



Nomenclature of Vertebrate Fauna

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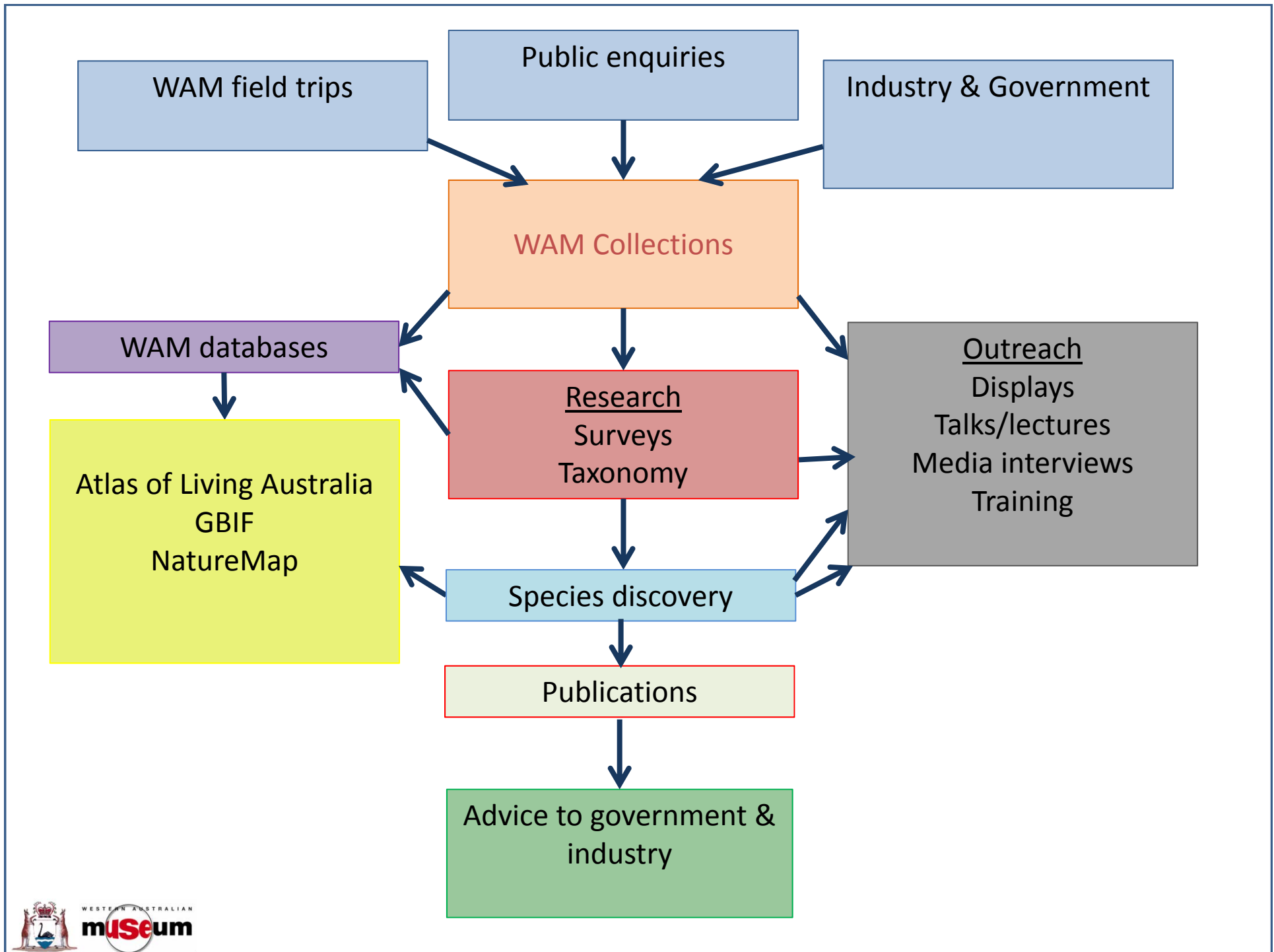


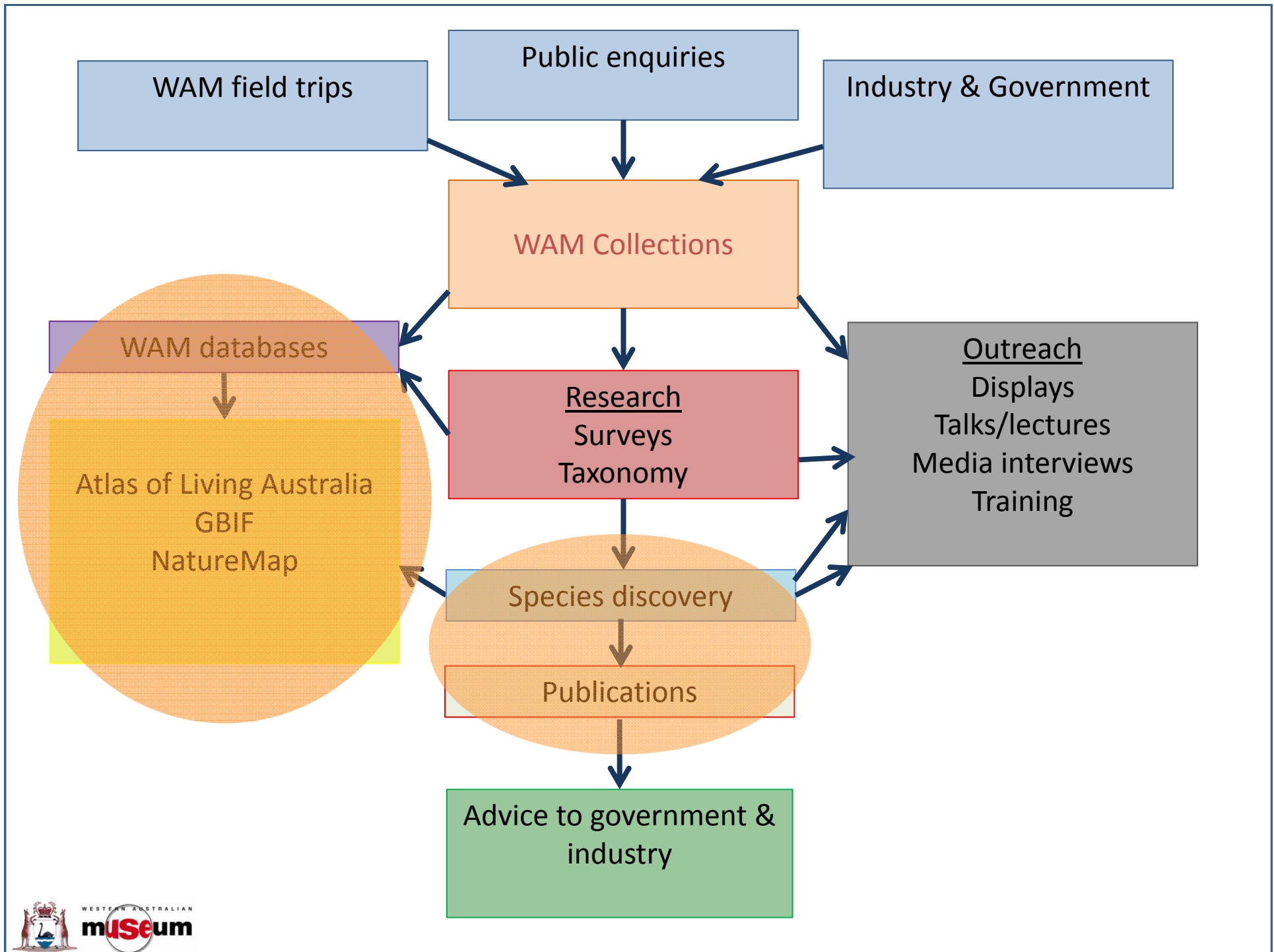
What is the WA Museum?

How to keep updated on species names?

Good Identification

Collaboration between Industry and the WAM





WA Museum Collections

- Entire WAM collections: 4.5 million objects
- AZ + TZ = \$91 million
- AZ + TZ holotypes = \$11 million
- Continual improvement and enhancement
- Field trips, public submissions, industry
- Many databased, but many are not....
 - Location, coordinates
 - Date
 - Collectors name
 - Habitat
 - Identification

Systematics

The branch of biology which deals with classification and nomenclature.

“WHAT IS IT”?

Systematics

“The **classification** of living organisms into hierarchical series of groups **emphasizing** their **phylogenetic relationships**”

Lincoln, R.J., Boxshall, G.A. and Clark, P.F. 1982. **A dictionary of ecology, evolution and systematics**. Cambridge University Press

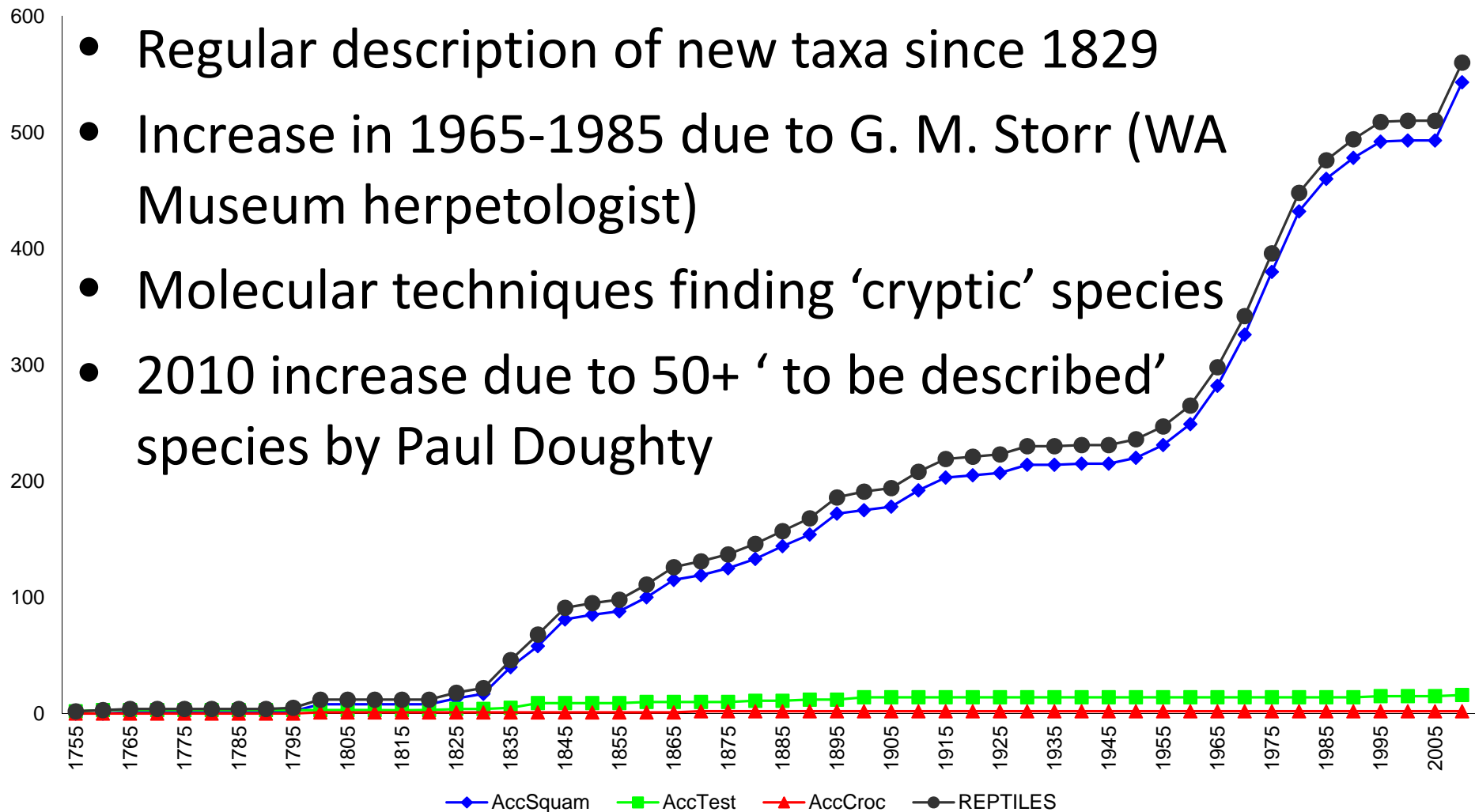
Taxonomy

“The theory and practice of **describing, naming and classifying** organisms”

Lincoln, R.J., Boxshall, G.A. and Clark, P.F. 1982. **A dictionary of ecology, evolution and systematics**. Cambridge University Press

Year of Taxonomic Description

- 570+ WA reptile taxa (species + subspecies)
- Regular description of new taxa since 1829
- Increase in 1965-1985 due to G. M. Storr (WA Museum herpetologist)
- Molecular techniques finding 'cryptic' species
- 2010 increase due to 50+ 'to be described' species by Paul Doughty



Appropriate names

- 1) WAM checklist
- 2) Online Resources/Databases (ALA, IOC, Reptile Database)
- 3) Field Guides
- 4) Primary Literature

WA Museum Checklist

Checklist of the Frogs of Western Australia

Department of Terrestrial Zoology, Western Australian Museum 49 Kew Street Welshpool WA 6106

This update: May 2016

Updated by Doughty, P., Ellis, R.J. & Bray, R.

Yellow highlight = change from previous version

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* To view species in taxonomic order, please use the 'Sort' column.

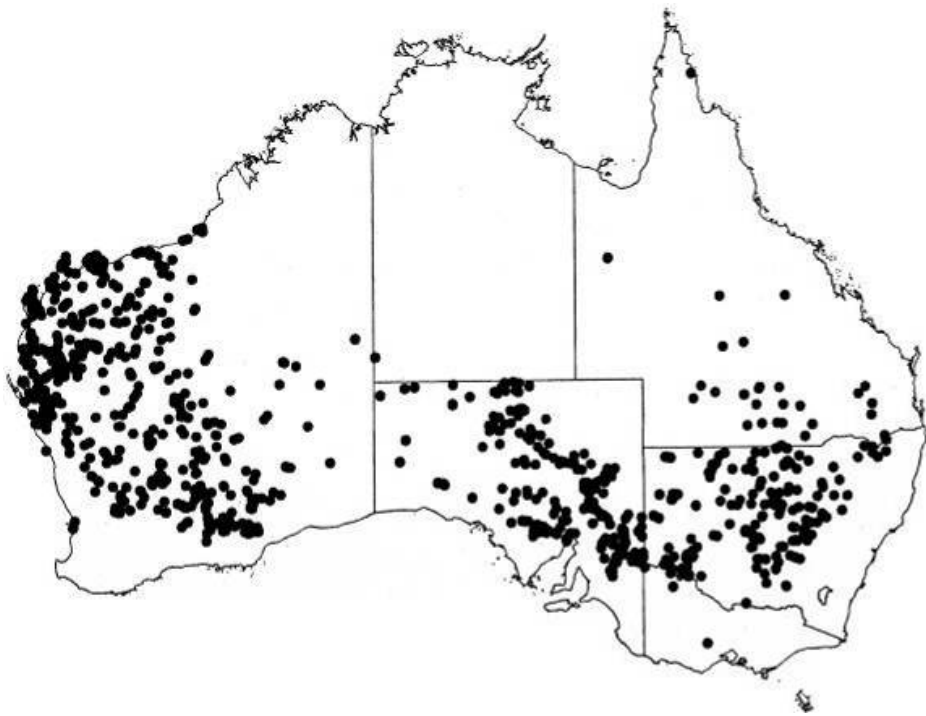
SORT	CLASS	ORDER	FAMILY	GENUS	SPECIES	Authority, year	Common names	Notes	Conservation Status
1	Amphibia	Anura	Hylidae	<i>Cyclorana</i>	<i>australis</i>	(Gray, 1842)	Giant Frog		
1	Amphibia	Anura	Hylidae	<i>Cyclorana</i>	<i>cryptotis</i>	Tyler & Martin, 1977	Hidden-ear Frog		
1	Amphibia	Anura	Hylidae	<i>Cyclorana</i>	<i>cultripes</i>	Parker, 1940	Knife-footed Frog		
1	Amphibia	Anura	Hylidae	<i>Cyclorana</i>	<i>longipes</i>	Tyler & Martin, 1977	Long-footed Frog		
1	Amphibia	Anura	Hylidae	<i>Cyclorana</i>	<i>maini</i>	Tyler & Martin, 1977	Sheep Frog		
1	Amphibia	Anura	Hylidae	<i>Cyclorana</i>	<i>platycephala</i>	(Günther, 1873)	Water-holding Frog		
1	Amphibia	Anura	Hylidae	<i>Cyclorana</i>	<i>vagitus</i>	Tyler, Davies & Martin, 1981	Wailing Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>adelaidensis</i>	(Gray, 1841)	Slender Tree Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>aurifera</i>	Anstis, Tyler, Roberts, Price & Doughty, 2010	Kimberley Rockhole Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>axillaris</i>	Doughty, 2011	Kimberley Rocket Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>bicolor</i>	(Gray, 1842)	Northern Dwarf Tree Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>caerulea</i>	(White, 1790)	Green Tree Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>cavemicola</i>	Tyler & Davies, 1979	Cave Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>coplandi</i>	(Tyler, 1968)	Rock Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>cyclorhyncha</i>	(Boulenger, 1882)	Spotted-thighed Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>inermis</i>	(Peters, 1867)	Bumpy Rocket Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>meiriana</i>	(Tyler, 1969)	Rockhole Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>microbelos</i>	(Cogger, 1966)	Javelin Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>moorei</i>	(Copland, 1957)	Motorbike Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>nasuta</i>	(Gray, 1842)	Striped Rocket Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>pallida</i>	Davies, Martin & Watson, 1983	Pale Rocket Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>rothii</i>	(De Vis, 1884)	Northern Laughing Tree Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>rubella</i>	Gray, 1842	Little Red Tree Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>splendida</i>	Tyler, Davies & Martin, 1977	Splendid Tree Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>staccato</i>	Doughty & Anstis, 2007	Chattering Rock Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>tomieri</i>	(Nieden, 1923)	Black-shinned Rocket Frog		
1	Amphibia	Anura	Hylidae	<i>Litoria</i>	<i>watjulumensis</i>	(Copland, 1957)	Wotjulum Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Heleioporus</i>	<i>albopunctatus</i>	Gray, 1841	Western Spotted Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Heleioporus</i>	<i>barycragus</i>	Lee, 1967	Hooting Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Heleioporus</i>	<i>eyrei</i>	(Gray, 1845)	Moaning Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Heleioporus</i>	<i>inornatus</i>	(Lee & Main, 1954)	Whooping Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Heleioporus</i>	<i>psammophilus</i>	(Lee & Main, 1954)	Sand Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Limnodynastes</i>	<i>convexusculus</i>	(Macleay, 1877)	Marbled Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Limnodynastes</i>	<i>depressus</i>	Tyler, 1976	Flat-headed Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Limnodynastes</i>	<i>dorsalis</i>	(Gray, 1841)	Western Banjo Frog		
2	Amphibia	Anura	Limnodynastidae	<i>Limnodynastes</i>	<i>lignarius</i>	(Tyler, Martin & Davies, 1979)	Carpenter Frog		

WA Museum Checklist

- WAM checklist for new changes
 - Highlights the recent changes and gives the background information as to why the change has occurs
 - Points to the primary literature
 - Trickle down to field guides
- Changes made up of two types
 - Eureka! New species
 - *Lerista neviniae*
 - Revisionary work (slog)
 - *Acanthophis cryptamydros* Kimberley Death Adder
 - *Eremiascincus pallidus* vs (*fasciolatus*)

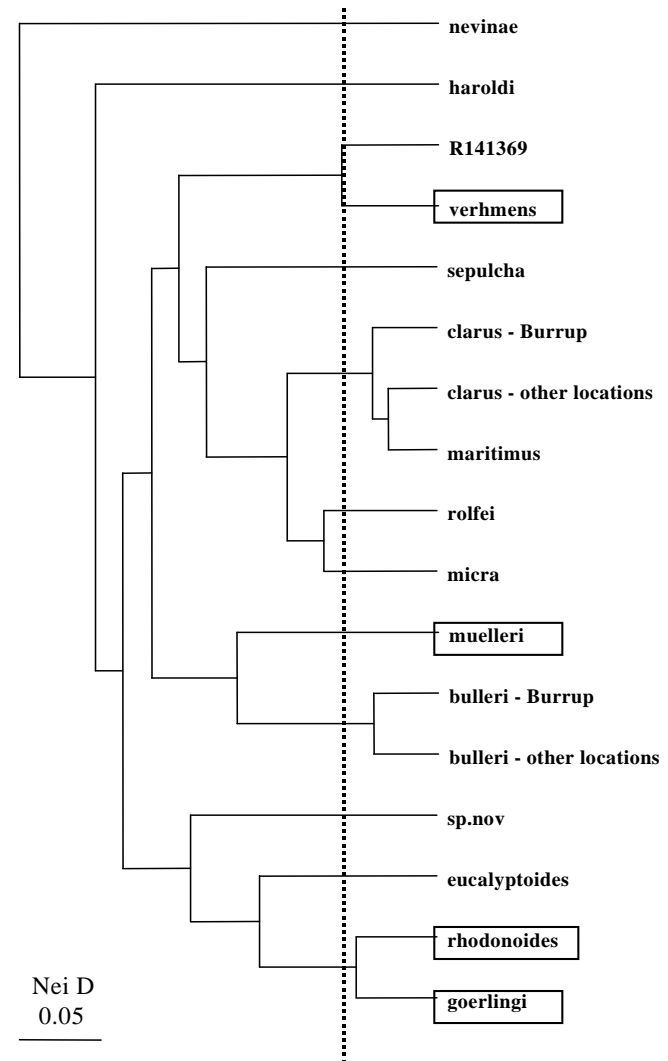
Lerista muelleri – pre-2007

- Common across Australia
- Long-acknowledged morphological variation
- Identification difficult – specimens small



Molecular variation in *Lerista muelleri*

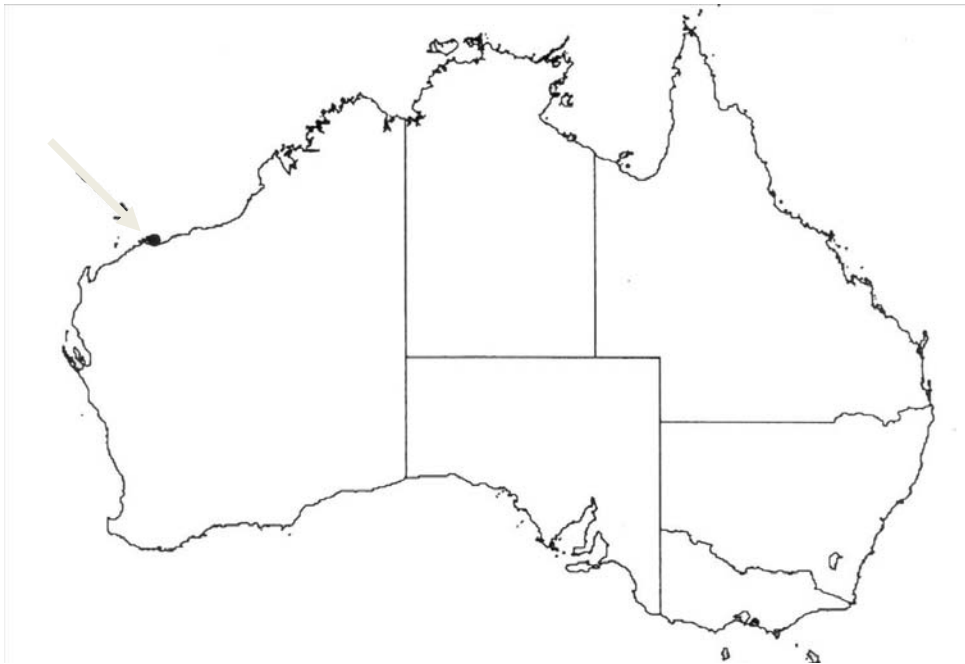
- Molecular analysis
- Seventeen distinct morphotypes
 - Thirteen species recognized
- Molecular study confirmed geographic separation
- Most species widespread



Smith, L. A. and Adams, M. 2007. Records of the Western Australian Museum 23: 309-358.

Lerista neviniae

- Restricted to Cape Lambert
- Short-range endemic
- Listed as vulnerable



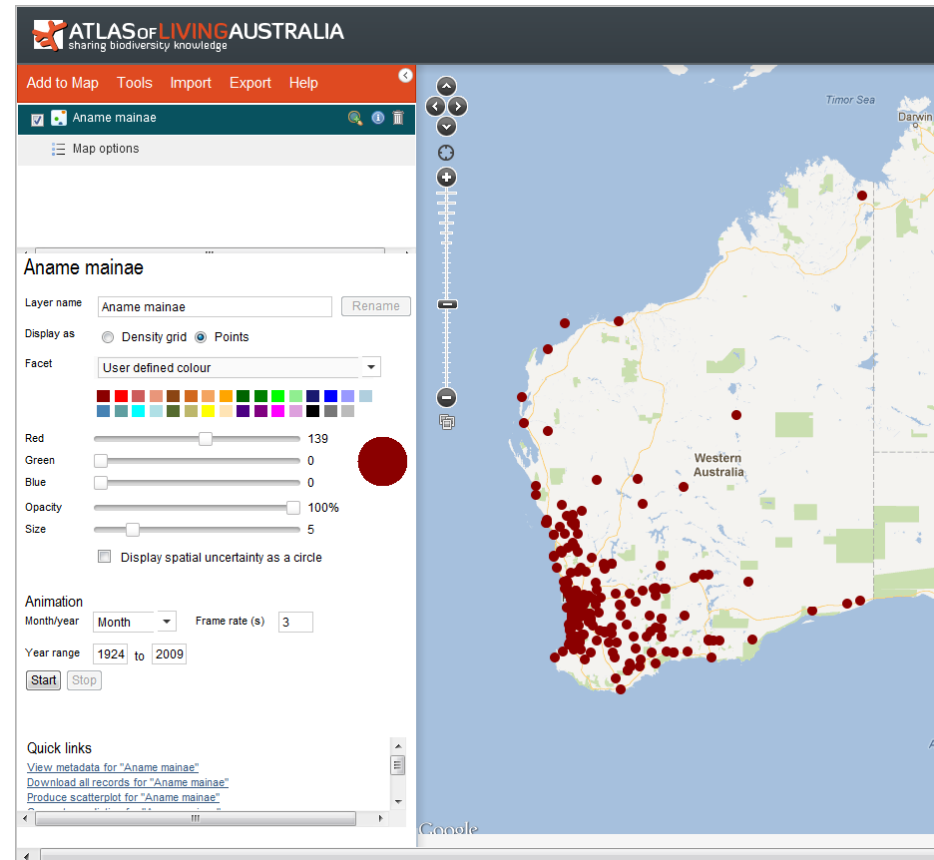
Online Resources/Databases

Only as good as the data going in.

Atlas of Living Australia (ALA)

<http://www.ala.org.au/>

- Choose museum vouchered records
- Good mapping
- Can use to search museum databases



OZCAM

<http://ozcam.org.au/>



Nature Map

<https://naturemap.dpaw.wa.gov.au/>

The screenshot shows the homepage of the NatureMap website. At the top left is the Department of Environment and Conservation logo. The main title 'NatureMap' is in a large, stylized font, with the subtitle 'Mapping Western Australia's biodiversity' below it. On the right, there are links for 'Site map', 'Accessibility', and 'Contact us', along with a search bar for 'Search DEC...' and a 'Go!' button. Below the search bar is a link to 'Search whole of WA Government'. A navigation menu includes 'Home', 'Themes', 'Maps', 'Tools', and 'Help'. A login section for 'Username / Password:' is present. The main content area features a 'Welcome to NatureMap' message with the tagline 'Where is What? and What is Where?' and 'Produce maps, lists and reports of WA's flora and fauna diversity.' It includes two small images: one of an acacia tree and one of a map. Below these are links to search by name or area, and a link to provide feedback. On the right side, there is a 'Latest News' section titled 'NatureMap V1.5 Released!' dated 09 / 08 / 2012, with a link to the news archive. The footer contains the logos of the Department of Environment and Conservation and the Western Australian Museum, along with a copyright notice and a list of links: 'wa.gov.au', 'DEC Home', 'Privacy', 'Disclaimer', 'Copyright', 'Registration', and 'Feedback'.

Department of Environment and Conservation

NatureMap

Mapping Western Australia's biodiversity

Site map Accessibility Contact us

Search DEC... Go!

Search whole of WA Government

Home Themes Maps Tools Help

Username / Password: /

Register Forgot Password

Welcome to NatureMap

Where is What? and What is Where?
Produce maps, lists and reports of WA's flora and fauna diversity.

Acacia

Search for species [by name](#) or [by area](#).

What do you think of NatureMap? [We'd love to know](#).

Latest News

NatureMap V1.5 Released!

[News archive](#) 09 / 08 / 2012

A new version of NatureMap has just been released. This version makes new species datasources and reference layers available, and a brand new theme: the **Great Western Woodlands!** See the news archive for more details.

A collaborative project of

Department of Environment and Conservation

WESTERN AUSTRALIAN MUSEUM

By using this site you indicate acceptance of NatureMap's [copyright and disclaimer provisions](#).

Minimum Requirements: See the [Accessibility page](#) for supported browsers. Javascript and cookies must be enabled.

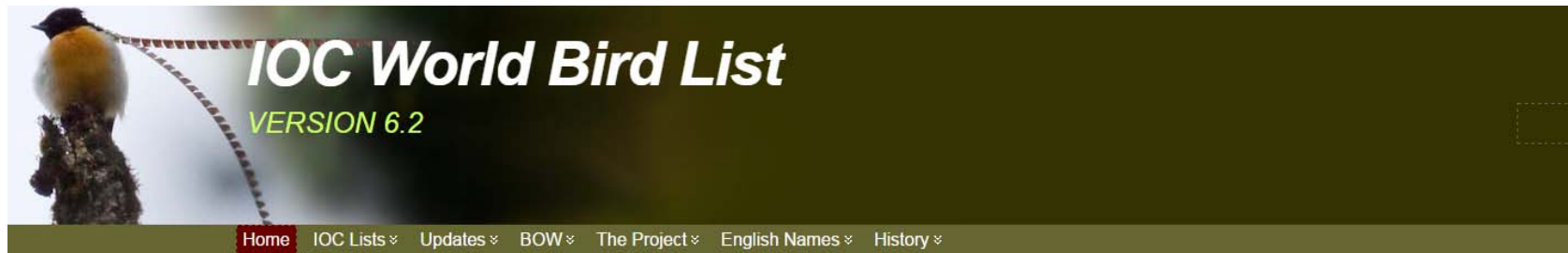
wa.gov.au

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Global Biodiversity Information Facility (GBIF)

IOC World Bird List

<http://www.worldbirdnames.org/>



"Wisdom begins with putting the right name on a thing"
(Old Chinese Proverb)

ADVISORS

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Welcome

The IOC World Bird List is an open access resource of the international community of ornithologists. Our goal is to facilitate worldwide communication in ornithology and conservation based on an up-to-date classification of world birds and a set of English names that follows explicit guidelines for spelling and construction (Gill & Wright 2006).

To keep up with the active industry of taxonomic revisions, the IOC editorial team and advisors update the web-based list quarterly. The updates include changes of recommended names or classification, additions of newly described species, corrections of nomenclature, and updates of species taxonomy.

The IOC World Bird List complements three other primary world bird lists that differ slightly in their primary goals and taxonomic philosophy, i.e. **The Clements Checklist of the Birds of the World**, **The Howard & Moore Complete Checklist of the Birds of the World, 4th Edition**, and **HBW Alive/Bird Life International**. Improved alignment of these independent taxonomic works is a goal of the newly structured International Ornithologists Union, including a Round Table discussion at the 2018 meeting in Vancouver, British Columbia.

Special thanks always to our expert advisors (left panel), to Sally Conyne for compiling Ranges, to Eng-Li Green for website management, to Larry Master and Colin Campbell for photos, to Peter Kovalik for spreadsheet magic, and to all volunteer **participants**. We welcome your corrections and your suggestions for improvement. You can reach us at worldbirdnames@gmail.com.

Frank Gill & David Donsker (Editors)

THIS WEBSITE PROVIDES:

- **HTML lists** of 10,637 extant species and 154 extinct species of birds of the world (Version 6.2), with subspecies (20,490) and annotations.
- **Spreadsheets** in different formats, XML versions of the Master List, and Comparisons with other world lists.
- **Classification** of 40 Orders, 239 Families (plus 2 Incertae sedis), 2289 Genera
- **Updates** of new species and proposed splits, taxonomic revisions, and changes of names.
- **Spelling guidelines for English bird names**, including **On hyphens and phylogeny (WJO 2009)**

Plus many more

- Reptile Database
- Amphibian Species of the World
 - Search for Australia
- Australian Faunal Directory

***Lists WILL vary**

- Lag time between publication and updates
- Differences of opinion

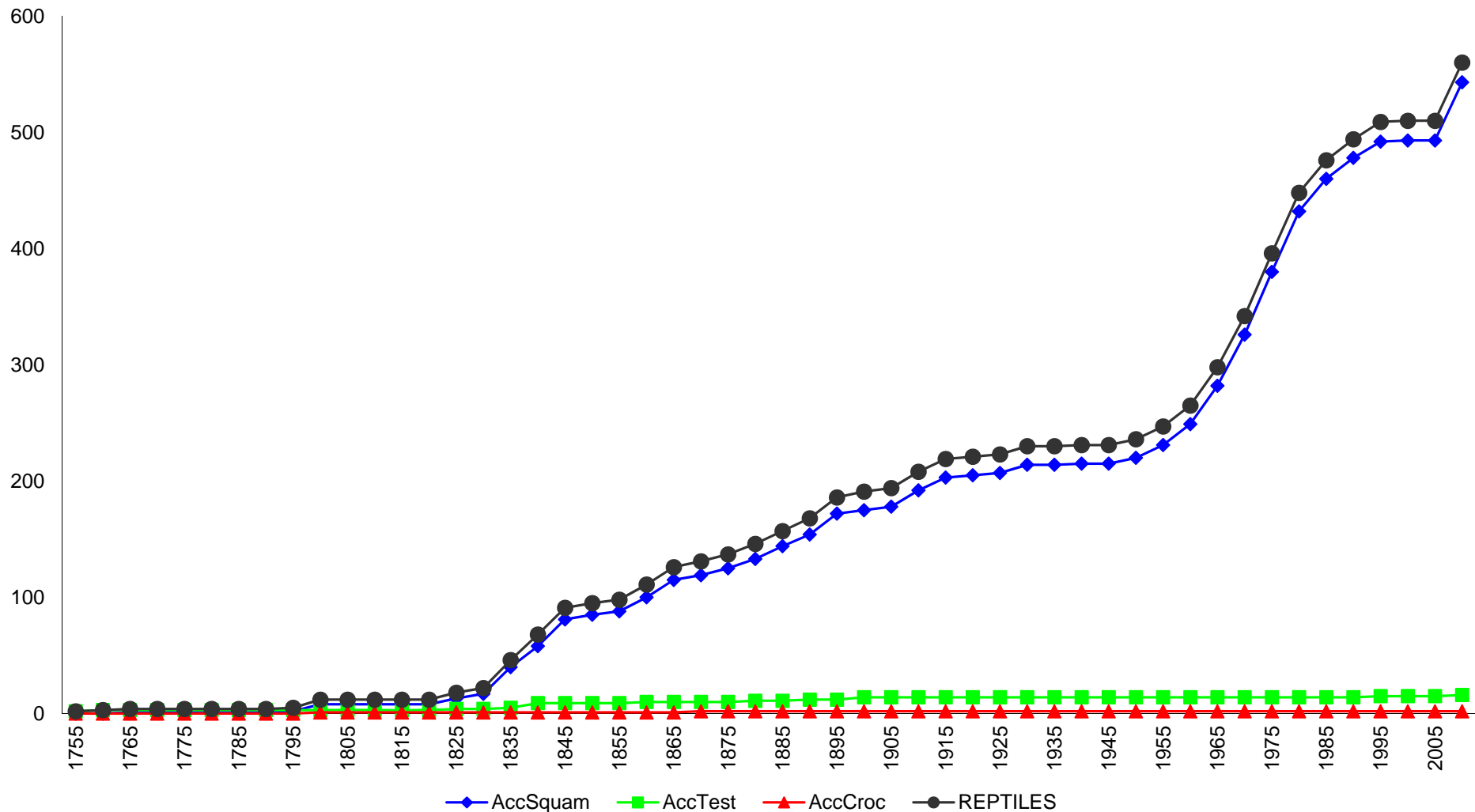
Is your ID correct?

Good Identification

- Experienced workers as part of the team (twitchers, herp geeks)
- Importance of Keys
 - Cogger + old WAM books (have limits)
 - Primary literature
 - WAM checklist points to spp. descriptions
- The problem we face in WA: so many species!
 - Can be difficult to keep track of the 970+ reptiles in WA

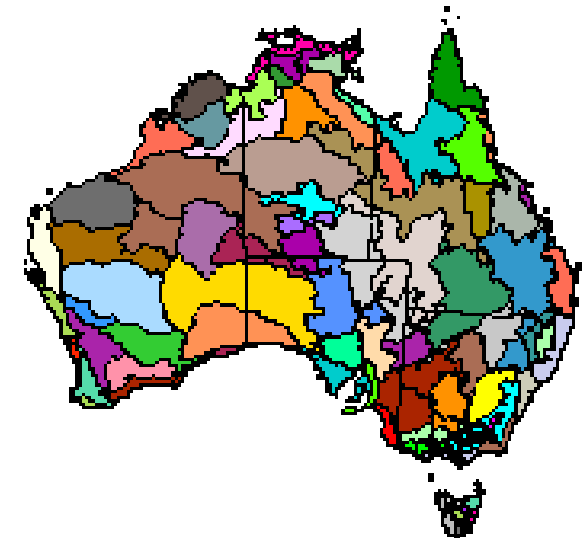
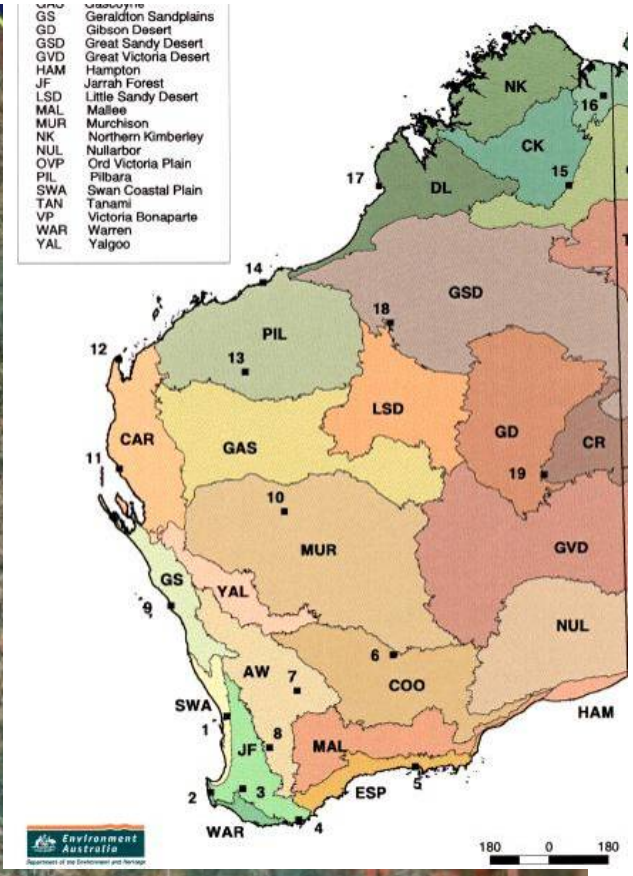
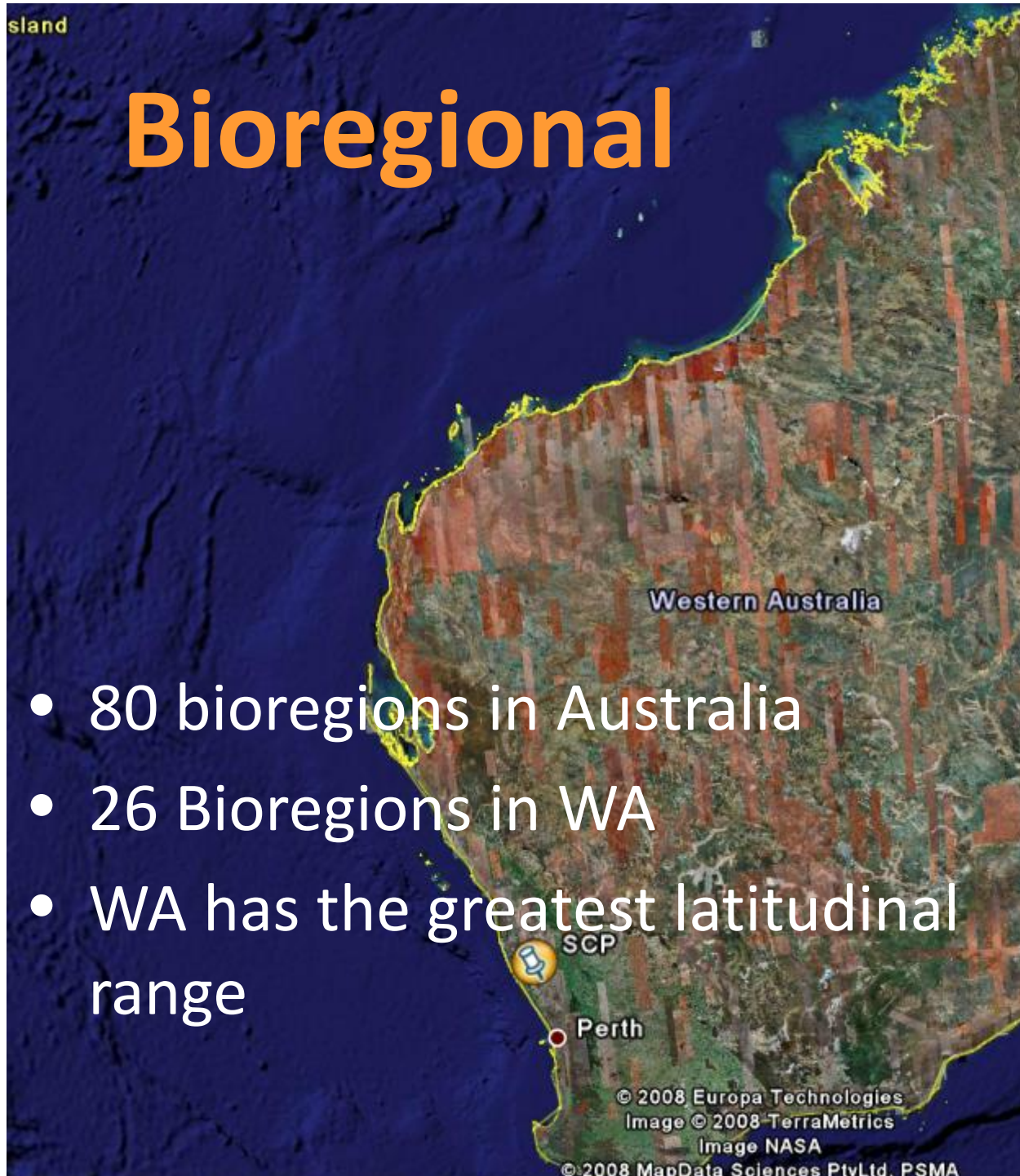
Year of Taxonomic Description

- 570+ WA reptile taxa (species + subspecies)

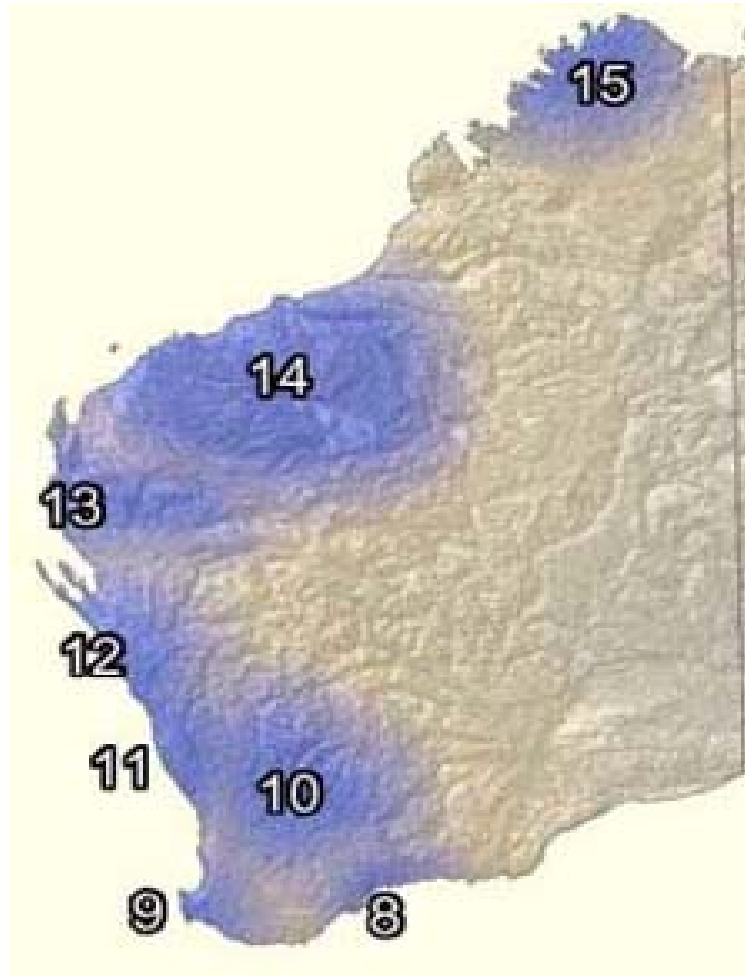


Bioregional

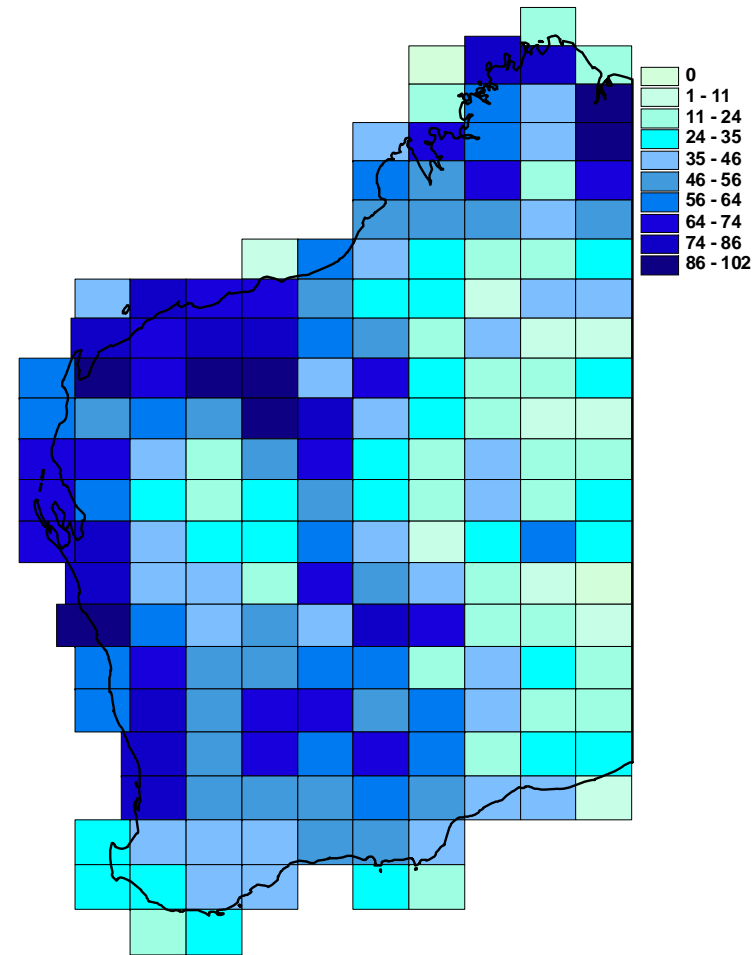
- 80 bioregions in Australia
- 26 Bioregions in WA
- WA has the greatest latitudinal range



WA Reptile Species Richness



Reptile Richness

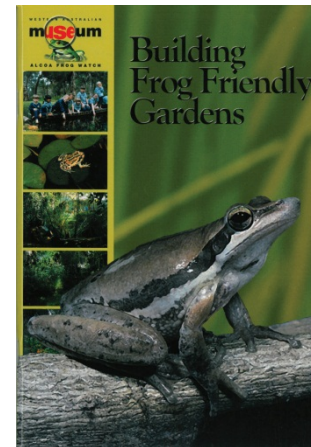
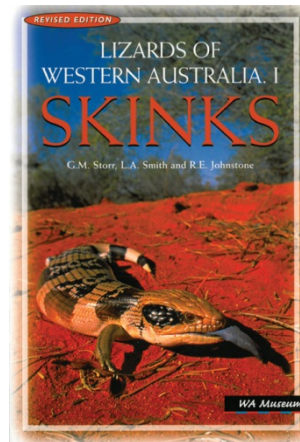
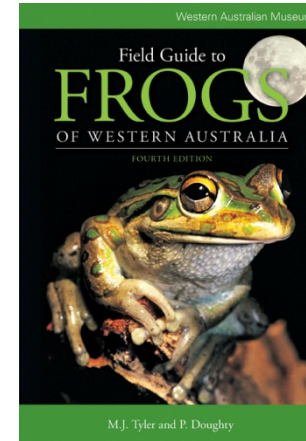
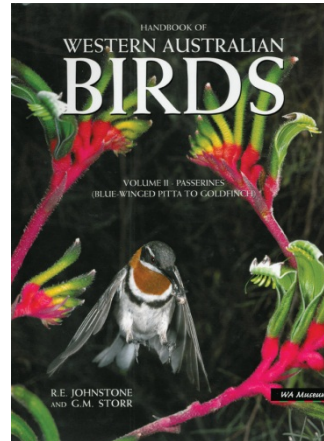
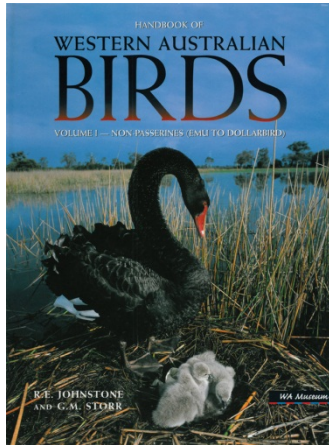


- Based on museum specimen records
- Reptiles richest in Kimberley, Pilbara and West coast
- Arid areas generally poorly sampled

Correct ID Very Important

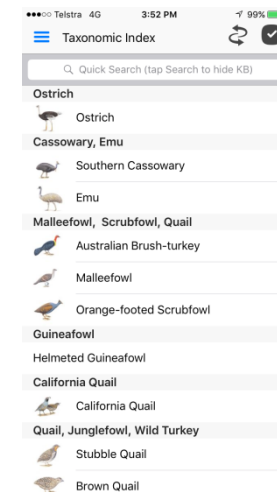
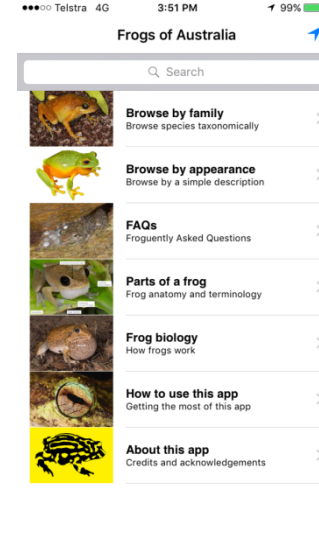
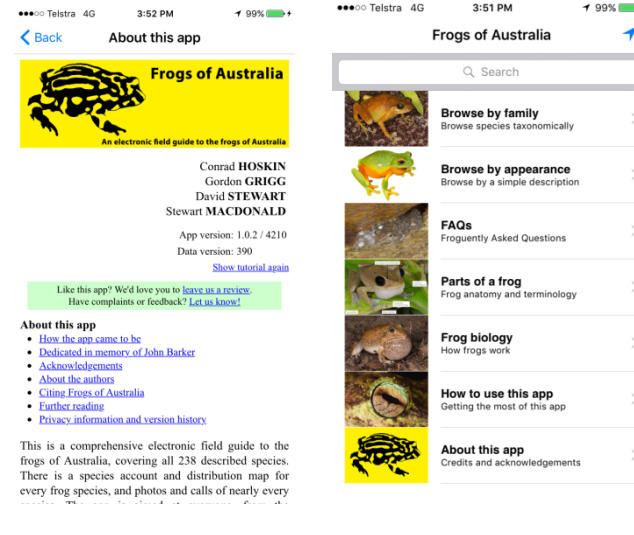
- Feeds into decision making
- Tissue collection without a voucher needs to be correctly identified
- Museum at an advantage as we collect vouchered records
 - Allow us to go back and look at the specimens to confirm IDs

WA Museum – Field Guides



Apps

- Easily accessible
- Frogs of Australia
 - Multiple Images
 - Multiple call files
- Menkhorst Birds
 - Call files



Is your ID correct?

- So many species
- Big State
- Big learning curve for new workers
- Primary literature

- Have been times even at WAM where tissue only was a mistake
- Don't make assumptions – even experts can be tripped up

Good Identification

- Photos in the field to help with confirmation of IDs and also to accompany tissue samples (if you have ethics permission)
- Can contact the Terrestrial Zoology Department at WAM for hot finds

Good Identification

- Can contact the Terrestrial Zoology Department at WAM for hot finds
 - A good example of this recently was 2 lake Cronin Snakes which were a large range extension for a species we have very limited collections of



What do I do?

- Uncertain about an individual?
 - Take photos
 - Take a tissue sample (if permitted)
- Have a look at the reference collections at WAM
- Call the Museum
 - Rare finds
 - Potential new species
 - Send through photos
- Contact the Museum before you go out in the field in case of species of interest e.g. *Tympanocryptis gigas*. We have no tissue samples in the collection.

WA Biodiversity

- WA has amazing biodiversity
- Nightmare to get your head around
- Take tissue samples
 - Can be run through genetics
 - Lodged at the museum
 - Only if you have ethics permits