CENTRE FOR BIODIVERSITY & NATURAL PRODUCTS
GBIF DATA MOBILIZATION PROJECT 2021 – 2023

ZOOLOGY COLLECTIONS REPORT

22 JUNE 2023

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ZOOLOGY COLLECTIONS SECTIONAL REPORT FOR THE GBIF DATA MOBILIZATION PROJECT (2021 – 2023)

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The GBIF Data Mobilization Project has been a process of teaching and learning, of errors and corrections. Most importantly, it has magnified the significance of Papua New Guinea's biodiversity data, and why we as an institution are responsible for its dissemination for development purposes and our contribution to the global biodiversity information. With the global concern for biodiversity loss due to climate change impacts, it is of utmost importance that our biodiversity information be gathered, collated and published for scientific research, development and monitoring of biodiversity. The Natural Science Resource Centre remains host to this valuable information for Papua New Guinea, and the world.

This report aims to highlight what has been achieved for the UPNG Zoology Collections during the project time span, recommendations, and how these milestones have added onto my personal and professional achievements, as an officer in charge of the collection.

1. THE ZOOLOGY COLLECTIONS AND DATABASE

The Zoology Collection hosts Amphibians, Reptiles, Mammals and Aquatic Vertebrates specimen dating back to as early as the 1920's. All specimen had been curated and registered into registry books specifically for each animal order. During the course of the project, separate databases were created for each order using Microsoft Excel Workbook. 65% of the information in the registry books have been digitized, and the process is still ongoing. Copies of the digitized database have been saved in the external hard drive provided by the Centre. Below is a summary of the work done in the collections.

Table 1. Summary of data mobilization and standardization in Zoology Collections

COLLECTION	DATA TRANSCRIBED FROM REGISTRY BOOKS	DATA CLEANED	DATA STANDARDIZED USING DARWIN CORE STANDARDS	DATA PUBLISHED
AMPHIBIANS (Frogs & Toads)	✔	✔	✔	
REPTILES (Snakes, Lizards, Skinks)	✔	✔	✔	✔
MAMMALS (Rodents, Bats)	✔		✔	
AQUATIC VERTEBRATES (Fishes, Mollusks, Crustaceans)			✔	

As Table 1 shows, the Amphibian and Reptile Databases have been created. The original data has been transcribed from the registry books, data cleaned using online data cleaning tools, and standardized using Darwin Core Standards. The Mammal and Aquatic Vertebrates Database have been created but data entry is still an ongoing process. A milestone for these collections was the publication of the dataset for Snakes of Papua New Guinea online, using GBIF's IPT Portal.

2. RECOMMENDATIONS FOR ZOOLOGY DATABASE DIGITIZATION

In regard to the database entries and work on digitization, there are few issues that I have identified specifically to the Zoology Collections that needs improvement. There are needs for:

a. Advanced antivirus, and UPS for the Zoology Collections Computer.

Each collection was given an external hard drive to save all copies of the digitized database. However, the collection's computer antivirus is outdated and requires an advanced antivirus for use with this valuable information. With the current status of the computer, the database is at high risk of corruption. There is also a need for a UPS for the collection's computer so the information stored is not at risk during sudden power outages.

b. Safe storage for hard copies of data registry books and record card

All registry books and record cards are being kept on the shelves inside the collections. However, with the current state of the room, the records are in a deteriorating state and prone to mold and fungal growth, and weevil infestation. A records cabinet specifically to house these important documents will ensure that the original information is retained.

c. Data Encryption and Log Book for accessing Database and any form of editing or data entry

The database I have created runs the risk of data tempering since it is not encrypted. For starters, having a logbook for persons working in the collections will ensure we can track changes made to the database and minimize unauthorized access. Also, the collection needs data encryption for the digitized copies of the database.

d. Synchronized updating of records and quality check

During the course of data entry, I found there were many records that needed taxon name updates. There is a need to record the changes in the registry book, as with the record cards and all the information cards with the information.

3. RECOMMENDATIONS FOR SPECIMEN COLLECTIONS

During the course of data digitization, I have identified a few issues that if improved may make a huge difference to the current state it is in at the moment. There is a need for:

a. Proper curation of all specimen housed in the collections

Over the years, many volunteers have happily topped up alcohol in the specimen jars checking what medium it has been preserved in. As a result, there are some specimens recorded as having been preserved in formalin or alizarin but now have alcohol topped up. To ensure a specimen remains in our collections for long, such petty information needs to be checked first. Therefore, I will recommend that only the officer in charge of the collections or the curator be the only ones to curate the specimen. Volunteers need not touch the specimen. They can help out with other housekeeping or data entries.

b. Maintenance to the air-condition unit

The aircon in the collections requires maintenance and has been down since 2022. Numerous requests to have it fixed have been to no avail. As a result, there has been a regrowth of mold in the collections due to the humidity. The specimen needs a cool room so the alcohol does not evaporate.

c. Annual reports on the collections

For people starting out in a collection like myself, there is a huge gap of information that is not made available by the curator or the division. There is a need for documentation of work being done in the collections. It can be submitted at the end of the year, and a copy made available in the collections. Compilation of reports like these can ensure proper work is checked, maintained or improved.

4. RECOMMENDATIONS FOR RESEARCH AND OUTREACH

This year was the first year we participated in World Environment Day activities organized by NCDC and the Port Moresby Nature Park. It was during these events that I realized the significance of the collections and the lack of awareness our fellow citizens have of biodiversity loss at the national level, and on the global scale.

Here are some suggestions on how we can use the work we are doing in the collections to reach out to Community- Based Organizations, Schools, Non- Government Organizations and Government Authorities.

a. Incorporate workshops/ debates/ awareness on certain environmental issues with UN mandated days for celebrations such as World Mangrove Day or International Day of Forests etc.

Such events like these divert all focus to celebrating the day full of activities, but forget to address the issue at hand. These workshops can be used to achieve milestones at the organization and community level that will contribute to achieving the national and global goals for the environment.

b. In-house information sessions (UPNG Information Sessions) on current global or national status on biodiversity.

I think it is important for everyone involved in the academia to create an avenue for dialogue on issues on biodiversity and the environment, without the need or presence of representatives of government agencies or authorities. People tend to digress from important issues discussed when there are people in positions of power present. Creating a space like this will allow everyone to discuss or debate environmental issues freely, formulate research projects aimed at solving these issues. After this, we can present our report to the rest of our concerned citizens, government agencies, stakeholders and donor agencies who will be willing to support our action.

c. Create a Biodiversity Newsletter or Magazine under the Centre for the purpose of highlighting important events, research projects, academic or student seminars for UPNG and the wider community.

Even with the digital age expansion, the wider community still rely on information that is formally reported and compiled. Having a newsletter can ensure that the UPNG Community remains aware and supports whatever project or awareness we venture into. This can further bridge the information and communication gap between schools in UPNG, and the wider community.

5. PROFESSIONAL AND PERSONAL ACCOMPLISHMENTS

At a professional and personal level, this project has enabled me to achieve many things both directly and indirectly, and I can say it has equipped me with data management skills for life. In this age of information, there is just a multitude of ways to collect data, analyze and present it. However, for biodiversity data, it is deemed sensitive. Providing quality datasets will have a huge impact on development, progress and addressing issues affecting biodiversity. Here are some things I have learned during the course of the project that is invaluable.

- ***Darwin Core Standards***

Darwin Core Standards are used as a global standard for collating quality biodiversity information. I learned about the different data types (collections, observations, sample- based, taxonomic and possibly pictures) and how to best share the information. For our case, we worked with collections database. This process has also enabled me to edit the Zoology databases and create fields that were relevant for each collection. I added field that are required for animal collections and other information often left out by the avid researchers. I have learned from this process that information recorded in the field is very important. Quality information always retains its validity.

- ***Principles of data management in digitization***

Data quality and coherence (especially on subjects like Georeferencing, dates, names and taxa cross-checking) are a vital part of the digitization process. This has allowed me to update the taxonomic name changes in the database and to include its authors.

- ***Basic concepts of data cleaning and other data management tools used validate and clean datasets.***

I learned the main concepts of data cleaning, related tools, and best practices in the curation process. Being one of the most tedious works for any scientist, but a vital one to retain correct information. This process allowed me to sort through and filter out any redundancies, misspellings and wrong formatting. I was able to clean out databases for Amphibians, Reptiles, Mammals and other Invertebrates. It also taught me to use tools available online to confirm the taxonomic information for all specimen. I was also able to see the scientific name changes of the specimen and make amendments to the existing database.

- ***Data publishing using IPT***

Learned how to publish data using IPT, also about the different licenses, use of metadata, mandatory fields for publishing, and also the hosting of datasets by different institutions.

- ***Teamwork, networking and time management***

I have learned the importance of teamwork, networking and time management to achieve the project's milestones. It has also brought to light the team's strengths, weaknesses and how well our unique abilities complement one another.

- ***Past curators, researchers and collection managers***

While compiling information for the project, I learned about the work of the past curators, researchers and collection managers who have passed through UPNG Zoology Collections and it is astounding. Their great work has laid the foundation on which myself and many others will continue to work on. Biodiversity data is truly immortal. I have been able to transcribe all the data they had recorded in registry books and record cards into a proper database using Microsoft Excel Worksheet.

- ***Published my first dataset using GBIF IPT portal.***

Putting together the Snakes of Papua New Guinea dataset was a great challenge. After various editing and omissions, I was able to publish the dataset online. Through this process I realized the importance of data quality.

In conclusion, the GBIF Data Mobilization Project for the Natural History Collections has been a successful one for the Zoology Collections. Although the digitization process is still ongoing, there is a framework in place and tools available to ensure it is fully digitized. Natural History Collections are truly immortal once records are kept well, data is of quality and it can be used for generations to come.

I would like to extend my gratitude and appreciation to the Project Lead, Dr. Gagul, for my late inclusion into the project team. Being able to see through a project like this, and led by a team of women is empowering. I hope that we can build on our skills and knowledge from here on and be advocates for biodiversity and research.