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## **A history of hydrogeology in Australia from pre-European to the 21<sup>st</sup> Century**

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Indigenous people lived throughout Australia as hunter-gathers for over 40 000 years. For water supply in drier areas and during droughts they used springs or dug shallow wells. This would have been particularly the case 20 000 years ago at the aridity maximum of the last glacial cycle.

The settlement by Europeans began in 1788 as a penal colony. Later, in 1840 the geologist, Rev W.B. Clark arrived and soon after commenced the first geologic mapping in the colony. He had some knowledge of groundwater from his earlier compiling of an inventory of wells in Suffolk (UK) and in 1850 he was made Chairman of the new Artesian Water Board in the search for water for Sydney.

Colonisation spread across the country, and by the mid-19<sup>th</sup> century the States had mostly settled to their present day boundaries, each with their own parliament and administration. Gold was discovered in 1851 in New South Wales (NSW) and shortly after in Victoria. As a consequence the Geological Survey of Victoria was established in 1856 headed by A. S Selwyn, a British geologist. By 1866 he had completed a geological map of the State at 1 inch to 8 mile scale. This lay the foundation for investigating the earth resources, including groundwater. The other States followed Victoria by creating geological surveys over the next 40 years.

In 1878 the discovery by drilling of artesian water at Bourke in western NSW, located in the Great Artesian Basin, was a nationwide stimulus for drilling for groundwater. By 1901 the States and Territories had federated as the Commonwealth of Australia, whose constitution assigned responsibility of water to the States and Territories. A number of State hydrogeologists made substantial contributions over the next 75 years. They include R.L. Jack, E.J. Kenney, C.S.J. Mulholland, E.R. Pittman, C.S. Gloe, E P. O'Driscoll, L.K. Ward and W H Williamson. During the period 1912-1928 an important collaborative step between the States and the Commonwealth were the five Interstate Artesian Water conferences.

In 1962 the Australian Water Resources Council (AWRC), representative of the States, Territories and the Commonwealth, was established, together with its Technical Committee on Underground water (TCUW). This was a time of great activity by State Groundwater agencies: Exploratory and investigative drilling by the States was boosted by a Federal subsidy scheme; the AWRC underwrote the first couple of national groundwater conferences and started the groundwater schools program to train hydrogeologists. During this period many reports were published and two major reviews of Australia's water resources were published; one in 1965 and the other in 1975.

By the 1970s recognition of a number of groundwater problems were emerging: groundwater extraction had increased dramatically with the risk of over allocation, pollution of groundwater was evident and salinization of soil and streams was increasing. These management issues were accommodated to varying degrees in groundwater and environmental legislation of the various jurisdictions.

By the late 1980s and early 1990s two peak intergovernmental forums were established: In 1988 the revamped Murray Darling Basin Authority, governed by a Ministerial Council, was given broader powers impacting on groundwater programs. In 1992 a system of managerial federalism was introduced via the Council of Australian Governments (COAG), with membership of the Prime Minister, State premiers and Chief Ministers, to achieve an efficient and effective delivery of services in areas of shared responsibility. A national framework for improved groundwater management- was developed in 1996. As a result there was a tightening up of groundwater resource assessments facilitated by groundwater modelling, improved bore data bases, bore licensing, and groundwater costing and trading arrangements. By 2014 the Federal government provided funding for a National Groundwater Research and Training Centre and there was now a national groundwater data base.

