

Global Biodiversity Information Facility - Norway

November 2025

GBIF Global Biodiversity Information Facility

IRSAE metabarcoding school, Drøbak | 21th November 2025

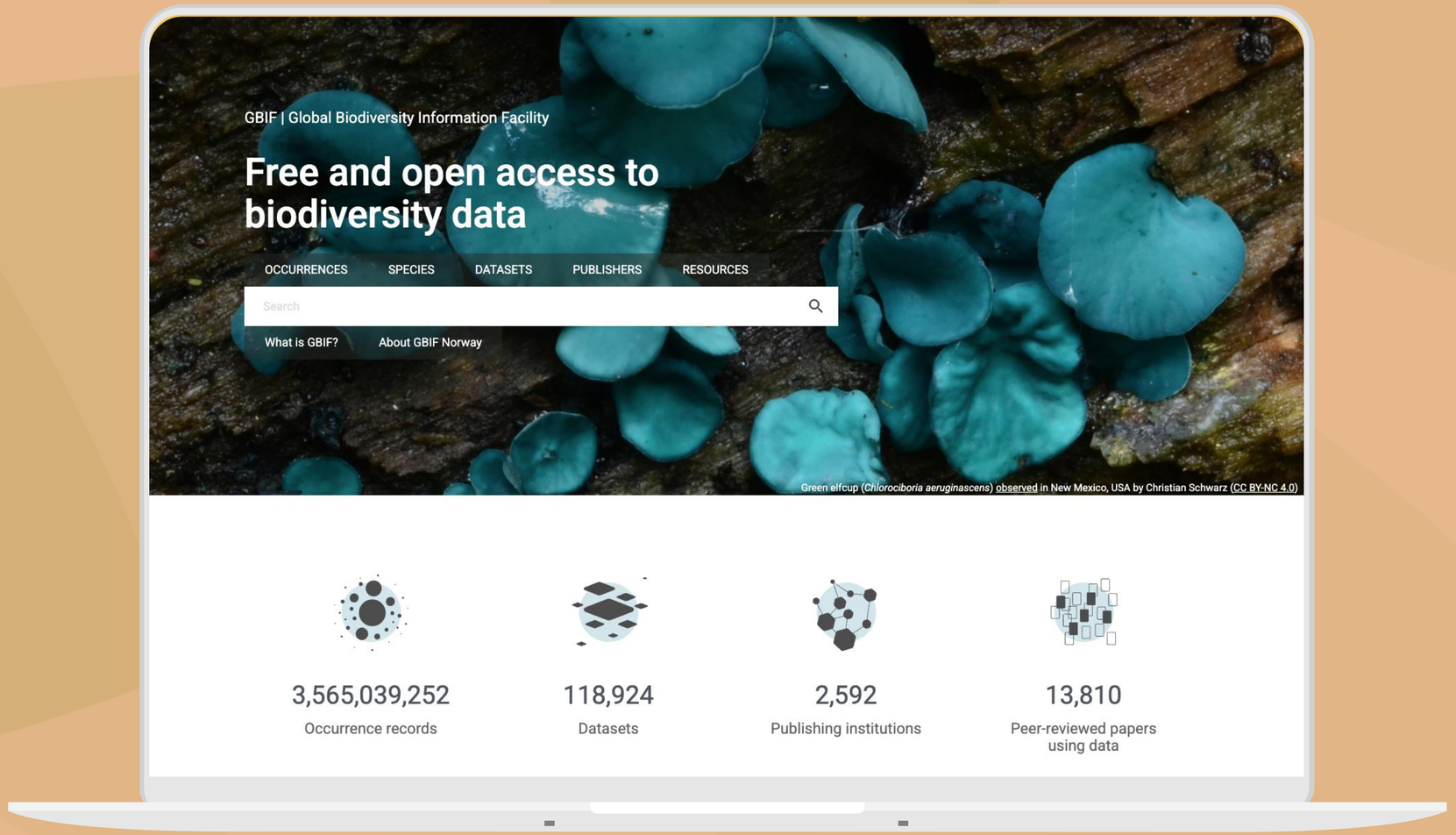
What is GBIF?

Intergovernmental network and research infrastructure

Provides anyone, anywhere, **free and open access to data** about all types of life on Earth

Voluntary collaboration through Memorandum of Understanding (MoU)

Participant nodes, Secretariat in Copenhagen, Denmark



https://www.gbif.org

Vision

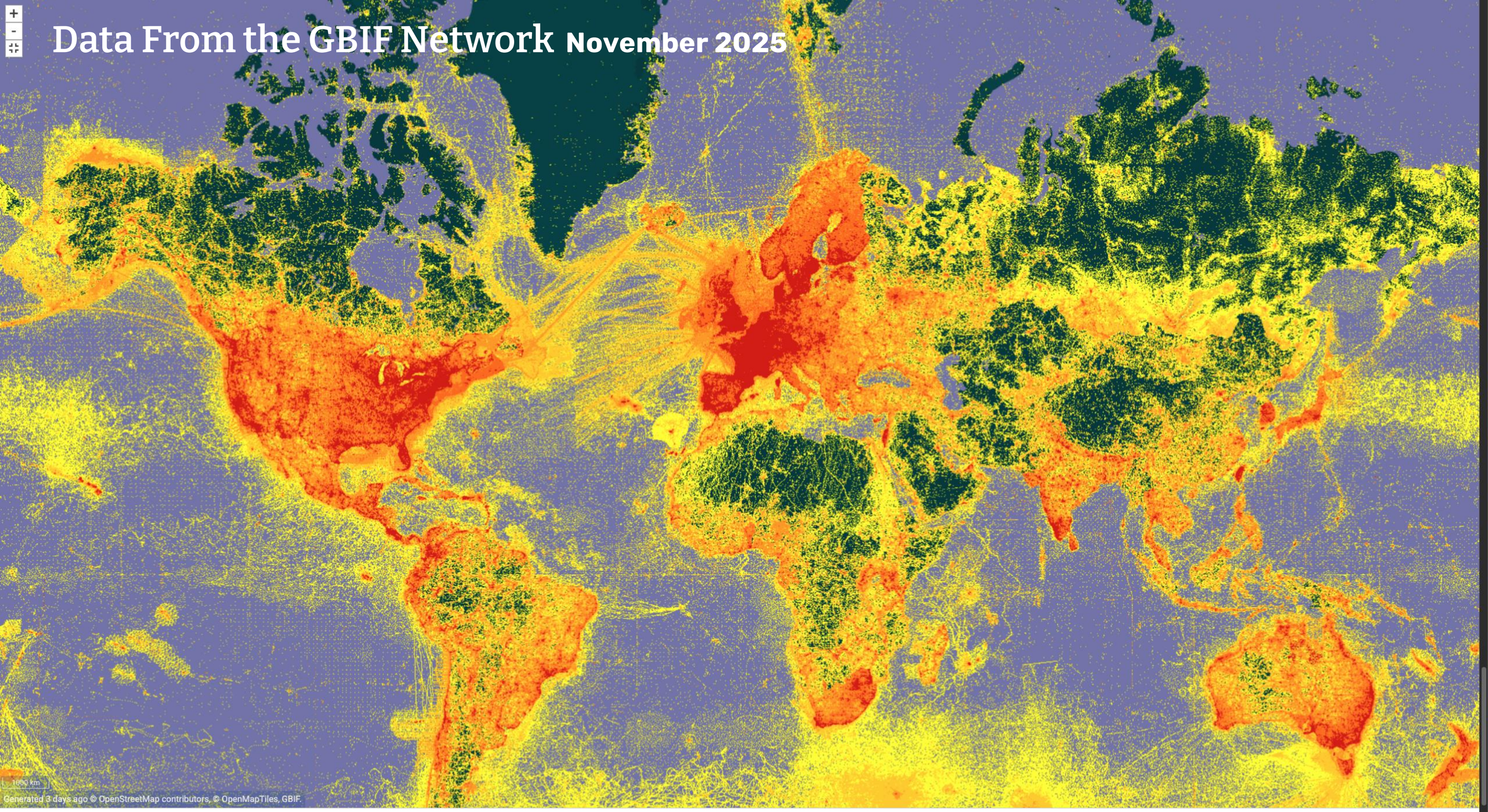
A world in which the best possible biodiversity data underpins research, policy and decisions.



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

https://www.gbif.org/strategic-plan


Data From the GBIF Network November 2025
1000 km
Generated 3 days ago © OpenStreetMap contributors, © OpenMapTiles, GBIF.
Any year
1600 - 2025
EXPLORE

Datasets

118,924

Hosted portals

58

Country Participants

69



Peer-review papers using data

13,810

Organizational Participants

42

Average records downloaded per month (2025)

273.0 billion

Publishers

2,592

Species occurrence records

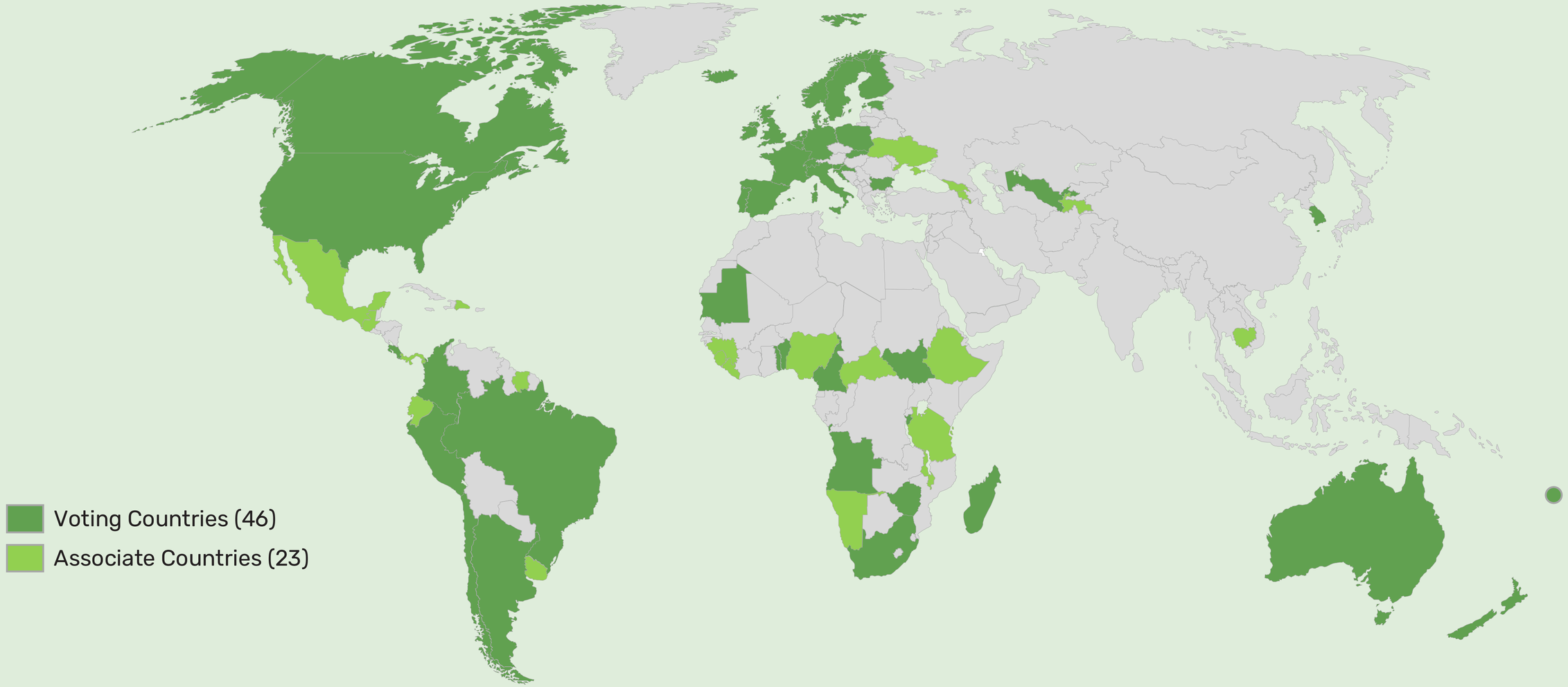
3,565,039,252

By the numbers | November 2025

www.gbif.org

November 2025

GBIF Participant countries

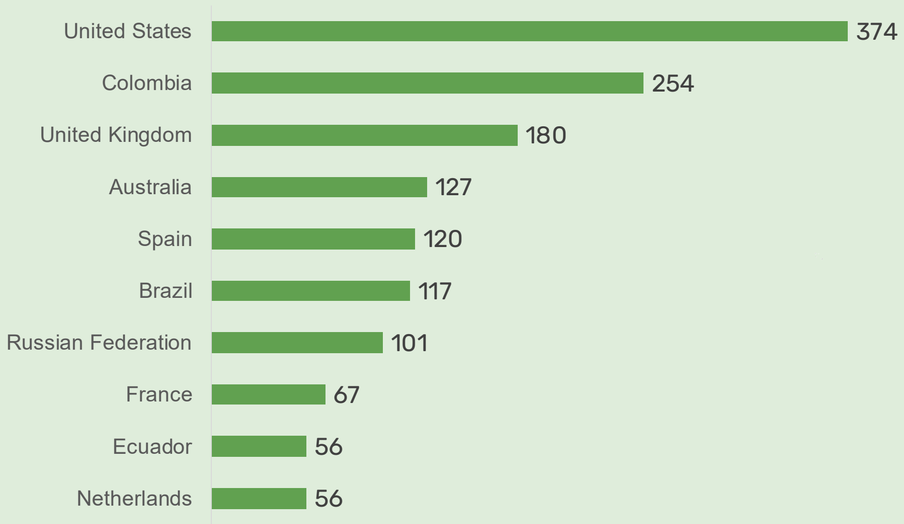


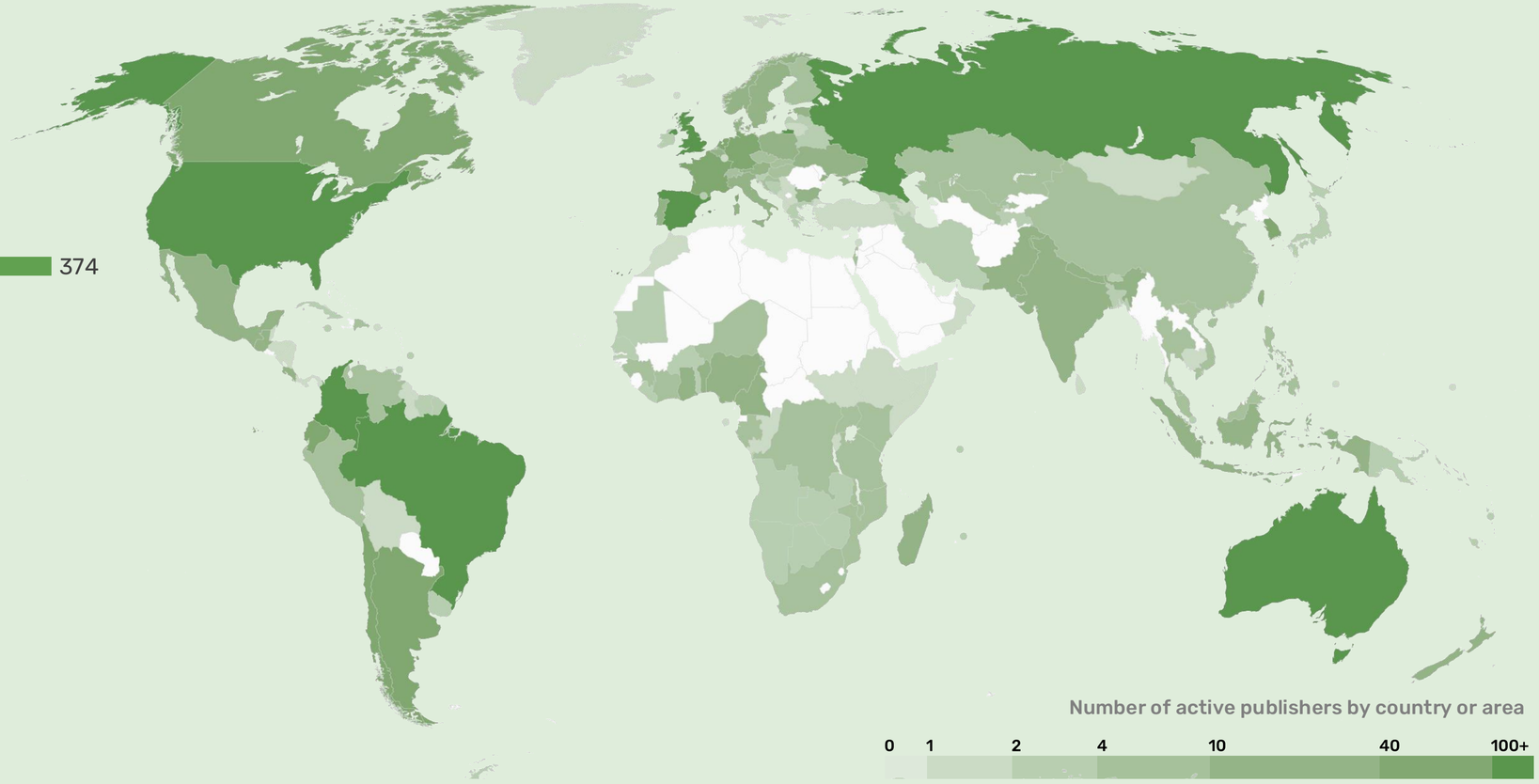
https://www.gbif.org/the-gbif-network

August 2025

GBIF network of data publishing institutions

149 countries/areas with institutions sharing data through GBIF





https://www.gbif.org/publisher/search

Occurrences published by country: 2025

Rank	Country/Territory	2025 (Nov)	2024 total	2024 rank
1	United States (US)	62,508,873	33,821,261	1
2	Netherlands (NL)	15,492,849	22,828,689	2
3	Belgium (BE)	15,237,666	2,495,213	13
4	Sweden (SE)	14,567,458	9,411,544	4
5	France (FR)	8,807,747	209,879	9
5	United Kingdom (GB)	5,967,436	3,452,259	6
6	Norway (NO)	5,346,401	5,429,355	5
7	Canada (CA)	2,966,297	2,381,581	7
8	Denmark (DK)	1,660,716	4,919,717	8
9	Germany (DE)	209,240	163,806	21
	OTHER COUNTRIES + AREAS	**27,805,198**	**85,113,198**	
	TOTAL	**160,569,881**	**107,666,470**	



https://www.gbif.org/occurrence/search

GBIF.org traffic by country: 2025

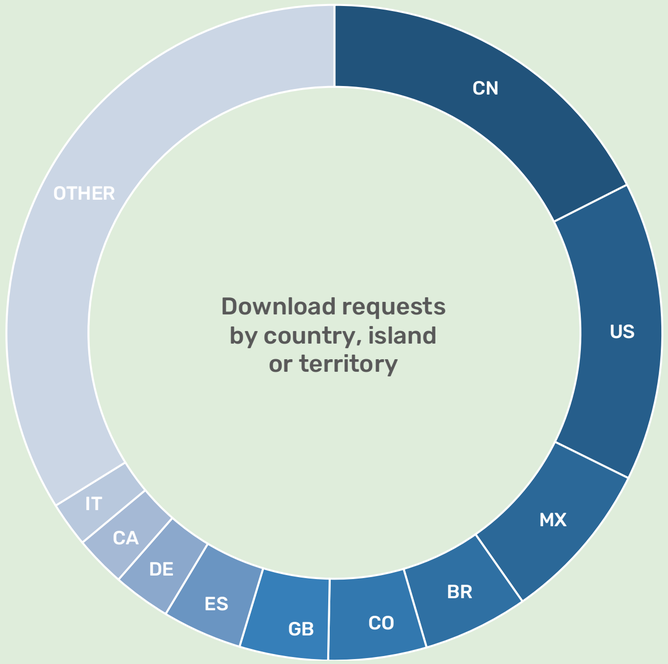
Rank	Country/Territory	Visitors	Visits	Effective visits*	% Effective visits	2024 rank	Pages / visit
1	United States	438,240	513,431	**215,641**	9.28 %	1	4.13
2	China	681,012	1,519,664	**212,753**	9.15 %	7	3.41
3	Colombia	200,079	253,724	**121,788**	5.24 %	2	4.88
4	Indonesia	156,379	192,106	**111,421**	4.79 %	3	6.02
5	Spain	169,904	213,102	**110,813**	4.77 %	4	6.08
6	France	232,762	275,916	**110,366**	4.75 %	5	4.31
7	Brazil	196,835	232,094	**109,084**	4.69 %	8	4.79
8	Germany	176,298	216,238	**99,551**	4.28 %	9	5.40
9	Mexico	156,317	185,509	**70,760**	3.67 %	6	4.70
10	India	153,906	172.585	**69,505**	3.04 %	10	4.28
	TOTAL	**4,505,094**	**6,117,962**	**2,324,826**	**100.00%**		**4.66**

SOURCE: Plausible.io. * Effective visits = total visits - (total visits x bounce rate)

Data download requests by country: 2025

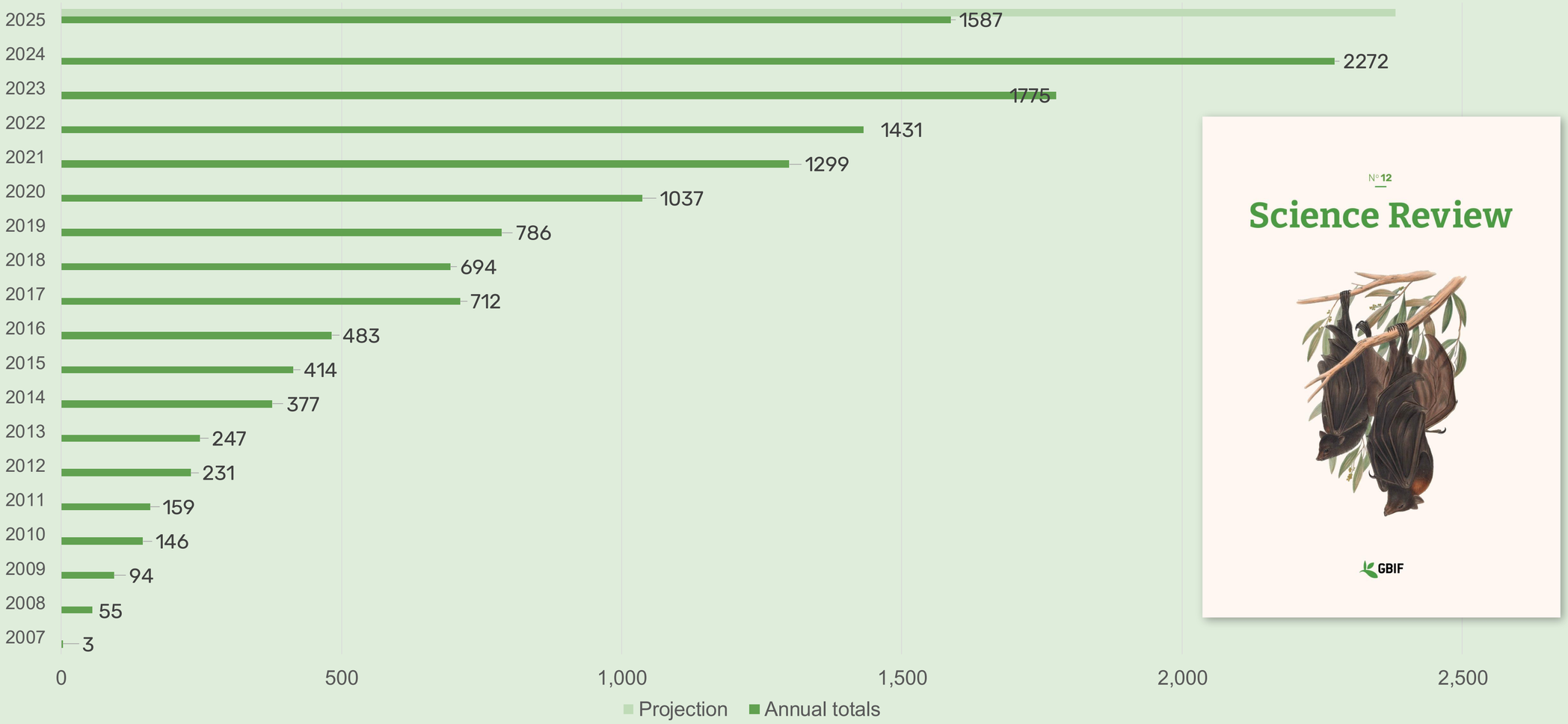
Rank	Country	2025	2024 total	2024 rank
1	China	41,998	63,485	1
2	United States	35,340	41,921	2
3	Mexico	19,086	29,712	3
4	Brazil	12,412	21,641	4
5	Colombia	11,592	21,274	5
6	United Kingdom	10,458	13,502	7
7	Spain	9,408	14,704	6
8	Germany	6,794	8,558	10
9	Canada	6,013	8,946	8
10	Italy	5,300	5,344	13
	OTHER COUNTRIES + AREAS	**80,090**	115,002	
	TOTAL	**238,491**	347,717	

165 countries, islands & territories where users have ≥5 requested downloads in 2025



SOURCE: GBIF.org infrastructure. Downloads adjusted to remove outlier users with >500 downloads for Jan-June 2025

Peer-reviewed publications using GBIF-mediated data



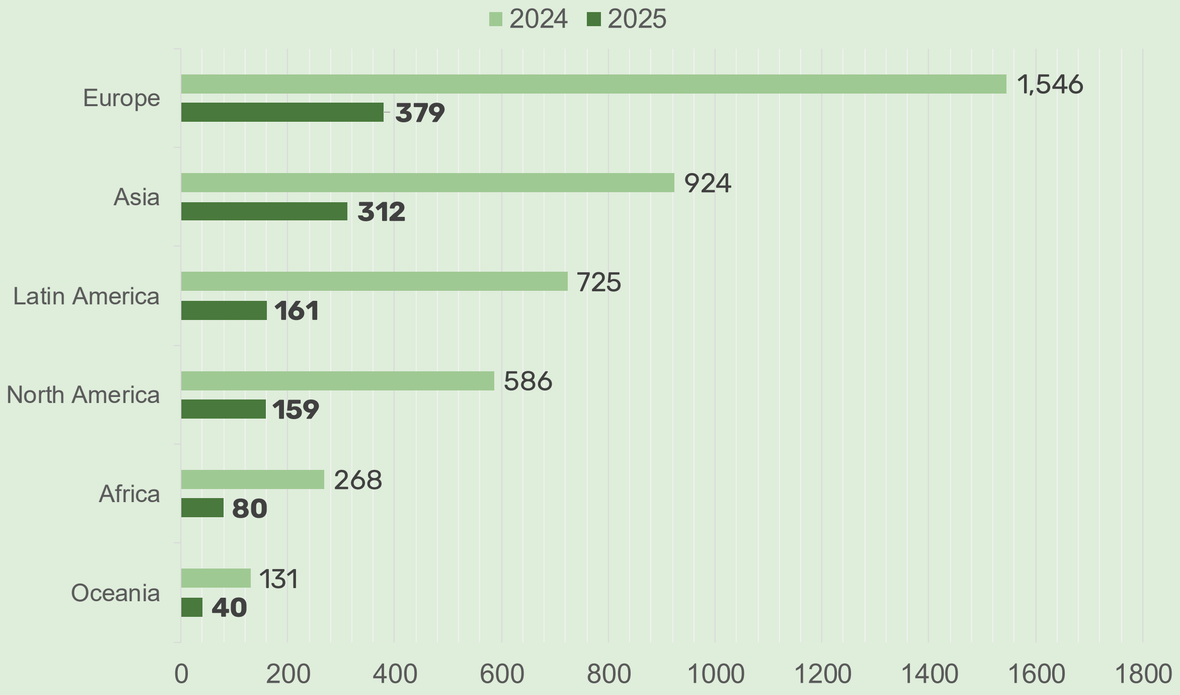
https://www.gbif.org/resource/search?contentType=literature&literatureType=journal&relevance=GBIF_USED&peerReview=true

Data use in peer-reviewed journals: 2025

Peer-reviewed uses by country

End of Year		2025 total	2024 total	2024 rank
1	**China**	**187**	529	1
2	**United States**	**134**	486	2
3	**United Kingdom**	**52**	186	5
4	**Brazil**	**48**	238	3
5	**Germany**	**43**	186	6
6	**Spain**	**37**	171	7
6	**Mexico**	**37**	186	4
8	**Australia**	**31**	104	10
9	**Italy**	**28**	107	8
10	**India**	**27**	78	12

Peer-reviewed uses by region



https://www.gbif.org/resource/search?contentType=literature&literatureType=journal&relevance=GBIF_USED&peerReview=true

Suggestions reviewed
2,766

Institutions
8,787

Global Registry of Scientific Collections



Countries
125

Collections
10,158

Country editors
68

Digitized specimens
248,566,791

Hosted portals update



8
Institutional



13
GBIF national Participants and regions

54
Hosted portals in production



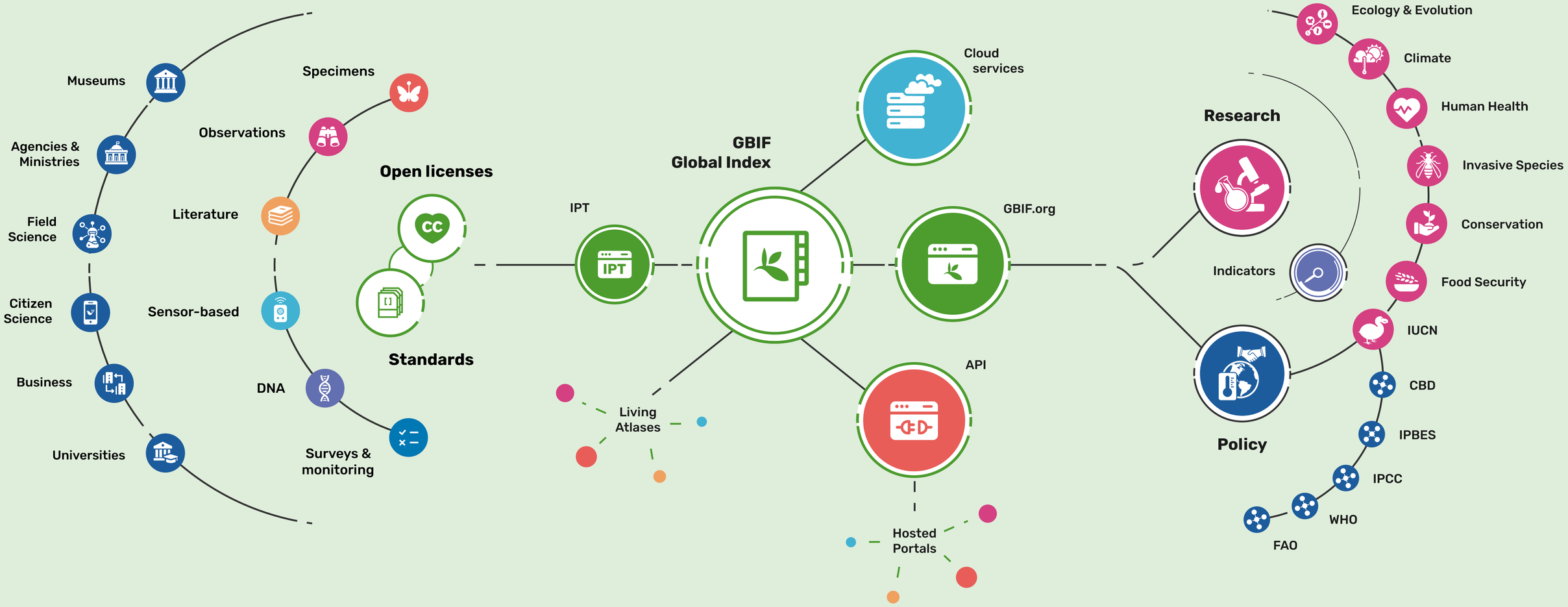
27
Scientific journal



6
Networks/thematic networks

https://www.gbif.org/hosted-portals

Providing biodiversity evidence for research and policy



GBIF

data publishing



Role and functions of a GBIF node coordinating a biodiversity information facility

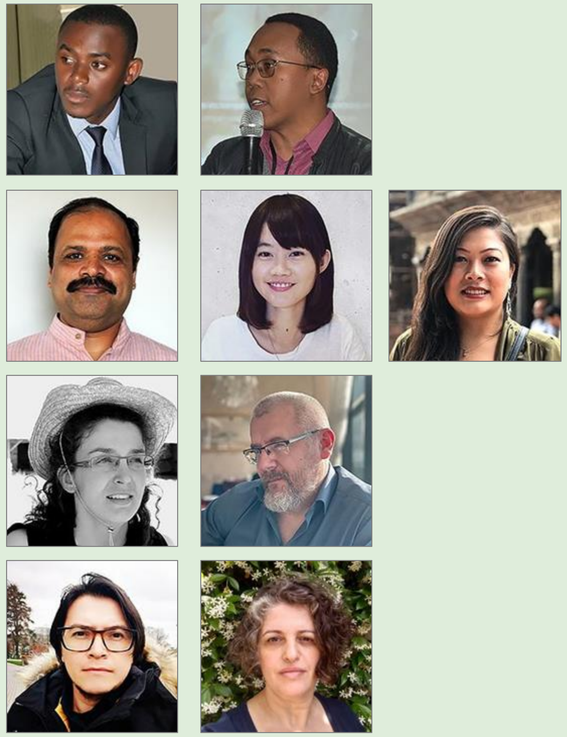
- Supports research communities
- Supports policy and decisions
- Engages and enables data publishing community
- Provides technical services for biodiversity data management



https://docs.gbif.org/effective-nodes-guidance/1.0/en/

Regional support teams

Africa	Laban Musinguzy (Uganda) Tsiky Rabetrano (Madagascar)
Asia	Vijay Barve (India) Melissa Liu (Taiwan) Lily Shrestha (Nepal)
Europe and Central Asia	Salza Palpurina (Bulgaria) Oleg Borodin (Belarus)
Latin America, the Caribbean and the Pacific	Leonardo Buitrago (Colombia) Anabela Plos (Argentina)



- Regional support contractors to complement nodes support from national participants.

Publish your datasets with GBIF

Step 1: digitize collections & herbaria

Step 2: register for endorsement in GBIF

Step 3: convert to Darwin Core format

Step 4: publish from national GBIF node

Alternative: publish from the regional GBIF cloud data repository – https://cloud.gbif.org/

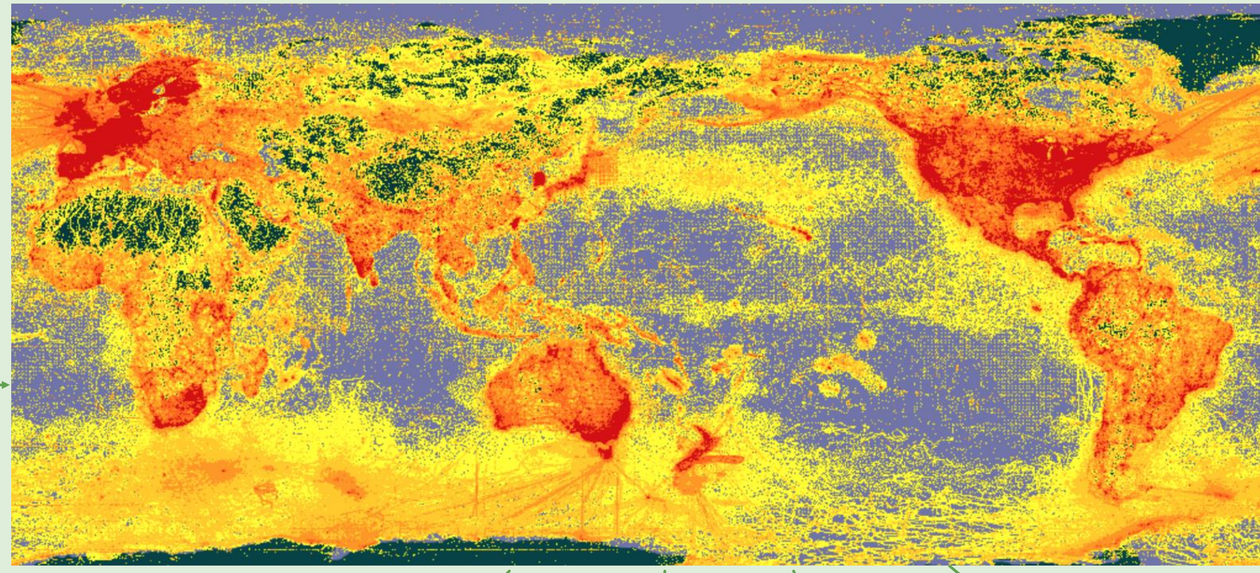


Alternative: Many citizen science data platforms publish data in GBIF

https://www.gbif.org/publishing-data/

A window on evidence about where species have lived, and when

- Observations/ surveys
- Digitized specimens
- Literature
- Data publishing and indexing
- Common standards (DwC)
- Satellite tracking
- Environmental DNA

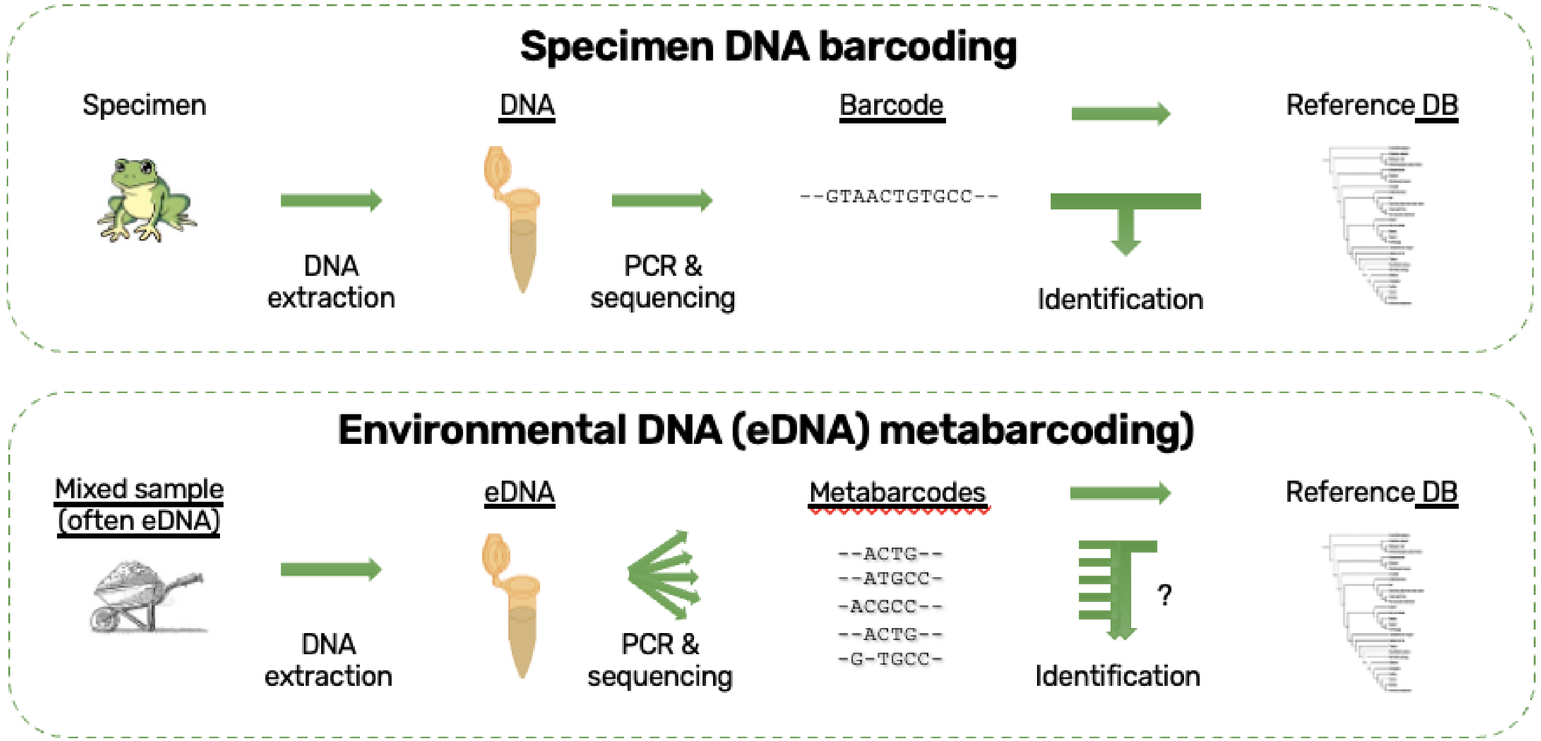


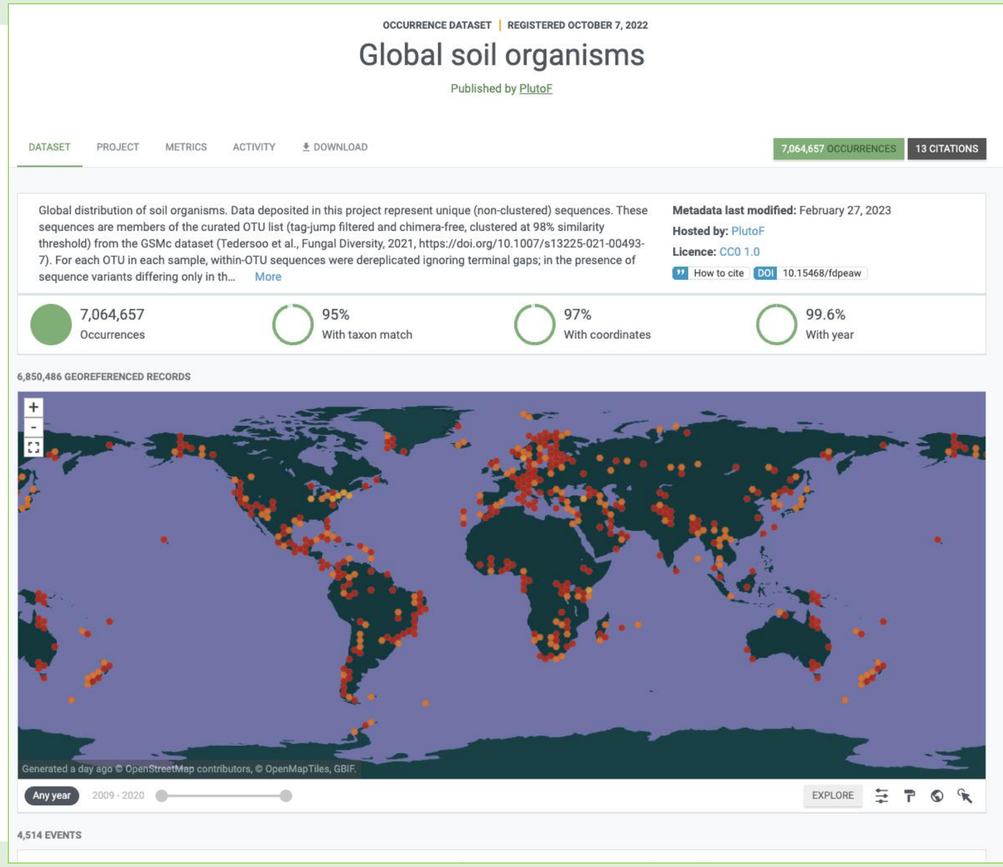


- Data discovery and use

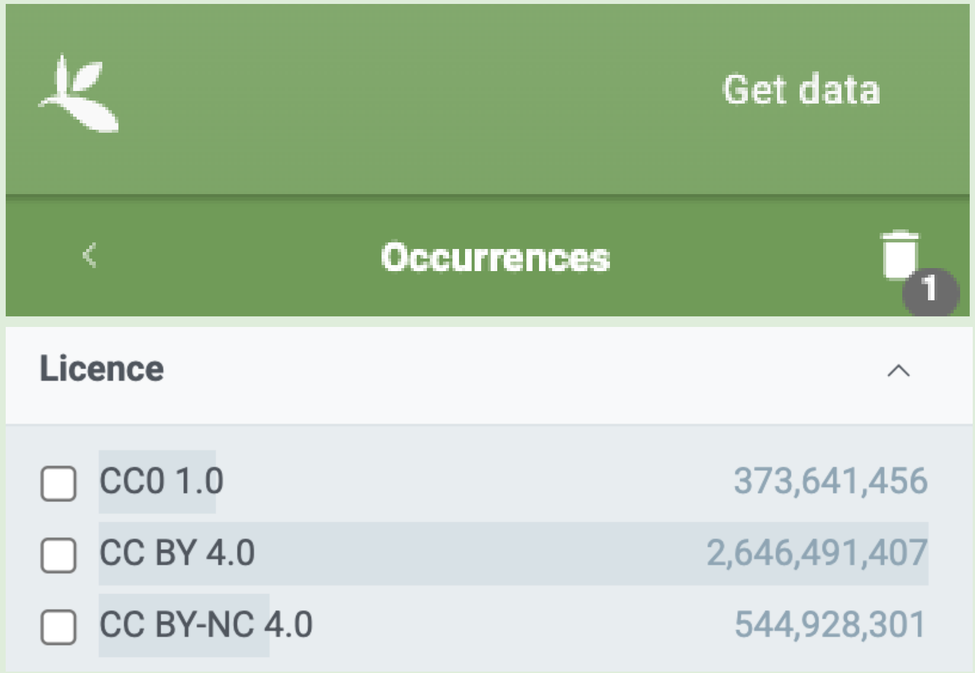
https://www.gbif.org/occurrence/search

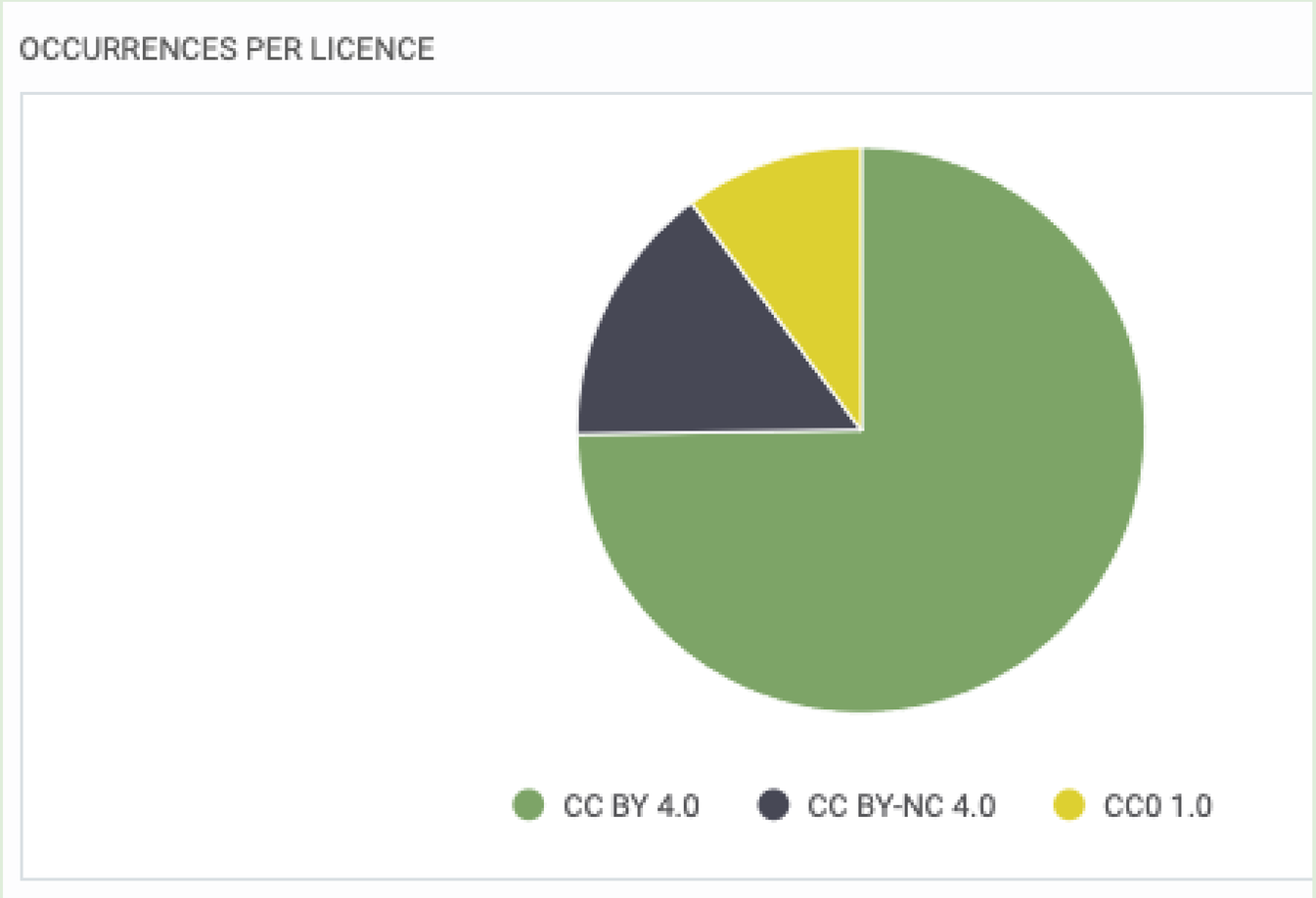
Exploring biodiversity through DNA evidence





GBIF Data licenses





https://www.gbif.org/occurrence/charts?occurrence_status=present

GBIF terms and agreements

Terms of use

Agreements, policies and disclaimers relating to access and use of GBIF-mediated data and services

Data

GBIF does not guarantee the accuracy of the biodiversity data served through GBIF.org and web services. Use of data accessed through the portal and web services is at the user's own risk.

Users must observe the provisions of the data user agreement. Data publishers must observe the provisions of the data publisher agreement.

Provisions for personal data provided or collected while using the site are detailed in the privacy policy.

Data licensing

In 2014, following a community-wide consultation, the GBIF Governing Board established a general policy to "ensure that all species occurrence datasets within the network are associated with digital licenses equivalent to one of…three choices supplied by Creative Commons":

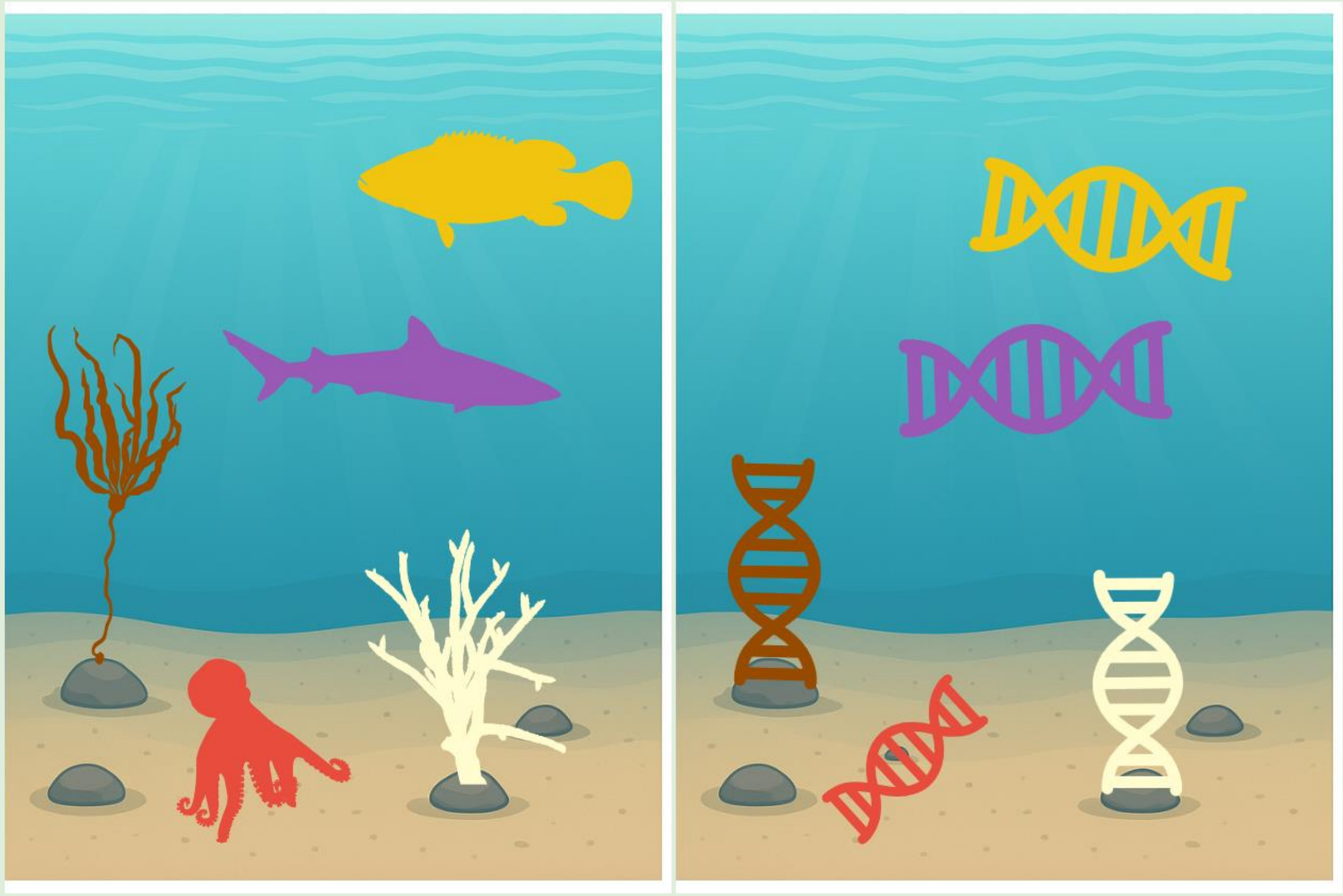
- CC0, under which data are made available for any use without restriction or particular requirements on the part of users
- CC BY, under which data are made available for any use provided that attribution is appropriately given for the sources of data used, in the manner specified by the owner
- CC BY-NC, under which data are made available for any use provided that attribution is appropriately given and provided the use is not for commercial purposes

https://www.gbif.org/terms



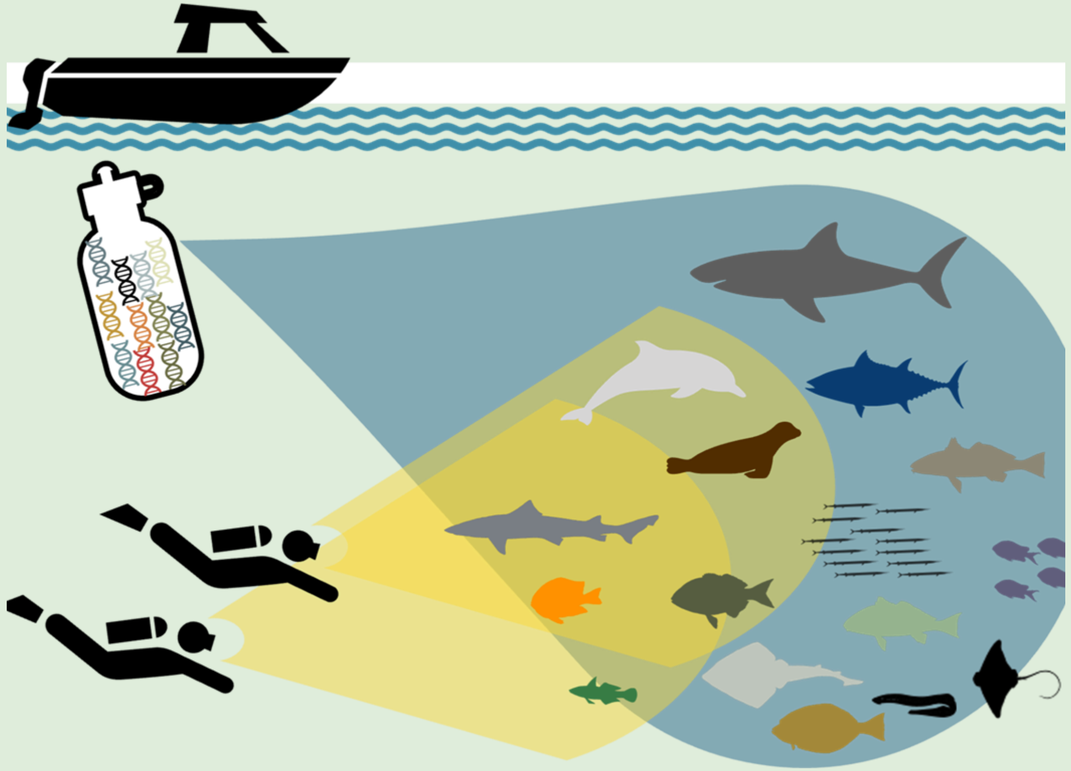
Metabarcoding Toolkit

eDNA can reduce the resources needed to observe biodiversity



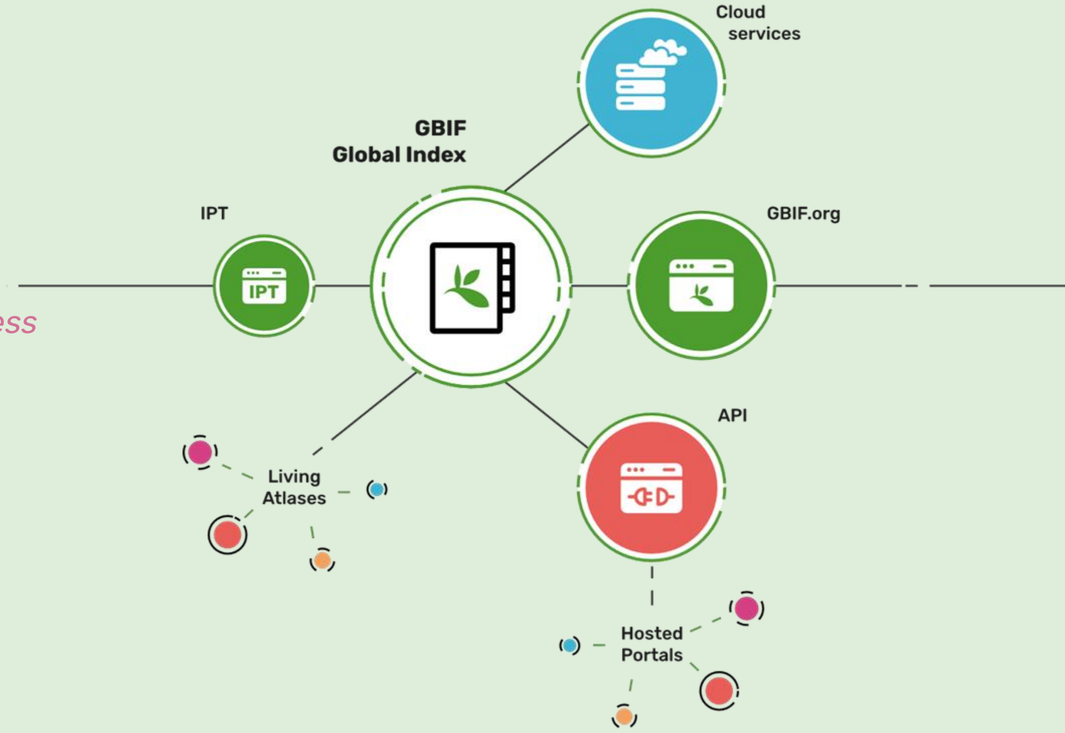
Based on slides from Zachary Gold and Susie Theroux

eDNA helps, but it's not a silver bullet



Share

FAIR and open access



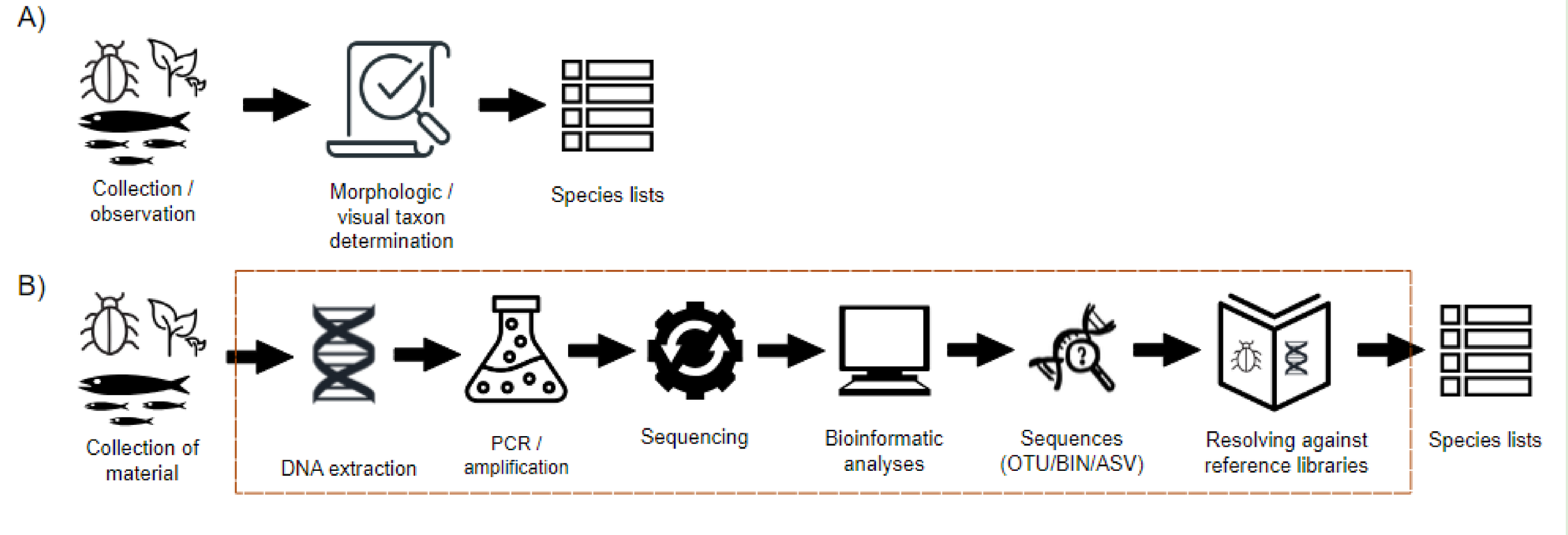
Based on slides from Zachary Gold and Susie Theroux

What concerns do users have about publishing eDNA?



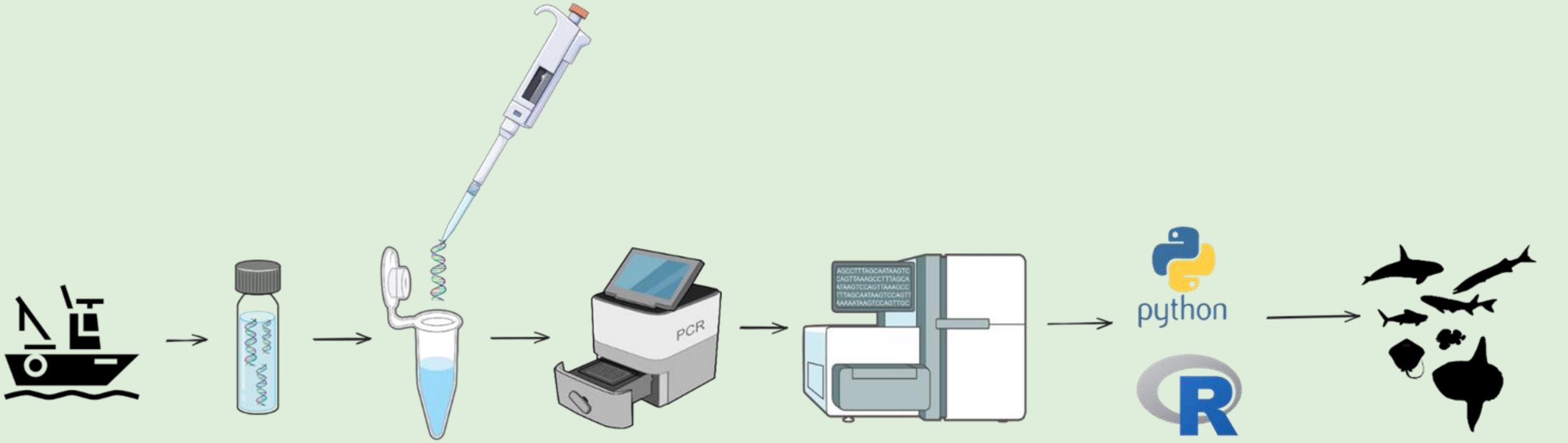
Learning how to publish eDNA can be overwhelming

The DNA-Derived Data Extension



Modified from Figure 2:

Abarenkov K, Andersson AF, Bissett A, Finstad AG, Fossøy F, Grosjean M, Hope M, Jeppesen TS, Kõljalg U, Lundin D, Nilsson RN, Prager M, Provoost P, Schigel D, Suominen S, Svenningsen C & Frøslev TG (2023) Publishing DNA-derived data through biodiversity data platforms, v1.3. Copenhagen: GBIF Secretariat. https://doi.org/10.35035/doc-vf1a-nr22.



Sampling

Wetlab
Library Prep

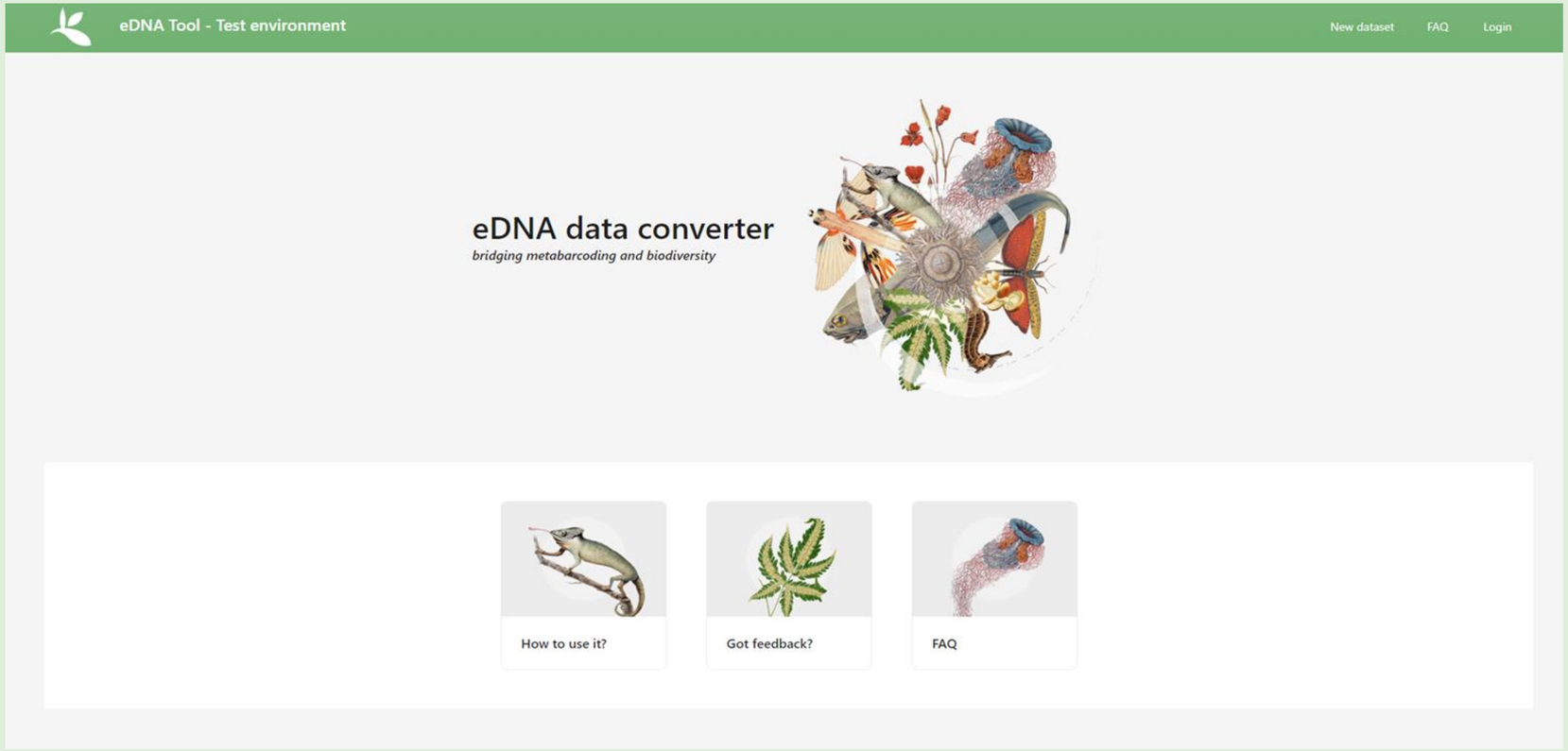
Sequencing

QC
Analysis

Species
Detections

Based on slides from Zachary Gold and Susie Theroux

GBIF Metabarcoding Toolkit (MDT)



https://mdt.gbif-test.org/

Metabarcoding Data Toolkit – user guide

GBIF Secretariat – DNA@gbif.org – Version 6e3acb4, 2025-09-26 12:00:23 UTC

This document is also available in PDF format.

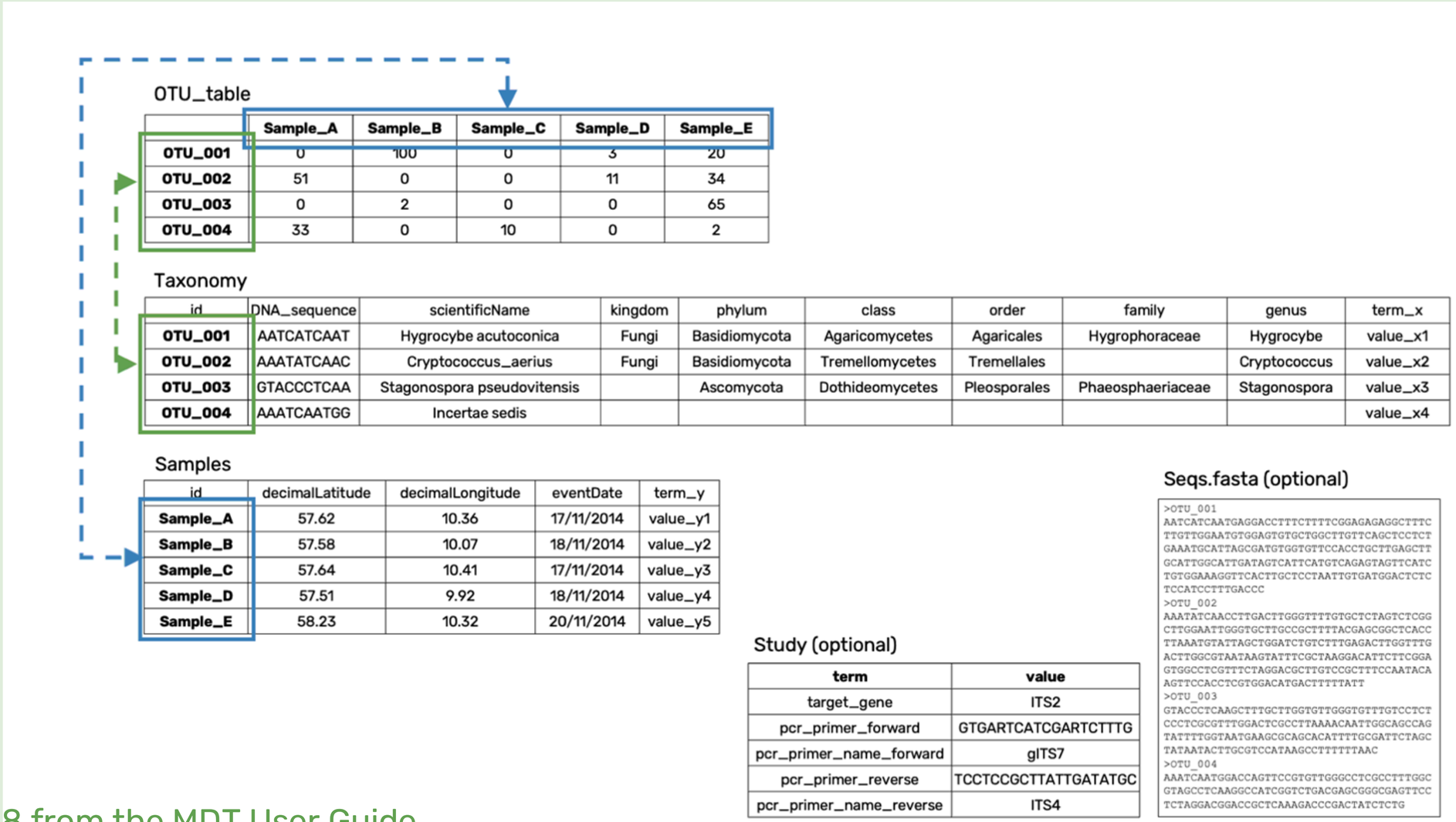


https://docs.gbif-test.org/mdt-user-guide/en/

Core Components

- Excel Templates
- Metabarcoding Requirements
- MDT feedback mechanisms
- MDT Sandbox environment

MDT Core Components



OTU_table

	Sample_A	Sample_B	Sample_C	Sample_D	Sample_E
OTU_001	0	100	0	3	20
OTU_002	51	0	0	11	34
OTU_003	0	2	0	0	65
OTU_004	33	0	10	0	2

Taxonomy

id	DNA_sequence	scientificName	kingdom	phylum	class	order	family	genus	term_x
OTU_001	AATCATCAAT	Hygrocybe acutoconica	Fungi	Basidiomycota	Agaricomycetes	Agaricales	Hygrophoraceae	Hygrocybe	value_x1
OTU_002	AAATATCAAC	Cryptococcus_aerius	Fungi	Basidiomycota	Tremellomycetes	Tremellales		Cryptococcus	value_x2
OTU_003	GTACCCTCAA	Stagonospora pseudovitensis		Ascomycota	Dothideomycetes	Pleosporales	Phaeosphaeriaceae	Stagonospora	value_x3
OTU_004	AAATCAATGG	Incertae sedis							value_x4

Samples

id	decimalLatitude	decimalLongitude	eventDate	term_y
Sample_A	57.62	10.36	17/11/2014	value_y1
Sample_B	57.58	10.07	18/11/2014	value_y2
Sample_C	57.64	10.41	17/11/2014	value_y3
Sample_D	57.51	9.92	18/11/2014	value_y4
Sample_E	58.23	10.32	20/11/2014	value_y5

Study (optional)

term	value
target_gene	ITS2
pcr_primer_forward	GTGARTCATCGARTCTTTG
pcr_primer_name_forward	gITS7
pcr_primer_reverse	TCCTCCGCTTATTGATATGC
pcr_primer_name_reverse	ITS4

Seqs.fasta (optional)

```
>OTU_001
AATCATCAATGAGGACCTTTCTTTTCGGAGAGAGGCTTTC
TTGTTGGAATGTGGAGTGTGCTGGCTTGTTCAGCTCCTCT
GAAATGCATTAGCGATGTGGTGTTCCACCTGCTTGAGCTT
GCATTGGCATTGATAGTCATTCATGTCAGAGTAGTTCATC
TGTGGAAAGGTTCACTTGCTCCTAATTGTGATGGACTCTC
TCCATCCTTTGACCC
>OTU_002
AAATATCAACCTTGACTTGGGTTTTGTGCTCTAGTCTCGG
CTTGGAATTGGGTGCTTGCCGCTTTTACGAGCGGCTCACC
TTAAATGTATTAGCTGGATCTGTCTTTGAGACTTGGTTTG
ACTTGGCGTAATAAGTATTTCGCTAAGGACATTCTTCGGA
GTGGCCTCGTTTCTAGGACGCTTGTCCGCTTTCCAATACA
AGTTCCACCTCGTGGACATGACTTTTTATT
>OTU_003
GTACCCTCAAGCTTTGCTTGGTGTTGGGTGTTTGTCCTCT
CCCTCGCGTTTGGACTCGCCTTAAAACAATTGGCAGCCAG
TATTTTGGTAATGAAGCGCAGCACATTTTGCGATTCTAGC
TATAATACTTGCGTCCATAAGCCTTTTTTAAC
>OTU_004
AAATCAATGGACCAGTTCCGTGTTGGGCCTCGCCTTTGGC
GTAGCCTCAAGGCCATCGGTCTGACGAGCGGGCGAGTTCC
TCTAGGACGGACCGCTCAAAGACCCGACTATCTCTG
```

Figure 8 from the MDT User Guide

MDT Excel Templates

6.1. OTU table template 1 – Excel workbook

A workbook with three/four sheets: **OTU_table**, **Taxonomy**, **Samples** and (optionally) **Study**. Template 1.

6.2. OTU table template 2 – Excel workbook with fasta file

Same as #1, except instead of having the sequences in the **Taxonomy** sheet, a fasta file (**seqs.fasta**) is provided. Template 2.

6.3. OTU table template 3 – TSV format

Three/four tsv (or csv) files **OTU_table.tsv**, **Taxonomy.tsv**, **Samples.tsv**, and (optionally) **Study.tsv** containing study-wide global values. Template 3.

6.4. OTU table template 4 – TSV format with fasta file

Same as #3, except instead of having the sequences in the **Taxonomy.tsv**, a fasta file (**seqs.fasta**) is provided. Template 4.

MDT Requirements

Fields Automatically Handled by MDT

The following fields are automatically populated and require no user input:

- basisOfRecord, occurrenceID
- organismQuantity, organismQuantityType
- sampleSizeValue, sampleSizeUnit
- taxonID, eventID

Fields to be Provided by User

Required

- DNA_sequence
- scientificName
- eventDate
- eventID (Sample ID used by default)

Highly Recommended

- materialSampleID, recordedBy
- decimalLatitude, decimalLongitude
- target_gene, target_subfragment
- pcr_primer_forward, pcr_primer_reverse
- pcr_primer_name_forward, pcr_primer_name_reverse
- pcr_primer_reference, seq_meth
- otu_class_appr, otu_seq_comp_appr, otu_db
- kingdom

Recommended

- env_broad_scale, env_local_scale, env_medium,
- associatedSequences, lib_layout, sop,
- samplingProtocol, identificationRemarks, identificationReferences,
- phylum, class, order, family, genus

MDT Feedback mechanisms

Report a bug:
https://github.com/gbif/metabarcoding-data-toolkit-ui/issues/new

Request a feature:
https://github.com/gbif/metabarcoding-data-toolkit-ui/issues/new

GBIF Discourse:
https://discourse.gbif.org/t/for-matters-relating-to-the-metabarcoding-data-toolkit-or-the-datatype-in-general/5484

Strengths of eDNA



Sampling

Ease of sampling, collect samples remotely

Minimal environmental impact

Filters, DNA extracts, and sequences can be preserved long term, allowing reanalysis



High Sensitivity

Improved detection of rare and cryptic species

Detect broad diversity of species simultaneously, from microbes to mammals



Standardization of biases

Ability to standardize taxonomic analyses

Minimize biases and increase comparability of data across sampling programs



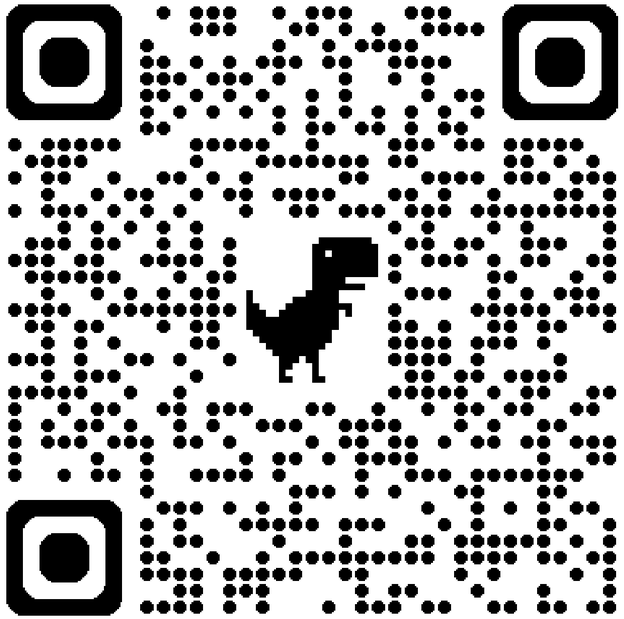
Burden

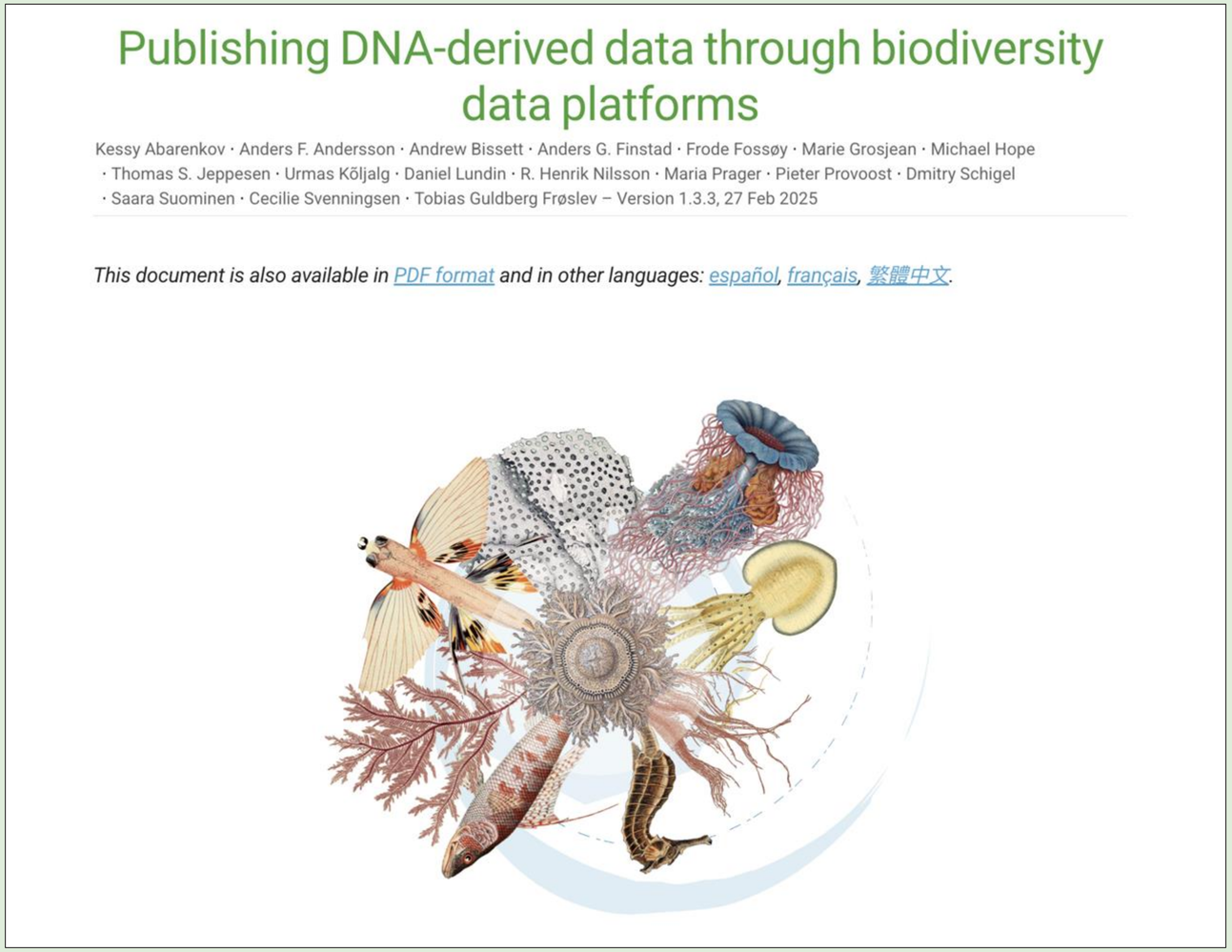
Low cost per sample

Fast data turnaround times

Based on slides from Zachary Gold and Susie Theroux

Suggested Reading





Abarenkov K, Andersson AF, Bissett A, Finstad AG, Fossøy F, Grosjean M, Hope M, Jeppesen TS, Kõljalg U, Lundin D, Nilsson RN, Prager M, Provoost P, Schigel D, Suominen S, Svenningsen C & Frøslev TG (2023) Publishing DNA-derived data through biodiversity data platforms, v1.3. Copenhagen: GBIF Secretariat. https://doi.org/10.35035/doc-vf1a-nr22.



EXERCISES

MDT Sandbox environment - hands on (15 min)

Work through the MDT Quick Start Guide, exploring the tool and user documentation with the example dataset provided in the Quick Start Guide

https://docs.gbif-test.org/mdt-user-guide/en/#simple_quick_start

https://mdt.gbif-test.org/

https://mdt.gbif.no/

https://mdt.gbif-test.org/

https://mdt.gbif.no/

ChatIPT (AI LLM bot)

https://chatipt.svc.gbif.no/

THANK YOU

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