



# Australian Fossil Mammal Sites (Riversleigh/Naracoorte)

Inscribed on the World Heritage List in 1994

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Riversleigh and Naracoorte are among the world's greatest fossil sites. They are a superb illustration of the key stages of the evolution of the unique wildlife of Australia, a continent where the evolution of mammals has been the most isolated and distinctive in the world.

Riversleigh shows Australia's mammals evolving during the period of Earth's greatest diversity of plants and animals.

Naracoorte's mammal fossils show Australia's extinct giant mammals shrinking and disappearing during later climatic changes and around the appearance of humans in Australia over 50,000 years ago.

The Australian Fossil Mammal Sites (Riversleigh/Naracoorte) were inscribed on the World Heritage List for their outstanding natural universal values:

- as outstanding examples representing major stages of the earth's evolutionary history
- as outstanding examples representing significant ongoing ecological and biological evolution.

Over 2,000 kilometres separate the two sites that form this World Heritage area. Riversleigh (100 km<sup>2</sup>), located in north western Queensland, is confined to the watershed of the Gregory River. The site at Naracoorte, South Australia, covers 3 km<sup>2</sup> and comprises limestone caves. It is located in flat country, punctuated by a series of stranded coastal dune ridges that run parallel to the present coastline.

Riversleigh is one of the world's richest Oligo-Miocene mammal records, linking that period (15-25 million years ago) to the predominantly modern assemblages of the Pliocene and Pleistocene epochs. The site provides exceptional examples of middle to late Tertiary mammal groups, in a continent whose mammalian evolutionary history has been the most isolated and most distinctive in the world.

The extensive fossil deposits at Riversleigh are encased in hard, rough limestone, which was formed in lime-rich freshwater pools. They record at least 20 million years of mammal evolution, providing the first records of many distinctive groups of living mammals including marsupial moles and feather-tailed possums, as well as other unique and now extinct Australian mammals such as marsupial lions.

The variety of deposits at Riversleigh has led to an understanding of how the environment has changed over time from a rich rainforest community to semi-arid grassland, and how the animals that lived there have changed too.

The discovery of the fossils at Riversleigh has profoundly altered the understanding of Australia's mid-Cainozoic vertebrate diversity. The remains of a 15 million-year-old monotreme has provided new information about this highly distinctive group of mammals, and several Tertiary thylacines have been identified. Placental mammals are represented by more than 35 bat species and the Riversleigh fossil bat record is the richest in the world.

In stark contrast to the semi-arid conditions at Riversleigh stand the cool caves at Naracoorte. Here are fossils that document a distinctive group of animals, with the ancestors of modern species alongside the doomed giants of a world that was about to be devastated by climatic changes. These doomed giants were the megafauna – very large animals that once lived in Australia. Lost giants include a marsupial lion (*Thylacaleo*) and the rhino-sized, wombat-like *Diprotodon*.

The fossils in the Naracoorte Caves illustrate faunal change spanning several ice ages, highlighting the impacts of both climatic change and humankind on Australia's mammals from at least 500,000 years ago.

Further research at the Naracoorte Caves sites is expected to document a series of snapshots of Pleistocene life in south east Australia, including details of climate and vegetation associated with the fauna.



Specimens representing 118 vertebrate species have been discovered, ranging in size from very small frogs to rhino-sized marsupials. These include exceptionally preserved examples of the Australian Ice Age megafauna, and a host of modern species such as the Tasmanian devil, thylacine and others. The Naracoorte fossils span the probable time of the arrival of humans in Australia, and this is valuable in analysing the complex relationships between humans and their environment. Records of past climates are being elucidated from speleothems and the impacts of climate on faunal change are being revealed.

Both sites provide evidence of key stages in the evolution of the animals of the world's most isolated continent. The history of mammal lineages in modern Australia can be traced through these fossil deposits and, as a consequence, there is a better understanding of the conservation status of living mammals and their communities.

The sites, each highly significant in its own right, are presented as a serial World Heritage listing. While there are other important Australian fossil mammal sites, Riversleigh and Naracoorte are outstanding for the extreme diversity and the quality of their fossils. They also provide links through time that unify the biota of the past with those of today in the Wet Tropics of Queensland, the Gondwana Rainforests of Australia and Kakadu National Park World Heritage properties.

Day-to-day management of Riversleigh is the responsibility of the Queensland Environmental Protection Agency; while Naracoorte is the responsibility of the South Australian Department for Environment and Heritage.



top strip and title page: Rock outcrops typical of the Riversleigh area Colin Totterdell  
 top: *Thylacoleo carnifex* skeleton on display in Victoria Fossil Cave Steven Bourne  
 above centre: Ossuaries Chamber in Victoria Fossil cave Steven Bourne  
 above: Near pristine skull of *Simosthenurus gilli*, the smallest of the short faced leaf eating kangaroos. Steven Bourne