

(DRAFT) Fairy Tales and Digital Research Data

Jorrit H. Poelen

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Poelen, J. H., & Seltsmann, K. C. (2025, October 23). Book Binding for the Digital Age hash://md5/097a516df8d5eb03aadcaeed942e557b. Datos Vivos/Living Data 2025, Bogotá, Colombia. Zenodo. <https://doi.org/10.5281/zenodo.17392711> a presentation as part of the Datos Vivos conference in Bogotá, Colombia 21-24 Oct 2025.

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Guiding Questions

How do *you* keep our Digital Biodiversity Data around?

How do *you* make use of our (past, present, future) digital research data?

What is *one* of *your* experiences that comes to mind in which digital data played a *not* so beneficial role in a transnational, multi-institutional, collaborative research community? Share your horror story!

Digital Data on the Internet are Ephemeral

*[...] We began in 1996 by archiving the Internet itself, a medium that was just beginning to grow in use. Like newspapers, the content published on the web was ephemeral - but unlike newspapers, no one was saving it. [...]*¹

¹Internet Archive. 2025. Accessed on 2025-10-13 at <https://archive.org/about>

Digital **Biodiversity** Data on the Internet are Ephemeral

[...] 20%-75% of biodiversity datasets in data networks GBIF, iDigBio, DataONE, and BHL changed or were unavailable in 2019/2020.[...] ²

²Elliott et al. 2020. Ecol Inf. doi:10.1016/j.ecoinf.2020.101132

Who or what keeps our Digital Biodiversity Data around?

- a) **the Data Fairy.**
- b) Awareness of the fragility of digital data.
- c) Common sense data archiving and citation practices.

Who or what keeps our Digital Biodiversity Data around?

a) **the Data Fairy.**

Who is this Data Fairy?

b) Awareness of the fragility of digital data.

c) Common sense data archiving and citation practices.

Is GBIF our Data Fairy?

GBIF Secretariat provides a publication **framework** for biodiversity data, but **is neither the owner nor custodian of such data**, and therefore is not responsible for the actual content served by Data Publishers.

GBIF Secretariat cannot guarantee the quality or completeness of data, **nor does it guarantee uninterrupted data access services**. Users employ these data and services at their own risk. ³.

³<https://www.gbif.org/terms/data-user> as accessed on 2025-10-13

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No!

GBIF is not claiming to be a data fairy who keeps your digital archives.

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Is Zenodo our Data Fairy?

[...] Data files are versioned. Records are not versioned. [...] Records can be retracted from public view; however, the data files and record are preserved. [...] Items will be retained for the lifetime of the repository. This is currently the lifetime of the host laboratory CERN, which currently has an experimental programme defined for the next 20 years at least. [...] All data files are stored in CERN Data Centres, primarily Geneva, with replicas in Budapest. [...] In case of closure of the repository, best efforts will be made to integrate all content into suitable alternative institutional and/or subject based repositories. [...] ⁵.

⁵<https://about.zenodo.org/policies/> as accessed on 2025-11-05

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Data Fairy is a Cousin of the Poop Fairy.



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Recent Reminders of Data Fairy Absence

- ▶ Server infrastructure running the Symbiota Hosted Portals at Arizona State University (ASU) was compromised and taken offline 21 Jul 2025 and was said to be fully restored on 10 Oct 2025 after hard work by the Symbiota Support Hub team. The outage affected over 54 hosted collections.
- ▶ The Symbiota Collections of Arthropods Network (**SCAN: <https://scan-bugs.org>**) serving specimen occurrence records and images from over 100 North American arthropod collections for all arthropod taxa, was taken offline in 2025 with no plans to revive it.
- ▶ 20 years since its inception and facilitating access to over 300k digitized biodiversity data works, the **Biodiversity Heritage Library** faces an uncertain future as it is set to lose their institutional sponsor, the Smithsonian, on 1 Jan 2026 ⁷.

⁷<https://about.biodiversitylibrary.org/about/future-of-bhl/>

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Book Binding for Digital Biodiversity Data

- ▶ What is so neat about physical books?
- ▶ What is book binding for biodiversity data?

The Neat Thing about Physical Books

Even before the invention of the book press, books and scrolls have been pretty successful in transferring knowledge across generations and around the world.

Typically, books are portable stacks of bound paper containing text and imagery.

Books can be combined into collections without changing their design.

Books are kept around the world in (little) public libraries, academic institutions, private collections and national archives.

Books are wireless, their content cannot be easily altered remotely, changes can be detected (ripped out pages), and they need no power to operate.

Books can be sent by physical mail.

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Idea . . . what if we treat digital data more like a bound book instead of a web location?

Steps to Binding Digital Data Books

Step 1. Use **signed** citations to reference digital data ⁸.

Step 2. Bind these referenced data by describing them in a **Data Bill of Materials** (DataBoM).

Step 3. Publish the data bill of materials, a digital text file.

Step 4. Use the signed citation of the data bill of material (DataBoM) in your research.

Step 5. Continuously monitor the availability of the DataBoM and the associated data.

⁸Elliott et al. 2023. Sci Data. doi:10.1038/s41597-023-02230-y

Existing DataBoMs

>300k Digitized Biodiversity Heritage Literature Items

Poelen, J. H., & Agosti, D. (2025). A Versioned Literature Corpus derived from Biodiversity Heritage Library hash://md5/b3cd9de0685deeebf57a5d225e59c10f (0.3) [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.16616872>

Darwin Core Archives Associated with scan-bugs.org

Elton, Nomer, & Preston. (2025). Versioned Archive and Review of Biotic Interactions and Taxon Names Found within globalbioticinteractions/scan hash://md5/58de50154e330c331993fe5d0852ad84. Zenodo. <https://doi.org/10.5281/zenodo.16894884>

How to keep our Digital Biodiversity Data around?

I've been using this Data Bill of Materials approach to track terrabytes of biodiversity data since Sept 2018, keeping identical copies across independent storage locations, and reusing their content.

For examples and recorded presentation, see:

Poelen, J. H., & Seltmann, K. C. (2025, October 23). Book Binding for the Digital Age hash://md5/097a516df8d5eb03aadcaeed942e557b. Datos Vivos/Living Data 2025, Bogotá, Colombia. Zenodo. <https://doi.org/10.5281/zenodo.17392711> a presentation as part of the Datos Vivos conference in Bogotá, Colombia 21-24 Oct 2025.

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And Remember



Thank you!

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For questions/comments/ideas, please do reach out to:

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