

Layers of Life: AI-Ready Species Images, Sounds, & Spatial Occurrence Data in the Atlas of Living Australia (ALA)

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eResearch 2025



Wompoo Fruit Dove
(*Ptilinopus magnificus*)
Photo credit matthewkwan

The Atlas of Living Australia acknowledges the Traditional Owners of the land we're meeting on today – the Turrbal, Yuggera & Jagera Peoples. We pay respect to the past and present Elders of Aboriginal and Torres Strait Islander communities.

We honour and celebrate their spiritual, cultural and customary connections to Country and the biodiversity that forms part of that Country.

Biodiversity data

...and why it matters

- “Biodiversity is the variability among living organisms, including within species, between species and of ecosystems. It is **essential to the natural environment, and to human survival, wellbeing and economic prosperity**” (Convention on Biological Diversity Article 2)
- Currently, 1,900+ Australian species & ecological communities are threatened (SOE 2021)
- **Biodiversity data underpins conservation, research, and policy**
- **Data access supports science and innovation** 🧪 👩‍🔬



Eastern Spiny-tailed Gecko
(*Strophurus williamsi*)
Photo Credit James Bennett



Tasmanian Purple-Star
(*Isophysis tasmanica*)
Photo Credit Joey Santore



Golden Stag Beetle
(*Lamprima aurata*)
Photo Credit Ben Travaglini

Atlas of Living Australia (ALA)

Australia's national biodiversity data infrastructure

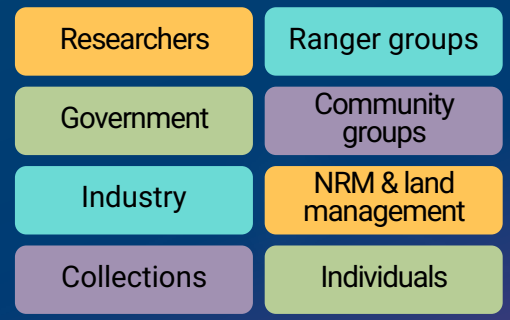
- Our mission is to:
 - Support research and decision-making on Australia's biodiversity
 - Provide trusted and robust biodiversity data services
- **ALA aggregates & openly provides data**



850+ data partners



140,000+ users



Multi-dimensional data

ALA products and services



Multi-dimensional data

ALA products and services



Data in the ALA

Occurrence Records

A sighting of an individual organism, with a taxonomic ID (what), date (when) and location (where).



Where:
-32.777,
116.966



What:
Thorny Devil
(*Moloch horridus*)



When:
22 Mar
2020



Thorny Devil (*Moloch horridus*)
Photo Credit Clarissa Human

Data in the ALA

Occurrence Records

Atlas of Living Australia
ala.org.au

Home > Occurrence records > Record: Observations:169917956 (Moloch horridus)

Occurrence record: Observations:169917956
Human observation of Moloch horridus Gray, 1841 | Thorny Devil recorded on 2020-03-23

Flag an issue

View original record Compare 'original vs processed' values Copy record id API

Dataset

Dataset resource	iNaturalist Australia
Institution code	Supplied institution code "iNaturalist"
Collection	Supplied collection code "Observations"
Catalog number	169917956
Occurrence ID	https://www.inaturalist.org/observations/169917956
Record type	Human observation Supplied basis "HumanObservation"
Identified by	Clarissa Human
Collector	Clarissa Human
User	Clarissa Human
License	CC BY-NC 4.0 (Int) Supplied as https://creativecommons.org/licenses/by-nc/4.0/
Rights holder	Clarissa Human
Presence/Absence	PRESENT
Identification verification status	research
Date identified	2023-06-28T10:00
Identification ID	979729550

Event

Dataset / Survey name	iNaturalist research
Occurrence date	2020-03-23 Supplied date "2020/03/23 1:50 P 82
Verbatim event date	2020/03/23 1:50 P 82
End day of year	82
Date precision	DAY
Event time	13:50:00+08:00
Start day of year	82

Taxonomy

Scientific name	Moloch horridus
Identified to rank	species
Common name	Thorny Devil
Kingdom	Animalia
Phylum	Chordata
Class	Reptilia
Order	Squamata

Map data © OpenStreetMap contributors, Imagery © CartoDB

Photographer: Clarissa Human
Rights holder: Clarissa Human
Image license: <http://creativecommons.org/licenses/by-nc/4.0/>
View image details

```

"location": {
  "country": "Australia",
  "decimalLatitude": -32.777637,
  "terrestrial": true,
  "decimalLongitude": 116.966586,
  "stateProvince": "Western Australia",
  "biome": "TERRESTRIAL",
  "coordinateUncertaintyInMeters": 1953,
  "marine": false,
  "countryCode": "AU",
  "geodeticDatum": "EPSG:4326"
},
"event": {
  "year": 2020,
  "endDayOfYear": "82",
  "month": 3,
  "datePrecision": "DAY",
  "startDayOfYear": "82",
  "day": 22,
  "eventDate": "2020-03-23"
},
"attribution": {
  "dataResourceName": "iNaturalist Australia",
  "license": "CC-BY-NC 4.0 (Int)",
  "dataResourceId": "dr1411"
}

```

```

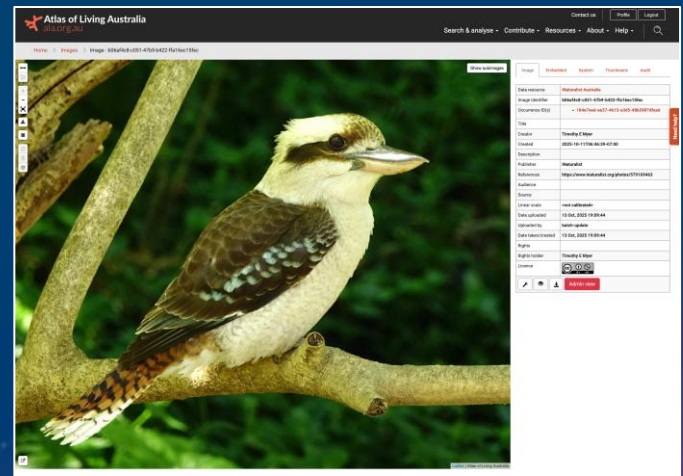
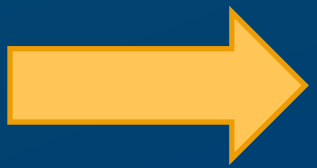
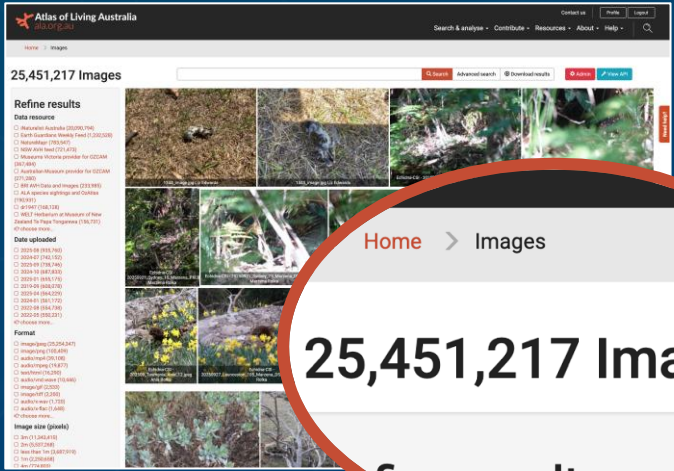
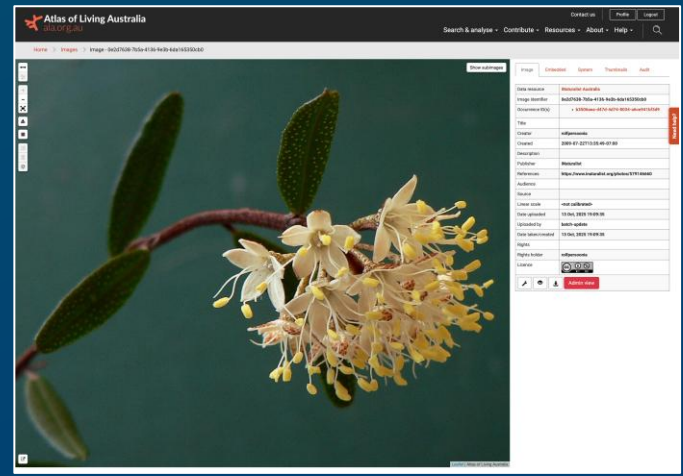
"uuid": "cd5c728c-3b94-4ec4-8f21-d15cf19970a2",
"occurrence": {
  "rightsHolder": "Clarissa Human",
  "occurrenceStatus": "PRESENT",
  "basisOfRecord": "HUMAN_OBSERVATION",
  "modified": "2024-07-29T23:10:20Z",
  "images": [
    "https://images.ala.org.au/image/proxyImage?imageId=c96d6879-45b1-400c-8a5d-edb56336013f",
    "https://images.ala.org.au/image/proxyImage?imageId=ba5525d6-a1ef-4aa1-b0df-5e54a4a6076e",
    "https://images.ala.org.au/image/proxyImage?imageId=1ac61c88-1bf3-4eed-97cc-6dcce419e177"
  ]
},
"classification": {
  "scientificName": "Moloch horridus",
  "matchType": "exactMatch",

```

Images in the ALA

Over 25 million images available on the ALA

- Most are Creative Commons licensed e.g. CC-BY, CC-BY-NC
- Can search and filter using the website
- APIs



Getting records & images from the ALA



Biscuit Star
(*Pentagonaster duebeni*)
Photo Credit Tony Strazzari

Getting data & images – example

- For 2025 bird of the year, the Tawny Frogmouth (Birdlife Australia)



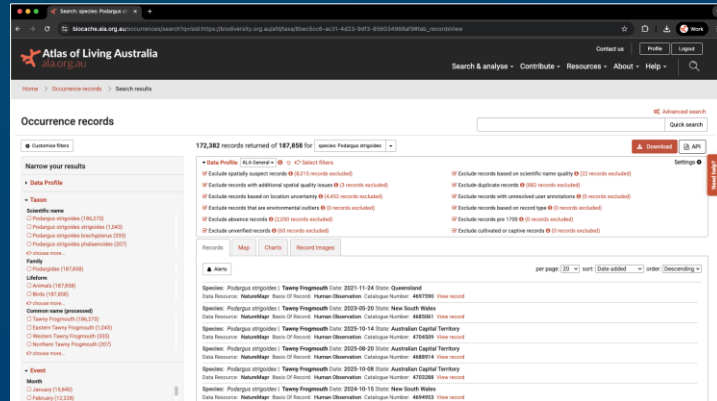
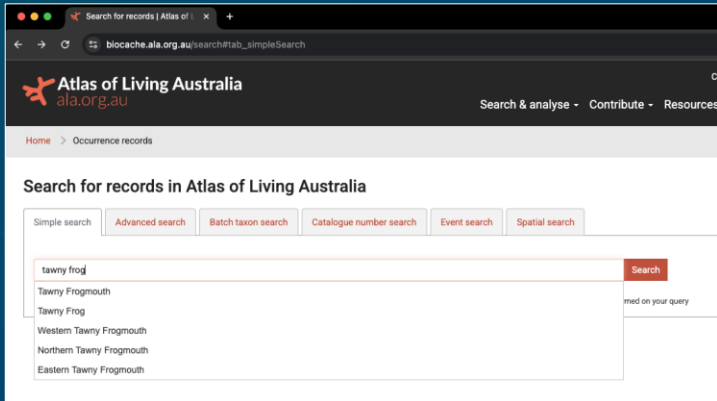
- Imagine you want to:
 - Find occurrences (sightings) of the species – that have images, and are in Tasmania
 - Get the associated images, and metadata for each image



Tawny Frogmouth (*Podargus strigoides*)
Photo Credit James Bennett

1. Search occurrence records

ala.org.au > Search & analyse: Search & download records > search for “tawny frogmouth”



Via `/occurrences/search`

APIs: Using a scientific or common name
e.g. `https://api.ala.org.au/occurrences/occurrences/search?q=tawny%20frogmouth`



Returns list of occurrences in JSON:

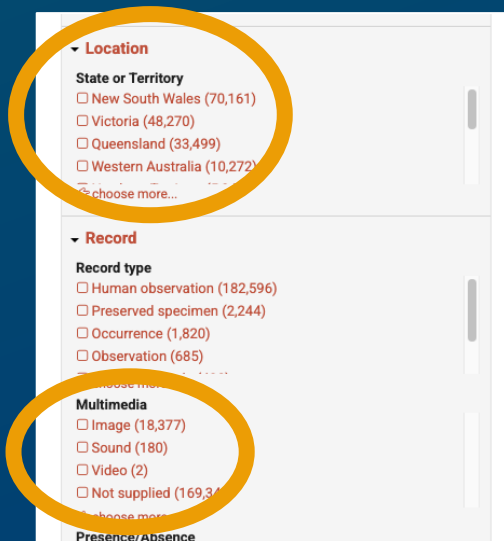
```

"totalRecords": 2385,
"sort": "score",
"dir": "asc",
"status": "OK",
"occurrences": [
  {
    "uuid": "d774e355-61e8-4734-b37d-0585398e4bc",
    "raw_catalogNumber": "SUR28712-253067",
  }
]

```

1a. Filter occurrence records

Add facets to narrow down results



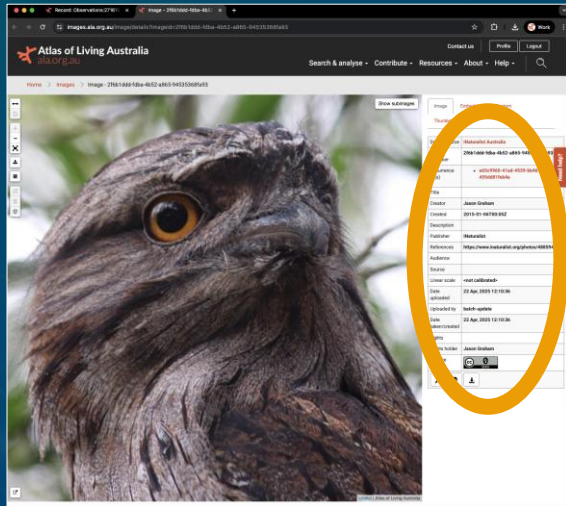
Via
APIs: `/occurrences/search`
Add `fq=multimedia:"Image"`
Add `fq=state:"Tasmania"`

e.g.
<https://api.ala.org.au/occurrences/occurrences/search?q=tawny%20frogmouth&fq=multimedia%3AImage&fq=state%3ATasmania>

2. Get associated images

Browse record(s) > view image & metadata

⚠ Note that an occurrence record and it's associated image/s *can* have difference licenses



```
"references": "https://www.inaturalist.org/observations/271615436",
"imageMetadata": [
  {
    "imageId": "2f6b1ddd-fdba-4b52-a865-94535368fa93",
    "height": 1207,
    "width": 1170,
    "tileZoomLevels": 5,
    "thumbHeight": 300,
    "thumbWidth": 291,
    "filesize": 1205055,
    "mimetype": "image/jpeg",
    "creator": "Jason Graham",
    "rightsHolder": "Jason Graham",
    "license": "http://creativecommons.org/publicdomain/zero/1.0/",
    "imageUrl": "https://images.ala.org.au/store/3/9/a/f/2f6b1ddd-fdba-4b52-a865-94535368fa93",
    "thumbUrl": "https://images.ala.org.au/store/3/9/a/f/2f6b1ddd-fdba-4b52-a865-94535368fa93",
    "largeThumbUrl": "https://images.ala.org.au/store/3/9/a/f/2f6b1ddd-fdba-4b52-a865-94535368fa93",
    "squareThumbUrl": "https://images.ala.org.au/store/3/9/a/f/2f6b1ddd-fdba-4b52-a865-94535368fa93",
    "tilesUrlPattern": "https://images.ala.org.au/store/3/9/a/f/2f6b1ddd-fdba-4b52-a865-94535368fa93"
  }
]
```

Via APIs: `/occurrences/search`
Add `im=true`

or, `/image/details` using the image ID

e.g.

`https://api.ala.org.au/occurrences/occurrences/search?q=tawny%20frogmouth&fq=multimedia%3AImage&fq=state%3ATasmania&im=true`

Getting data & images – example

So now we have 🙌

- Occurrence records for Tawny Frogmouths
 - from TAS & with images
- Image URL and metadata



Tawny Frogmouth (*Podargus strigoides*)
Photo Credit Jason Graham, CC0

ALA API docs

- 150+ web services
 - Most are open and freely available
 - A few require JWT (sensitive data, user details)
- Documentation: docs.ala.org.au
 - Browse by services, e.g.
 - Images
 - Occurrences
 - Metadata
 - Species
 - Lists
- View full Swagger docs

docs.ala.org.au/introduction

Atlas of Living Australia
ala.org.au

Introduction

The Atlas of Living Australia (ALA) is Australia's national biodiversity database. It is a collaborative, digital infrastructure that aggregates Australian biodiversity data from multiple sources, making the information open, accessible and reusable. The ALA delivers trusted data services for Australia, supporting world-class biodiversity research and decision-making.

These data stored in the ALA have been fully parsed, processed and augmented with consistent taxonomic, geolocation and climate/environmental data. Our data API provides access to over 100 million species occurrence records as well as taxonomic and scientific name information for over 153,000 species, complete with geospatial, taxonomic and temporal searching & filtering as well as bulk downloads for use 'offline'.

Documentation

Welcome to the ALA API Portfolio Hub.

We've recently moved to this API Gateway to streamline access and improve security for end-users by incorporating user authentication. ALA data are still open and freely accessible. For more information or assistance, please contact sueport@ala.org.au.

API Endpoint: "<https://api.ala.org.au/>"

ALA APIs allow two main methods of access

1. No Authentication - The majority of the API endpoints across all published ALA services do not require authentication and are open to public access.
2. JWT Authentication/Advanced Access - For API endpoints that provide write access and read access to sensitive or private data, the requestor (user or machine) needs to be authenticated. JWT access token can be used to authenticate requests. The [Authentication](#) section provides details on JWT usage.

Authentication

Open ID Connect is used to obtain an access token. Once an access token is obtained it should be passed as a bearer token in the HTTP Authentication header.

Authorization: Bearer: <access_token>

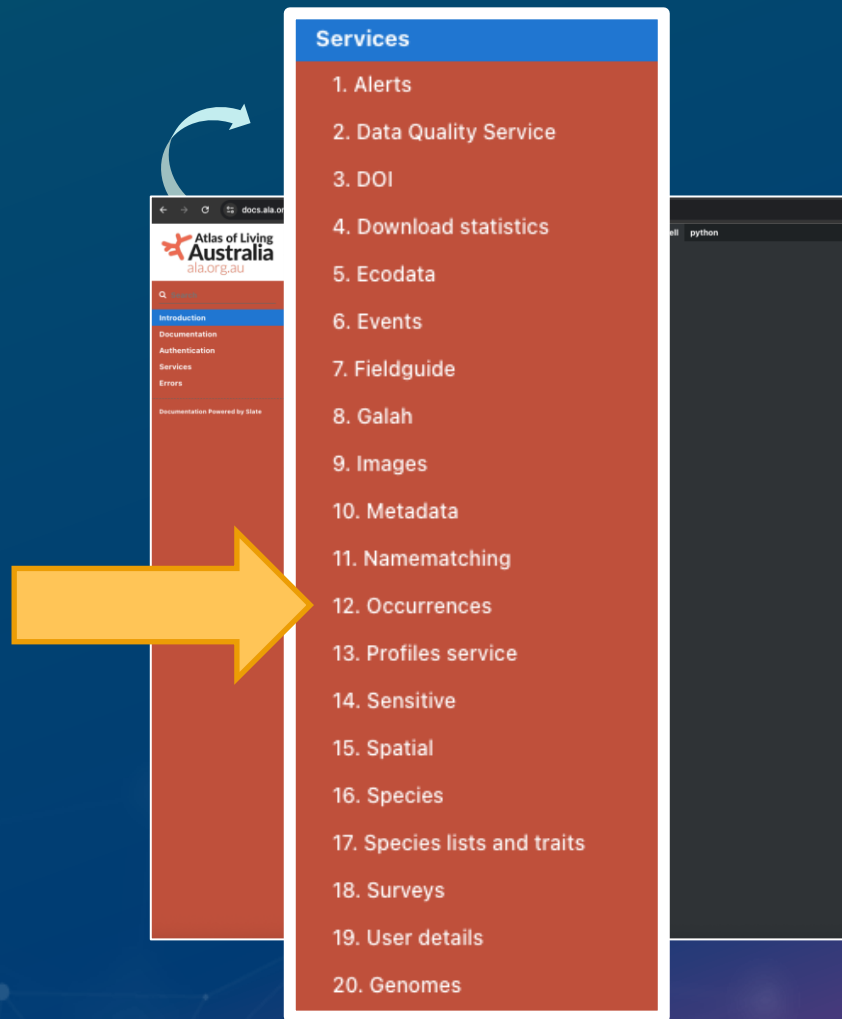
Client application details are required for access token generation. Please follow this [step-by-step guide](#) for **Client Registration** and **Token Generation**. The **Token Generation** functionality of the guide implements the ALA recommended [Authentication Code Flow using PKCE](#) flow mentioned below.

We support multiple ways to obtain an access token:

- [Client Credentials](#)
- [Authentication Code Flow](#)
- [Implicit Flow](#)

ALA API docs

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 - Images
 - Occurrences
 - Metadata
 - Species
 - Lists
- View full Swagger docs



Images – recent upgrades



Turquoise Elfcup
(*Chlorociboria aeruginosa*)
Photo Credit Christine Jones

Images upgrades

Accelerated and streamlined data ingestion

- **Cloud-Native Direct Ingest** 🚀
 - **New!** Direct ingestion from AWS S3 buckets
 - Eliminates costly data transfer steps
- **Ingestion Pipeline Resilience** 🛡️
 - Enhanced stability and throughput for batch uploads

= Data becomes discoverable and AI-ready faster



Images upgrades

Enhanced capacity and performance for high-res datasets

- **Just-in-Time (JIT) Derivative Generation** 🕒
 - Tiles and thumbnails generated *on-demand*
 - **Massively reduced** initial ingest processing time and storage costs
- **Global Speed & Scalability (CDN)** 🌐
 - Integration with **CloudFront** for image delivery
 - Images and tiles are cached closer to the user, ensuring fast load times worldwide
- **Platform Modernisation** ⚙️
 - Core service upgrade to **Java 21**

= **High-resolution data is fast, efficient, and ready for global consumption**

Images upgrades

UI refresh

Atlas of Living Australia
ala.org.au

Contact us Sign up Login

Search & analyse - Contribute - Resources - About - Help -

Home > Images

ALA Images

Explore millions of species images from across Australia – contributed by hundreds of trusted data providers.

999,999 Images [View API](#)

Search by species, data provider, location and more... [Search](#) [Advanced search](#)


Refine results

Data resource


- Earth Guardians Weekly Feed (496,064)
- Museums Victoria provider for OZCAM (356,448)
- Camera trap surveys in Queensland's Wet Tropics 2022-2023 (29,075)
- Queensland Museum provider for OZCAM (22,559)
- Queen Victoria Museum Art Gallery provider for OZCAM (16,973)
- 1411 (14,286)
- Echidna-CSI (12,970)
- TurtleSAT (8,478)
- NSW_Woomargama_wombats_Linley_2021-22 (7,218)
- iNaturalist Australia (5,606)
- [choose more...](#)

Date uploaded


- 2025-09 (367,783)
- 2025-04 (279,464)
- 2022-10 (103,601)
- 2022-11 (68,931)




(no title supplied)
Earth Guardians Weekly Feed
Created by: (unknown)
Licence: unrecognised_licence




(no title supplied)
Earth Guardians Weekly Feed
Created by: (unknown)
Licence: unrecognised_licence




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Earth Guardians Weekly Feed
Created by: (unknown)
Licence: unrecognised_licence




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Licence: unrecognised_licence




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Earth Guardians Weekly Feed
Created by: (unknown)



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Earth Guardians Weekly Feed
Created by: (unknown)



(no title supplied)
Earth Guardians Weekly Feed
Created by: (unknown)

Summary

- ALA provides **open access to biodiversity data**
 - 150m+ occurrence records, 25m+ images, audio
 - From 850+ data providers
 - Most records, images and sounds are ok to use with attribution – e.g. CC-BY, CC-BY-NC
- **Access & download data** via website, APIs (15+ apps/services), & galah (R or Python)
- We've **upgraded our images app** to accelerate data ingestion and enhance capacity and performance, to make data discoverable faster



Crimson Rosella
(*Platycercus elegans*)
Photo Credit
Graham Winterflood

Contributing data to ALA

- Want to contribute data? Have questions?
 - [Sharing a dataset with the ALA support article](#)
 - Contact us: support@ala.org.au
 - [Galaxias R & Python tools](#)
 - Check out our [Data Mobilisation Program \(2026\)](#)



Cape York Graceful Tree Frog
(*Ranoidea bella*)
Photo Credit Mark Simpson

ALA @ eResearch 2025

- **Wed 22 Oct, 16.30, Boulevard Auditorium**
Layers of Life: AI-Ready Species Images, Sounds, and Spatial Occurrence Data in the Atlas of Living Australia
- **Thu 23 Oct, 11.20, Boulevard Room**
Evolving Systems for Biodiversity Science: The Atlas of Living Australia's Next-Gen Cloud Platform Journey
- **Visit us at Booth 27 – opposite rooms B1/B2/B3**



Rakali (*Hydromys chrysogaster*)
Image credit: Sandy Horne, CC BY-NC



Cleopatra's Needles
(*Thelymitra apiculata*)
Photo credit Stephen Buckle

 **Atlas of Living
Australia**
ala.org.au

Thank you, please get in touch if you have any questions.

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ala.org.au