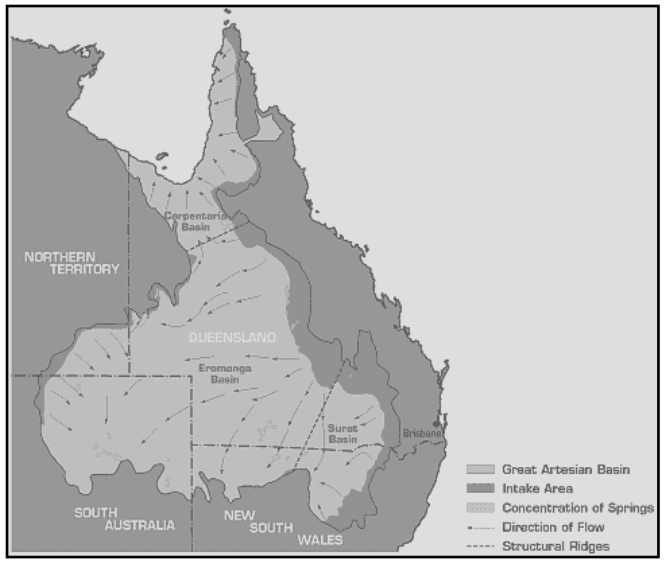

The Great Artesian Basin (GAB) is one of the largest artesian groundwater basins in the world and underlies approximately one-fifth of Australia extending beneath regions of Queensland, New South Wales, South Australia and the Northern Territory.
The Basin covers a total area of over 1 711 000 square km and it has an estimated total water storage of 64 900 million megalitres (a megalitre is one million litres and is equivalent to about half the water in an Olympic swimming pool).

The Great Artesian Basin was formed between 100 and 250 million years ago and consists of alternating layers of waterbearing (permeable) sandstone aquifers and non-waterbearing (impermeable) siltstones and mudstones.

Natural discharge occurs mainly from mound springs in the south-western area. Mound springs are natural outlets of the artesian aquifers from which groundwater flows to the surface. Dating of the artesian waters has given ages of almost 2 million years for the oldest waters, which occur in the south-western area of the Basin.

History
The inland of Australia is traversed by streams but these rarely flow and have few permanent waterholes. Unpredictable rainfall and high evaporation meant that early dams and earth tanks built to service the growing population and pastoral industry were unreliable.

Prior to European settlement, Aborigines used the mound springs of the Great Artesian Basin. Some of these mound springs feature in Aboriginal myths and hold significant spiritual and cultural beliefs of indigenous communities. Mound springs were and still are a valuable resource for the support of wildlife.

Europeans first discovered the artesian groundwater in 1878 when a shallow bore sunk near Bourke in New South Wales produced flowing water. In 1885 the Queensland Government Geologist decided to drill a deep bore at Blackall, however, before completion of this bore, the first artesian flow in Queensland was obtained near Cunnamulla in 1887. Later that year Barcaldine became the first town with artesian water [http://www.news.com.au/couriermail/extras/oq/book8bore.html]

The number of bores drilled in Queensland increased from 34 to 524 in the ten year period from 1889 to 1899. By 1915 over 1 500 flowing artesian bores had been drilled throughout the Basin. Thousands of kilometres of bore drains were excavated to distribute water around properties, thus allowing sheep and cattle to be raised on the vast Mitchell grass, mulga and spinifex plains. Bore drains are small, open channels that can extend 100km or more.

The water from the Great Artesian Basin continues to be of vital importance to outback regions of Queensland, New South Wales and South Australia. This water is often the only available supply for towns and properties for their domestic and stockwatering requirements. The GAB also supplies water for minor irrigation works, key mining and extractive industries, the petroleum industry, an emerging tourism industry and limited industrial purposes.

Formation
The water of the GAB is held in a sandstone layer laid down by continental erosion of higher ground during the Triassic, Jurassic, and early Cretaceous periods. During a time when much of what is now inland Australia was below sea level, the sandstone was then covered by a layer of marine sedimentary rock shortly afterwards, which formed a confining layer - thus trapping water in the sandstone aquifer. The eastern edge of the basin was uplifted when the Great Dividing Range formed. The other side was created from the landforms of the Central Eastern Lowlands and the Great Western Plateau to the west.

Most recharge water enters the rock formations from relatively high ground near the eastern edge of the basin (in Queensland and New South Wales) and very gradually flows towards the south and west. (A much smaller amount enters along the western margin in arid central Australia, flowing to the south and east.) Because the sandstones are permeable, water gradually makes its way through the pores between the sand grains, flowing at a rate of one to five metres per year.

Discharge water eventually exits through a number of springs and seeps, mostly in the southern part of the basin. It takes up to two million years for water to travel to the springs in the Lake Eyre area.

Why It Flows
'Artesian' water is underground water confined and pressurised within a porous and permeable unit known as an aquifer. The aquifers of the Great Artesian Basin consist of permeable sandstones. They are recharged by rainfall infiltrating into the uplifted and exposed sandstones on the edge of the Basin. Recharge waters slowly move down through the sandstone, filling the aquifer to the level of the intake area. As the aquifer is confined by an overlying impermeable unit, the water becomes pressurised. When a bore is drilled into one of the aquifers, the water rises as a result of the pressure. The level to which it rises is called the potentiometric surface. If this is above ground level, then the bore will flow. In a sub-artesian bore the water does not rise above the ground surface.

Figures

Maximum depth	3000 m
Area	1 711 000 square kilometres
Total volume of stored water	64 900 million megalitres (estimated)
Individual bore flow	up to 8 megalitres per day
Current basin discharge	1500 megalitres per day
Age of water	up to approx. 2 million years
Maximum pressure	1300 kilopascals
Water temperature	average 30-50°, max 100°C
Average groundwater flow rate	1-5 m per year

Details derived from http://www.nrw.qld.gov.au/water/gab/

Bore at Blackall Woolscour 1906

The Great Artesian Basin

Open bore at Blackall 1908

"To the tortured thirsty cattle, bringing gladness in its going;
Through the droughty days of summer it is flowing, ever flowing
It is flowing, ever flowing, further down."
A.B. "Banjo" Paterson