

The wet tropical rainforests of Queensland (like this one) are the closest living analogue of the original Gondwanan forest which once covered the Cumberland Plain.
(Source: M. White, *After the Greening, The Browning of Australia*, p. 244).



Giant conifer forests of the Acuararian and Podocarpaceae families dominated the Cumberland Plain throughout the Cretaceous period.
(Source: T. Haines, *Walking With Dinosaurs*, BBC Television Production, Episode 2, 1999).



End of Mesozoic Era

From the Middle Miocene onwards, vegetation types adapted to seasonal dry spells and the wet sclerophyll forest became common.
(Source: M. White, *After the Greening, The Browning of Australia*, p. 74).



Start of Cenozoic Era

By the time European explorers arrived in Sydney's west, the landscape was dominated by dry sclerophyll forest interspersed with open grasslands. (Source: unknown).



William Howe, a Scottish free settler, established the Glenlee estate on the now site Mount Annan Botanic Garden. The property was noted for its dairying activities and its extensive orchards.



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|-------------------|-------------------|----------------------------------|---------------------------|------------------------------------|---|-------------------|--------------------------------|-----------------------------------|---|----------------------------|
| Triassic | Jurassic | Cretaceous | Cretaceous | Tertiary | Tertiary | Quaternary | Quaternary | Quaternary | Quaternary | Quaternary |
| 230 million years | 180 million years | (beginning) 140 million years | (end) 65 million years | (Early Eocene) 55 million years | (Miocene & Pliocene) 5.3-2.4 million years | 1.6 million years | (3rd Ice Age) 700,000 years | European exploration 200 years | European settlement 100 years to present | Mount Annan Botanic Garden |

Climate: warm and humid with dark winters until the end of the Cretaceous period. The end of this period was marked by a sudden cooling event which is believed to have precipitated the evolutionary changes from ancient to modern-type flora. This global cooling is also thought to have been a contributing factor to the extinction of the dinosaurs and the emergence of mammals.

Dominant flora: Conifers of the Araucariaceae and Podocarpaceae families (such as Hoop and Wollemi Pines); cycads of the Pentoxylean and Bennettitalean families and ferns (such as giant tree ferns). Flowering plants were virtually unknown until the end of the Cretaceous and most species were adapted to surviving long periods with little or no light. By the end of the Cretaceous, before the cooling, tree forms of flowering plants had evolved and were competing with the



For most of the Jurassic and Cretaceous periods, the forests of eastern Australia were dominated by conifers of the Araucariaceae family, which includes Hoop pines (pictured) and the Wollemi pine.
(Source: M. White, *After the Greening, The Browning of Australia*, p. 121).

conifers for dominance in the forest although araucarian conifers remained common.

Dominant fauna: First dinosaurs, primitive egg-laying mammals (from which the platypus is descended), turtles and marine reptiles. The dominant dinosaurs of Eastern Australia are small to medium-sized hip silophodontids, swift bipedal dinosaurs with large eyes adapted for night vision. There are also numerous invertebrates including cockroaches, dragonflies, grasshoppers and beetles. Elsewhere in the world, large plated dinosaurs, such as stegosaurs, have evolved but these giants never find their way to Australia, which is destined to become a biological time capsule for ancient floral and faunal species

At the end of the Cretaceous, a sudden cooling event contributed to the eventual extinction of the dinosaurs and the change from ancient to modern type flora. Until that time, small, agile dinosaurs (hipsilophodontids) dominated Australia, like this Leaellynasaura.
(T. Haines, *Walking With Dinosaurs*, BBC Television Production, Episode 6, 1999).



Climate: The cooling event which marked the end of the Cretaceous, also marked the mass extinction of dinosaurs. Although climate returned to a more humid and warm one, it was still considerably drier than the Jurassic "golden age." Throughout the Miocene and Pliocene, the climate became gradually cooler and drier, resulting in the gradual aridification of much of the continent.

Dominant flora: In the early Eocene the once dominant conifer forests were overtaken by the Myrtaceae (eucalypt) family and Proteaceae. Forests were "closed" with an understorey of tree-ferns, ferns and mosses. Native grasses had not yet evolved. By the middle Miocene, falling rainfall had removed much of the forest understorey, which gradually retreated to the Blue Mountains. Casuarinaceae became more dominant, competing vigorously with Myrtaceae and Proteaceae for dominance in the forest. Forested areas became less dense and the forest fringe increased; tree ferns and conifers became less common and plants evolved to suit the more arid conditions. From the middle Miocene onwards the dry sclerophyll forest interspersed with open woodland and grasslands was characteristic of the Sydney basin. The old rainforests of the Cumberland Plain were almost entirely replaced by these new "dry" forests, although isolated pockets survived (such as the one at Cobbitty). At the height of the last Ice Age (15,000 to 18,000 years ago) sea levels dropped and the Mount Annan district was covered by mallee, callitris, acacia and casuarina woodlands. Most of the surviving Cumberland Plain woodland relates to this phase.

Dominant fauna: In the early Eocene, faunal diversity had increased to include fish, frogs, turtles, crocodiles, lizards, snakes, birds, bats and the earliest form of platypus. The age of mammals had dawned and a variety of marsupials occupied the Cumberland Plain. The end of the Miocene saw one of the most significant evolutionary changes - the emergence of humanoid apes. By the end of the Pliocene, Australia's unique Megafauna had evolved and the kangaroo also appeared to take advantage of the new grasslands. By the end of the 2nd ice age (around 2.4 million years ago) homo sapiens had emerged. By around 40,000 years ago human were occupying the Cumberland Plain and fire-stick farming was a common practice

Climate: Australia was still in the grip of the last Ice Age when the first humans arrived in the Sydney basin. After the Ice Age, sea levels stabilised (4,000 - 6,000 years ago) and the continent was much as we see it today. The climate was cold, dry and windy and the plain was frequently devastated by severe bush fires. It was an inhospitable land, prone to seasonal droughts and floods. Since that time, the climate has gradually stabilised to a comparatively predictable seasonal weather pattern, with hot and dry summers with westerly winds dominating and occasionally southerly winds which lower the temperature and precipitate rainfall. Winters are generally cool and dry and the seasonal droughts and floods of 200 years ago are no longer the norm.

Dominant flora: Climatic changes contributed to the spread of dry sclerophyll forests and open grasslands across the Cumberland Plain. Flowering plants, such as grevillea, banksia and melaleuca all provided food for humans. After the arrival of Europeans in 1788, a number of exotic species were introduced including pasture grasses, fruit trees and numerous exotic shrubs such as privet. Quince and lemon hedges were a feature of the district, particularly on the large estates, such as Glenlee, part of which became the MABG site. Exotic species have continued to be introduced throughout the 20th century, including the African Olive which has devastated much of the surviving



These Dharug hunters were drawn in 1813 by an unknown artist. The animals they are hunting purport to be wallabies, but look more like Thylacine (which were once plentiful on the Cumberland Plain).
(Source: J. Kohen, *The Dharug and Their Neighbours*, p. 61).

native vegetation as well as removing evidence of earlier cultural plantings. The establishment of the Mount Annan Botanic Garden marked a new phase in the biological evolution of the site. Remnants of Cumberland Plain Woodland have been conserved and programs to repopulate with endemic species have been instigated.

Dominant fauna: Giant marsupials, such as the diprotodon and procoptodon and carnivorous animals such as the thylacine and thylacoleo shared the landscape with humans for several thousand years, although exactly when they became extinct is not known. Small marsupials, such as possums, gliders and marsupial mice were also abundant and formed part of the diet of the Aboriginal people. In 1788, six months after the arrival of the First Fleet, six of the colonist's cattle wandered away from the settlement at Port Jackson and found a new home near Mount Annan. Large flocks of wild ducks were observed by Watkin Tench in 1796. Kangaroo numbers were severely depleted by intense hunting pressure from the Dharawal by the time Europeans arrived and other species suffered similarly at the hands of the Europeans.



The Mount Annan Botanic Garden was officially opened in 1988 as part of Sydney's Bicentennial celebrations. The site contains valuable stands of remnant vegetation, and reminders of former Aboriginal and European landuses.

Evolutionary timeline of the Mount Annan site