GBIF Global Biodiversity Information Facility

WORKSHOP PRIMER

AUG 2025

GBIF BACKGROUND AND GLOBAL ROLE AS BIODIVERSITY INFRASTRUCTURE

This primer is designed to do two things –

1. Answer questions you might have about the Global Biodiversity Information Facility (GBIF) in a way that will allow you to fully participate in the August 25 GBIF Strategy and Mobilisation Workshop.
2. Get you thinking about the role you and your organisation play as a contributor to and user of this vast, free resource.

Our workshop will help to articulate concrete benefits, strengthen connections across New Zealand's GBIF user community, and explore how barriers can be reduced so that GBIF secures a stronger, more trusted role among your organisations.
We don't intend to spend workshop time revisiting high-level concepts, as GBIF's philosophy and value proposition are well understood. Instead, the focus will be on identifying specific ways GBIF can deliver greater impact in New Zealand, and on strengthening the community of practice that supports it. Every organisation that will be present at the workshop currently plays, or could play, a critical role in this collective effort.

In brief, the purpose of our workshop is to leverage GBIF's clear value proposition into practical impact for New Zealand.

Welcome to GBIF for Aotearoa New Zealand (and to the New Zealand Organisms Register, too).

WHAT IS GBIF?

The Global Biodiversity Information Facility (GBIF) is the world's largest open-data infrastructure for biodiversity. Established in 2001 by OECD countries, GBIF is an international network designed to provide anyone, anywhere, with open access to data about life on Earth.

GBIF provides access to more than 3 billion species occurrence records from over 100 countries. Its federated model connects data from thousands of institutions, ensuring that information remains with its custodians while being standardised, discoverable, and usable worldwide. GBIF's value lies in enabling high-quality, traceable biodiversity data to support science, conservation, environmental reporting, and policy at national and global levels. By offering trusted infrastructure, open standards, and analytical tools, GBIF lowers barriers to data sharing, reduces duplication, and enhances the impact of biodiversity information that underpins decision-making in the face of biodiversity loss and climate change.

All biodiversity data shared through GBIF is openly available under Creative Commons licences, supporting the principle of free global access and reuse. Publishers can choose CC0 (no restrictions), CC BY (free use with attribution), or CC BY-NC (attribution, non-commercial use). This approach aligns with international best practice and New Zealand's open access framework (NZGOAL).

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GBIF BY THE NUMBERS:

THE GBIF 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.

THE INFRASTRUCTURE: HOW GBIF WORKS

GBIF is much more than a database. It is a federated, standards-based infrastructure that supports the full lifecycle of biodiversity data.

The workflow can be understood in four sequential processes:

1. **Mobilisation:** Preparing biodiversity data from monitoring programmes, research, and collections so it can be shared in interoperable formats. This includes museum records, ecological surveys, council monitoring, community initiatives, and emerging sources such as eDNA and camera traps.
2. **Publishing:** Making datasets available online using common standards (Darwin Core, EML, DwC-A) and appropriate metadata. The primary tool is GBIF's free Integrated Publishing Toolkit (IPT), which is now hosted for New Zealand publishers through GBIF NZ.
3. **Federation**: Connecting datasets across institutions, sectors, and countries through common protocols and quality checks. Data remain with their owners, but federation ensures they are discoverable and usable as part of a global network.
4. **Access & Use**: Enabling discovery, download, and analysis through open portals, hosted national atlases, and machine-to-machine APIs. Tools such as rgbif (R) and pygbif (Python) give researchers, agencies, and innovators programmatic access to data for reporting, modelling, and policy support.

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KEY FACTS:

- **107 PARTICIPATING COUNTRIES AND ECONOMIES (INCLUDING NEW ZEALAND)**
- **2,427 PUBLISHING INSTITUTIONS WORLDWIDE**
- **112, 514 + DATASETS**
- **3+ BILLION OCCURRENCE RECORDS**

Datasets in GBIF fall into four main classes starting simply and become progressively richer, more structured and more complex:

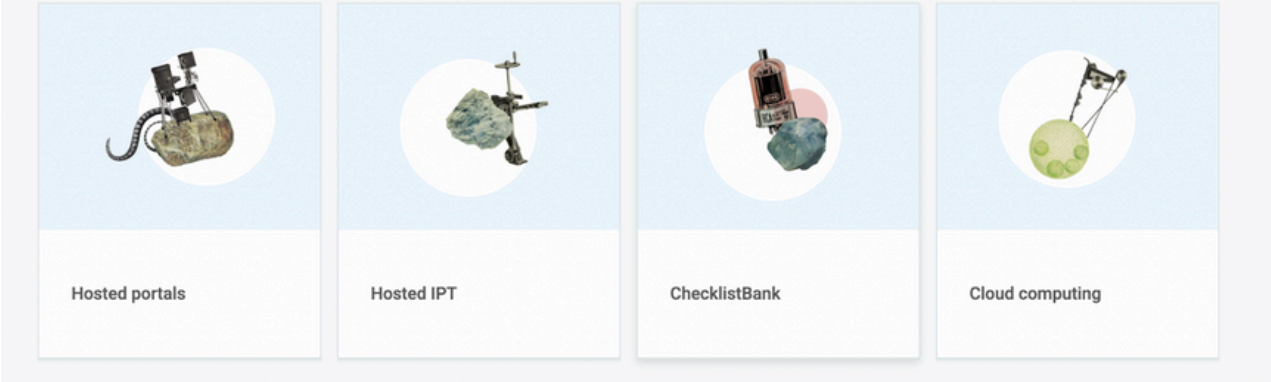
1. **Metadata-only** – descriptions of datasets that exist but are not yet fully digitised or published. Useful for showing data availability and prioritising future mobilisation.
2. **Checklist** – lists of organism names for a specific context (e.g. taxonomic group, geographic area, or management status).
3. **Occurrence** – the most common class, detailing individual records of species presence, typically from specimens, observations, or automated devices.
4. **Sampling-event** – structured datasets linking species records to specific sampling events, locations, and protocols, well-suited for ecological surveys and monitoring programmes.

ADDITIONAL SERVICES

GBIF provides a suite of services that extend beyond data publishing, including:

- **Hosted portals** – enabling countries like New Zealand to stand up a national biodiversity data portal without bespoke infrastructure.
- **Training and learning resources** – covering data standards, publishing, and use.
- **Data access tools** – APIs, libraries, and analytical services that support integration into science, monitoring, and policy systems.
- **Checklistbank** - GBIF - Catalogue of Life platform for publishing, managing, and accessing authoritative taxonomic checklists.

INFRASTRUCTURE RESOURCES



WHY GBIF MATTERS FOR NEW ZEALAND

Almost everyone who works in any field related to biodiversity or biosecurity understands the value of the collective. The varied positions that exist in the broad sector locally – as well as in our global networks – can't be effective without collaboration. This is because we deal with systems, and systems are complex.

The more of us that work with and on large systems like GBIF and the datasets that build it, the better they will be, and the better we can all be as a result.

We live in a time where a lot of information is restricted, paywalled and where pursuits of individual actors are promoted above those of the collective. We also know that the pathway from evidence to action is not always linear.

GBIF provides proven, global infrastructure that New Zealand can use right off the shelf to:

- Support national reporting – including State of the Environment reporting, the Aotearoa New Zealand Biodiversity Strategy, and contributions to the UN Convention on Biological Diversity.
- Reduce duplication and cost – by federating existing data rather than building bespoke systems.
- Enable innovation – through open APIs, data cubes, and integration with emerging methods (e.g. eDNA).
- Strengthen credibility – by aligning with international standards and connecting New Zealand science and policy to a global evidence base.

WHAT IS TRUSTED BIODIVERSITY INFRASTRUCTURE?

> ***We had an ageing infrastructure, which we replaced with a GBIF-hosted portal***
>
> – the United States Geological Survey

"Trusted biodiversity infrastructure" is the term we're using to describe the systems that support the complex work of preserving and promoting New Zealand's unique biodiversity.

While GBIF may not label itself explicitly as a trusted biodiversity infrastructure, this concept is woven into its design: it is an open, expertly-governed, technically robust system that ensures biodiversity data are reliable, accessible, interoperable, and impactful. Critically, the system itself and how it is made available is free of charge (although those costs are collectively spread among organisations that maintain nodes around the world).

Contributors can trust GBIF to handle, attribute, and preserve their data responsibly.

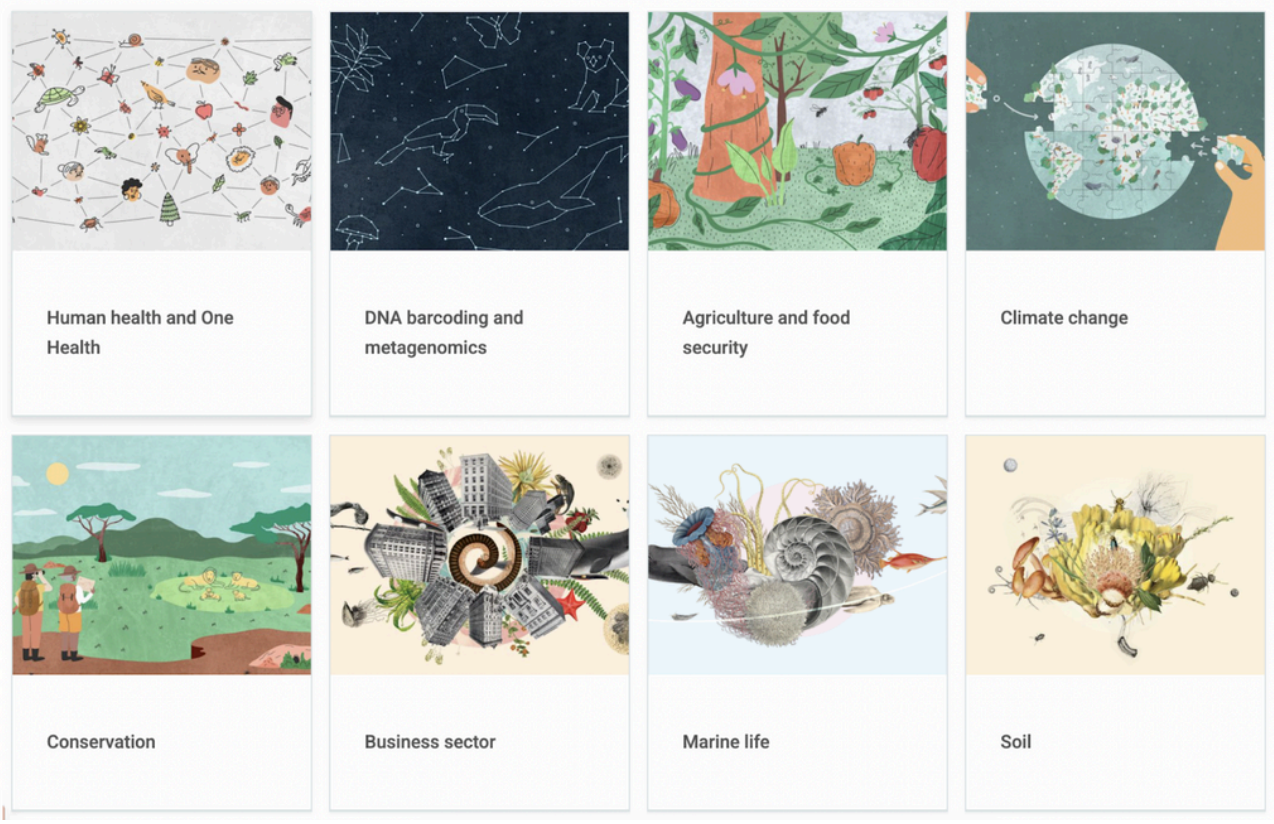
Users can rely on GBIF for high-quality, traceable data that drive science and policy with confidence.

WHAT IS GBIF'S GLOBAL ROLE AND VALUE PROPOSITION?

Read more about GBIF's value proposition at: **gbif.org/value**

For our work to be effective, we must demonstrate to leaders and to the public that our decisions are grounded in evidence and can be trusted. This is a core value of GBIF; we are all in need of ways to collect and to connect for broad impact, and we are all in need of ways to show our working. GBIF is a way in which you can show how you got from problem to solution, using verified evidence, from scientists, policy-makers and problem solvers just like you.

The applicability of free and open biodiversity data spans beyond academia, as GBIF-mediated data is also used to inform decision-making and policy (e.g. documents produced by local and national agencies; extinction risk assessments for thousands of species on the IUCN Red List of Threatened Species) as well as comprehensive reports by large-scale intergovernmental and convention-based bodies, such as the Intergovernmental Panel on Climate Change (IPCC).



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GBIF adds value across all stages of the data value chain, allowing governments, NGOs, businesses and scientists to make more informed decisions and open new lines of inquiry for ground-breaking research. The journey from collecting data to effecting change is one in which GBIF plays a pivotal role, facilitating easier access to data for those who need it, and providing the analytical tools to make sense of the data.

A SHORT SUMMARY OF GBIF IN AOTEAROA NEW ZEALAND

New Zealand was one of the original signatories to the GBIF Memorandum of Understanding in 2001, shortly after GBIF's establishment (also in 2001). The New Zealand Government, through the Ministry of Research, Science and Technology (MoRST), now MBIE, was the initial representative.

GBIF New Zealand was initiated and lead due to strategic leadership by Manaaki Whenua – Landcare Research (MWLR), which established the national GBIF node and continues to host it today.

CURRENT ROLES AND RESPONSIBILITIES (AS OF 2025)

Head of Delegation: Meredith McKay (ECan). Provides national leadership, ensures commitments are met, and represents New Zealand's position in GBIF decision-making.
Node Manager: Dr. Aaron Wilton (MWLR). Connects stakeholders, mobilises biodiversity data, and drives technical and community collaboration across the GBIF network.
MBIE: Remains the Voting Participant and liaison to GBIF Secretariat.
MWLR: Continues to support the GBIF NZ Node and host infrastructure for GBIF and NZOR.
Governance: Still informal; no current contract or statutory mandate establishing or resourcing the GBIF NZ Node (this will be a critical focus of our workshop!)

WHAT THE GBIF NODE OFFERS

A GBIF Node provides services in four key areas:

1. Support for science and research, contributing to improving biodiversity evidence for scientific research and understanding.
2. Support for policy and decisions, contributing to developing partnerships that benefit policy and society.
3. Engaging and enabling the community, contributing to developing the GBIF network to meet future needs and challenges.
4. Technical services for biodiversity data management, contributing to maintaining and evolving infrastructure to advance biodiversity-related knowledge.

GBIF NEW ZEALAND TIMELINE OF EVENTS

2001
- GBIF officially established between participating governments (including New Zealand).

2004
- NZ hosts GBIF International meetings; brings pacific countries together.

2005
- New Zealander to lead development of the world's first complete species database with GBIF, and elected as GBIF Chair (Dr David Penman).

2015
- GBIF widely accepted as solution for NZ taxonomic Collections.

2021
- New Zealand has seven publishers and 141 datasets but, publication by NZ has plateaued.

2022
- GBIF Head of Delegation and Node manager establish a New Zealand workplan.

2023
- Gap analysis finds that central and regional government are lowest mobilisers and compared with other countries New Zealand is falling behind in its efforts; New Zealand interventions and recommendation on need for indigenous data governance and mechanism for indigenous data labels at GB31. Envirolink tools project potential for regional councils to use GBIF to access and share species occurrence data for biodiversity and biosecurity management.

2024
- GBIF workplan includes new indigenous data governance working group and pilot for bicultural notices and labels in GBIF; Smart Weed Alert Tool (SWAT) developed using GBIF mediated data; MFE pilot funding 5 councils to pilot uploading biodiversity data to GBIF; DoC confirms GBIF Federation as priority and launches mobilising biodiversity data programme.

2025
- Ten new publishers across the NZ sector including regional councils and DoC; Continued but accelerated increase in number of Occurrence records with over 2 million more occurrences from New Zealand publishers.