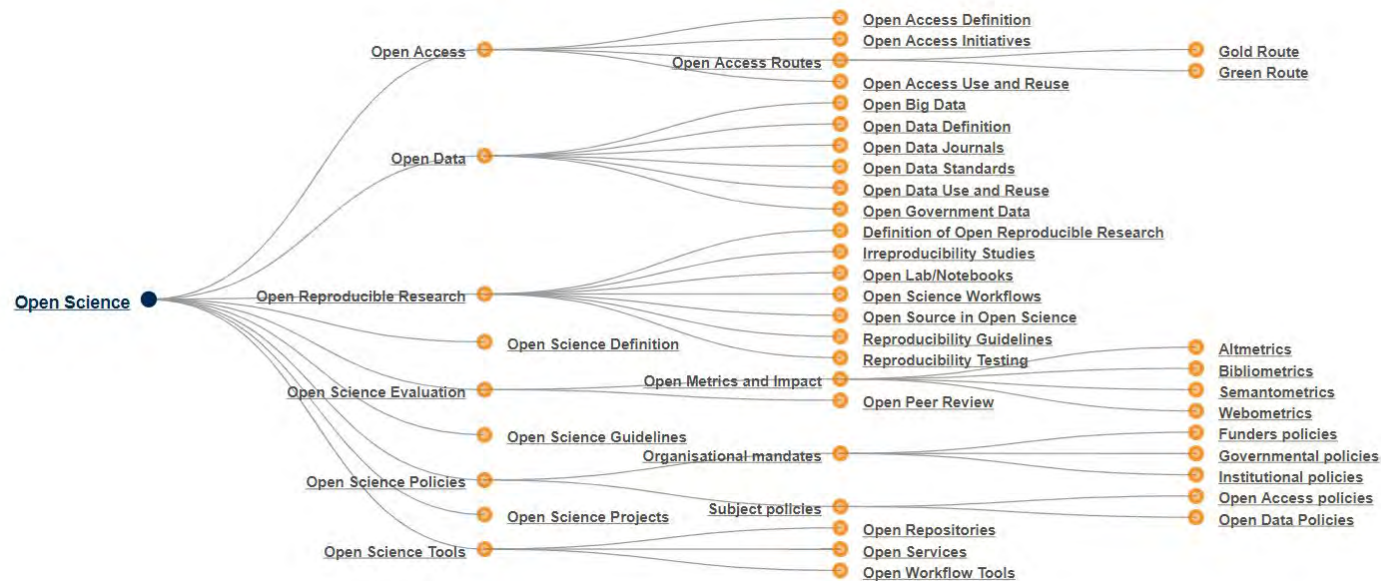
Open Science - more than just open access to publications!

...Open **Educational Resources**

Open Educational Resources (OER) are teaching, learning and research **materials** in any medium – digital or otherwise – **that reside in the public domain** or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.



Open Science - Taxonomy!



Open Science - Ideas for opening up!

During the planning stage

Consider writing a **blog post/ research idea paper** outlining your ideas and approaches early on to get community feedback.

- *Find the relevant research question*

Seek involvement from other researchers, be sure to consider involving other stakeholders too.

- *Make the research Question is sharp and clear*
- *Research is relevant with the research question*

Check data repositories to see if there are existing data that you can reuse or build upon.



The screenshot displays the Rio Open Science interface. At the top, a dark navigation bar contains the 'Rio' logo (an elephant icon) and links for 'Home', 'Articles', 'About', 'About Pensoft', 'Books', 'Journals', and 'Blog'. Below this, a teal 'Grant Proposal' button is visible next to the text 'Research Ideas and Outcomes 3: e13414' and the DOI 'https://doi.org/10.3897/rio.3.e13414 (02 May 2017)'. A red 'Reviewable' button with a 'v1' version indicator and a 'CrossMark' icon are also present. The main content area features the title 'Tracking Invasive Alien Species (TrIAS): Building a data-driven framework to inform policy' in a large, bold font. Below the title, the authors are listed: 'Sonia Vanderhoeven, Tim Adriaens, Peter Desmet, Diederik Strubbe, Thierry Backeljau, Yvan Barbier, Dimitri Brosens, Julien Cigar, Maxime Coupremagne, Rozemien De Troch, Hilde Eggermont, André Heughebaert, Kris Hostens, Pierre Huybrechts, Anne-Laure Jacquemart, Luc Lens, Arnaud Monty, Jean-Yves Paquet, Céline Prévot, Tim Robertson, Piet Termonia, Ruben Van De Kerchove, Gert Van Hoey, Bert Van Schaeybroeck, Diemer Vercayie, Thomas Jethro Verleye, Sarah Welby, Quentin John Groom'. At the bottom of the visible section, the word 'Abstract' is followed by a small upward-pointing triangle icon.

Open Science - Ideas for opening up!

During the planning stage

- Write a **Data Management Plan**
- Create a **Communication Plan**
- Foresee revision

Population genetic study prior to the translocation of graylings within the framework of the Flemish Species Protection Plan (EVINBO)

Plan Metadata: BelSPO DMP, n.n.

7280, n.n. n.n. <https://orcid.org/0000-0002-7280-0003-3610-6918>

My Dashboard

The table below lists all the plans associated with the **current user account**. This includes the plans you have created with this account and the plans that have been shared with you for this account.

Project Title	Template	Edited	Role	Owner	Test	Visibility	Shared	
Biodiversa+ BIRuW Biodiversity indicators for Ruling the Wor...	BELSPO DMP	24-05-2023	Owner	You	☒	N/A	No	Actions
Checking Belgap DMP	BELSPO DMP	01-09-2020	Owner	You	☐	Private	No	Actions
My project (FWO DMP)	FWO DMP	02-05-2018	Owner	You	☐	Private	No	Actions

Create plan

Research Institute for Nature and Forest 's Plans

The table below lists the plans that users at your organisation have created and shared within your organisation. This allows you to download a PDF and view their plans as samples or to discover new research data.

Project Title	Template	Owner	Updated	Download
Population genetic study prior to the...	INBO Project focus template	an.vandenbroeck@inbo.be	30-06-2022	
Onderzoek naar metapopulaties en tran...	INBO Project focus template	karen.cox@inbo.be	17-05-2022	
MOVE2GBIF - Mobilizing animal GPS tra...	INBO Project focus template	peter.desmet@inbo.be	21-01-2022	

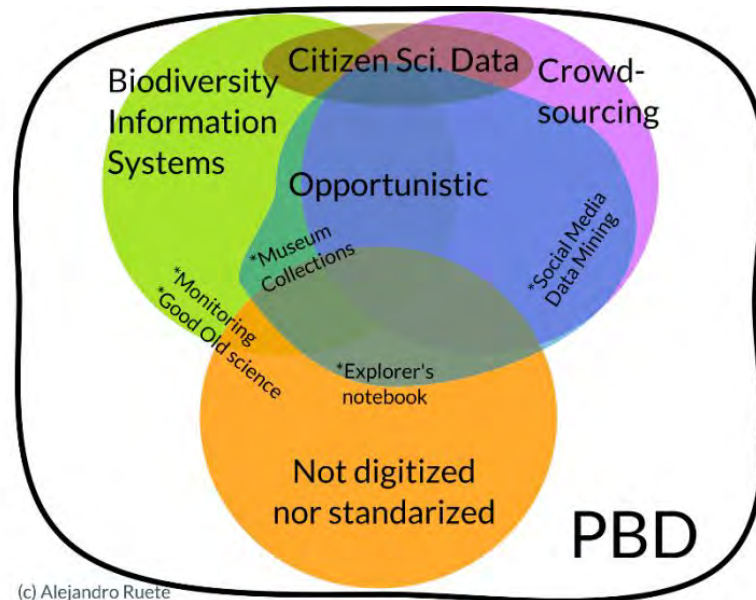
landers (Northern-Belgium). The results of this for the grayling (*Hipparchia semele*). Insight in ent of guidelines for defining conservation units

The above plan creator(s) have agreed that others may use as much of the text of this plan as they would like in their own plans, and customise it as necessary. You do not need to credit the creator(s) as the source of the language used, but using any of the plan's text does not imply that the creator(s) endorse, or have any relationship to, your project or proposal

Open Science - Ideas for opening up!

During the active stage_ data collection

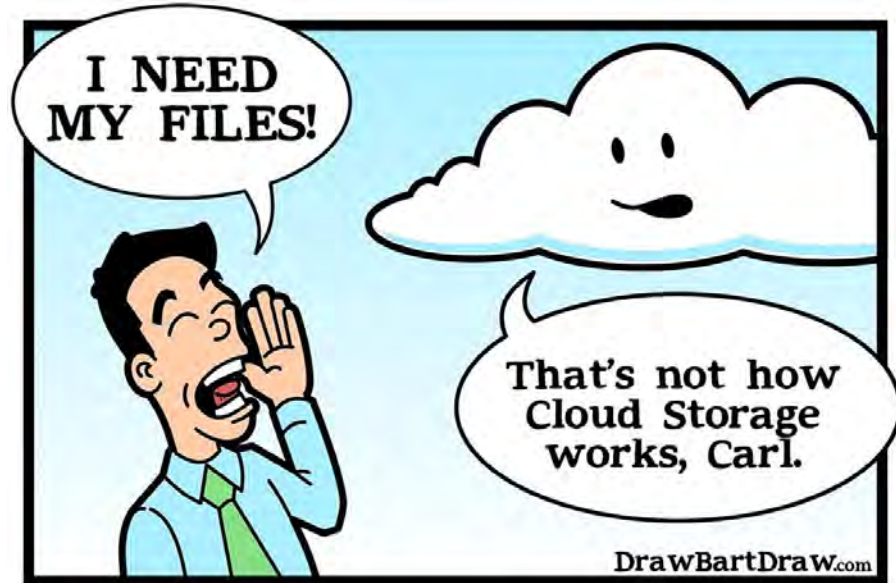
- Data collection through **well defined protocols**
- Automatic data collection when possible
- **Existing data is (re)used** when possible
- Validation procedures are in play
- Measurement biases are understood and documented



Open Science - Ideas for opening up!

During the active stage_ data storage

- Data is well organised, documented and stored
 - Use **DMP**
 - **Metadata**
 - Be aware of sensitivities (GDPR...), sensitive data



Open Science - Ideas for opening up!

During the active stage_ data analysis

- Data validation is reproducible
 - fixed validation rules
- Data transformation is reproducible
 - scripted data workflow
- Data analysis is adequate and correct
- Analyse workflow is open and reproducible
 - A versioning system is used (git)
 - Code and scripts are kept

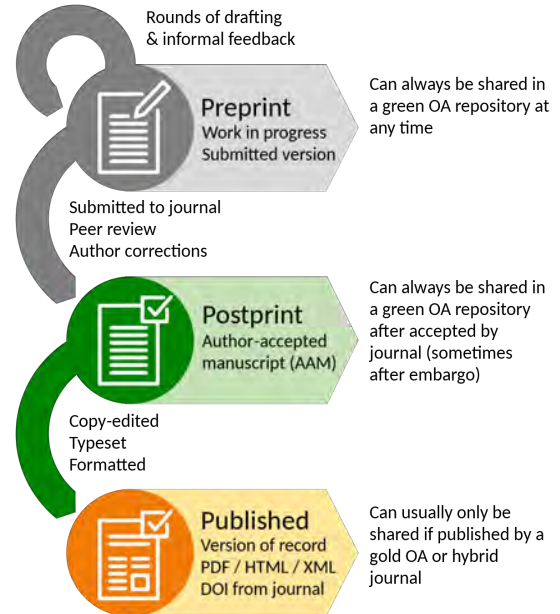


Open Science - Ideas for opening up!

During the active stage

You might share your methodologies and early findings via **preprints**.

Worried about getting scooped if you share early? Pre-registering your study gives you **time-stamped evidence of your ideas**. In addition, any peers that review your early work can vouch for you. The Open Science Framework (**OSF**) guide offers great advice on pre-registering your project.



Open Science - Ideas for opening up!

Towards the end of your research_data sharing

- Data is published as open data
- FAIR principles are followed
- Open source code (scripts)
- Open protocols



Open Science - Ideas for opening up!

Towards the end of your research_publications

- Published as open access
- Correct citations of sources (DOI...)
- Use of OrcID's

The screenshot displays the ORCID iD profile for Dimitri Brosens. The header includes the ORCID logo with the tagline "Connecting Research and Researchers", the user's name "Dimitri Brosens", a language dropdown set to "English", and a search bar. Navigation tabs for "ABOUT", "FOR RESEARCHERS", "MEMBERSHIP", "DOCUMENTATION", "RESOURCES", and "NEWS & EVENTS" are visible. The profile section on the left shows the ORCID ID, a public record print view, a QR code, and a list of "Also known as" names. The main "Biography" section lists employment history, including the Research Institute for Nature and Forest (INM) and the Belgian Biodiversity Platform (BBP). The "Education and qualifications" section lists a degree from Ghent University. Each entry includes a "Preferred source" icon.

ORCID
Connecting Research and Researchers

Dimitri Brosens English

ABOUT FOR RESEARCHERS MEMBERSHIP DOCUMENTATION RESOURCES NEWS & EVENTS

Dimitri Brosens Biography

ORCID ID
https://orcid.org/0000-0002-0845-0116
View public version

Display your ID on other sites
Public record print view
Get a QR Code for your ID

Also known as
Dimitri Brosens

Country
Belgium

Keywords
Biodiversity

Websites & Social Links
Belgian Biodiversity Platform
Research Institute for Nature and Forest profile page

Other IDs

Employment (3)

Research Institute for Nature and Forest: Brussel, BE
Employment
Source: Research Institute for Nature and Forest
★ Preferred source

Belgian Biodiversity Platform: Brussels, BE
2009 to present
Employment
Source: Dimitri Brosens
★ Preferred source

RBINS: Brussels, BE
2001 to 2009 | (Education Department)
Employment
Source: Dimitri Brosens
★ Preferred source

Education and qualifications (1)

Ugent: Ghent, BE
1996 to 2001 | Ms (Biology Department)
Education
Source: Dimitri Brosens
★ Preferred source

Open Science - Ideas for opening up!

Towards the end of your research_archiving

- all documents and achieved sustainable and made open in an efficient way
- all data will be archived
- all samples are archived
- all protocols are archived
- all source code is archived





Open Science - Ideas for opening up!

Towards the end of your research_reuse

- Create opportunities for internal and external reuse of all resources

Open Science - Ideas for opening up!

Towards the end of your research

Make sure to publish with an **Open Access** journal and/or to deposit your publications in an **Open Access repository**. This means that anyone can read - and cite - your findings in the short and longer-term.

Be sure to **deposit** any **data** required to validate your findings as well as any **software** you've developed to analyse or visualise them.

Link your papers, data, and code to each other through the assignment of DOIs. Link all of these back to you through your [ORCID](#) !



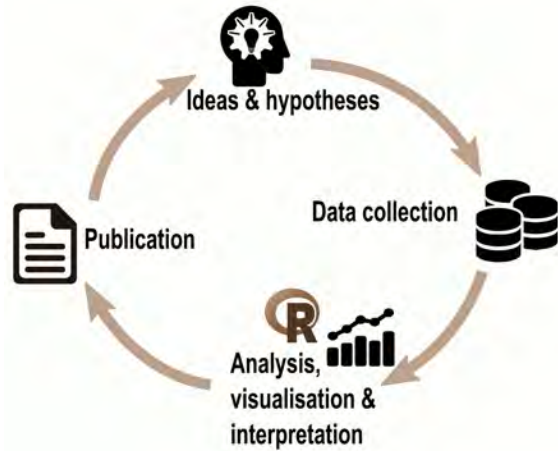


What is driving funding bodies to embrace Open Science?

The key driver for this is the belief that publicly funded research should be made available to support

public trust in research
to support **scrutiny** and **validation**
to enable **reuse**
and to drive **innovation**.

Research Life Cycle



Research Life Cycle



Research Life Cycle



Research Life Cycle



Research Life Cycle



Research Life Cycle



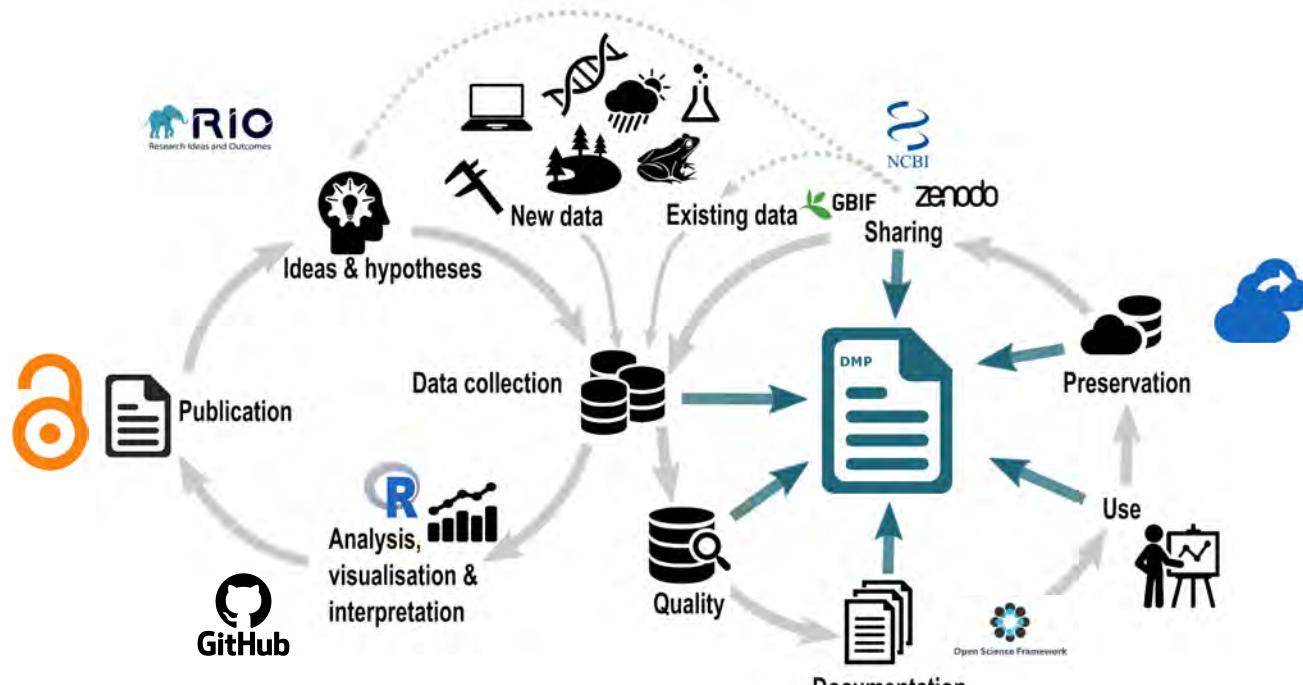
Research Life Cycle



Research Life Cycle



Research Life Cycle: Data Management Plan



Thank you....

Some Questions?

Data Management Plans: Why scientists should create & sustain them

Jennifer Anderson, Swedish University of Agricultural Sciences

FUNACTION Coordinator (BiodivProtect)

MoSTFun Partner (BiodivMon)



Funaction

Aquatic fungal
biodiversity



MoSTFUN

Monitoring strategies for aquatic fungi biodiversity



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FUNACTION — Aquatic FUNgal biodiversity: developing knowledge and strAtegies to inform ConservaTION priorities and measures





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FUNACTION — Aquatic FUNgal biodiversity: developing knowledge and strAtegies to inform ConservaTION priorities and measures

Foundation:

Produce the knowledge needed for the basis of AF-aware conservation actions.

Conservation:

Translate that knowledge into conservation planning and monitoring tools.

Communication:

Build support for AF-aware conservation and produce a useful scientific basis for implementation.



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biodiversity

FUNACTION — Aquatic FUNgal biodiversity: developing knowledge and strAtegies to inform ConservaTION priorities and measures

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WP1
Continental patterns in aquatic fungal biodiversity



WP2
Multinational study to test the effectiveness of existing protected areas (PAs)



WP3
Systematic conservation planning using aquatic fungi



WP4
Developing monitoring of aquatic fungal biodiversity and related ecosystem functions



WP5
Effective engagement, communication, and dissemination of information



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@funaction.bsky.social



FUNACTION

Jennifer Anderson (SE)

Olga Vinnere Pettersson

Ziming Wang

Isabel Fernandes (PT)

Ronaldo Sousa

Diana Graça

Andreas Bruder (CH)

Daniel Romero-Mujalli

Red Calore

Veljo Kisand (EE)

Leho Tedersoo (EE)

Kristel Panksep

Victoria Prins

Monika Böhm (US)

Hans-Peter Grossart (DE)

Alice Retter

Lars Ganzert

Solvig Pinnow

Laura Garzoli (IT)

Ester Eckert

Emanuele Ferrari

Diego Fontaneto

Selene Chinaglia

Former members

Michael Bruun-Nielsen

Sérgio Costa

Cátia Canteiro

Mercè Montoliu Nerín



REPUBLIC OF ESTONIA
MINISTRY OF RURAL AFFAIRS





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Data



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Andreas Bruder (CH)
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Mercè Montoliu Nerín



FORMAS

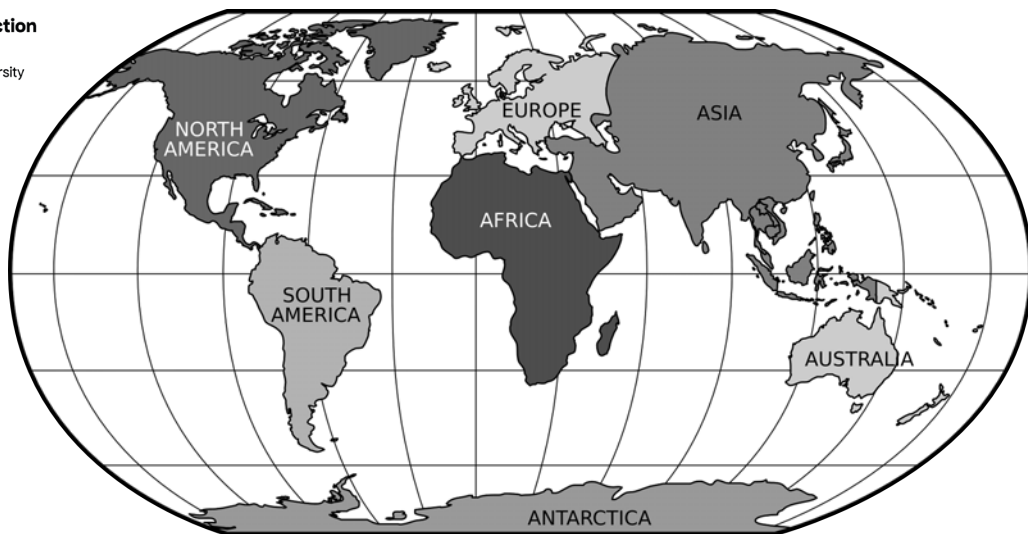


- Consortium members
 - names, contact info, social media accounts,
 - titles, positions, work addresses.
- Partner organizations—logos, rules
- National Funders—contacts, logos
- Consortium Meeting Notes
- Consortium Documents--other

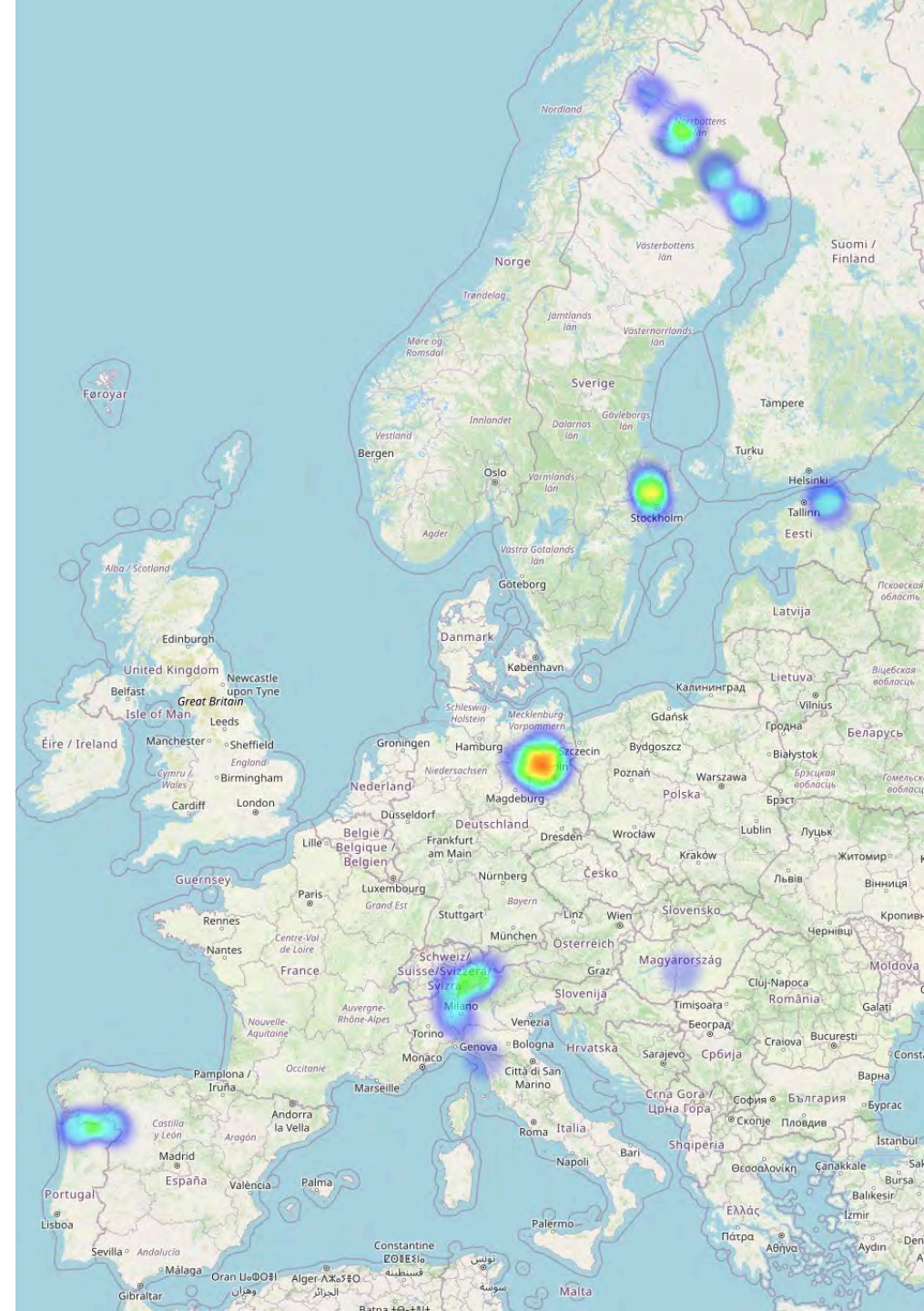


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Data



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Data



- Stakeholder info
- Surveys & responses
- Webinars & registrations

- Consortium members
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Samples:

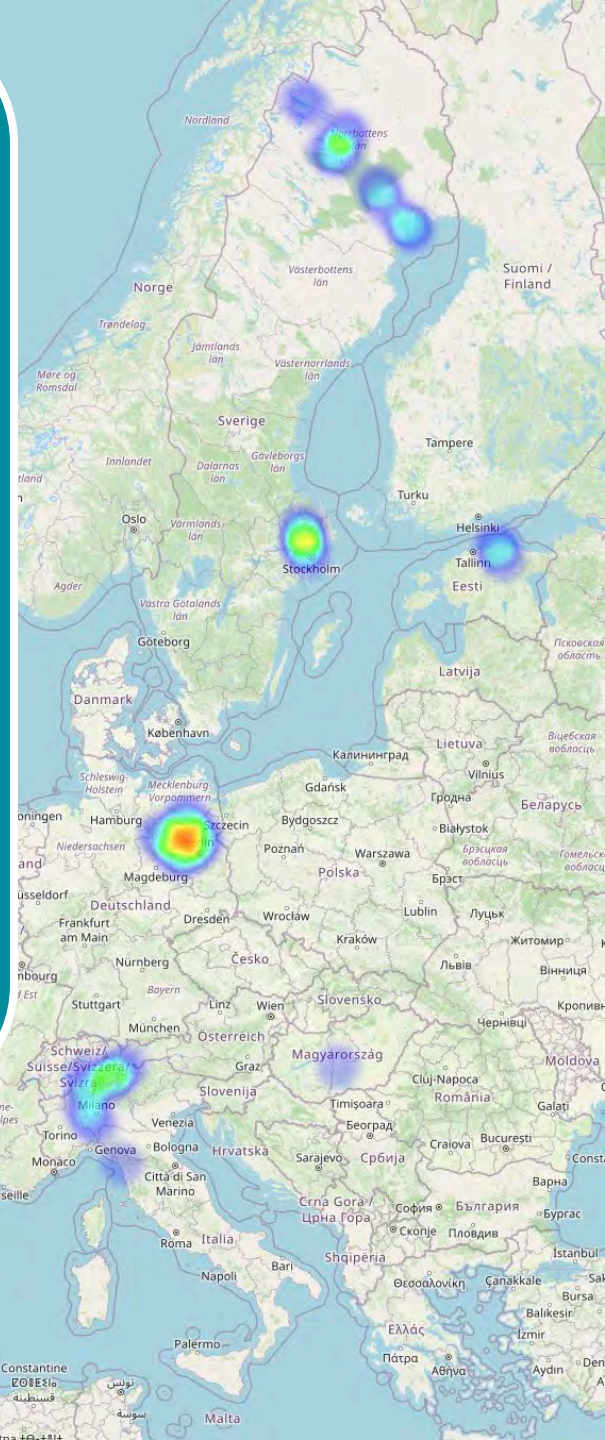
- Water-microbes
- Water-chemistry
- Sediment
- Leaf litter

Primary Scientific Data:

- DNA sequences-metabarcodes & metagenome
- Water chemistry
- Site metadata

Secondary Scientific Data:

- Maps
- Models
- Derived outputs





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Data

- Event outcomes
- Videos
- Outreach materials
- Media reach
- Outputs tracking

- Stakeholder info
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- Scripts
- Readme
- Analysis documentation

- Project datasets
- Independent datasets



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Data

- Event outcomes
- Videos
- Outreach materials
- Media reach
- Outputs tracking

- Stakeholder info
- Surveys & responses
- Webinars & registrations

- Permits, permissions, Nagoya, GDPR.....

- Photos – with people, w/out people

- Consortium members
 - names, contact info, social media accounts,
 - titles, positions, work addresses.
- Partner organizations—logos, rules
- National Funders—contacts, logos
- Consortium Meeting Notes
- Consortium Documents--other

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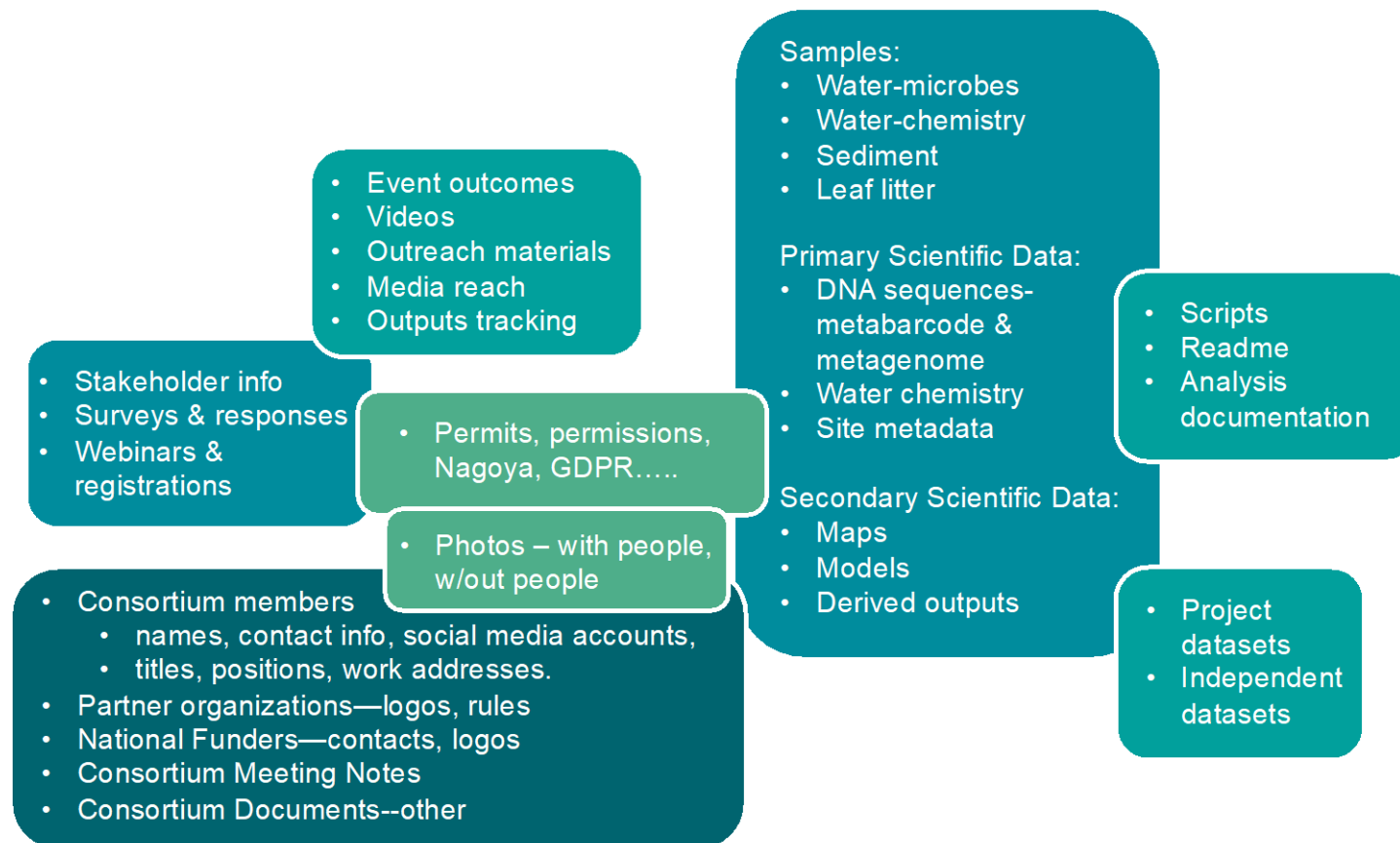
- Maps
- Models
- Derived outputs

- Scripts
- Readme
- Analysis documentation

- Project datasets
- Independent datasets

Special considerations

- Large datasets
- Personal data - GDPR
- Public/Private
- who is responsible?
- When?
- Where?
- Backup
- Archiving
- Formats
- Terminologies
- Sharing internal/external





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Data Management Plans: Why scientists should create & sustain them

1	Project
8	Partners/teams
7	Countries
6	National funding agencies
23	Team members
4	Former members
5	Work Packages (2 co-leads each)
10	Case study watersheds
10	Timepoints
~800	Unique collections
>3000	Total samples

Personal data -- GDPR

Unique raw data

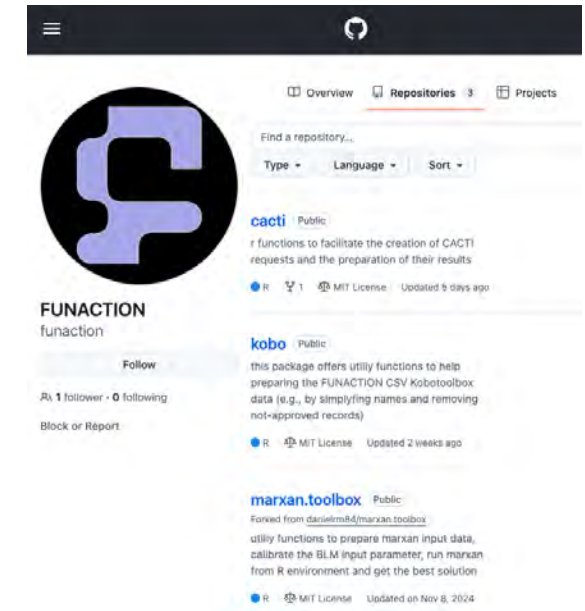
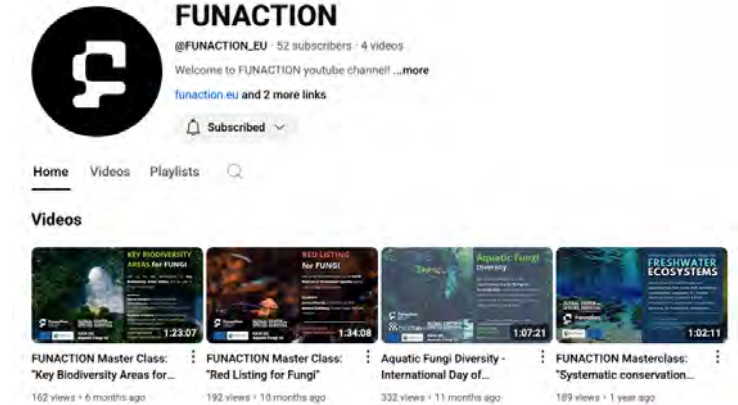
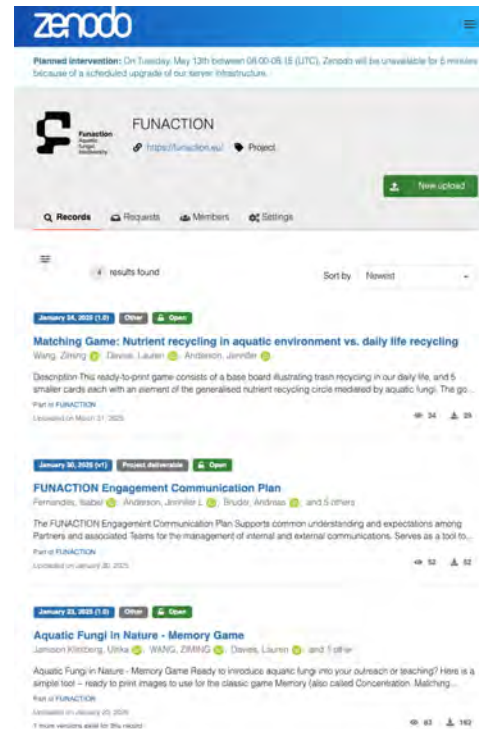
Internal/external documents

Shared/cooperative tasks

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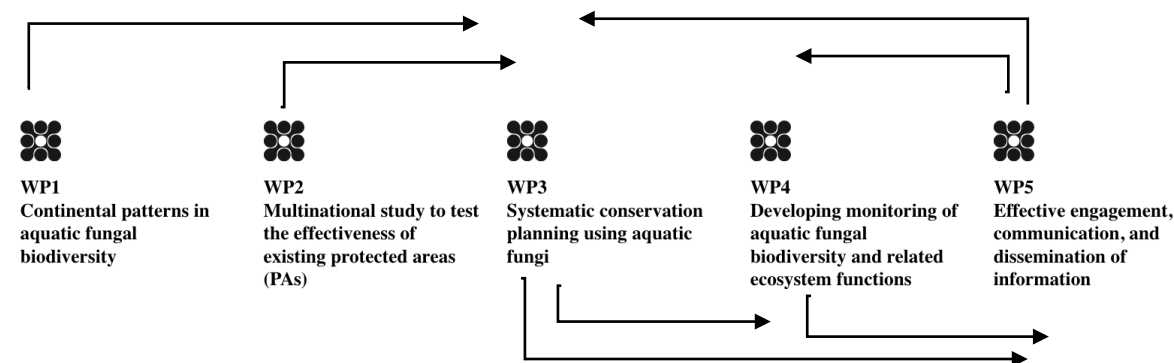
Data Management Plans: Why scientists should create & sustain them

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~800	Unique collections
>3000	Total samples

Personal data -- GDPR
Unique raw data
Internal/external documents

Shared/cooperative tasks

Open Science



Spain (water chemistry)

Estonia (extractions, library prep)

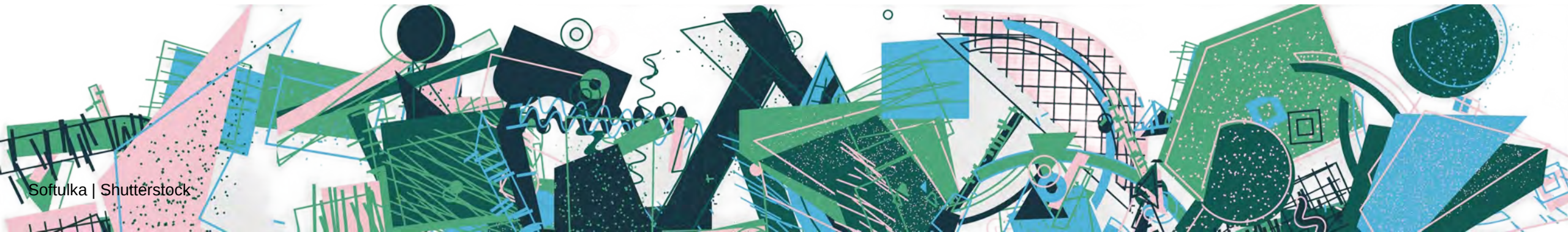
Sweden (sequencing)



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Data Management Plans: Why scientists should create & sustain them

Avoidance of chaos





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Data Management Plans: Why scientists should create & sustain them

- Efficiency
- Structured data collection & storage
- Reduce risk of loss
- Consistency within/among teams and continuity over time
- Promotes share/re-use of data and reproducibility
- Longevity – supports deposits to public databases

(adapted from: Goudeseune L. et al 2023 DOI : [10.5281/zenodo.3448251](https://doi.org/10.5281/zenodo.3448251))





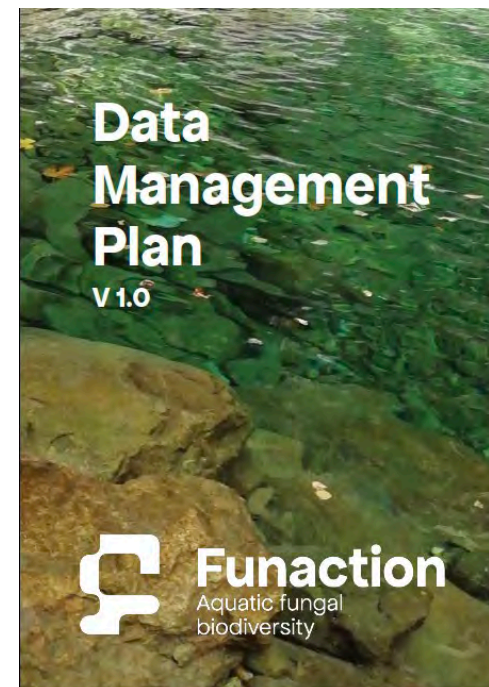
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Data Management Plan:

The DMP

- Supports common understanding and expectations among Partners and associated teams for the management of data associated with FUNACTION.
- Serves as a tool to ensure FUNACTION meets research community, partner institution, national and EU standards for data access (inclusive of FAIR principles and deposition of data into appropriate public repositories).
- Provides a mutually agreed framework defining the use, sharing, and storage of data.

- Efficiency
- Structured data collection & storage
- Reduce risk of loss
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- Longevity – supports deposits to public databases



Canteiro, C., Fernandes, I., Ferrari, E., Kisand, V., Retter, A., Romero Mujalli, D., & Anderson, J. L. (2024). FUNACTION Data Management Plan. Zenodo.
<https://doi.org/10.5281/zenodo.11073579>



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Data Management Plan: FUNACTION



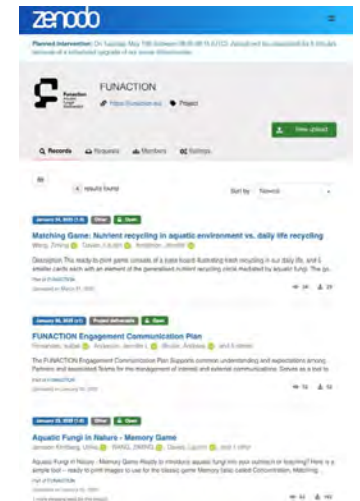
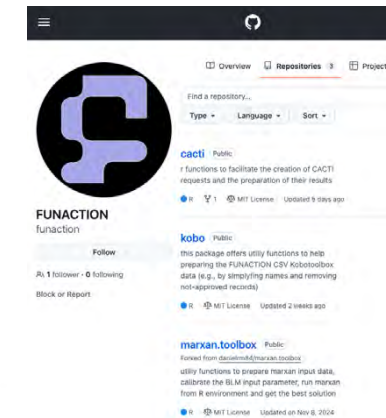
Element

Shared online docs

DMC meetings

Reporting at monthly meeting

Data - component	Solution
Sequence data	SLU: Physical server with backup. Redundant copies.
Personal data	SLU: Sharepoint w/ restricted access & physical server
Terminologies for metadata	Enforced through Kobotoolbox collection
IDs	Persistent unique identifiers as per DMP



Data Management Plan: FUNACTION

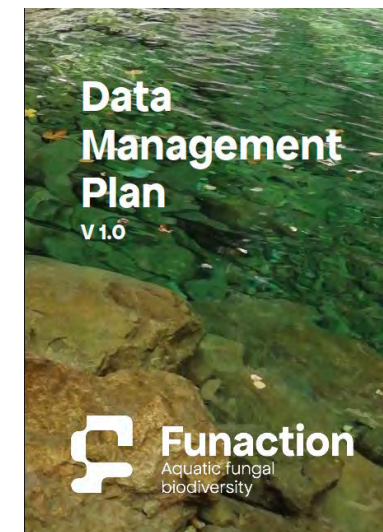
Sample naming conventions

= persistent unique identifiers

Table 5.2 Components of the USID and ST and their accepted values.

	Unique Site ID (USID)			Specific Sample types (ST)			
	Broad geographic ID	Site ID (SID)	Sampling occasion (SO)	Sterivex filter	Chemistry (water for chemical analysis)	Sediment	Litter
FUNACTION (WP2)	WC Table 5.3	## 01-30	T1-T8	W1, W2	C1, C2	S	L
FunAqua (WP1)	CC Table 5.4	## 01-30	T1-T8	W1	C1, C2	S	L

- Efficiency
- Structured data collection & storage
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Data Management Plan: FUNACTION

Sample naming conventions

= persistent unique identifiers

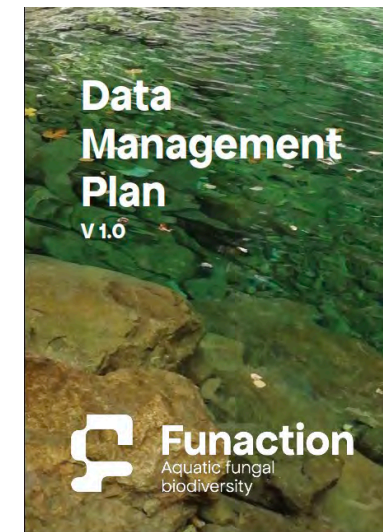
+ flexible for use throughout project

LU09T1_W1_MB1 = DNA sample relating to sample from above for barcode “1”

LU09T1_W1_ MB1_raw = Raw sequence data from sample

LU09T1_1-wWWW-xy = USID + number to identify unique photo file + w[initials to identify people pictured in photo if applicable] + initials of photographer for photo credit

- Efficiency
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Data Management Plan: FUNACTION

Standardized terminologies

Centralized data collection

- = Uniform, correctly spelled/typed/etc, terminology
- = Standard formats
- = Unified dataset from the start, across the countries
- = Transparency
- = Availability

- Efficiency
- Structured data collection & storage
- Reduce risk of loss
- Consistency within/among teams and continuity over time
- Promotes share/re-use of data and reproducibility
- Longevity – supports deposits to public databases

FUNACTION_v1

▼ Determine the Unique Site ID (USID) and declare the samples taken

* Project

- ☐ FUNACTION
☐ FunAqua

* Country

* Watershed

* Unique Site ID (USID)

FUNACTION: WC+SID+SO; FunAqua: CC+SID+SO. WC & CC find from previous questions. SID = number assigned to a specific site and always re-used for that specific site. SO = Sampling occasion. If a site is visited for the first time and/or the only time, it gets T1. Example LU09T1

* Sample types taken

Select all that apply. NOTE: this will be used to trace samples--so double check you are accurate.

- ☐ Sterivex (label as USID-W1)
☐ Sterivex (label as USID-W2)
☐ Water for chemical analysis (label as USID-C1) --- DO NOT filter
☐ Water for chemical analysis (label as USID-C2) --- Filter this sample through 0.45 um
☐ Sediment (label as USID-S)
☐ Litter/Organic matter (label as USID-L)

Volume filtered for Sterivex filter (ml) -W1

Volume filtered for Sterivex filter (ml) -W2

Kobotoolbox



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Data Management Plan: FUNACTION

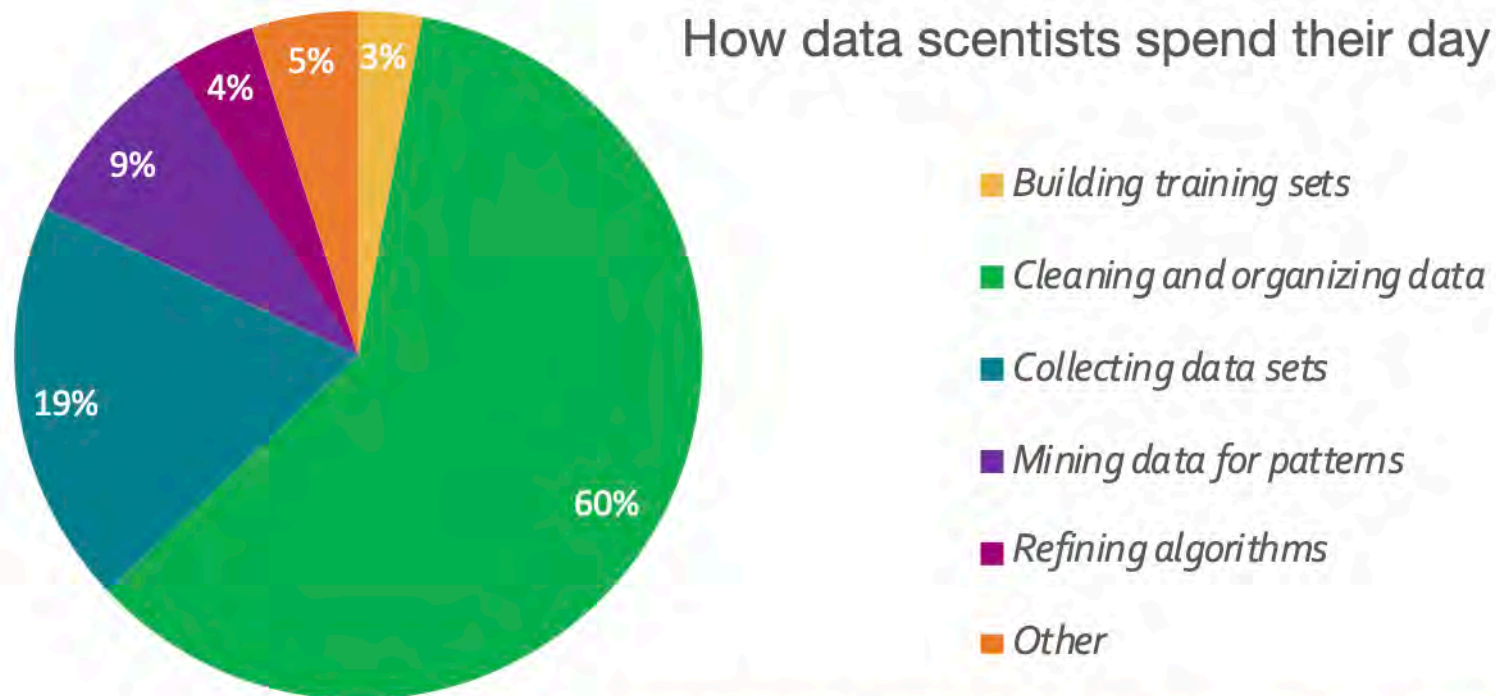


Figure 2: How data scientists spend their day (redrawn after [CrowdFlower, 2016](#))

Goudeseune L. et al 2023 DOI : [10.5281/zenodo.3448251](https://doi.org/10.5281/zenodo.3448251)

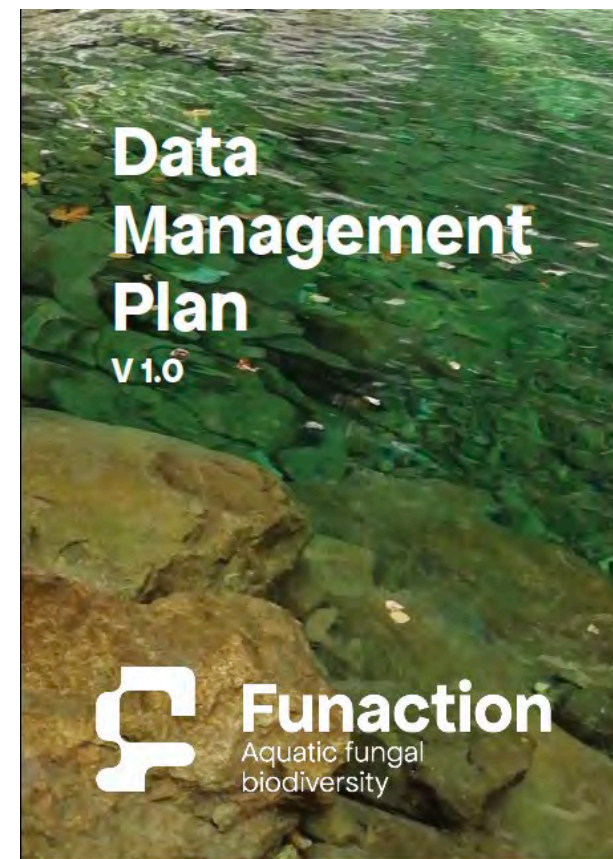
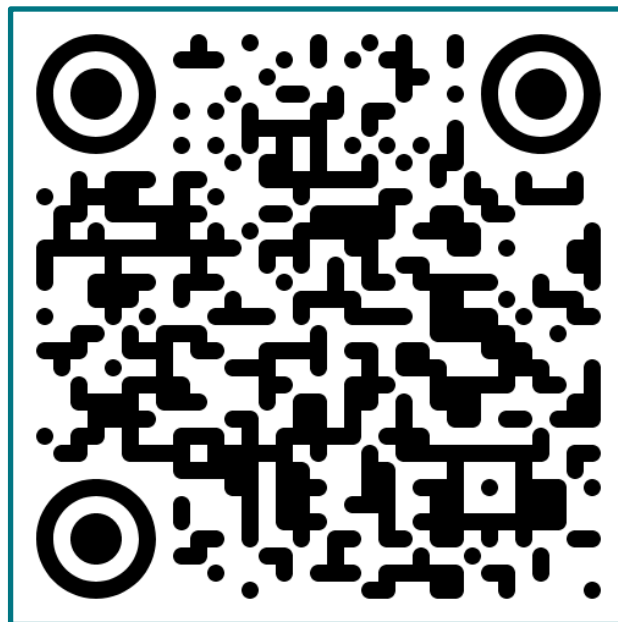
- Efficiency
- Structured data collection & storage
- Reduce risk of loss
- Consistency within/among teams and continuity over time
- Promotes share/re-use of data and reproducibility
- Longevity – supports deposits to public databases



Funaction
Aquatic
fungal
biodiversity

Data Management Plan: FUNACTION

Switzerland	Daniel Romero Mujalli (Andreas Bruder)
Germany	Alice Retter
Estonia	Veljo Kisand
Italy	Emanuele Ferrari
Portugal	Isabel Fernandes
USA	Catia Canteiro





SCIENCE AND
EDUCATION **FOR**
SUSTAINABLE
LIFE

Artificial intelligence (AI) in data management

Eero Siivola, Finnish environment
institute (Syke)



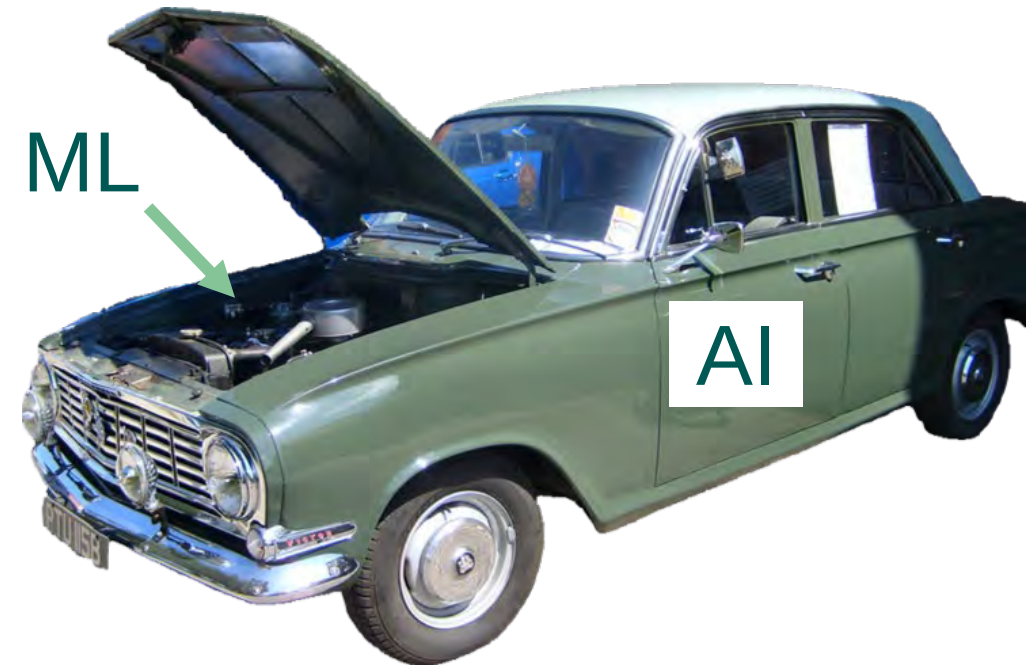
Suomen ympäristökeskus
Finlands miljöcentral
Finnish Environment Institute

Contents of the talk

- What is AI?
 - Beyond misconceptions and hype
- Foundations of the use of AI
- AI in Biodiversity Data Management
- Ethical concerns
- Future aspects of AI research
- Conclusion

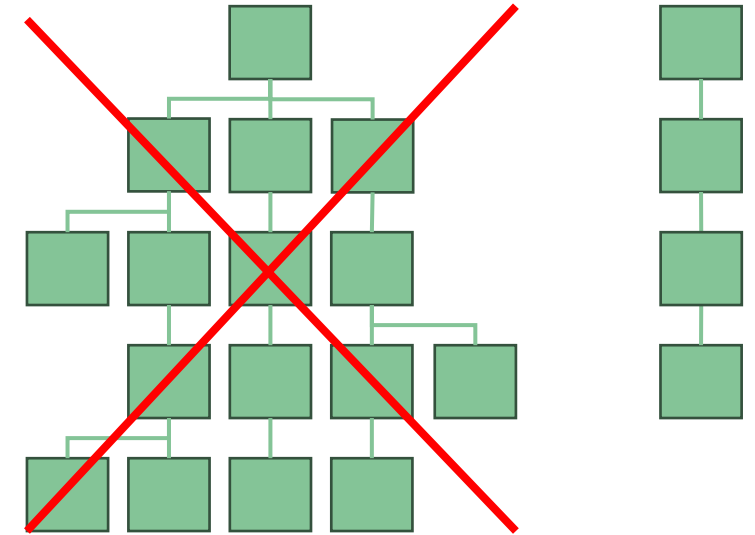
What is AI? (demystifying AI)

- AI = computer systems designed to perform tasks that typically require human intelligence
 - E.g. recognize patterns, make decisions, interpret images/language
- Now-a-days AI is commonly used as a synonym for different advanced tools like chat GPT
 - Most AI is driven by Machine Learning (ML) – methods (=methods that learn from data)
- Disclaimers:
 - AI is not magic – it always makes mistakes
 - AI works reliably on a set of very limited tasks,
 - Setting up AI is often laborous
 - AI is often black box



Foundations of the use of AI

- AI is data driven
 - AI depends on high-quality, well-documented and FAIR (Findable, Accessible, Interoperable, Reusable) data
 - Poor data = poor AI outcomes
 - AI often requires lots of data
- AI requires infrastructure: storage systems, processing power, tools for sharing and standardizing data
- AI requires interdisciplinary collaboration
 - E.g. domain experts (biologists, chemists, GIS experts or ecologists) and AI experts
- Building the foundations for AI is often laborous

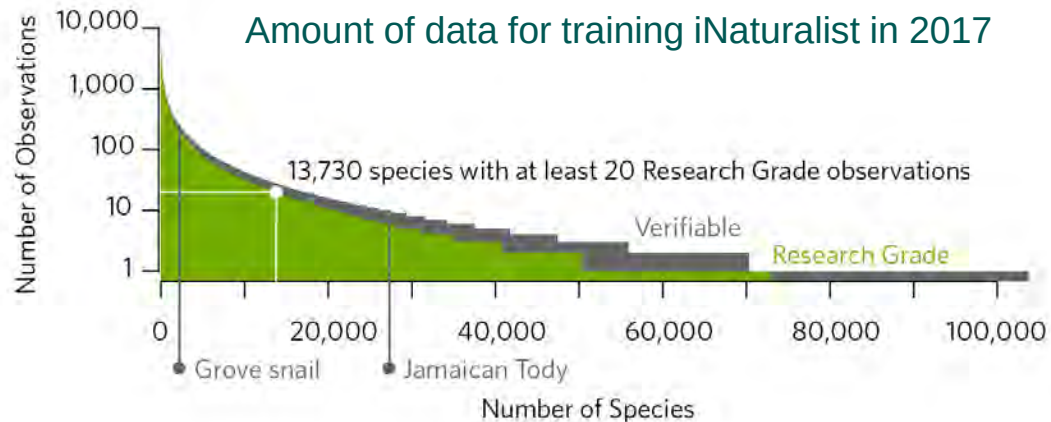


Occam's razor: all else being equal, the simplest explanation that fits the data is usually the best one.

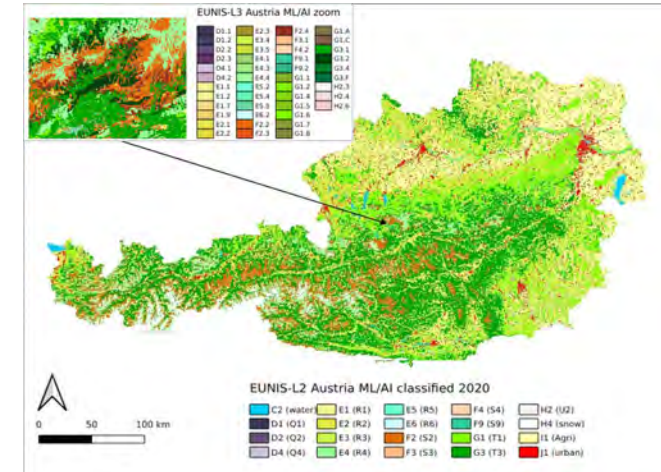
Simpler, purpose-built models often provide better results than overly complex, generalized models.

AI for data collection and data-analysis

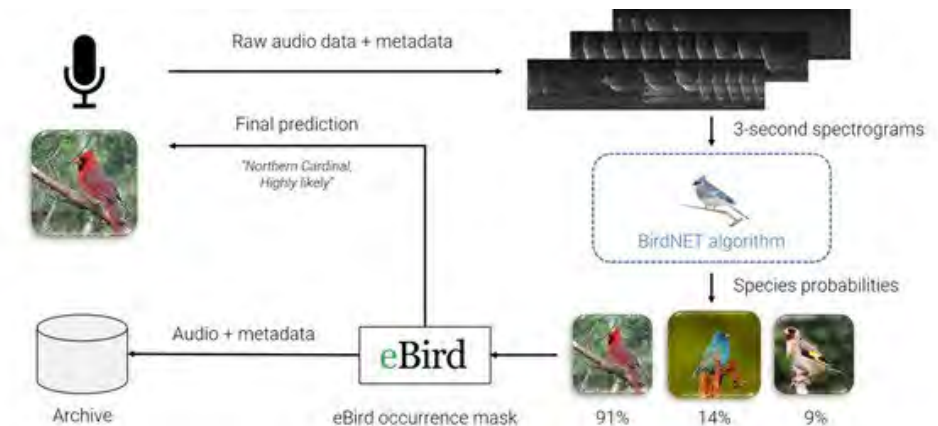
- Tools like camera traps, satellites and acoustic sensors generate large volumes of data
- AI can help in pre-sort, extract or classify species in photos and sounds - e.g., iNaturalist, BirdNET
- AI might be useful if:
 - There exists lots of data (e.g. >10k data points)
 - Some level of mistakes are OK
 - There are resources for tailor-made solutions



EUNIS classes of Austria from Sentinel 2 satellite data:



Work scheme of BirdNET:



AI in database management

- Anomaly detection: ML can flag unusual entries (e.g. coordinate far outside known range, new species)
- AI-enhanced databases learn from usage: e.g. predictive indexing or query optimization to speed up common database queries.
- Self-managing systems: cloud databases use AI to auto-scale, balance loads, and optimize storage for biodiversity repositories.
- Only few real life examples: Mostly basic research and custom solutions until now

Anomaly detection from camera data



AI in master data management (MDM)

- Master data (like species lists) must be consistent
- Unifying reference data (especially taxonomy): AI can reconcile synonyms, spelling variants, and common names across datasets.
 - Example: GBIF's Backbone Taxonomy (plus AI fuzzy matching) ensures consistent species names.
- Recent advances in Natural Language Processing (NLP), like Large Language Models (LLMs) will potentially help
 - “LLM for Data Management”: <https://doi.org/10.14778/3685800.3685838>
 - “How Large Language Models Will Disrupt Data Management”: <https://doi.org/10.14778/3611479.3611527>

AI for reference data & metadata management

- AI can automate metadata creation: e.g. extract scientific names, locations, and keywords from text or images
- Intelligent tagging: NLP models classify datasets by theme (ecosystem, methodology), improving search/discovery
- Smart catalogs: AI-powered data catalogs (e.g. Alation) infer metadata and suggest relationships between datasets

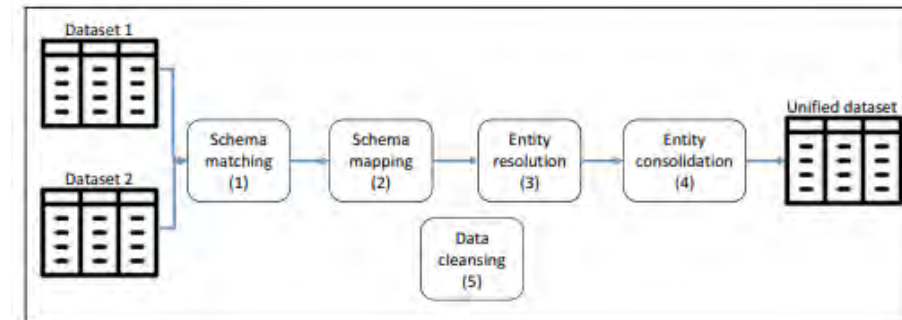
Automatic metadata creation from text labels



Ai for data transformations and ETL pipelines

- ETL = extract, transform, load
- Smart ETL pipelines: AI/ML suggests mappings between formats and generate code for transformations
- Continuous integration: With ever-changing schemas, ML can update workflows automatically.
- While concrete examples are emerging, the trend is clear: ML will make data wrangling less manual and more intelligent.

Dataset integration with AI:



AI in Biodiversity Data Management

Storage & lifecycle management:

- Data organization: AI can index and tag datasets, suggest metadata to improve Interoperability, and compress or summarize data for efficient accessibility (= easier and better FAIR)
 - This makes it easier to re-use existing data
- Preservation and archiving: AI can help to assess which data merit long-term storage (based on usage, quality, scientific value)
 - Example: EOSC EDEN project (Horizon Europe project, 2025->) is developing frameworks for this
- Cloud optimization: AI is increasingly being used by the cloud environment providers to optimize all kinds of processes

Storage and lifecycle management currently remains mostly manual for researchers

Ethical and legal concerns

- Transparency & explainability: Complex AI models are “black boxes.”
 - It's essential to document, share code/models, and use explainable AI techniques
- Data bias and fairness: Biased training data (e.g. over-sampling common species or regions) can skew AI models.
 - Bias can lead to under-detection of rare or understudied species.
- Privacy and sensitivity: Some biodiversity data (e.g. the location of an endangered species nest) are sensitive.
 - AI tools must respect data privacy laws (like GDPR) and ethical guidelines.
- Environmental impact: Training large AI models consumes energy
- Regulation (EU AI Act): New laws will classify AI tools by risk level.
 - “low-risk” tools (like AI-assisted analytics) might have fewer restrictions, while “high-risk” cases (e.g. wildlife monitoring systems affecting policy) may need strict governance.

Future directions in AI research



- Foundation models: Models that are trained on vast datasets so they can be applied across a wide range of use cases
- Agentic AI: AI systems that can perform tasks independently and collaborate with other AI agents. These systems are expected to handle more complex tasks with minimal human intervention
- Resource efficiency: Large AI models will become more resource efficient
- Explainable AI (XAI): Research of interpretable models is and will stay popular due to increasing regulation
- Collaboration and community: Shared AI resources (open models, large labeled datasets like iNaturalist) will accelerate progress and revolutionalise some fields (E.g. recent development in meteorology)
- EU AI and data legislation impact: The upcoming EU AI Act and related laws (GDPR, data protection) will shape AI use

Conclusion

- Key messages: AI is a powerful set of tools that can greatly enhance biodiversity data workflows.
 - Its success depends on quality data management
 - There are not many practical tools available
- Action points to be able to utilize AI for your data management:
 - Make sure your data is accessible and of good quality
 - Expect things to take more time and resources than the hype leads you to believe
 - For best results, collaborate with ML/AI experts
 - Keep your eyes open
 - Lots of attention on the field: Safe to expect fast progress

Questions/discussion?

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Research/sources

<https://arxiv.org/html/2504.09288v1>

<https://peerj.com/articles/18853/>

https://www.inaturalist.org/pages/computer_vision_demo

<https://bou.org.uk/blog-granados-birdnet/>

<https://blog.vito.be/remotesensing/habitat-mapping-ai>

<https://doi.org/10.3389/fmars.2023.1283265>

<https://www.nature.com/articles/s41598-023-50179-0>

<https://doi.org/10.1525/elementa.418>

<https://doi.org/10.3389/focsu.2024.1528837>

<https://www.frontiersin.org/news/2025/03/03/reimagining-fair-for-an-ai-world-frontiers-introduces-fair-data-management>

<https://link.springer.com/article/10.1007/s42514-022-00101-3>

<https://eosc.eu/eu-project/eosc-edен/>

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