Atlas of Living Australia
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Atlas of Living Australia Annual Work Plan

2023–2024

NCRIS National Research Infrastructure for Australia
An Australian Government Initiative

CSIRO

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Further information

Further information regarding the ALA annual workplan is available by contacting **ala@csiro.au**

Executive summary

The Atlas of Living Australia (ALA) annual work plan details the projects, activities and major investments planned in a financial year to deliver on the strategic priorities articulated in the ALA Strategy 2020–2025 (https://www.ala.org.au/publications/). The work plan is reviewed and endorsed by the ALA Advisory Board and aligns with the annual National Collaborative Research Infrastructure Strategy (NCRIS) Business Planning process. It is released publicly to provide our stakeholders greater visibility on ALA priorities, and to provide opportunities for collaboration.

2023-24 will be the fourth year of delivery of ALA's Strategy 2020-25. International engagement will be a major priority for the ALA as it will play an international leadership role in hosting two major international events in Australia including the Governing Board meeting of the Global Biodiversity Information Facility in Canberra in October, and the TDWG international conference a week prior in Hobart. In parallel, the ALA will be working with its key partners to scope the core elements of a potential National Approach to Biological Collections as input to the scoping work being undertaken around the NRI Roadmap.

With several external projects ending in 2023, this provides the team with an opportunity address multiple significant upgrades to our core systems. This includes a re-architecture of its taxonomic names service while in parallel transitioning to a new model of taxonomic content governance. Second the ALA will embark on the first stage of a review of its user experience and user interface (UX/UI) given the complexity of what we currently deliver to users. The UX/UI project will change the way the ALA designs and implements new biodiversity data products to ensure they are integrated and offer a consistent and contemporary user experience. Both activities will be supported by further 'hardening' of our core systems to address expanding efficiency, security, and disaster recovery requirements.

As a biodiversity data infrastructure, enhancing our data systems remains a priority and will be actualised through a number of new projects including the (a) development of a data roadmap, (b) streamlining how data are provided to the ALA to allow us to support a greater number of data partners, and (c) and transitioning our recently released Restricted Access Species Data Service to an adoption mode given the recent release of the supporting national framework and data service. Collectively these three data transformations will improve the value of the ALA to our users, and better support our data partners.

Finally, the ALA will further grow its partnerships with Aboriginal and Torres Strait Islander people through the commencement of its Indigenous Partnerships Program, which will build on the success of the extant Indigenous Ecological Knowledge program. The ALA sees significant national benefit in improving how we can bring Indigenous perspectives to the operation of national biodiversity data infrastructure.

Introduction

The Atlas of Living Australia (ALA) is a National Collaborative Research Infrastructure Strategy (NCRIS) project responsible for mobilising biodiversity information to support national and international users demanding timely access to Australian biodiversity data. The ALA provides biodiversity data to over 110,000 users a year in research, industry, government and for communities. It benefits and supports research excellence in fields such as biodiversity, genetics, and ecosystem science; it delivers to major natural environmental resource management programs; and it supports the international research community by providing Australian data to the Global Biodiversity Information Facility (GBIF). The ALA is founded on the principle of open data access realised through a Creative Commons (CC) licence model. This is important in the context of maximising the reuse of data produced, collected, held and funded by the government, as well as contributing data. The ALA currently holds over 100 million records of more than 111,000 species from across Australia and elsewhere.

ALA Strategy 2020–2025

The ALA Strategy 2020–2025 (https://www.ala.org.au/publications/) was released in July 2020 and is framed around four strategic priorities, which are to:

- deliver trusted data
- provide robust services
- partner for impact
- support decision-making.

The development of the strategy was informed by a comprehensive ALA Future Directions National Consultation process, completed late in 2019. Key outcomes from the consultation included the recognition that users will need to access, upload and integrate different data types from the typical biodiversity occurrence record; this can include genetic data, eDNA and sensor network data, including imagery and acoustics. Access to trusted biodiversity data, accompanied by metadata, will continue to be a fundamental requirement to support research and decision-making. Access to longitudinal, or time-series, biodiversity monitoring data and ecological plot data will be essential to understand changes and trajectories and to predict future states of biodiversity. Finally, stakeholders identified that, for the ALA to deliver greater national benefit to research and decision-making, and to address the major national biodiversity management challenges, its data holdings will need to be more geographically and taxonomically representative and comprehensive.

The results of the ALA Future Directions National Consultation provide the reference data that have shaped the ALA Strategy 2020–2025. However, the strategy has also been developed in response to internal priorities that are often opaque to our external stakeholders. Foremost among these is the need to upgrade ALA infrastructure to address extant infrastructure challenges and anticipated needs around new data streams. In addition to guiding the ALA's future state, the strategy will also provide stakeholders with greater clarity regarding the ALA's priorities, thus highlighting opportunities for partnering and aligning. These priorities will be communicated to stakeholders each year through the ALA Annual Work Plan.

About the ALA Annual Work Plan 2023–2024

The annual work plan describes the new projects, activities and major investments planned for each financial year to deliver on the priorities articulated in the strategy. It provides an indication of resources committed (Table 1) and, where appropriate, identifies the ALA lead who can act as a point of reference for external stakeholders.

Table 1. Indicative size of activities in the ALA work plan

Full time equivalent staff needed to scope, undertake, and deliver activity	Size
< 1FTE	Small
1–2 FTE	Medium
>2 FTE	Large

The primary objective of the work plan is to provide the ALA Advisory Board, the NCRIS program and our partners with greater insight into the activities of the ALA and potentially, to engage in partnership opportunities. The work plan is reviewed by the ALA Advisory Board in preparation for public release and/or consultation before the start of each financial year in July. This is the second work plan under the ALA's Strategy 2020–2025, for the third year of implementation. Figure 1 shows the relationship between the work plan, the ALA strategy and key timelines leading to public release before the start of each financial year.

Figure 1.0. Relationship between the ALA strategy, NCRIS business planning and the ALA's annual work plan

Operations (business-as-usual) framework

This work plan focuses on the new projects and activities planned for 2023–2024. In parallel, the ALA continues to provide extensive operational support for our systems and users framed around its five functions: data, applications, systems, engagement, and science and decision support. These functions are described further in Table 2.

Table 2. Overview of ALA teams and their functions

Team	Overview
Data	The Data team manages data ingestion into the ALA, including occurrences, events, images, metadata, and species checklists. Data from museums and collections, citizen science and government are standardised and harmonised, and enhanced with authoritative taxonomic and spatial information. Technical support and expertise is offered to large and small data providers to standardise incoming data using Darwin Core and facilitate data delivery, harvest and automation. The ALA's taxonomic backbone and sensitive data service is built and maintained along with keeping national and state-based conservation and sensitive lists up to date. The team is working towards the following: • broadening the types of data that can be ingested by working with data providers, users, and the local and international informatics communities. This refers to event-based survey data, eDNA, biologging and other biodiversity monitoring techniques. • refactoring the taxonomic backbone to accurately reflect the source authorities and improve delivery timeframe for updates. • rewarding data providers for sharing data with the ALA by helping them to manage their data loads, assess data quality and track data usage and impact

Team	Overview
Applications, Governance and Architecture	The Applications, Governance and Architecture Team perform three main functions: 1. Manages and maintains several user-facing, primary data-generating applications ensuring that they continue to be fit for purpose and deliver capabilities that are consistent with the ALA's strategic objectives. Applications include BioCollect, MERIT, DigiVol, Profiles platform, iNaturalist Australia Node, Australia's Virtual Seed Banks (AVSB) and the Australian Reference Genome Atlas (ARGA). 2. Provides oversight and secretariat functions around governance and accountability for ALA software products and product-related processes; and 3. Provides the overarching architectural framework and governance around architectural strategy and operational activities. The Applications, Governance and Architecture Team has a high external partner focus, working directly with application users to ensure that they maximise value from using the products; are introduced to all ALA capabilities relevant to their business; and establish deep and lasting partnerships with the ALA. The team is also one of the primary frontline points of engagement for strategically significant relationships and project-based contracts, such as the establishment and service delivery of the MERIT application to DCCEEW and BioCollect hubs to the WA government (IBSA and IMSA), Brisbane City Council, and the NSW ecological restoration community (through the NSW Dept. Of Environment and Planning)
Systems	The Systems team is responsible for system operational robustness, security, and system modernisation. They manage and report the IT risk profile of the ALA, ensuring that operational parameters, security, budget, and technical debt are effectively monitored and addressed. Leveraging internal and external specialist expertise, the team actively contributes innovative techniques and processes that have a significant impact on ALA operations, encompassing system modernization, cloud architecture, and work prioritization methods. Building and nurturing relationships with key strategic IT providers, including CSIRO IM&T, Amazon Web Services, and ARDC Cloud Compute, falls within their purview. Additionally, the team manages 15+ core biodiversity products and systems, and supports new IT projects, directing the implementation of procedures and techniques. By actively communicating ALA systems, architecture, and IT innovations to both internal and external audiences, they establish strong community relationships and contribute to the growth and reputation of the ALA.

Engagement	The Engagement Team are responsible for managing priority ALA sector engagement activities, including projects that have a significant external engagement component. The team leads partnerships with the collection's community (museums, herbaria and libraries) and international biodiversity data infrastructures and initiatives, such as the Biodiversity Heritage Library and Biodiversity Information Standards (TDWG). The team also supports a range of national activities focused on citizen science, biosecurity, and restricted access to species data under the program banner of National Biodiversity Data Initiatives. The team supports continuous improvement to ALA core functions including the Taxonomic Backbone, taxonomic name matching and user interface/ usability. The team also work respectfully and collaboratively with Indigenous communities to deliver the ALA's Indigenous Ecological Knowledge program. The team has responsibility for managing the ALAs project management framework.
Science & Decision Support	The Science and Decision Support Team provides analysis products and services for internal and external stakeholders. The team focuses on the following priorities: • Improving open, reproducible scientific workflows through improved support for ALA data and services in programming languages such as R and Python • Providing visualisations, dashboards, models and reports to provide insights into the collections held by the ALA and to highlight their potential ecological applications or interpretations. • Driving better links between the ALA and the research community through outreach via training and workshops, communications activities such as webinars and media appearances, and scientific publications.

2023–2024 work plan at-a-glance

1 & 2. Delivering trusted data and providing robust services

The ALA will commence a major upgrade to its **taxonomic backbone**, and names matching service to future-proof it given the architecture is now over a decade old and unable to address new user applications. In addition,

- The recently released **Restricted Access Species Data Framework and Service** will move into an implementation phase to build awareness, and support adoption.
- The team will deliver two important transformations to its data program including **Streamlining Data Provision and** developing a **Data Roadmap.**

The ALA will continue its journey to **Strengthening IT Resilience** which commenced last financial year, with the earlier cloud uplift project. This includes a focus on backups, disaster recovery, and implementing improved cybersecurity measures working closely with CSIRO and industry cloud hosting partners.

3. Partnering for impact

ALA's partnerships program will

- Provide international leadership through the hosting of two major International Events including the international meeting of the **Biodiversity Information Standards (TDWG)** organisation, and the **Governing Board Meeting of the Global Biodiversity Information Facility** both in October and in Hobart and Canberra respectively.
- Grow our **Biosecurity Program** through deeper engagement with state and territory biosecurity sector stakeholders, and enhancement of our national biosecurity alerts capability.

4. Support decision-making

We will continue to deliver projects to improve how we support decision-making in response to Australia's changing biodiversity landscapes.

- The **UX/UI project** will develop new approaches for providing users with a more integrated experience across web, applications, and data systems to support more complex decision-making needs.
- Progressing our partnership with the Department of Climate Change, Energy Environment and Water (DCCEEW) to significantly **enhance the MERIT Platform** which supports a national biodiversity conservation program.
- Partnering with the Australian National University to explore innovative approaches to accessing the richness of ALA data through the **Generous Interfaces** project.

Strategic priority 1: Deliver trusted data

Trusted, high-quality data are fundamental to supporting world-leading biodiversity research and delivering value to decision-making. The ongoing challenge of working with our community to improve and better communicate the quality of biodiversity data in the ALA emerged as a dominant theme from the ALA's Future Directions National Consultation process. 'Data quality' is a general term referring to the taxonomic and spatial accuracy of data, but also the temporal and geographic coverage of biodiversity data in the context of its ability to support research and decision-making.

Title	Description	Lead	Size	Strategic action
Restricted Access Species Data Framework Adoption	Access to species information and data that is restricted from open public access is critical to environmental management and research. This activity will bring into operation the national framework on best practices for sharing restricted access species data, the centralised data service that will enable streamlining of data requests across multiple data custodians, and a proof-of-concept secure environment for working restricted access species data.	Cameron Slatyer	Small	1.1 1.2 1.6 3.5 4.4 4.5
Taxonomic Backbone Rearchitecture	To date, the ALA's taxonomic backbone has been built with multiple authoritative sources using a systematic approach to resolving conflicts and building a combined index. This project sees the creation of the 'ALA Taxonomic Working Group,' which lends domain expertise and knowledge to the technical build process and management of a program engaging external stakeholders to ensure that the output is consistent with the National Species List. The goal of the project is twofold for the year: to update the current index, and to develop an improved process for the ongoing build which both improves the speed of	Cameron Slatyer	Large	2.1 3.3

	index build and deployments and engages the taxonomic community to improve the quality of the index and the name matching service.			
Data Roadmap	The ALA will develop a Data Roadmap that outlines our current and future status regarding data-related activities, our key partners, data communities and standards, and levels of IT maturity within each element. The roadmap will set out a plan that builds on existing efforts to improve data currency, quality and relevance to research and decision-making. Future growth in data volume and relevance will be driven not only by automated data ingestion, but also by the adoption of more complex data types and standards. The roadmap will also describe possible approaches to data sensitivity challenges for the biodiversity data landscape in Australia, especially for threatened species, biosecurity, and privacy.	Peggy Newman	Small	1.3 1.4
Streamlining Data Provision	Following on from building a new data ingestion framework the ALA will focus on to providing API-driven data uploads with automated review and verification. The Data and Science teams will collaborate to build an R package to prepare Darwin Core Archives from source data for ingestion, targeting ecological researchers and datasets. We will also host workshops, publish guides, produced training videos and further materials on the topic, and the data lifecycle of biodiversity data in the ALA.	Peggy Newman	Small	1.3 1.5 1.6

Strategic priority 2: Provide robust services

Thousands of users across research, government, industry, and community sectors use ALA data and services to contribute, mobilise, access, and analyse data. Beyond only data provision to the central ALA database, ALA infrastructure also supports our stakeholders to mobilise and manage their data. This is achieved through BioCollect, DigiVol and Atlas hubs. The ALA's evolution into one of the world's foremost biodiversity infrastructures, supporting a growth of 10 million biodiversity occurrence records annually, requires regular review and system redesign to deliver robust data services into the future. This includes both the 'soft' enablers, such as how we interact and respond to user requests, and system upgrades to support the increasing volume, variety and velocity of data expected from new biodiversity data streams. New data streams challenging the ALA will include plot data, genetic information, acoustic, sound and video, and increasingly higher-quality images. This strategy makes a commitment to improving the user experience and uplifting the robustness of our infrastructure to ensure it remains at the forefront of biodiversity data delivery.

Title	Description	Lead	Size	Strategic action
Strengthening IT Resilience	The ALA acknowledges the pivotal significance of IT resilience in upholding uninterrupted service levels, safeguarding data, systems, and applications. To further strengthen ALA's platform, several improvements to the existing operations have been planned. These include key components of IT resilience, such as (a) advancing current backup and disaster recovery plans to minimize downtime, (b) establishing robust cybersecurity measures, (c) deploying web application firewalls (WAFs) for safeguarding against web-based attacks, (d) mitigating the impact of DDoS attacks through dedicated protection measures, (e) optimizing performance and availability through load balancing, (f) implementing continuous monitoring for proactive issue identification, and (g) fostering a culture of security awareness among staffs. By effectively executing this work	Sathish Sathya Moorthy	Large	2.1 2.3

	plan, the ALA will fortify its IT resilience capabilities, thereby ensuring seamless operations and heightened protection for our web applications and systems.			
Lists tool re-development	The Lists product is a core component of the ALA infrastructure which holds managed lists of subsets of taxa for a variety of different purposes. Some of these lists underpin other core ALA components and services such as biosecurity alerts and RASD-S. It also provides a service dependency for other applications such as BioCollect and Profiles by enabling functional capability in those applications around constrained taxon lists. Demands on the existing Lists tool have grown and evolved since it was developed, and the current tool is no longer fit-for-purpose. This project will redevelop the Lists product to ensure that it can support current and anticipated requirements well into the future.	Simon Checksfield	Medium	2.1 2.3 2.5 2.6

Strategic priority 3: Partner for impact

The ALA plays a national and international leadership role in biodiversity informatics and IT system development to support the biodiversity sector. Its success has also leveraged the expertise and networks provided by our partners in museums, collections, government biodiversity data programs and partner NCRIS facilities, and increasingly through our relationships with the citizen science sector.

This strategy makes a commitment to further provide leadership around biodiversity informatics and to partner with those communities that provide complementary skills through domains such as taxonomy and ecological modelling, and national e-research partners. Globally, our key partnership will continue with GBIF, to achieve efficiencies and deliver improved data services. We will also partner with other international initiatives (e.g. iNaturalist) to ensure the Australian biodiversity community has access to the best research infrastructure, technology and methods.

Finally, this strategy will guide the ALA in partnering with new sectors. These include industry and the environmental consulting sector, which in many parts of Australia is the dominant sector acquiring new biodiversity data. Engaging more deeply with the biosecurity sector will also provide an opportunity to improve ALA record holdings while supporting national biosecurity surveillance and risk assessment needs.

Title	Description	Lead	Size	Strategic action
Indigenous Partnerships Program	As a national biodiversity data infrastructure, the ALA recognises the importance of Indigenous ecological knowledge as a complement to western science, in addition to the value of partnering with Indigenous groups in the delivery of its mission. Historically this has manifested in several ways including ALA's successful Indigenous Ecological Knowledge program. The ALA will extend its partnerships with Aboriginal and Torres Strait Islander people in response to its recently completed review of Indigenous Partnership pathways. Elements of this response will include greater engagement with Indigenous Ranger programs, improving cultural awareness within the ALA and its Board, and further growing our Indigenous scholar program.	Ely Wallis, Andre Zerger, Juliet Seers, Nat Raisbeck-Brown	Small	1.6 3.4

Environmental Biosecurity Program	Through its 2019 national consultation process, stakeholders identified the opportunity to leverage ALA capability to better support the research and management needs of Australia's biosecurity system. In response, the ALA established a biosecurity program to commence developing additional capability to the biosecurity sector. In the coming year the program will undertake a systematic review to better understand national research and management drivers for improved access to national biosecurity data, including gaps in the system to inform the development of a forward strategy. The ALA will also deliver and expand its flagship Biosecurity Alerts capability partnering with states and territories, and support national programs such as CSIRO's Catalysing Australia's Biosecurity initiative.	Erin Roger and Andrew Turley	Medium	4.3 4.4 4.5
Australian Reference Genome Atlas (ARGA)	Currently, Australia's genomic data for our flora, fauna and fungi species resides across numerous international data repositories, museums or research labs, making it difficult to find, access and compare genomic data on Australian species. The Australian Reference Genome Atlas (ARGA) was established as a pilot to optimise discovery and access to genomic data from multiple global repositories relevant to Australian species. In a partnership with BioCommons and Bioplatforms Australia with support from the Australian Research Data Commons, the ALA will transition ARGA from a limited pilot application to a fully functional operational system. ARGA will provide linkages to specimen and occurrence data in the ALA as well as other related data banks. It will also provide a user-centred experience to navigate the complex area of genomics data and a simple mechanism for accessing data from the repositories housing such information.	Kathryn Hall and Peter Brenton	Large	2.1 2.2 2.4 2.5 3.1 3.2 3.3 3.4 3.5 4.5

International Events	In October 2023 ALA will co-host two major international meetings welcoming delegates to Australia. The Biodiversity Information Standards (TDWG) meeting will be held in Hobart. TDWG creates and maintains standards for interchange of biodiversity data, making it a key player in making data FAIR. The GBIF Governing Board and Global Nodes meeting will be held in Canberra. This event will attract leaders in biodiversity management, exchange, and publishing from around the world. ALA and Australia are seen as key contributors to the international community and hosting will further enhance our reputation globally.	Andre Zerger, Ely Wallis	Medium	3.3
Towards a National Approach to Biological Collections	With the release of the 2021 National Research Infrastructure Roadmap and the call for a step-change around a national approach to collections, the ALA will work with its partners to identify and communicate drivers, future needs, and current capabilities to to scope a national approach to biological collections. We will partner with the Council of Heads of Australian Fauna Collections, Council of Heads of Australasian Herbaria, Australian National Botanic Gardens & National Research Collections Australia (CSIRO) to develop a business case and partnership model	Andre Zerger, Cam Slatyer, Ely Wallis	Medium	3.3

Strategic priority 4: Support decision-making

In addition to mobilising, harmonising, and delivering biodiversity data, the ALA provides users with sophisticated decision-support tools, such as the Spatial Portal and 'galah,' through its website and partnerships to deliver advanced analytics – for example, through virtual laboratories such as the EcoCommons and Biosecurity Commons. An outcome from such capability is a user community with access, not only to data, but also to decision-making tools to support business needs.

The ALA will continue to develop decision-support tools to enable its users to derive the best value from Australia's biodiversity data. In parallel, we will establish closer relationships with users to better understand their decision-making needs and their expectations of biodiversity data, as well as to include longitudinal data, survey plot data and data that are 'analysis-ready'.

Within five years, the ALA's data and services will be on a critical path for several national and state biodiversity monitoring, assessment and reporting programs, and will be delivering data services to support decision-making. Use cases could include state biodiversity assessments and monitoring programs, and Commonwealth State of the Environment Reporting.

Using the ALA's position of strength as an integrator across government and research sectors will ensure that Australia's best biodiversity data supports key decision-making needs.

Title	Description	Lead	Size	Strategic action
User expereince/ User interface (UX/UI) Upgrade	The ALA homepage has been redesigned at least five times since the inception of ALA, but the user interfaces of the core end-user applications have not been refreshed at the same rate. To address user needs and feedback this project will address user interface inconsistencies among applications, usability and quality of information presented. We recognise that improving our software applications to address user needs is not a discrete activity, and to do this in a more consistent and predictable way, a new UX practice will be established within the ALA. The 'UX Practice' will implement a rolling strategy to continuously improve end-user applications and define a governance framework that will integrate into existing operational frameworks such as the Change Advisory Board and Architecture and	Javier Molina	Medium	2.2

	Operations Forum.			
EcoCommons Australia Program	EcoCommons is a $6 million collaborative program developed by a consortium of university, government and NCRIS partners. The program serves over 8000 unique users and acts as an important gateway for researchers and decision-makers to use ALA data and integrate it with additional environmental data from other research and government programs and facilities. The EcoCommons program is strategically important as it provides analytical models and workflows that increase the value of ALA data. The ALA will continue its enduring partnership with the program as it moves to a new stage focussed on engagement and sustainment.	Martin Westgate	Medium	3.2 4.1 4.2
Industry Engagement	Understanding, catering for and responding to user needs is a critical function of ALA management. The Industry Engagement project seeks to build on previous work, which identified how industry and business use the ALA. Improvements exist to better meet needs for how industry users can search the ALA, providing training opportunities and ensuring the ALA has good usage tracking. In the longer term, the project will align with other projects such as UX/UI to deliver changes to the website. Planned products or outputs for this financial year are – development of an industry fact sheet and updated industry metrics.	Cameron Slatyer	Small	3.2 4.3 4.5

MERIT (Monitoring, Evaluation, Reporting & Improvement Tool)	The Australian government invests hundreds of millions of dollars each year in programs which enhance Australia's natural environment and protect our native species. These investments need a monitoring and reporting system to ensure that they deliver value to the Australian public and result in measurable improvements in our environmental and biodiversity assets. The ALA has been providing development and support services through the MERIT application since 2013. This activity is continuing from 2023 with a new multi-year partnership between the ALA and DCCEEW to improve systems.	Peter Brenton and Chris Godwin	Large	2.1 2.6 4.1 4.2 4.4
Re-designing digital biodiversity experience	With the richness and complexity of data provided by the ALA, an emeging challenge for users is how to locate the information quickly and easily they require to answer key questions, without masking the richness and complexity of the data they are seeing. The question of how to design web interfaces that navigate these tradeoffs in effective ways is an area of open research. The ALA is partnering with researchers at the Australian National University to design, test, and implement 'generous interfaces' that support rapid insights into the data and providers that make up the ALA.	Kylie Morrow and Martin Westgate	Small	1.2 4.1 4.3