Capturing the history of Victoria's field naturalists

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Abstract

In 2023, BHL Australia (the Australian branch of the Biodiversity Heritage Library) received two grants to gather the history of Victoria's field naturalist clubs and to share the invaluable contribution these community organisations have made to Victoria's heritage. The first, a Public Record Office Victoria (PROV) Local History Grant, funded the digitisation of the legacy publications of Victoria's naturalists' clubs and the creation of an online collection. The second, a Wikimedia Australia Partner Grant, enabled the creation of Wikipedia pages and Wikidata records for each organisation's publications and people, and the uploading of archival images into Wikimedia Commons.

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BHL & BHL Australia

The cultivation of natural science cannot be efficiently carried on without reference to an extensive library (Darwin 1847).

The Biodiversity Heritage Library (BHL) is the world's largest virtual library of biodiversity literature and archival material. Launched in 2006, it is a global digitisation initiative to make the foundation of our understanding of biodiversity freely accessible online (BHL 2024). This invaluable resource now includes 62 million pages of biodiversity knowledge from the libraries and archives of over 600 contributors worldwide. BHL contributors are, for the most part, single organisations. The vast majority are large well-resourced museums, herbaria or universities in the US and the UK. They include the Smithsonian, Kew Gardens, Harvard, Yale, and the Natural History Museums of London, Paris, Berlin, and America (New York).

BHL Australia began operation in 2010 with a single contributing organisation, Museums Victoria. However, since then, it has grown to include over 50 contributing organisations across the country. These include Australia's state and territory natural history museums and herbaria, state libraries, universities, royal societies, government agencies, and natural history publishers. Together these organisations have contributed over 600,000 pages of Australia's biodiversity knowledge, all of which is freely available online on the BHL website. The digitisation operation is still hosted by Museums Victoria and the project is nationally funded by the Atlas of Living Australia (ALA), which is part of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (see Kearney 2020 for a full history of BHL Australia).

The publications of large institutions can be found in libraries across the globe and often exist in multiple locations online. In contrast, small community publications are not well represented, on either BHL or elsewhere. Their publications are challenging to access, both in physical and digital form. BHL Australia is endeavouring to bridge this gap: to ensure that the biodiversity knowledge of Australia's regional natural history publishers is freely accessible and discoverable to a global audience.

Why field naturalist club publications?

Field naturalists have observed, discovered, collected, researched, and published the natural history of their specific regions across time (Presland 2010). They are the custodians of extensive local knowledge and records, and their publications are an invaluable resource of long-term biodiversity knowledge. This information is essential to researchers tracking changes in species distribution and abundance, and/or the appearance and disappearance of introduced and threatened species. This is the information researchers need when doing a conservation assessment of a species, towards having it listed as vulnerable, endangered or critically endangered.

Field naturalist publications also detail the rich history of the organisations themselves and the passionate people behind them. They are a vital resource in efforts to promote and share the contributions of natural historians. For many of

these people (particularly those who were not white men), these community publications may contain the only published reference of their name.

Prior to the start of this project, Victoria's field naturalist clubs had little or no presence online, and neither did their publications. The aim of this project is to make their local biodiversity and social history freely accessible and discoverable within the linked online networks of knowledge.

Seeking support and funding

In early 2023, BHL Australia reached out to the regional field naturalist clubs in our home state of Victoria. We presented the organisations with a project proposal and asked for letters of support and collaboration to accompany our quest for funding. We received enthusiastic responses from the field naturalist clubs of Ballarat, Bendigo, Castlemaine, Geelong, LaTrobe Valley, Peninsula and Ringwood. We also sought and received the backing of BHL Australia's host organisation, Museums Victoria, and the state based Field Naturalists Club of Victoria.

BHL Australia then applied for two grants: a Public Record Office Victoria (PROV) Local History Grant and a Wikimedia Australia Partner Project Grant. The first would fund the digitisation of the legacy publications of Victoria's field naturalist clubs and the creation of an online collection on the BHL website. If funded, the digitisation effort would preserve and make accessible the wealth of historical information contained within these publications. The resulting online collection would serve as a valuable resource for researchers, historians, and enthusiasts interested in the flora, fauna, and community history of Victoria's diverse regions.

The Wikimedia Australia Grant would expand on the reach of this digitisation effort. With funding, we hoped to create Wikipedia pages and Wikidata records for each field naturalist club, as well as for their publications and notable people, places, and events across time. It would also enable the sourcing and uploading of archival images onto Wikimedia Commons. The output would highlight the history and significance of each organisation and its publications via content-rich pages that would be linked to and from the publications we would upload onto the BHL website.

In both grant applications, we emphasised the importance of this project in increasing the representation of women and other underrepresented contributors to biodiversity knowledge. While women were usually excluded from the more scholarly societies, they have a long history of involvement in field naturalists' clubs (for example, see Elliot 1909). Their work was rarely published in scholarly journals, but they are notable in community publications, either as organisers of events or authors of articles.

We were extraordinarily grateful and honoured to be awarded both grants at the end of 2023 (see Public Record Office Victoria and Wikimedia Australia).

Sourcing the material

Upon receiving the two grants, we once again contacted our field naturalist partners to share the exciting news and begin the process of sourcing their publications, archives, and knowledge. Some of Victoria's field naturalist clubs have long histories stretching back as far as the 1800s, but most were established in the mid to late 1900s. All the field naturalist clubs produce a regular newsletter or bulletin, either monthly or quarterly, and most have also published non-periodical books, leaflets, field guides, species lists and maps. We hoped to also source and make accessible their unpublished records, such as minute books, species observation lists and photographs.

Our first step was to seek written permission from each rights holder to upload their in-copyright content onto the BHL website, which we received from most clubs soon after we had confirmation of the PROV grant. From the early 2000s, most clubs began producing their newsletters/bulletins as born-digital PDFs. In many cases, we were able to download these directly from their club websites, or via a Google drive created for us by the clubs.

Due to the clubs being located across regional Victoria, sourcing print material was more complex. The *Ballarat Naturalist* and Bendigo Field Naturalists Club's *Whirrakee* were sent to us via Australia Post. BHL staff personally collected 350 copies of the *Castlemaine Naturalist* as a part of our visit to the club's February meeting (Kearney 2024). Members of the Latrobe Valley Field Naturalists Club drove nearly 150 kilometres from Moe to hand-deliver their newsletters to ensure they arrived safely.

Every item received underwent the regular pest-prevention procedures that BHL Australia (and Museums Victoria) carry out on all material received from external organisations. BHL Australia is in the fortunate position of having access to Museums Victoria's industry-leading conservation staff and services. Our Pest Management Policy requires that all material that enters the BHL Digitisation Lab is first a) inspected by Museums Victoria's integrated pest management conservation staff, and b) placed in the Museum's artefact freezer for at least a week.

All material entering the freezer is sealed in a freezer bag to prevent accumulation of moisture. Upon removal from the freezer, the material is allowed to defrost and re-acclimatisation for three days before being moved into the BHL Lab. This procedure is informed by the National Archive of Australia's Integrated Pest Management advice (NAA 2024) as a non-intrusive method of killing most insects and mould, without affecting the paper material or glue binding. It also ensures that no external organic material or pests can spread to other material in our care.

Digitising the material

Once each batch of field naturalist club material reached the Digitisation Lab, we undertook a thorough audit of every item. We noted the volume/issue schema, title variations and dates, as well as any missing, incomplete or damaged issues we would need to request from the clubs. All staples and paper clips were removed to

prevent damage to the scanner glass during digitisation. This also served to prevent any (further) rust and damage to the printed material.

The vast majority of BHL Australia's content is digitised using a single Zeutschel OS 16000 overhead book scanner. The scanner has an A2-sized bed, with two independently moving halves that automatically measure and compensate for book thickness, as well as an adjustable gap between the two beds to allow large spines to lay flat. An automatic glass platen is used to press book pages flat to ensure perfect page scans. The platen can be disabled when scanning rare or fragile material.

As per BHL's Digital Imaging Specifications (BHL 2018), we scanned all field naturalist material as 400PPI TIFF files, which we then down-scale to 300PPI during post-processing. Zeutschel book scanners use the Omniscan scanner software, which automatically recognises each recto and verso page, outputting them as separate files, speeding up digitisation and post-processing tasks.

Bound hardcover books, such as *The nature of Latrobe: a guide to the parks and reserves in the Latrobe region* made full use of the scanner bed functionality. Most other field naturalist material was softcover or involved loose-leaf pages (after staples were removed). These, while not as technically difficult to scan as bound rare books, required finesse and focus, to ensure the glass platen would not damage the very thin copy paper. Particular care was required for material published in the early 1970s, which had been copied from typewriter paper using a mimeograph machine. This material, while not the oldest we digitised, was sometimes difficult to read due faded ink, emphasising the importance of preserving this material before its contents are lost forever.

Once each newsletter was scanned and exported as TIFF files, BHL Australia volunteers cropped, edited, and cleaned up each image in Adobe Photoshop. This included ensuring each page was the correct dimensions, straightening the text to optimise Optical Character Recognition (OCR) and cleaning 'noise' from the page borders. Despite the amount of work and attention to detail required to undertake this work, the Digitisation Technician (Jack Eastaugh) and volunteers scanned and cropped over 1,500 physical field naturalist newsletters between the start of the project in late 2023 and June 2024.

In most cases digital-born material skips the steps previously discussed, and is delivered to us as PDFs that we simply need to export as TIFF files to be uploaded onto BHL. However, in some cases, further post-processing was required, usually due to pages being set up in a booklet layout (the first sheet containing the front and back cover) and requiring pages to be manually reordered for each newsletter.

A unique aspect of this project, which is not usually considered in regular BHL Australia digitisation work, was the redaction and de-identification of personal information of club members. In contrast to the usual journals and books we digitise, many of these newsletters are not produced for mass-circulation. They are community publications created for club members (who generally know each other very well) to communicate information about the club, such details of excursions and observations. Personal phone numbers, emails and home addresses are regularly published.

BHL Australia communicated these privacy concerns to each club and let them decide what level of redaction they would feel comfortable with. Many clubs took us up on this offer and provided a list of information they would like removed. Practically, this meant we used the redaction tool in Adobe Acrobat for digital-born material and Photoshop's rectangle tool for scanned content.

Due to the community focus of these publications, many did not have existing MARC records, which are required for upload onto BHL. Creating new MARC records is a regular part of the BHL workflow. We frequently create and edit records for old or rare books and serials, as well as for unpublished material such as diaries, letters, etc. This was complicated by the fact that many of the newsletters did not use consistent titles. For example, *The Ballarat Naturalist* was alternatively published as the *Field Naturalists' Club of Ballarat Excursion / News Sheet* and *Ballarat Field Naturalists Club Excursion - News Sheet*.

Once each item had passed through our quality control checks, it was uploaded into BHL's custom-built pagination software, Macaw (Metadata Collection and Workflow System, produced by the Smithsonian). Once in Macaw, our volunteers added page-level metadata, identifying page/plate numbers, titles pages, tables of contents, images, etc., which serve to assist end-users find item-level information quickly on BHL.

Once pagination was complete, the publications were sent on to the two websites they can be accessed from, Internet Archive (IA) and the BHL. IA hosts all BHL content and acts as the 'back end' source for every image on BHL. IA also implements full-text OCR using the Tesseract module. Basic metadata can be accessed from the IA pages for each item, including MARC record data and contributor information, however only through BHL can users access page-level data, article data and BHL's scientific name index, as well as the IA metadata and OCR record.

To bring all this content together, we created a *Field Naturalist Clubs of Victoria Collection* landing page on the BHL website. At the time of writing (June 2024), BHL Australia had digitised and uploaded 1375 issues – over 21,000 pages biodiversity knowledge – from the publications of the following field naturalist clubs:

- Bendigo Field Naturalists Club
- Castlemaine Field Naturalists Club
- Geelong Field Naturalists Club
- Latrobe Valley Field Naturalist Club
- Peninsula Field Naturalists' Club
- Field Naturalists' Club of Ballarat
- (Ringwood Field Naturalists Club – coming soon)

Making the material discoverable online

The final step in the PROV-funded part of this project was to make the contents of the field naturalist publications discoverable via article data and Digital Object Identifiers (DOIs).

BHL is traditionally a library project; we digitise and upload library (and archive) items onto the BHL website with their accompanying item-level metadata, which is usually sourced from the item's library catalogue record. This creates a BHL catalogue record for each item, which is searchable both within the BHL catalogue and via external search engines. For serial publications, where the items are either single volumes or several volumes bound together, their BHL catalogue record will include the name of the serial, the publication data, and the volume and/or issue number. However, this data tells us nothing about what is inside each volume, which means it is not very useful for anyone other than librarians.

The bibliographic unit of most interest to researchers is not serial titles or volumes; but articles. Article data includes author names, specific publication dates, page ranges and, most importantly, article titles. Article titles contain topic specific information that, within the sphere of biodiversity, includes common names, scientific names, place names, names of collectors, details of anatomy, conservation status, etc.

Traditionally, BHL contributors did not upload article data, but over time, BHL has evolved from an online repository of library materials into a fully searchable interlinked network of big data (Kalfatovic 2017, Kearney 2020). The surfacing of article data has been a critical part of this change. In 2020, BHL Australia launched (and continues to lead) a global BHL discoverability project to bring the historic biodiversity literature into the modern linked network of scholarly research via article data and DOIs (see Kearney 2022).

Uploading article data into BHL makes each article a bibliographic unit in its own right, searchable both within the BHL catalogue and via external engines. The assignment of DOIs to these bibliographic units provides a unique and permanent link that can be used to persistently cite and track each publication. DOIs also enable article discovery by bots and algorithms, such as Unpaywall, an open database of (at the time of writing) 50,470,213 free scholarly articles (Kearney 2018).

BHL Australia's wonderful volunteers began gathering and checking article data during Melbourne's first lockdowns in 2020, and several are committed to continuing this important work. They have now made tens of thousands of BHL articles discoverable. During 2024, their primary focus was Victoria's Field Naturalist Clubs. The outcome of this work is full publication runs where every article has its own record in the BHL catalogue (see *Peninsula Field Naturalists Club Newsletter*) and its own DOI (e.g. https://doi.org/10.5962/p.381307).

It is important to note here, that DOIs cannot be assigned to components of titles (such as articles, chapters, etc.), unless the title has its own "parent" identifier, ideally (for serials) an ISSN. For the most part, the serial publications of Victoria's Field Naturalist Clubs lacked ISSNs, so before we could assign a DOI to each article, we needed to request an ISSN for each serial title via the National Library of Australia. For example, the shiny new ISSN for the *Field Naturalists' Club of Ballarat* is 2982-0529.

Victoria's field naturalists and the Wikisphere

While we were busily digitising and uploading the field naturalist publications onto the BHL website, we were also working on the deliverables of our Wikimedia Australia grant: to increase the online presence of the clubs through the creation of Wikipedia pages, Wikidata records and Wikimedia Commons files. These will serve as interlinked evidence of each club's history, observations, and notable conservation achievements, ensuring they will be more discoverable to future researchers. As their digitised publications on BHL are cited in the Wikisphere, the clubs will also be able to track the impact they are having on biodiversity knowledge.

The first step was to create a Regional Field Naturalists Clubs of Victoria Wikimedia dashboard to track our progress and output. Wikidata records were then created for all field naturalist clubs that did not previously have them, or expanded if they did, using references drawn from the digitised newsletters/bulletins on BHL and our own research. Each Wikidata record has a unique, persistent identifier, which allows editors to collect information about an organisation, title, or person, in one place. An example of this is the Wikidata record for the *Peninsula Field Naturalists' Club Newsletter* (Q125502444), which links back to the BHL newsletter's website, and includes the BHL Bibliography ID and the newly created ISSN.

The discoverability of Victoria's field naturalist clubs on Wikipedia was dramatically increased through the creation of new Wikipedia pages (e.g., Bendigo Field Naturalists Club page). We also expanded existing Wikipedia pages that were previously "stubs" (articles deemed too short and incomplete to provide encyclopaedic coverage of a subject), such as the Field Naturalists' Club of Ballarat page, where we increased the length of the article by over 2600 words and added 31 new citations. We have created a list page that catalogues 49 notable field naturalist clubs in Australia, many of which are now discoverable on Wikipedia in some form. At the conclusion of the project (31 May 2024), the BHL Au team had contributed 317 edits on Wikipedia, including 27,200 words and 292 citations to the field naturalist clubs and related pages, drawing from digitised content from this project on BHL, and other notable print and online sources. These stats are in addition to the contributions of the broader Wikimedia Australia volunteer editor community who assisted in expanding articles, finding sources and providing guidance and feedback to our work.

The Wikimedia Australia grant also funded the sourcing of images for each club page and the addition of these images to Wikimedia Commons. These included club emblems, page scans of their club newsletters and archival images of club members and activities. We are still in the process of liaising with the clubs to obtain written permission to assign Creative Commons Licenses to these images (as required for upload to Wikimedia Commons). As such, these images will be uploaded and added to their respective Wikipedia pages across 2024.

Outreach and engagement

Both our PROV and Wikimedia Australia grants included outreach and engagement deliverables. The first of these was with the clubs themselves, as well as with their local communities. BHL Australia visited many of the regional localities throughout 2024, including with Castlemaine in February, Ballarat in May and LaTrobe Valley

(Moe) in August. We gave presentations about the project at monthly club meetings and met with club members to discuss their publications and archives, returning with boxes of material to scan at our BHL digitisation lab at the Melbourne Museum. These visits were usually followed with a write up of our visit in the subsequent monthly club newsletter (see Kearney 2024).

Throughout the life of the project, we shared our progress via regular reports back to the clubs and funders, and on social media (see our field naturalists posts on @bhl-au and LinkedIn). In the second half of 2024, we will be publishing blog posts and articles, such as this VALA paper, to document and share the work involved in this endeavour.

While this project focuses on Victoria, the publications now accessible online will reach far beyond our state. The audiences of both BHL and Wikipedia are diverse and global. They include scientists, historians, students, educators, artists, environmental policy makers, family historians and Wikipedia editors. Since the launch of the BHL in 2010, the online library has served over 15 million people from 240 countries and territories across the globe (BHL 2024).

Next steps… Making the species observations data discoverable online

A major role of naturalists lies in the creation of a permanent record of their observations — through the medium of publication (Presland 2010).

The publications of Victoria's field naturalists are riddled with observations of Victoria's flora and fauna, the vast majority of which include specific locations, dates and, in many cases, photographs. This makes these observations verifiable data points (iNaturalist 2024). Many field naturalist clubs are now using apps, such as iNaturalist, to record their observations (see iNaturalist projects The Field Naturalists Club of Victoria and Castlemaine Field Naturalists Club Mt Alexander Region). This means their observations are uploaded into biodiversity databases, including the Atlas of Living Australia and the Global Biodiversity Information Facility, where they combine with the observations of researchers and citizen scientists worldwide, informing distribution maps and expanding our knowledge of species abundance and biology (e.g. flowering times, migration patterns, butterfly emergence, species interactions, etc.).

However, the use of such technologies is relatively recent (2019 for the Field Naturalists Club of Victoria and 2020 for the Castlemaine Field Naturalists Club). The observations in the legacy publications of our field naturalists are therefore yet to join this growing corpus of easily accessible data. Once we have completed the digitisation of this material, the next obvious step will be to surface this information, ideally using AI to identify images and scrape tabular data (see Dearborn et al. 2023, Alvares et al. 2021, August 2020). While this is beyond the scope of the current project, we will endeavour to secure funding for this critical work in the future.

Conclusion

At the time of writing (June 2024), the Wikimedia Australia funded period of the project (Feb-May 2024) was complete, and we were halfway through the PROV funded period of the project (Jan-Dec 2024). All deliverables for the Wikimedia Australia grant were complete and we had digitised material on behalf of six of the seven field naturalist clubs who had originally signed letters of support for the PROV grant. We had developed wonderful relationships with all the field naturalist clubs involved in the project, and news of this important work was spreading; by June, three additional field naturalist clubs had sought to join the project and we had started to digitise their material for upload onto BHL.

The loveliest part of this project is that it will live beyond the funded end date. We will continue to engage with the natural historians of Victoria and beyond, adding their newly published material to BHL along with any further archives that surface as a result of the promotion of this project. It has been an honour to make this rich biodiversity heritage freely accessible online. The most rewarding part of the project, however, has been the reactions of the field naturalists as their histories, activities, conservation efforts and enormous contribution to our understanding of Victoria's biodiversity receive the recognition they deserve across BHL and the Wikisphere.

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