

# Mobilizing biodiversity data from natural history collections in Fiji

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**Programme:** BID

**Project ID:** BID-PA2020-006-NAC

**Project lead organization:** The University of the South Pacific, Institute of Applied Sciences

**Project implementation period:** 1/7/2021 - 30/6/2023

**Report approved:** 4/9/2023

## Final Narrative Report

### Executive Summary

We have published 19,629 records of data based on the collections housed at the South Pacific Regional Herbarium and the University of the South Pacific (USP) over nine datasets in four Natural History disciplines. Moreover, two more Marine datasets and one update of the Fern and Fern allies dataset are nearing publication.

During the two years, we have delivered three capacity-building workshops in data mobilisations (theory and practical), collection management and collection care.

Covid pandemic restrictions and challenges in recruiting technicians and discontinuing a staff's employment hindered progress in deliverables and activities. The published dataset was significantly smaller than the proposed; however, we have worked out the workflow of capturing, cleaning, and mobilising data for the USP terrestrial collections. We could also assess the status of the collections in fuller picture from the management and care point of view. The project outcomes became useful foundations that can contribute much more to the future.

One of the best outcomes of the project was to have affirmed working relationships between the and beyond partner institutions and initiated collaborations between the USP collection keepers so that future collaboration will be encouraged.

Once the USP's database is upgraded, the next plan is to share it between the Natural History collection areas (which used to be only available for the herbarium collections) and across the university campus in different parts of the South Pacific region. It is a significant achievement led by this project through many iterations of patient discussion.

### Progress against milestones

**Has your project completed all planned activities?: No**

**Has your project produced all deliverables: No**

**Rationale:** In 2021 Fiji was under COVID restrictions at various levels. One of the examples of lost efficiency for this period was that the Marine collection interns worked at home using the images of the Marine registry book the curator had prepared for them, as the capacity of attendance at the university campus was capped at 70 %.

For the herbarium front, accessing the database and the collection facility during the restriction was impossible. It also took us a long time to understand the malfunctioning database fully. Besides the duplicate records and missing data for many fields, we could not export the data into the desired format, which was deemed unusable. We retrieved data from the Symbiota web database, where partial data with selected specimens were lodged. While we had the better dataset, it required to do intensive ground truthing against the physical specimens.

We also lacked the human resources to carry out the activities, which documented the above.

## Report on Activities

### Summary of the implementation of the project activities

We altered activities to adjust to the situations and needs identified along the way; however, the activities to aim at the better-catered capacity building were well achieved. Here is a summary of the activities of the capacity buildings.

Engagement and network workshop part 1: online theory (Apr. 2022), part 2: face-to-face practical (Aug. 2022):

Initially, we proposed to conduct an introductory theory session with our project partners to familiarise them with the importance of data mobilization and the details of our BID project. After many lengthy discussions in 2021, we decided that it would be best also to include other local biodiversity data holders and practitioners and include a practical session that involved training them in specimen collection and management. Unfortunately, due to pandemic restrictions on any form of gatherings where there was a limit to the numbers that could be physically present and the uncertainties of when these restrictions would be lifted we had to keep postponing our workshop dates. We then altered our plans for a collaboration workshop and engagement survey to accommodate for delays and setbacks brought about by the pandemic and lockdown restrictions. The adjusted plan included splitting the initially proposed collaboration workshop into two parts, a theory session delivered virtually and a practical session to be delivered face-to-face once restrictions eased up. The theory part was delivered on 28th April 2022 via Zoom, and was received well by the participants. It was a great learning experience for all and this was evident during the Q & A session where discussions revolved around sensitivity of sharing data and data ownership. The second and practical session was held on 24th & 25th August 2022. We concentrated on theoretical components as well as collections tour (to understand what preserved specimens are) on the first day, and covered practical components on the second day, such as familiarizing with Darwin Core, data capturing, cleaning data, and mapping data. We also spent some time discussing how to deal with sensitive data using five hypothesizing scenarios – the idea of this session arose from a result of the virtual workshop, in which some participants raised concerns about the data sensitivities. Prior to the virtual workshop we also conducted an engagement survey using google forms to

assess the situational needs of biodiversity data holders. In the "report attachments" a copy of the survey form, a copy of the virtual workshop programme, a list of the participants names, and a summary of responses from the survey is attached.

Collection management and Collection Care workshop with Auckland Museum, Auckland, New Zealand:

An amendment was made to convert the second year's engagement survey & network workshop to a collection management and collection care workshop, co-funded by the Auckland Museum Institute. The Museum invited three persons from the project team, one each from the marine and the terrestrial collections of USP, and another from the Ministry of Agriculture. The team worked with various collections held at the Museum by rotating between different natural history departments, digitisation of specimens and practice on IPM (Integrated Pest Management). It provided a valuable opportunity for the team to be exposed to the archival standard that meets international practices and enhance the knowledge of collection management and care.

The Marine Curator received hands-on knowledge about the care and management of a large natural history collection. He was able to see space and shelving management, pest control, safety, and digitization workflows. He has already started implementing small changes in the USP Marine Collection, such as the labelling format of the specimen shelves and new specimen quarantine areas. He will implement more changes following the completion of this Project. He is also confident in growing his new network with the Auckland Museum curators and collection managers. He also had a meeting with the Auckland Museum team are responsible for the Museum's GBIF records. He discussed workflows and shared contact information to the team.

Data capture trip (and subsequent mini data-capture blitz by the Auckland Museum volunteers):

After the employment of the acting project manager (M. Tabua) was disrupted by the university's bureaucracy in early March 2023, the terrestrial biodiversity data capturing and mobilizing activities were temporarily interrupted. A decision was made to adjust the 'taxonomy workshop' into a 'data capture trip' to aim to publish the monocot dataset.

Three Auckland Museum staff spend five days in the South Pacific Regional Herbarium to capture and check data with the herbarium specimens. Additionally, with the time constraints, point-and-shoot images of the specimens were taken to bring back to the museum. These images were processed and used to capture data by six museum volunteers, all undergraduate students from the Auckland tertiary institutions. Albeit a short time, we were pleased to be able to provide training for the students in biodiversity data literacy. The monocotyledon dataset contained 3269 lines of data originally, which expanded to c. 4200 (4042 data published) after accounting for all the physical specimens. The dataset was published and accessible (<https://doi.org/10.15468/qur8qh>).

Data capturing and mobilisation:

Through the data capturing and mobilizing activities, we have published nine datasets (four herbarium, one entomology, one vertebrate and three marine datasets) date and potentially two more marine datasets on the way. The details of the dataset are documented under the section of Deliverables.

The Curator of the Marine Collection, being a GBIF Mentor and Trainer, was a great help with our data mobilisation and workshops. He was able to address all questions from Fijian Government workshop participants that related to GBIF and PBIF.

Installing a Database:

We have identified Specify to be used by both the herbarium and the marine collection. This is after virtual discussions in 2021 with the senior managers from the National Institute of Water and Atmospheric Research (NIWA) in New Zealand, who gave us a brief introduction to the usability and functionality of Specify. Further into the project, NIWA collection managers gave us a tutorial on Specify during the collection management and collection care workshop held at Auckland Museum. We have gained some more depth in knowledge of how to operate the database; however, we concluded that the installation of the software and initial setting up for the data fields requires much more assistance from the IT staff of the university. We have yet to work out the best solutions for the software.

Concurrently, there have also been discussions about upgrading and maintaining the herbarium's local database. As of 30th June 2023, USP's IT has identified that the current database management software platform is obsolete and has insufficient storage capacity. The university offered (and was paid for by the project) a graduate intern position to:

1. Upgrade to a new database management software.
2. Migrate the existing records to the new database.
3. Implement additional features such as geo-referencing and a better search function.

The plan is to share the newly upgraded database between the biodiversity collection areas (whereas it used to be only available for the herbarium collections) and across the university campus in different parts of the South Pacific region.

Data-capturing and mobilizing data:

In 2021 Fiji was under COVID restrictions at various levels. One of the examples of lost efficiency for this

period was that the Marine collection interns worked at home using the images of the Marine catalogue book the curator had prepared for them, as the capacity of attendance at the university campus remained capped at 70 % until 2022. Scanning of marine catalogue books took longer than expected, with limited access to material and facilities under COVID restrictions.

Being on lockdown also meant that access to herbarium specimens and data was restricted. The herbarium database can only be accessed via the university's network; therefore, cross-checking data from our Excel sheet to what's on the database or cross-checking against physical records was not possible.

We slowly established a workflow that works for our data post-lockdown, but we realized and acknowledged that the workload was not matched with the available human recourse.

We have encountered a delay in hiring the Marine database technicians, as aforementioned earlier in the report. The lack of technicians brought a significant delay and setback in the data capturing and mobilizing activities in year 2. We have planned to use the digitized specimen images to run a data capturing blitz, aimed at training undergraduate students during their semester break, which unfortunately never eventuated because there were no technicians to undertake the task.

## Completed activities

### **Activity: Engagement Workshop**

**Description:** Engage and survey endusers via a situational and needs online assessment of biodiversity data practitioners and their organizations.

The form was made available online for at least two weeks. Introductions to data types, to GBIF, and its practices.

**Start Date - End Date:** 26/4/2022 - 6/5/2022

**Verification Sources:** A sample of the survey form and a summary of the responses received is in the "Report Attachments" section in the Mid-term report

### **Activity: Collaboration Workshop**

**Description:** Introductory workshop with our project partners from government and other non-government biodiversity data holders, introduce/familiarize them with data mobilization, what GBIF is and the details of our project. Theory part only (two hour session via Zoom).

**Start Date - End Date:** 28/4/2022 - 28/4/2022

**Verification Sources:** In the "Report Attachments" is a list of participants that attended the virtual theory session and a copy of our programme.

### **Activity: Data capturing collections - year 1**

**Description:** Data-captureing collections and data management.

1. Fern dataset was used to pilot the data management and data-captureing work flow.
2. Aquatic biodiversity records at The University of the South Pacific was captured into the dataset.
3. Entomology data entry has been on-going

**Start Date - End Date:** 4/10/2021 - 31/5/2022

**Verification Sources:** 1. to be published

2. <https://doi.org/10.15468/w8jpdj> ac

3. <https://10.15468/ec2jrj>

## Activity: Data mobilization – year 1

**Description:** Ensure data standards for GBIF are being met for newly digitized material and publishing data to GBIF.

1. Aquatic biodiversity records at The University of the South Pacific was mobilised.

**Start Date - End Date:** 4/10/2021 - 31/5/2022

**Verification Sources:** <https://doi.org/10.15468/w8jpdj> accessed via GBIF.org on 2022-06-22

## Activity: Collaboration and Capacity Building workshop

**Description:** A part 2 of the workshop following the theory session held in April 2022. The part 2 was a mixture of lectures and practical sessions which aimed to cement the knowledge of biodiversity data mobilisation.

**Start Date - End Date:** 24/8/2022 - 25/8/2022

**Verification Sources:** Report Attachment section: our programme (Programme\_USP\_Aug 2022.pdf) and list of participants

## Activity: Data capturing from collections - year 2

**Description:** Capturing data (data-entry) for the following dataset.

1. Entomology dataset
2. Vertebrate dataset
3. Bryophyte dataset
4. Gymnosperm dataset
5. Monocotyledons dataset
6. Aquatic biodiversity records
7. Juvenile scalloped hammerhead sharks
8. Checklist of scientific and local names of the finfishes
9. Ferns and Fern allies dataset

**Start Date - End Date:** 1/6/2022 - 7/7/2023

**Verification Sources:** 1. <https://doi.org/10.15468/ec2jrj>

2. <https://doi.org/10.15468/qesrre>

3. <https://doi.org/10.15468/tqqfhp>

4. <https://doi.org/10.15468/pekj97>

5. <https://doi.org/10.15468/qur8qh>

6. <https://doi.org/10.15468/w8jpdj>

7. <https://doi.org/10.15468/r8aa8r>

8. <https://doi.org/10.15468/wwn8cw>

9. <https://doi.org/10.15468/d9qh8j>

## Activity: Data mobilization year 2

**Description:** Dataset captured were cleaned and formatted to meet Darwin Core standards and published to GBIF.

**Start Date - End Date:** 1/7/2022 - 7/7/2023

**Verification Sources:** 1. Entomology dataset: <https://www.gbif.org/dataset/a0bb9d01-8f0e-4d62-aea8-cb190eccc98>

2. Vertebrate dataset: <https://www.gbif.org/dataset/61366a70-822c-45b8-9e66-e61726dd13e8>

3. Bryophyte dataset: <https://www.gbif.org/dataset/d7aa30e1-de36-4b10-9ba8-1c41c7304dca>
4. Gymnosperm dataset: <https://www.gbif.org/dataset/227cf353-879a-4efa-a483-bc9d93bf252c>
5. Monocotyledons dataset: <https://www.gbif.org/dataset/824ce0bc-3ce7-434e-87b6-56e00569bfd4>
6. Aquatic biodiversity records: <https://www.gbif.org/dataset/a0bb9d01-8f0e-4d62-aea8-cb190eccc98>
7. Juvenile scalloped hammerhead sharks: <https://www.gbif.org/dataset/539b6767-cc4e-4bda-b0c4-ec9cc297fe86>
8. Checklist of scientific and local names of the finfishes: <https://www.gbif.org/dataset/969d0be3-eea6-4133-827c-c82314e08900>
9. Fern and Fern allies dataset: <https://www.gbif.org/dataset/2270c173-c76f-4599-878e-44bde6b9b347>

## Activity: Project evaluation

**Description:** Reflection of achievement & set-backs, and discussion of future directions.

**Start Date - End Date:** 27/6/2023 - 7/7/2023

**Verification Sources:** The project evaluations were held during the last two weekly meetings via Microsoft Teams.

## Report on Deliverables

### Deliverables - Summary

We have published 17,991 records based on the physical specimens housed at the University of the South Pacific (and South Pacific Regional Herbarium) over seven datasets in four Natural History disciplines of the 50,000 proposed records to be published. The details are as follows:

- 4,939 new plant records over 4 datasets (Gymnosperms: <https://doi.org/10.15468/pekj97>, Monocotyledons: <https://doi.org/10.15468/qur8qh>, Bryophytes: <https://doi.org/10.15468/tqqfhp>, Fern and Fern allies: <https://doi.org/10.15468/d9qh8j>)
- 8,811 new entomological records of the 9000 proposed record (<https://doi.org/10.15468/ec2jrj>)
- 894 new vertebrate records of the 300 proposed records (<https://doi.org/10.15468/qesrre>)
- 2,761 new marine biodiversity records of the 13,000 proposed regards (<https://doi.org/10.15468/w8jpdj>)

Additionally, 790 new records from a checklist (<https://doi.org/10.15468/qesrre>) and 848 new records from a sampling event (<https://doi.org/10.15468/wnw8cw>) for the marine diversity were published. Taken together, the total of new records published during the project was 19,629.

New marine records under a previous BID Project ID:

As part of the Project Proposal Co-funding, the Marine Collection pledged work from four interns to assist with the mobilisation of new marine biodiversity records. Due to the COVID-19 lockdowns one intern (A. Waqairoba) assisted remotely with the mobilisation of 3,662 new records that were published to GBIF within the duration of our Project timeframe.

The dataset in question is “Molluscan specimens from the Astrolabe Reefs (Kadavu, Fiji), 1986-2006” <https://doi.org/10.15468/9o4gxx>. The dataset however was first published under a previous BID project and still has the that Project ID BID-PA2016-0002-REG. It includes the Project ID that funded the intern, YF\190078. These new records were overlooked for reporting in our Mid-term progress report.

Two non-occurrence dataset types were also published by the Marine Collection (USP as Publisher). These were:

- i. A sampling event dataset: <https://doi.org/10.15468/r8aa8r> with 848 occurrence records
- ii. A checklist dataset: <https://doi.org/10.15468/wwn8cw> with 790 records that include Fijian vernacular names.

The Marine Collection Curator is working (mobilisation cleaning stage) on one dataset on marine algae records comprising of approximately 2,000 records, which should be published a week from the submission of this report. The mobilisation of this dataset was dependent on the recruitment of a technician under this Project that was to be assigned to the Marine Collection. The Technician was to have been trained by the Curator in the data mobilisation processes. Unfortunately there was a major delay in hiring the technician by the University, until very close to the Project end period. Given the short timeframe, two Technicians were hired and worked on mobilisation data entry until 30th June. The Curator is currently cleaning their work.

There is a possible sampling event dataset that the Curator has just received permission to mobilise and publish. This dataset inclusion would bring up the total records for the Marine Collection to just under 13,000 total records (ie, all Marine Collection records) for this Project, however it may be too late to include as a project output as it will take another week to mobilise.

The delay and cutback on plant records:

There has been a considerable delay in publishing any of our plant records. We have discovered duplicate records and missing data for a number of fields from a dataset containing more than 30,000 records. Moreover, we could not export the data from the database in the desired format, deemed unusable. We then retrieved data from the Symbiota web database, where partial data with selected specimens were lodged. While it was the better dataset, it required intensive ground truthing against the physical specimens. There have been numerous discussions on how to move forward with our dataset, and we have decided to work with small chunks of data at a time, starting with approximately 400 records of ferns and fern allies. Once we had established a working system with the ferns, the system was applied to the Gymnosperm and Monocotyledon datasets. This meant we would have a smaller dataset to publish than we initially anticipated, but we published records that have been thoroughly scrutinized and has greater data integrity.

Another unexpected conundrum is that we were creating discrepancies in the current scientific names and classification systems under which we published, and the physical filing systems and the label ID as we worked through the dataset. This was because we were unable to update the taxonomic changes in the database and physical specimens. As a bridging and temporary solution, we documented the records of the original scientific names on the labels, the current names and standardized authorships of the names in one place in the Excel file. All of these will have to be incorporated with the database and the specimens eventually; however, we fear that the information will get lost without the more rigorous collection management systems and continuous technical support from trained staff being available at the SUVA herbarium.

Therefore, we recommend not to continue creating a huge backlog of classification updates in an Excel format for the rest of the Angiosperm plant specimens until the herbarium has a functioning database and long-term, trained full-time staff are available.

## Deliverables produced by the project

### Dataset deliverables

#### **Publish new marine records**

**Dataset type:** Occurrences

**Dataset scope:** Increase occurrence records of Pacific marine collections based on physical specimens from Fiji waters on GBIF

**Number of records:** 10,000

**Data holder:** School of Agriculture, Geography, Environment, Ocean & Natural Sciences

**Data host institution:** School of Agriculture, Geography, Environment, Ocean & Natural Sciences

**% complete:** 30%

**Status update:** The data captureing is on-going. The rest of the dataset will be completed as the business as usual by the Marine collection team lead by the curator Kelly Brown.

**DOI:** 10.15468/w8jpdj

**Expected date of publication:**

## **Publish new plant records**

**Dataset type:** Occurrences

**Dataset scope:** Increase occurrence records of plants from Fiji into GBIF. Partially digitized data are stored in the old database system or spreadsheets with inconsistent data standard. Data will be cleaned, curated and standardized to conform with GBIF data.

**Number of records:** 24,000

**Data holder:** South Pacific Regional Herbarium (SUVA)

**Data host institution:** South Pacific Regional Herbarium, the University of the South Pacific

**% complete:** 20%

**Status update:** So far, a fraction of Ferns & Fern allies, gymnosperms and monocotyledonous plants (minus Orchidaceae) were mobilised. Snap-shot images of selected fern specimens are currently captured, cleaned and formatted. The expected date of publication for Ferns and fern Allies are given below. The rest of the dataset for dicotyledonous families need to be reevaluated before we embark on mobilisation of the data.

**DOI:** 10.15468/pekj97; 10.15468/qur8qh

**Expected date of publication:** 2023-08-31

## **Insect records from Entomology Collection**

**Dataset type:** Occurrences

**Dataset scope:** Increase occurrence records of insect records from the Fiji islands on GBIF. This dataset was amended from 4000 plant records from Ministry of Agriculture and Forestry

**Number of records:** 4,000

**Data holder:** The South Pacific Regional Herbarium

**Data host institution:** The University of the South Pacific and Biodiversity Centre

**% complete:** 200%

**Status update:** Completed.

**DOI:** 10.15468/ec2jrj

**Expected date of publication:**

## **Publish new marine records from the Fiji waters**

**Dataset type:** Sampling Event

**Dataset scope:** Increase occurrence records of Pacific marine collections based on physical specimens from Fiji waters on GBIF

**Number of records:** 848

**Data holder:** School of Agriculture, Geography, Environment, Ocean & Natural Sciences

**Data host institution:** The University of the South Pacific

**% complete:** 100%

**Status update:** Completed

**DOI:** 10.15468/r8aa8r

**Expected date of publication:**

## **Bryophyte records**

**Dataset type:** Occurrences

**Dataset scope:** Increase occurrence records of bryophyte from the Fiji islands on GBIF. This dataset was amended from 1500 plant and animals from Biosecurity of Fiji.

**Number of records:** 1,500

**Data holder:** The South Pacific Regional Herbarium (SUVA)

**Data host institution:** The Institute of the Applied Sciences, The University of the South Pacific

**% complete:** 39%

**Status update:** Simply does not have human resources to carry on capturing the rest of specimen data in the future.



DOI: 10.15468/tqqfhp

Expected date of publication:

### **Publish new marine records**

**Dataset type:** Occurrences

**Dataset scope:** Increase occurrence records of marine collections based on physical specimens from Fiji waters on GBIF

**Number of records:** 3,000

**Data holder:** School of Agriculture, Geography, Environment, Ocean & Natural Sciences Expected Host Institution: School of Agriculture, Geography, Environment, Ocean & Natural Sciences

**Data host institution:** The University of the South Pacific

**% complete:** 50%

**Status update:** Marine algal collections held at the Marine collections are near completion for mobilisations.

**DOI:**

**Expected date of publication:** 2023-07-31

### **Publish new plant records**

**Dataset type:** Occurrences

**Dataset scope:** Increase occurrence records of native plants from Fiji on GBIF.

**Number of records:** 6,500

**Data holder:** South Pacific Regional Herbarium (SUVA)

**Data host institution:** The University of the South Pacific

**% complete:** 0%

**Status update:** Lack of human resources and discarded at the mid-term of the project.

**DOI:**

**Expected date of publication:**

### **Publish new insect and vertebrate records**

**Dataset type:** Occurrences

**Dataset scope:** Increase occurrence records of insects from Fiji and Pacific mammals (6 species) and birds (20 species) on GBIF

**Number of records:** 300

**Data holder:** South Pacific Regional Herbarium and Biodiversity Centre

**Data host institution:** The University of the South Pacific

**% complete:** 200%

**Status update:** Preliminary records mobilised

**DOI:** 10.15468/qesrre

**Expected date of publication:**

### **Ilava ni Navakavu**

**Dataset type:** Checklist

**Dataset scope:** To publish a checklist of scientific and local names of the finfishes of the Vanua Navakavu, Fiji

**Number of records:** 790

**Data holder:** School of Agriculture, Geography, Environment, Ocean & Natural Sciences Expected Host Institution: School of Agriculture, Geography, Environment, Ocean & Natural Sciences

**Data host institution:** The University of the South Pacific

**% complete:** 100%

**Status update:** Completed

**DOI:**

**Expected date of publication:**

## Other deliverables

### Events

#### **GBIF Data Mobilization (virtual) Workshop**

**Dates:** 2022-04-28 - 2022-04-28

**Organizing institution:** The University of the South Pacific

**Country:** Fiji

**Number of participants:** 21

**Comments:** We altered our plans for a collaboration workshop and engagement survey to accommodate for delays and setbacks brought about by the pandemic and lockdown restrictions. The adjusted plan included splitting the initial proposed collaboration workshop into two parts, a theory session delivered virtually and a practical session to be delivered face-to-face once restrictions eased up. The theory part was delivered on 28th April 2022 via Zoom, and was received well by the participants. Prior to the virtual workshop we also conducted an engagement survey via google forms to assess the situational needs of biodiversity data holders. In the "report attachments" a copy of the survey form, a copy of the virtual workshop programme, and a list of the participants names is attached.

**Website or sources of verification:** In the "report attachments" a copy of the survey form, a copy of the virtual workshop programme, and a list of the participants names is attached.

### Events

#### **Collaboration and Capacity Building workshop (practical)**

**Dates:** 2022-08-24 - 2022-08-25

**Organizing institution:** The University of the South Pacific

**Country:** Fiji

**Number of participants:** 14

**Comments:** A part 2 of the workshop following the theory session held in April 2022. The part 2 was a mixture of lectures and practical sessions which aimed to cement the knowledge of biodiversity data mobilisation.

**Website or sources of verification:** The workshop programme and list of participants are appended.

### Events

#### **Capacity Building - Auckland Museum Collection Management and Collection Care Workshop**

**Dates:** 2023-03-27 - 2023-03-31

**Organizing institution:** Auckland Museum

**Country:** New Zealand

**Number of participants:** 3

**Comments:** Cofounded by the Auckland Museum Institute, this workshop was held at the Auckland Museum. Three participants from the partner institutions were invited: Kelly Brown (the USP, Marine collection) and Mereia Tabua (the USP, South Pacific Regional Herbarium) and Takala Tuifagalele (Ministry of Agriculture, Entomology collection). The rest of funding from GBIF was made available through the budget amendment at the mid-term. The full programme and photographs from the week were appended with this report. The report to the Auckland Museum Institute is available on request.

**Website or sources of verification:** Programme and photographs attached

## Events

### Data capturing trip

**Dates:** 2023-06-12 - 2023-06-15

**Organizing institution:** South Pacific Regional Herbarium, The University of the South Pacific

**Country:** Fiji

**Number of participants:** 3

**Comments:** Three Auckland Museum staff spend five days in the South Pacific Regional Herbarium to capture and check data with the herbarium specimens. Additionally, with the time constraints, point-and-shoot images of the specimens were taken to bring back to the museum. These images were processed and used to capture data by six museum volunteers from the Auckland tertiary institutions. Albeit a short period, we were pleased to be able to provide training for the students in biodiversity data literacy. The monocotyledon data set we had originally had 3269 lines of data, which expanded to 4200 after accounting for all the physical specimens. The dataset was published and accessible from DOI:10.15468/qur8qh.

**Website or sources of verification:** Activity photographs and dataset published as a result of the trip

### Communications and visibility

Given that we've had a few teething problems trying to kick off our project and meet our deliverables, we haven't had much to share regarding our achievements to-date. But we did write a brief media release that's published on the IAS-USP webpage (<https://www.usp.ac.fj/theinstitute-of-applied-sciences/news/the-institute-of-applied-science-receives-fjd-90000-for-datamobilization-project/>) and we introduced details of our project and GBIF as a platform to mobilize data to our fellow biodiversity practitioners in our first virtual workshop held on 28 April 2022. For your reference, our programme for that workshop can be found in the "Report Attachments" section. We endeavor to be more visible with our progress and plan on tweeting updates via the South Pacific Regional Herbarium twitter account (@SPRH1933). This appears to be the more popular and easiest means to communicate our work with the general public.

It is our regret to admit we have not started seeing temporal and geographical trends with the dataset we have published as it is a considerably small dataset. We are committed to publishing more data in the future and look forward to communicating these collection trends through scientific communication.

### Monitoring and evaluation

#### Final Evaluation

We have published the first terrestrial collection data housed at the South Pacific Regional Herbarium and the University of the South Pacific (USP). This project has also contributed to more USP Marine Collection data being mobilised. This is important as these collections do not yet have a permanent database management system. We acknowledge that it was a significant advantage guided by the Curator of the Marine Collection, being a GBIF Mentor and Trainer, also the core member of the project, with our data mobilisation and workshops.

The published dataset was significantly smaller than the proposed; however, we have worked out the workflow of capturing, cleaning, and mobilising data appropriate for the USP terrestrial collections. We could also assess the status of the collections in the fuller picture from the management and care point of view. The project outcomes became useful foundations that can contribute much more to future projects and continue mobilising data on GBIF.

One of the best outcomes of the project was to have affirmed working relationships between and beyond the partner institutions and initiated collaborations between the USP collection keepers so that future

collaboration will be encouraged.

Once the USP's database is upgraded, the next plan is to share it between the Natural History collection areas (which used to be only available for the herbarium collections) and across the university campus in different parts of the South Pacific region. It is a significant achievement led by the project through many iterations of patient discussion.

### Best Practices and Lessons learned

The COVID-19 pandemic allowed the University to determine its capacity for staff remote work; however, it could have been a more streamlined process. There were no remote work policies in place. Staff that were able to work remotely had to work around inconsistencies with internet connectivity.

The University management and administration (including Human Resources) teams could have played a more efficient role, especially in regard to the recruitment of technicians for our Project. Members of the Project team have provided their thoughts to about this issue to the relevant persons.

This was the first time that the Curator of the Marine Collection visited another natural history collection, and he benefited greatly from the knowledge that he was able to gain during a short one week trip. An exchange programme could be set up in the future.

This was also the first time that the Curator had access to work assistance from interns and technicians. The Curator is the only person working in the Collection and USP OHS/Compliance guidelines do not allow for the recruitment of volunteers in USP facilities. After this experience he will be looking for opportunities for work assistance, only after USP Human Resources are more familiar with this type of work requirement.

We unintendedly created discrepancies in the current scientific names and classification systems under which we published, and the physical filling systems and the label ID as we worked through the dataset. This became an issue because we were unable to update the taxonomic changes in the database and physical specimens. As a bridging and temporary solution, we documented the records of the original scientific names on the labels, the current names and standardized authorships of the names in one place in the Excel file. All of these will have to be incorporated with the database and the specimens eventually; however, we fear that the information will get lost meanwhile without the more rigorous collection management systems and continuous technical support from trained staff at the SUVA herbarium. The Curator of the herbarium has been engaged with the university to address the chronic staff shortage they face.

While the capacity-building workshop was well received, we could have assessed the participants' competencies with a short assessment and sought feedback to gain a subjective measure of success.

### Post Project activities

The Marine Collection is committed to publishing new datasets or adding to the existing datasets on GBIF post-project.

During the visit to the South Pacific Regional Herbarium, the three Auckland Museum staff took point-and shoot images of fern specimens. The images brought back to New Zealand was already partially processed to be used to capture data by the museum volunteers. This process will be continued until we complete capturing the information from the images in our possession, and the resulting dataset will be published by the end of 2023.

The curator of the South Pacific Regional Herbarium is already engaged with stakeholders to work with national invasive plant surveys. He is equipped with the knowledge and skills to work towards publishing the data on GBIF that will result from the project.

Finally, the Marine and Terrestrial Collection will continue networking with the Auckland Museum. We are planning to engage with larger-scale collection management and care projects in the future.

## Sustainability

## Sustainability Plans

The core team (M. Tabua, K. Brown and Y. Baba) met via Zooms/ Teams weekly to maintain contact, discuss issues, share ideas and keep company. Widespread use of remote meeting tools such as Zooms/Teams was a rare benefit we gained from COVID restriction. We cultivated working relationships through shared interests in collections and data sharing. The work involving collections has no end-point, so we started talking about potential future projects throughout the project. During the Auckland Museum's staff visit to the USP, we have scoped future data mobilisations and management projects with USP marine collection, South Pacific Regional Herbarium and Fiji Museum. We will continue communicating through Zoom/Teams so that the momentum we gained will extend into the future.

Through the one-week collection management and care workshop, the senior technician acknowledged that the knowledge he gained from the Entomology collection manager would be passed down to his junior colleagues at the Ministry of Agriculture. With the intention of the Ministry of Agriculture initiating its own reference collections, the Auckland Museum continues to support its effort of improving collection and collection data.

## Impact of COVID-19 pandemic on project implementation

Fiji went into a second lockdown in April 2021 due to the pandemic. We were not able to properly return to work until 4th October 2021. The uncertainty, the constant adjustments to changing restrictions and curfews imposed on us, the mental burnout from being forced out of our usual routines and cooped up indoors, trying to stay COVID-free, enduring grief from losing loved ones, and a myriad of other factors related to our second wave took a heavy toll on us individually and in different ways, and working from home wasn't always ideal to say the least. Project members could not access the collection facilities and the university's internal network which delayed our plans to organize ourselves for the project. Additionally, there was uncertainty around when we could resume physical gatherings and there were also strict measures in place that limited the number of people that could be physically present in an enclosed space at any given time. This hampered our progress significantly. We were unable to conduct proposed workshops, we are unable to access material that would help us progress with publishing datasets. One team member had two computers crash while working from home during lockdown which added to further delay of working towards deliverables. We were not permitted an extension to our project timeframe to make up for time lost during the lockdown. We also had to make adjustments to our project activities that has been mentioned above and through a separate budget amendment request.

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**GBIF leads the Biodiversity Information for Development (BID), a programme funded by the European Union. The programme provides supplementary support for activities addressing the needs of regional researchers and policymakers through mobilization and use of biodiversity data.**

