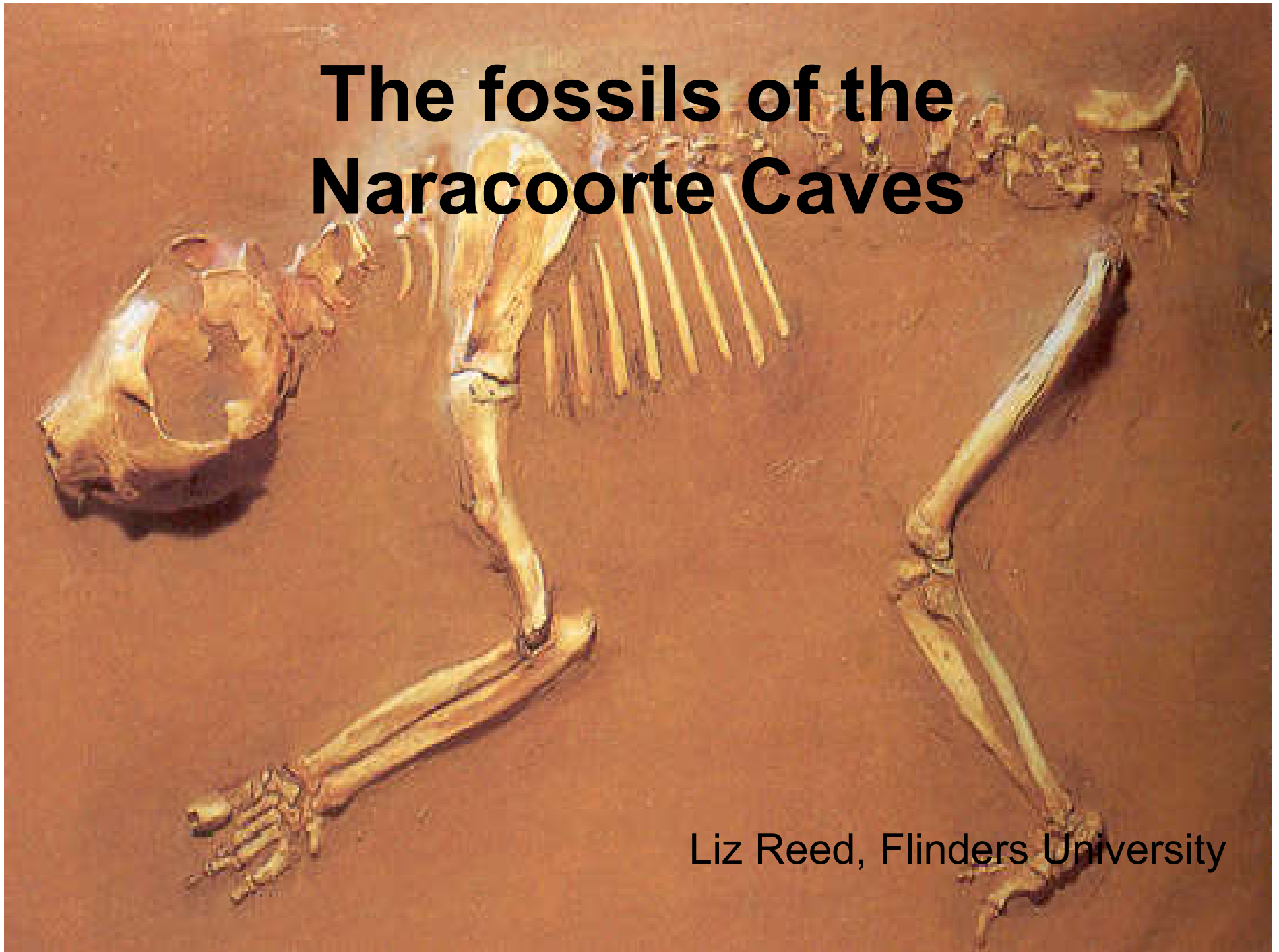


The fossils of the Naracoorte Caves



Liz Reed, Flinders University

Naracoorte Caves World Heritage Area

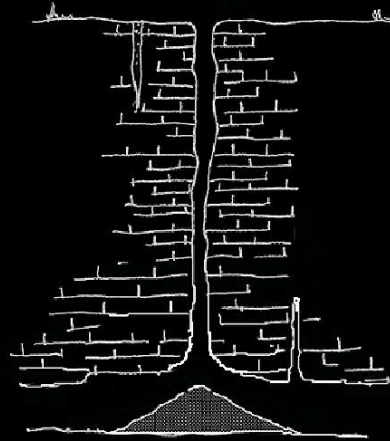
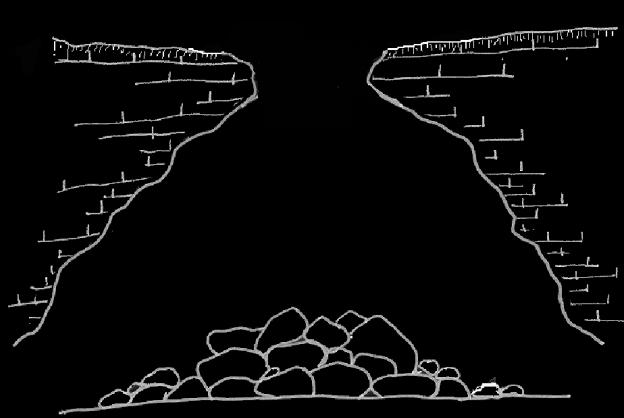
- The Naracoorte WH Area is around 307 hectares and has 26 known caves, the majority of which contain bone deposits.
- The largest of these deposits are contained in the Victoria Fossil Cave and Cathedral Cave.
- Naracoorte's caves have acted as pitfall traps & predator dens for almost half a million years.
- They preserve a series of 'snapshots' of ancient life in one geographic location.

Modes of bone accumulation in caves

- Natural traps - 'pitfall'- animals fall into cave via entrance & become trapped, unable to climb or fly out.
- Transport of bone material into cave by wind or water action.
- Natural deaths of cave-dwelling or frequenting animals e.g. possums, bats, birds.
- Bones collected by scavengers or herbivores.
- Bones accumulated by mammalian and avian predators that use caves as dens e.g. owls, Tasmanian Devils.

Cave entrances

Influence the mode of accumulation and composition of the fauna.







3 m

The Fauna

- Naracoorte's cave deposits preserve a rich record of the local fauna of the past.
- This record extends back at least 500,000 years and continues until the present day.
- The Naracoorte deposits span several glacial cycles, significant periods of climate and vegetation change and the arrival of humans.
- Recent work aims to place the fauna in a time / stratigraphic context to better understand faunal change over time.
- At least 118 species of amphibian, reptile, bird and mammal are represented.

The Fauna - Amphibians

CLASS AND ORDER	FAMILY AND SUB-FAMILY	GENUS AND SPECIES	COMMON NAME
AMPHIBIA ANURA	Hylidae (Tree frogs)	<i>Litoria ewingi</i>	Brown Tree Frog
	Myobatrachidae (Southern Frogs)	<i>Crinia signifera</i>	Common Froglet
		<i>Geocrinia laevis</i>	Smooth Frog
		<i>Limnodynastes dumerilli</i>	Bull Frog
		<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog

5 species of frogs.

All living in area
today.



The Fauna - Reptiles

REPTILIA TESTUDINES SQUAMATA	Chelidae (Side-necked Tortoises)	<i>Chelodina longicollis</i>	Common Long-necked Tortoise
		* <i>Emydura macquarii</i>	Macquarie Tortoise
	Agamidae (Dragon lizards)	<i>Pogona barbata</i>	Eastern Bearded Dragon
	Scincidae (Skinks)	<i>Egernia whitii</i>	White's Skink
		<i>Eulamprus tympanum</i>	Southern Water Skink
		<i>Lerista bougainvillii</i>	Bougainville's Skink
		<i>Tiliqua nigrolutea</i>	Blotched Bluetongue
		<i>Tiliqua rugosa</i>	Sleepy Lizard
	Varanidae (Goannas)	* <i>Varanus gouldii</i>	Sand Goanna
		* <i>Varanus varius</i>	Lace Monitor
	Madtsoiidae (Madtsoiids)	*† <i>Wonambi naracoortensis</i>	Giant extinct snake
	Elapidae (Elapid snakes)	<i>Notechis scutatus</i>	Eastern Tiger Snake
		* <i>Pseudechis porphyriacus</i>	Red-bellied Black Snake
		<i>Pseudonaja nuchalis</i>	Western Brown Snake

2 tortoise species.

8 lizard species



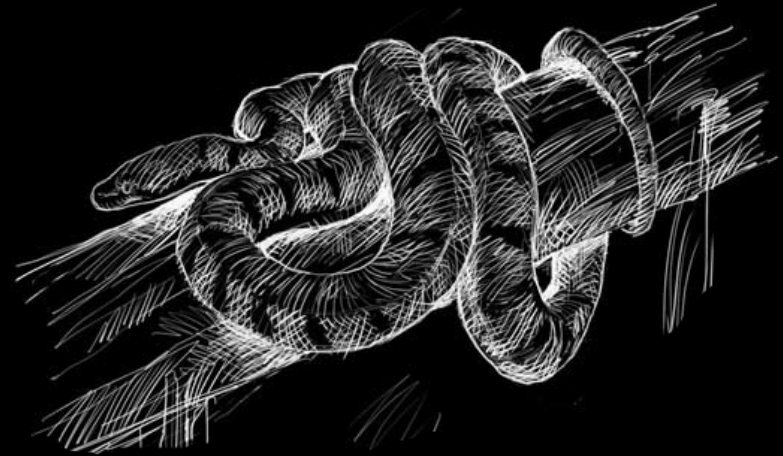
3 elapid snakes.

Recent finds – 4 new lizards.

Naracoorte's reptilian megafauna



Wonambi naracoortensis



Megalania prisca



The Fauna - Birds

AVES STRUTHIONIFORMES GALLIFORMES GRUIFORMES TURNICIFORMES CHARADRIIFORMES	Casuariidae (Cassowaries & Emus)	<i>Dromaius novaehollandiae</i>	Emu
	Dromornithidae (Dromornithids)	*† <i>Genyornis newtoni</i>	Extinct giant emu-like bird
	Megapodiidae (Megapodes)	<i>Leipoa ocellata</i>	Mallee Fowl
	Phasianidae (Pheasants, quails & allies)	*† <i>Progura naracoortensis</i>	Extinct giant Mallee Fowl
		<i>Coturnix pectoralis</i>	Stubble Quail
		<i>Coturnix ypsilophora</i>	Brown Quail
		<i>Gallirallus philippensis</i>	Buff-banded Rail
	Rallidae (Rails, crakes & allies)	<i>Turnix varia</i>	Painted Button-quail
	Turnicidae (Button-quails)	* <i>Pedionomus torquatus</i>	Plains Wanderer
	Pedionomidae (Plains-wanderer)		
	Scolopacidae		
	Gallinagoninae	<i>Gallinago hardwickii</i>	Latham's Snipe
	Tringinae	<i>Tringa glareola</i>	Wood Sandpiper
	Calidrinae	<i>Calidris ruficollis</i>	Red-necked Stint
	Charadriidae (Plovers & dotterels)	* <i>Charadrius australis</i>	Inland Dotterel
PSITTACIFORMES	Psittacidae (Parrots)	* <i>Pezoporus wallicus</i>	Ground Parrot
STRIGIFORMES	Tytonidae (Barn Owls)	<i>Tyto alba</i>	Barn Owl
		<i>Tyto novaehollandiae</i>	Masked Owl
CORACIIFORMES	Alcedinidae (Kingfishers, bee-eaters & rollers)	<i>Dacelo novaeguineae</i>	Laughing Kookaburra
PASSERIFORMES	Dicruridae (Monarchs, drongos, magpie-larks & allies)	<i>Grallina cyanoleuca</i>	Magpie-lark
	Artamidae (Woodswallows, butcherbirds & allies)	<i>Gymnorhina tibicen</i>	Australian Magpie
	Corvidae (Crows)	<i>Corvus</i> sp. indet.	unidentified raven

Naracoorte's avian megafauna



Genyornis newtoni

Giant Flightless bird

Progura naracoortensis

Giant Mallee Fowl



MAMMALS - Monotremes

2 species of Echidna, no record of Platypus.



Tachyglossus aculeatus
Short-beaked Echidna

Megalibgwilia ramsayi
Extinct Long-beaked Echidna



MAMMALS – Marsupials: Dasyuromorphia

MARSUPIALIA
DASYUROMORPHIA

Thylacinidae (Thylacines)

Dasyuridae
(Carnivorous marsupials)

***Thylacinus cynocephalus*

Antechinus flavipes

Antechinus minimus

**Antechinus stuartii*

**Antechinus swainsonii*

**Dasyurus maculatus*

**Dasyurus viverrinus*

**Ningauia yvonnae*

**Phascogale calura*

**Phascogale tapoatafa*

**Sarcophilus harrisii*

**†Sarcophilus laniarius*

Sminthopsis crassicaudata

Sminthopsis murina

Thylacine

Yellow-footed Antechinus

Swamp Antechinus

Brown Antechinus

Dusky Antechinus

Spotted-tailed Quoll

Eastern Quoll

Southern Ningauia

Red-tailed Phascogale

Brush-tailed Phascogale

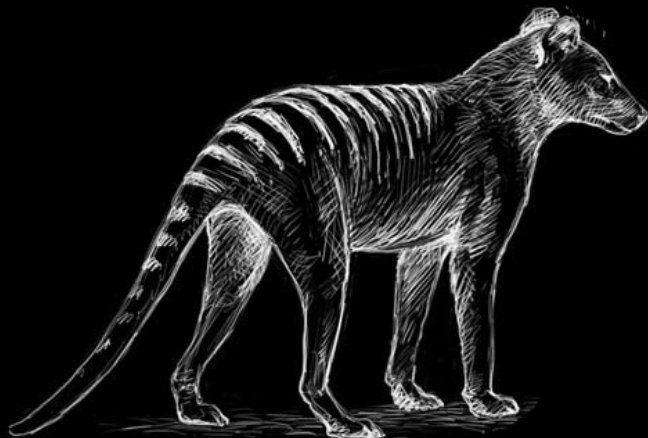
Tasmanian Devil

Extinct giant Devil

Fat-tailed Dunnart

Common Dunnart

2 families, 14 species



MAMMALS – Marsupials: Peramelemorphia

2 genera, 3 species



Isodon obesulus
Southern Brown Bandicoot

Perameles gunnii
Eastern Barred Bandicoot



MAMMALS – Marsupials: Diprotodontia

DIPROTODONTIA	Phascolarctidae (Koalas)	<i>Phascolarctos cinereus</i>	Koala
		*† <i>Phascolarctos stirtoni</i>	Extinct giant Koala
	Diprotodontidae (Large extinct marsupial quadrupeds)		
	Zygomaturinae	*† <i>Zygomaturus trilobus</i>	Extinct giant browser
	Diprotodontinae	*† <i>Diprotodon australis</i>	Extinct giant browser
	Palorchestidae (Large extinct tapir-like marsupials)	*† <i>Palorchestes azael</i>	Extinct giant browser
	Vombatidae (Wombats)	* <i>Lasiorhinus krefftii</i>	Northern Hairy-nosed Wombat
		* <i>Lasiorhinus latifrons</i>	Southern Hairy-nosed Wombat
		<i>Vombatus ursinus</i>	Common Wombat
	Thylacoleonidae (Marsupial 'lions')	*† <i>Thylacoleo carnifex</i>	'Marsupial Lion'
	Phalangeridae (Brush-tail possums & cuscuses)	<i>Trichosurus vulpecula</i>	Brush-tailed Possum
	Burramyidae (Pygmy-possums)	<i>Cercartetus concinnus</i>	Western Pygmy-possum
		<i>Cercartetus lepidus</i>	Little Pygmy-possum
		<i>Cercartetus nanus</i>	Eastern Pygmy-possum
	Pseudocheiridae (Ringtail Possums & Greater Glider)	* <i>Petauroides volans</i>	Greater Glider
		<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum
	Petauridae (Striped Possum, Leadbeater's Possum & wrist-winged gliders)	<i>Petaurus breviceps</i>	Sugar Glider
		* <i>Petaurus norfolcensis</i>	Squirrel Glider
	Acrobatidae	<i>Acrobates pygmaeus</i>	Feathertail Glider

MAMMALS – Marsupials: Diprotodontia

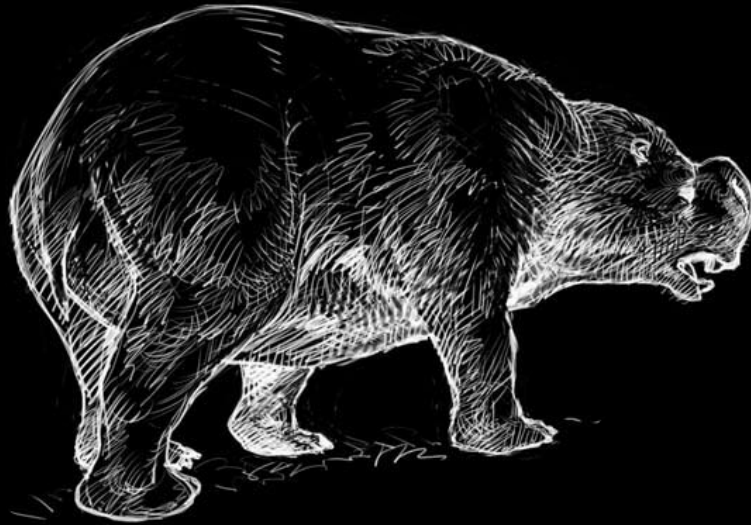


Naracoorte's megafauna - Diprotodontids

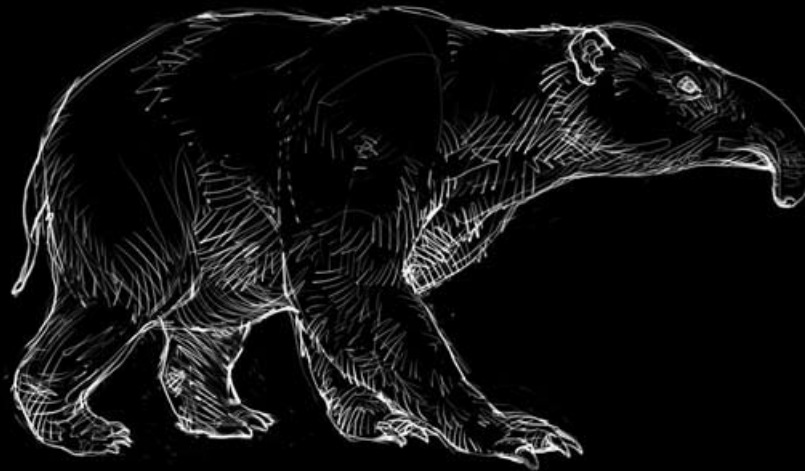
Zygomaturus trilobus



Diprotodon optatum



Palorchestes azael



Naracoorte's megafauna - Thylacoleonidae



Thylacoleo carnifex



Marsupials: Potoroidae & Macropodidae

	Potoroidae (Potoroos, bettongs & rat-kangaroos)	* <i>Aepyprymnus rufescens</i>	Rufous Bettong
		* <i>Bettongia gaimardi</i>	Tasmanian Bettong
		* <i>Bettongia lesueur</i>	Burrowing Bettong
		* <i>Bettongia penicillata</i>	Brush-tailed Bettong
		** <i>Potorous platyops</i>	Broad-faced Potoroo
		* <i>Potorous tridactylus</i>	Long-nosed Potoroo
	Macropodidae (Wallabies, kangaroos & tree-kangaroos)		
	Sthenurinae (extinct browsing kangaroos)	*† <i>Procoptodon goliah</i>	Extinct browsing kangaroo
		*† <i>Simosthenurus baileyi</i>	Extinct browsing kangaroo
		*† <i>Simosthenurus browni</i>	Extinct browsing kangaroo
		*† <i>Simosthenurus gilli</i>	Extinct browsing kangaroo
		*† <i>Simosthenurus maddocki</i>	Extinct browsing kangaroo
		*† <i>Simosthenurus newtonae</i>	Extinct browsing kangaroo
		*† <i>Simosthenurus occidentalis</i>	Extinct browsing kangaroo
		*† <i>Simosthenurus pales</i>	Extinct browsing kangaroo
	Macropodinae	*† <i>Sthenurus andersoni</i>	Extinct browsing kangaroo
		** <i>Lagorchestes leporides</i>	Eastern Hare-wallaby
		* <i>Lagostrophus fasciatus</i>	Banded Hare-wallaby
		* <i>Macropus eugenii</i>	Tammar Wallaby
		<i>Macropus fuliginosus</i>	Western Grey Kangaroo
		<i>Macropus giganteus</i>	Eastern Grey Kangaroo
		** <i>Macropus greyi</i>	Toolache Wallaby
		<i>Macropus rufogriseus</i>	Red-necked Wallaby
		*† <i>Macropus titan</i>	Extinct giant grey kangaroo
		** <i>Onychogalea lunata</i>	Crescent Nailtail Wallaby
		*† <i>Protemnodon anak</i>	Extinct browsing kangaroo
		*† <i>Protemnodon brehus</i>	Extinct browsing kangaroo
		*† <i>Protemnodon roechus</i>	Extinct browsing kangaroo
		<i>Wallabia bicolor</i>	Swamp Wallaby

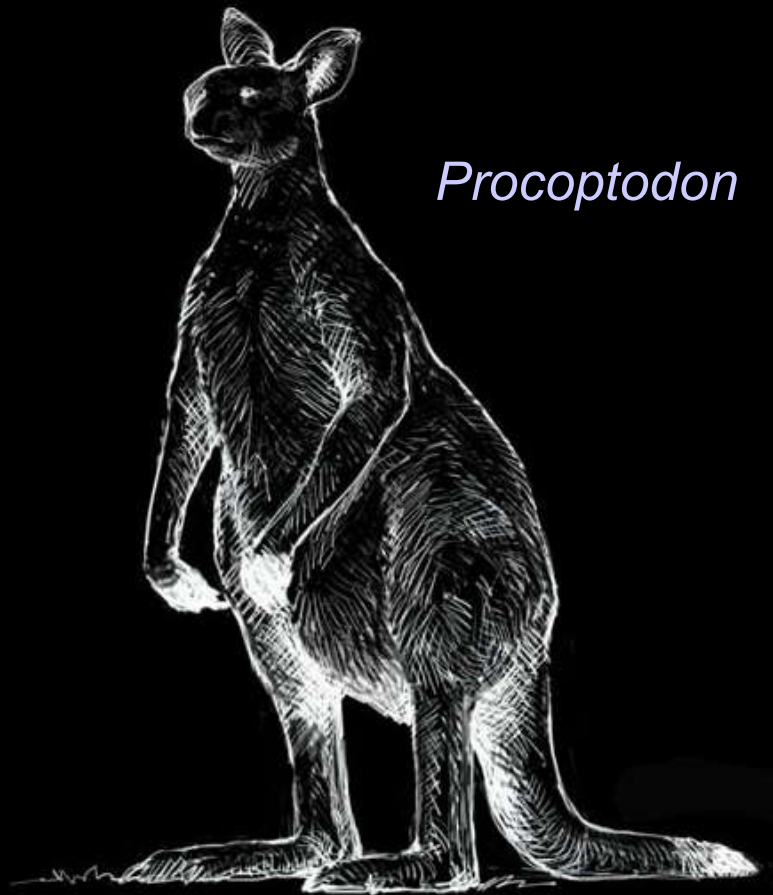
Marsupials: Potoroidae & Macropodidae

12 genera, 28 species



Naracoorte's megafauna - the kangaroos

The sthenurine kangaroos



MAMMALS – Placentals: Bats & Rodents

PLACENTALIA CHIROPTERA RODENTIA			
	Vespertilionidae (Ordinary bats)	<i>Miniopterus schreibersii</i>	Common Bentwing Bat
	Muridae (Rats and mice)	<i>**Conilurus albipes</i>	White-footed Tree-rat
		<i>Hydromys chrysogaster</i>	Water Rat
		<i>*Mastacomys fuscus</i>	Broad-toothed Rat
		<i>Notomys mitchellii</i>	Mitchell's Hopping Mouse
		<i>Pseudomys apodemoides</i>	Silky Mouse
		<i>*Pseudomys australis</i>	Plains Mouse
		<i>*Pseudomys fumeus</i>	Smoky Mouse
		<i>*Pseudomys gouldii</i>	Gould's Mouse
		<i>Pseudomys shortridgei</i>	Heath Rat
		<i>Rattus fuscipes</i>	Bush Rat
		<i>Rattus lutreolus</i>	Swamp Rat
		<i>*Rattus tunneyi</i>	Pale Field Rat



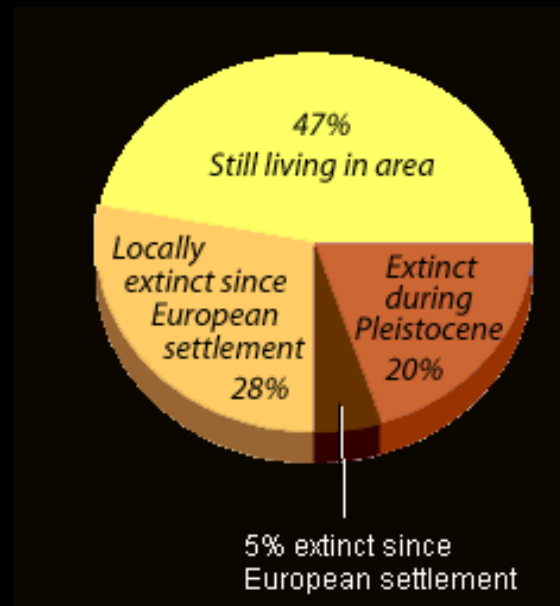
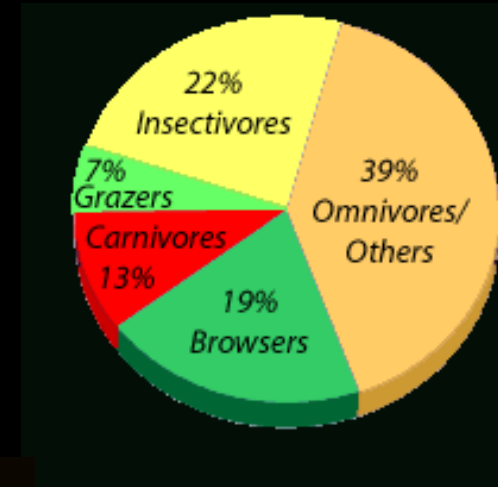
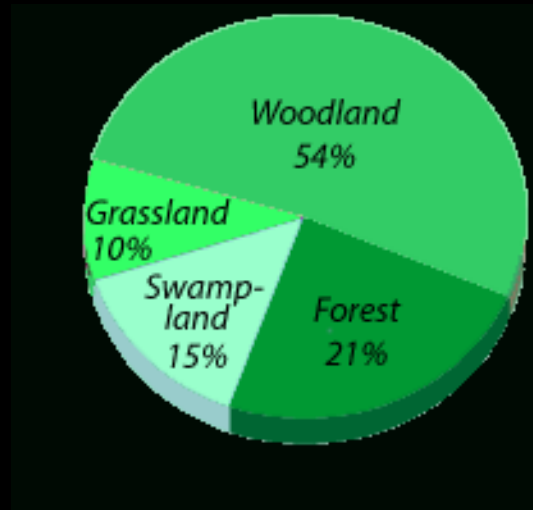
1 bat species

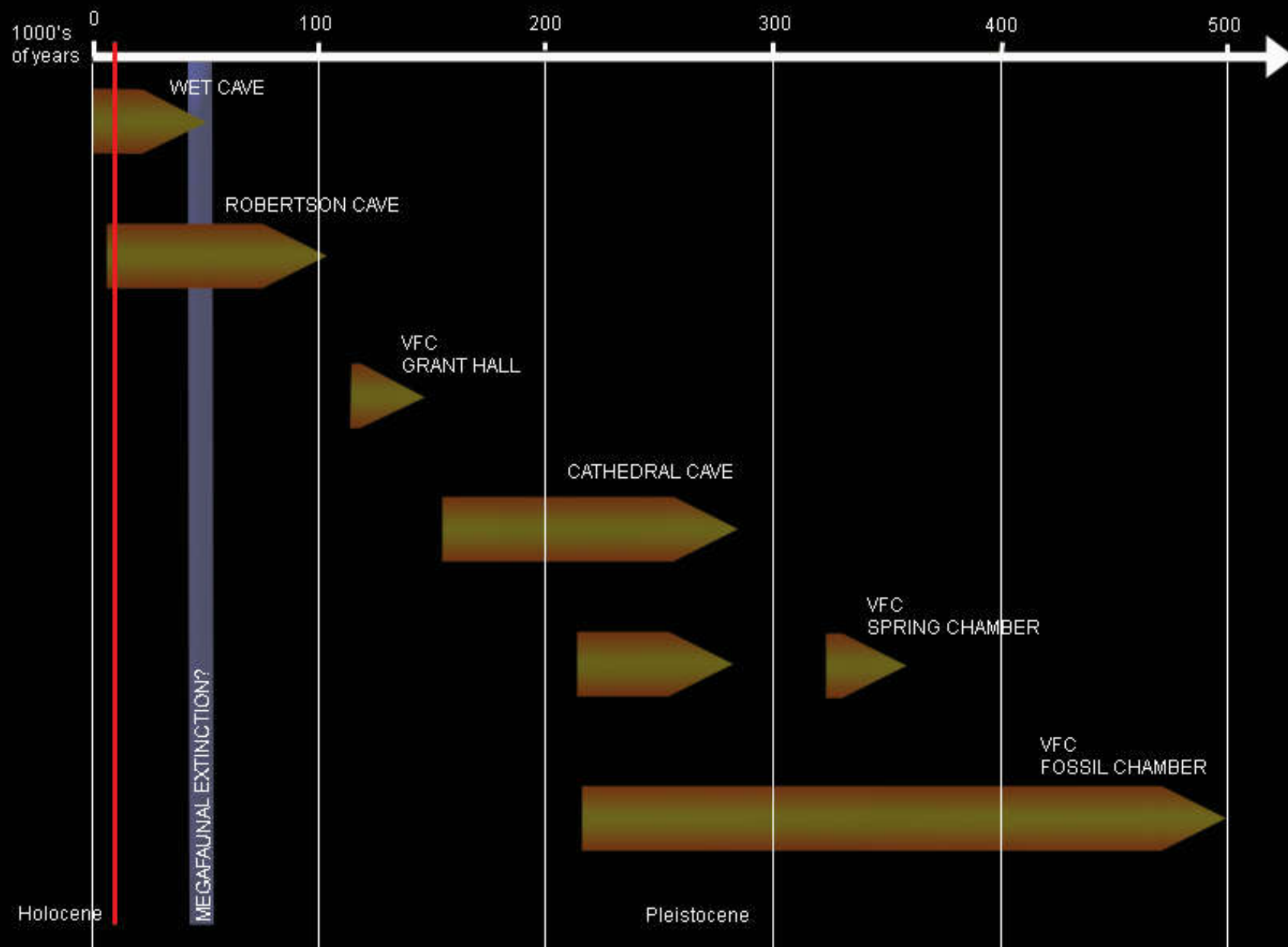
Rodents -:
6 genera,
12 species





Faunal composition, diet & habitat





The big picture and beyond...

- Modern palaeontology is much more than collecting fossils.
- We take a multi-disciplinary, 'whole site' approach incorporating geology, taphonomy, faunal analysis and dating at all stages of investigation.
- Making the most of current technologies – dating, stable carbon isotope analysis, DNA, pollen, tooth microwear, bone histology, microstratigraphy, bone chemistry etc.
- Cave deposits are finite resources - important to consider methodology and to preserve some of the deposits for future generations who **will** have better techniques.

The big picture and beyond ...

- The ultimate aim of research at Naracoorte is to track changes in fauna and environment over time.
- Naracoorte is uniquely placed to answer some of the big questions eg. megafaunal extinction, the impact of climate and humans on faunas.
- Naracoorte is the 'Rosetta Stone' for the Pleistocene of Australia.
- Each deposit is a 'snapshot' of the past and we aim to piece together the stories from each cave to place the faunas in time and space.
- Currently, a focus is on the younger part of the record ie. <100,000 years and particularly the terminal Pleistocene and Holocene – applications for modern biodiversity & conservation problems.