Atlas of Living Australia
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Atlas of Living Australia Annual Work Plan

2024-2025

NCRIS National Research Infrastructure for Australia
An Australian Government Initiative

CSIRO

The ALA is made possible by contributions from its partners, is supported by NCRIS and hosted by CSIRO.

Citing this publication

Atlas of Living Australia (2024) Atlas of Living Australia Annual Workplan 2024-25, Atlas of Living Australia, Publication Series No. 13, Canberra, Australia, pp. 21.

Further information

Further information regarding the ALA annual work plan is available at **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 has been released publicly to provide our stakeholders greater visibility on ALA priorities and to provide opportunities for collaboration.

2024-25 will be the fifth year of delivery under the ALA's current Strategy 2020-25. Priorities will include the production release of several important initiatives from 23-24, including the (a) operational national biosecurity alerts service, (b) new ALA home page, species pages and global search interface under the UX/UI project, and (c) stage 2 of the taxonomic architecture project which will include improved species names matching. The ALA has been continuously improving its business process as the team and portfolio of products and services have grown, with several earlier transformations now operating under as business-as-usual (e.g., project management framework, change advisory board). This year, we will see the design and implementation of a product and portfolio management framework to manage better ALA's biodiversity IT product lifecycle and the delivery of a recently designed policy framework for the ALA. These business-centred enhancements will collectively ensure that the ALA operates as one team in an environment of challenging competing priorities and external risks such as cyber security.

As a national research infrastructure funded under the NCRIS program, collaboration and partnerships are fundamental to how the ALA benefits Australia's researchers, decision-makers, and community. This year, the ALA will partner with Australia's biological collections sector and CSIRO to develop a business case to support a national approach to biological collections akin to the major programs currently underway in Europe and the United States. Given the importance of digital data emerging from Australia's biological collections, this program supports future science related to taxonomy, genetics, evolutionary biology, conservation biology, and ecology. Beyond the biological collections sector, the ALA will improve the reach and depth of its partnerships with Aboriginal and Torres Strait Islander People, working more closely with Indigenous ranger programs to co-design and deliver training programs to enhance the utility of the ALA. A similar model will be implemented to improve the ALA's value to environmental consultants to establish data partnerships with this sector, given their critical role in assessing Australia's biodiversity.

Introduction

The Atlas of Living Australia (ALA) is a National Collaborative Research Infrastructure Strategy (NCRIS) project that mobilises biodiversity information to support national and international users demanding timely access to Australian biodiversity data. The ALA provides biodiversity data to over 120,000 users annually in research, industry, government, and communities. It benefits and supports research excellence in 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 was founded on the principle of open data access realised through a Creative Commons (CC) licence model. This is important in maximising the reuse of data produced, collected, held, and funded by the government and contributing data partners. The ALA has over 134 million biodiversity occurrence records of more than 111,000 species 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 ALA 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 typical biodiversity occurrence records; this can consist of genetic data, eDNA, sensor network data, 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 understanding 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 address the major national biodiversity management challenges, its data holdings must be more geographically and taxonomically representative and comprehensive.

The ALA Future Directions National Consultation results provide the reference data that have shaped the ALA Strategy 2020–2025. However, the strategy has also been developed in response to internal priorities 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 provides stakeholders with greater clarity regarding the ALA's priorities, thus highlighting opportunities for partnering and aligning. These priorities are communicated to stakeholders yearly through the ALA Annual Work Plan.

About the ALA Annual Work Plan 2024-2025

The ALA annual work plan describes the new projects, activities, and major investments planned for each financial year to deliver on the priorities articulated in the ALA strategy. It indicates 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 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 fifth work plan under the ALA's Strategy 2020–2025 for the fifth 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 2024-2025. 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, industry, 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 to 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. Manage and maintain 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. Provide oversight and secretariat functions around governance and accountability for ALA software products and product-related processes; and 3. Provide 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 the Commonwealth Government Department of Climate Change, Environment, Energy and Water (DCCEEW) and BioCollect hubs to the WA government (IBSA and IMSA), Brisbane City Council, and the NSW ecological restoration community (through the NSW Department 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 modernisation, cloud architecture, and work prioritisation methods. The team manages key strategic IT provider relationships including with CSIRO's IM&T, Amazon Web Services, and the Australian Research Data Commons (ARDC) Cloud Compute. Additionally, the team manages more than 15 core biodiversity products and systems, and supports new IT projects, directing the implementation of procedures and techniques.

Engagement	The Engagement Team are responsible for managing priority ALA sector engagement activities, including projects that have a significant external stakeholder component. The team leads partnerships with the biological collections community (museums, herbaria and libraries) and international biodiversity data infrastructures and initiatives, such as the Biodiversity Heritage Library and Biodiversity Information Standards (TDWG). They also support 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. Internally, continuous improvement to ALA core functions is supported including the taxonomic backbone, taxonomic name matching and user interface/ user experience. The team also work respectfully and collaboratively with Indigenous communities to deliver the ALA's Indigenous Ecological Knowledge program. Finally, they have 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 deliver insights into the collections held by the ALA and to highlight their potential ecological applications or interpretations. • Driving stronger linkages between the ALA and the research community through outreach, training, and workshops.

2024–2025 work plan at-a-glance

1 & 2. Delivering trusted data and providing robust services

The ALA delivered Stage 1 of its **Taxonomic Backbone Rearchitecture** project in 2023-24, and the next stage will see the development of improved name matching and further improvements to support regular updates to the taxonomic backbone and related ALA systems.

- The team will **Streamline Data Provision** for the ALA by building a new data ingestion framework that supports API-based data uploads and automated review and verification for data owners.
- A body of work around **Advancing Digital Transformation** of our core systems will extend and enhance ALA's IT resilience in an environment where increasing cyber security risk creates challenges for an eResearch infrastructure. Further increases in biodiversity data volume from our partners demand system updates to ensure users continue to have a seamless experience.

We have been continually enhancing our business processes in an environment where the ALA and its portfolio of data products and services are growing and complex. In 2024-25, we will continue to enhance **the ALA Delivery Model** by developing a formal policy framework, a product and portfolio management approach to managing the product lifecycle and refining ALA's IT delivery model through a collective design approach.

3. Partnering for impact

ALA's partnerships program will

- Collaborate with Australia's biological collections sector and CSIRO to develop a business case to support a national approach to biological collections as an outcome of the 2021 National Research Infrastructure Roadmap. Titled ***Improving Discovery and Access to Australia's Biological Collections***, the initiative will ensure delivering data to the ALA through Australia's biological collections will become a core component of our national research infrastructure ecosystem.
- ALA's **Biosecurity initiative** will move to a new stage with the operational release of the national biosecurity alerts service supporting commonwealth, state/territory, and regional users.

4. Support decision-making

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

- The **UX/UI upgrade project** will publicly launch the new ALA home page, species pages, and global search capability. It will also deliver a UX/UI practice in the ALA to ensure our team can support ongoing product enhancements in a user-centred manner.
- The ALA will begin redeveloping our **mapping tools**, including the Spatial Portal. These tools provide a primary gateway for users to interact with data in the ALA. However, technology and data richness have evolved in recent years, requiring a redesign to ensure ALA's approach remains contemporary.
- The ALA will continue to work with stakeholders in academia, industry, and government to support national-scale reporting on the state of Australian biodiversity knowledge and fill knowledge gaps where possible.

Strategic priority 1: Deliver trusted data

Trusted, high-quality data are fundamental to supporting world-leading biodiversity research and delivering value for decision-makers. 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 scientific research and decision-making.

Title	Description	Lead	Size	Strategic action
Restricted Access Species Data (RASD) Framework Adoption	The ALA's sensitive data workflows, governance, and software artefacts are critical to providing trusted data services. To date the RASD Framework has provided a governance mechanism to share data, and this activity will seek to begin the operationalisation of the national framework's best practices by reviewing the workflows and technical architecture surrounding the Sensitive Data Service. New use cases for restricted access data such as privacy, biosecurity and Indigenous data governance will be reviewed for incorporation. The Biodiversity Information Standards (TDWG) processes will be used to shape data standards for sharing restricted access data.	Slatyer, Laity, Newman	Med	1.1 1.2 1.6 3.5 4.4 4.5
Taxonomic Backbone Rearchitecture	Stage one of the taxonomy project reconciled vascular flora and fauna taxonomy, removing and correcting over forty thousand scientific names. Stage two will refine the higher taxonomic levels (e.g. kingdom, phylum) and that of other taxonomic groups. It will also develop names-matching improvements working closely with the Australian Biological Resources, Catalogue of Life, and the Australian Biological Resources Study. Stage 2 improvements will be made to the process of the ongoing build of the taxonomic	Slatyer, Sherrin	Large	2.1 3.3

	backbone to improve the ability of ALA to regularly update taxonomy.			
Streamlining Data Provision	Following the building of a new data ingestion framework the ALA will focus on to providing API-driven data uploads with automated review and verification capabilities. The Data and Science Decision and Support Teams will collaborate to build R & Python packages to prepare Darwin Core Archives from source data for ingestion, targeting ecological researchers and datasets. We will also publish documentation and host workshops to support new and experienced users of the Darwin Core standard to use these tools.	Newman, Westgate	Small	1.3 1.5 1.6

Strategic priority 2: Provide robust services

Thousands of users across research, government, industry, and community sectors use data within the ALA and ALA services to contribute, mobilise, access, and analyse biological information. 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, 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
Advancing Digital Transformation	The Cloud-Uplift Program aims to accelerate digital transformation within the ALA. Building on ongoing enhancements to cloud platforms, products, security protocols, and IT resilience, this program prioritises the modernisation of platform and product architecture while reinforcing cyber security measures. This work extends and enhances ALA's IT resilience to better navigate the evolving digital landscape. Key initiatives include uplifting front-end applications, implementing modernised back-end infrastructure, establishing a centralised search engine system, and integrating automated testing to improve user experience and system scalability. Additionally, the deployment and ongoing monitoring of Web Application Firewall (WAF) controls and the introduction of Multi-Factor Authentication (MFA) aim to	Sathya Moorthy	Large	2.1 2.3

	strengthen ALA's cyber security resilience. We will also evaluate current shared resources and through Project Bedrock, ensuring consistency and automated management across all cloud accounts for a more efficient and secure operational IT framework.		
Refining the ALA IT Delivery Model	With a complex portfolio of products and services and an expectation to develop new capabilities to support Australia's biodiversity data users, the ALA needs to strategically review existing capabilities, and prioritise enhancements. Improving how our growing teams collaborate to build the most effective biodiversity data capabilities is a priority. This activity will implement a product and portfolio management approach to managing the full product lifecycle, develop ALA's first policy framework to improve alignment, and design a new IT delivery model that ensures architectural and technology decisions are made effectively.	Zerger, Checksfield	Small

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, biological collections, government biodiversity data programs and partner NCRIS facilities, and increasingly through our relationships with the citizen science sector.

Our 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 the Global Biodiversity information Facility (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 knowledge and science as a complement to western science. The ALA will continue with its successful Indigenous Ecological Knowledge program, by continuing the flagship Indigenous languages program of work, extending its partnerships with Aboriginal and Torres Strait Islander communities through greater engagement with Indigenous ranger programs, improving cultural awareness within the ALA and its Advisory Board, and further growing our Indigenous scholar program.	Wallis, Seers, Slatyer, Raisbeck-Brown, Zerger	Small	1.6 3.4

Environmental Biosecurity Program	Aligned with ALA's decadal plan, the ALA has prioritised collaborations in the biosecurity sector by identifying relevant data and infrastructure needs and working to share and integrate our knowledge, technology, and data. To support the sector, the ALA delivers its flagship Biosecurity Alerts Service which is a partnership with the Commonwealth Department of Agriculture, Fisheries and Forestry and CSIRO's Catalysing Australia's Biosecurity initiative. In the next year, the focus will be to expand our thinking on sensitive data to include the biosecurity sector. We will continue to broaden the userbase of the Alerts system through engagement with local government and NGOs.	Roger, Turley	Medium	4.3 4.4 4.5
Australian Reference Genome Atlas (ARGA)	Genomic data are key sources of knowledge which inform Australia's responses to environmental and biodiversity management including threatened species conservation, biosecurity, and pest species incursions. Understanding the biosphere is critical to Australia's ongoing biosciences research program. Genomic data are currently accessed through several online international data repositories, and with the rapid expansion of genomics technologies, these data resources are growing. At the same time, findability and access to data are diminishing as creators and researchers grapple with increasingly complex deposition processes and data sovereignty issues. Innovative technologies are needed to assist researchers to find, access and reuse existing data and to help researchers make informed and optimal decisions about future genomic sequencing efforts. The Australian Reference Genome Atlas (ARGA) pilot project established an indexing tool to assist researchers with the discovery of genomic data	Hall, Checksfield	Large	2.1 2.2 2.4 2.5 3.1 3.2 3.3 3.4 3.5 4.5

	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.			
Towards a National Approach to Biological Collections	The ALA, together with partners across the collections sector and other NCRIS facilities, will continue to develop a response to the 2021 National Research Infrastructure Roadmap on a national approach to biological and palaeontological collections. We will continue partner with the Council of Heads of Australian Fauna Collections, Australian Biological Resources Study, the Department of Agricultural, Forestry and Fisheries, biosecurity collections, Council of Heads of Australasian Herbaria, Australian National Botanic Gardens and National Research Collections Australia (CSIRO) to develop a business case and delivery model. This will include leveraging the opportunity presented by the 2024 International Congress on Research Infrastructure (ICRI24) to be held in Brisbane to host a side event to engage the international National Research infrastructure (NRI) community around this topic.	Zerger, Slatyer, Wallis	Medium	3.1 3.2

AusTraits	The ALA will again partner with a team led from the University of NSW (UNSW) to deliver updates on the AusTraits project. The broad goal for this new project is to improve delivery of quality trait information (as raw data, species traits, and spatial layers) for diverse research needs. ALA's contribution to the project is likely to include: • revising the information displayed in the traits tab, and • assist the AusTraits team in finding a long-term sustainable host for the API.	Wallis, Sathya Moorthy	Small	3.4
GBIF Oceania Regional Engagement	The ALA has successfully nominated to take on a role to represent the Oceania region at the GBIF Nodes Steering Group, and as such will support in organising a Regional Nodes meeting for 2024 and participate as an observer at the Asia Regional Nodes meeting. The meetings seek to share knowledge particularly around GBIF initiatives and data mobilisation strategies, and provide an adjacent forum for regional engagement in the GBIF Biodiversity Information for Development (BID) funding program.	Newman	Small	3.1 3.2

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 – e.g. 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 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 experience/ User interface (UX/UI) Upgrade	Through 2023-24, the ALA has been working on the establishment of a UX practice to improve user interface, usability and quality of information presented in our applications. The practice provides a governance framework and a set of operational guides. Work will continue the release of an improved set of species pages, home page and ALA search pages from 2023-2024. The UX practice will action the operational guides to measure the impact of any new designs released. The UX practice has also developed a prioritisation framework that will be used to plan the next set of applications or services that need to be redesigned	Molina	Large	2.1 2.2 2.3

Redevelopment of mapping tools: scoping study	The ALA has more than five different tools for displaying spatial information, each optimised for a different purpose or user group. This project will investigate the strengths and weaknesses of existing implementations, with the intention of consolidating the required functions into a smaller number of optimised tools.	Westgate	Small	2.2 2.6
Generous interfaces	Much of the ALA's digital presence currently requires a detailed knowledge of what data are available, and the attributes of that data, before users can find the information that they require efficiently. A more user-centred approach aims to demonstrate the breadth and capabilities of data accessible within the ALA and support users to better navigate the information in an intuitive manner. The ALA is collaborating with Professors Mitchell Whitelaw and Adrian Mackenzie (ANU) to investigate tools and techniques that would allow for a more 'generous' interface to data stored by the ALA.	Morrow, Westgate	Medium	4.1 4.3
Support national scale environmental reporting	The ALA has a critical role to play in articulating the extent of knowledge on Australia's biodiversity, and providing that information as clearly and openly as possible for use by researchers, industry, and government. The ALA will continue to expand our methods for summarising and explaining our data holdings and develop new tools to increase their utility for a range of audiences.	Balasubramaniam, Westage	Small	1.2 4.2 4.3