

5 ABORIGINAL PEOPLE AND GROUNDWATER



ABORIGINAL USE OF GROUNDWATER

The content for this section is taken directly from the Masters Thesis entitled "ABORIGINAL PEOPLE AND GROUNDWATER" by Bradley J. Moggridge (University of Technology, Sydney, 2005). For full details, refer to the original thesis document, including a comprehensive set of references.

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Aboriginal People in the Australian Landscape

Aboriginal people have been part of Australia's landscape for many millennia. There is no exact date of when Aboriginal people first arrived on the Australian continent or satisfactory evidence to indicate they evolved from Australia, but estimates range from 40,000 to 60,000 years ago and up to 110,000 years ago. Considering this, many Aboriginal nations believe that they have been here since time began – since the Dreamtime, "when the ancestral heroes first appeared and began their epic journey across the land" (Isaacs, 1984), and began creating the land, sky, water and life.

Since Aboriginal people have been a part of Australia's landscape, they have experienced and also triggered numerous changes to its environment. For instance changes in flora and fauna, ecological communities, fire dependence, volcanic activity, climate, and water availability. But the biggest change to the Aboriginal environment would have to be the invasion and settlement of Europeans and consequent rapid deterioration of their homelands.

Throughout all of these changes, Aboriginal people have adapted and survived. Their survival would not be possible without the knowledge of how to find and manage water - without water there is no life. Groundwater sources played a significant role in their survival, especially in the desert regions, which cover approximately seventy percent of the continent.

Aboriginal Groundwater Resources

There are a number of groundwater-related water sources which Aboriginal people have used in the past and still use today; which will be described and mentioned throughout this report. However to each Aboriginal tribe, their names

and significance would differ. These resources include: Soaks/soakages or native wells, springs/ natural springs, mound spring, bores, and hanging swamps. Some simple definitions follow:

- **Soaks/soakages or native wells:**
These terms refer simply to where groundwater discharges to the ground surface. Landform and vegetation are key indicators. They can occur near rivers, in ephemeral river beds, sand hills and near salt lakes. Native wells are simply the traditional means of tapping these soaks, and thus dug in areas where soakages were known. They ranged in depth up to 7 metres but averaged 1.5 metres in depth; they were then filled with debris, sticks, sand or had covers/caps placed on top of the wells, to reduce evaporation and stop animals accessing them and fouling the water. There is also mention that some were curved in shape for protection from evaporation and larger at the base to give greater capacity.
- **Springs / natural springs:**
Springs are often confused with soakages, but springs occur where impervious layers outcrop; the water table may be forced to the surface and water appears as a spring.
- **Mound springs:**
Geomorphic formations raised above the surrounding land surface formed by a deposit of minerals and sediment brought up from the artesian aquifers or confining beds by water at certain natural discharge points. Further information is provided in the next section.
- **Bores:**
A structure drilled or dug below the surface to obtain water from an aquifer system.
- **Hanging Swamps:**
Hanging Swamps are another groundwater dependent system that Aboriginal people would have used. Hanging swamps are shallow depressions on sloping rock faces on the edge of predominantly sandstone cliffs and occur at moderate to high altitudes. They are a constant source of water, fed by rain and groundwater thus allowing a range of plant species, which combined attract animal species.

Due to the lack of cultural information and research, especially in the Sydney Basin and Blue Mountains, the dreaming stories are lost forever, however they would have been part of "Dreaming Tracks" which provide a cultural link between sites and a spiritual interconnection between sites and land.



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ABORIGINAL USE OF GROUNDWATER

Aboriginal People and Mound Springs

There have been extensive studies carried out on Aboriginal people and mound springs, by archaeologists, mining companies including the Olympic Dam Project, social scientists and governments, because they hold great cultural and ecological significance.

Many stories of Aboriginal ancestral heroes are associated with mound springs and their placement along travel routes, and feature myths and spiritual significance. They are semi-permanent oasis in the desert that has provided water for Aboriginal people for thousands of years and thus a strong cultural connection.

All individual springs and complexes are known to hold significance to Aboriginal people, and it is impossible in modern times to predict, with any confidence, that an individual mound spring does not have any significance due to similarities with other springs in an area. It is emphasised that "the springs are considered so important that the large-scale deterioration of any group of springs would cause great distress to at least some Aboriginal people, whether their associations with the sites are direct or indirect".

The deterioration of the Dalhousie Springs to the Indigenous Southern Aranda people and the Irrwanyere Aboriginal Corporation is significant. The Dalhousie Springs are situated on the edge of the Simpson Desert in northern South Australia, and to the Aranda the springs are known as the Irrwanyere or 'the healing springs'. But following European settlement the springs became sick from poor land management practices by settlers, and now the local Aboriginal people are left with a degraded land legacy. This must be so painful for not only these traditional owners of Dalhousie Springs but all other traditional owners to see their land destroyed and treated with little or no respect; and when it is destroyed, the landholder sells it or leaves it for the Aboriginal people to repair. It is hard to explain the difficulty non-Aboriginal people may have in understanding Aboriginal people distress when the environment is polluted or damaged, 'If one part is damaged or destroyed, all other parts are under pressure'.



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GROUNDWATER AND THE DREAMTIME

Storytelling is an integral part of life for Australian Aboriginals. These stories are passed from one generation to another, usually by elders in Aboriginal communities both traditional and contemporary. The Dreaming or Dreamtime is an English translation of an Aboriginal concept. For example, three tribes of central Australia the Pitjantjatjara, the Arrernte and the Adnyamathanha use the following terms: Tjukurpa; Aldjerinya; and Nguthuna respectively, whereas the Gamilaraay people refer to the Dreamtime as – Burruguu.

The stories are told in detail and re-enacted in ceremonies which capture the imagination of the young, primarily for educating. The teaching styles have proven to be inspiring and powerful tools in presenting the Dreamtime beliefs and cultural practices.

Dreamtime stories depict the very basic part of a long and complex event. Stories covered include: the creation of the land and life, protocols and tribal lore, life and death, warfare, hunting, linking every creature and every feature of the landscape, male and female roles, as well as sacred and public affairs.

These are stories of the history and culture of Aboriginal people, handed down in this way since the beginning of time and refer to all that is known and all that is understood. Many groundwater related sites would be dreaming sites because water that originates from below the ground, with Aboriginal people not knowing the full extent of hydrogeological processes, would deem it to be spiritually significant. The dreaming significance of these sites, for instance, would link surface and sub-surface waters through their culture heroes. These sites would have also been where trade occurred, dispute resolution between tribes, plus marriage and male initiation. To Aboriginal people, the stories of the dreamtime represent the past, present and future.

The Rainbow Serpent

The Rainbow Serpent was a highly significant and powerful culture hero of Australian Aboriginal Dreamtime. It was connected to many different Aboriginal tribes throughout Australia, had many different names and usually took the form of a snake/serpent creature which linked the people to features in the landscapes. Those sites and stories associated with the Rainbow Serpent were and still are considered culturally significant to Aboriginal people.

The significance of the Rainbow Serpent has long been appreciated by anthropologists: it has been stated that the Rainbow Serpent story was perhaps “the most important of the mythology and that fuller knowledge of this is important to any attempt we may make to understand the Australian conception of nature”.

The Rainbow Serpent had many different roles depending on the tribe. Some of its roles related to: fertility in women and the land, close association to medicine men, heavily associated with important ceremonies, protector of its people and land, the formation of land features such as springs, rivers, lakes and lagoons, rain and flood events, but for the purpose of this report its connection to groundwater.

In Western NSW there is deep connection between the Rainbow Serpent (Wawi) and both surface water and groundwater, connecting beneath and across landforms. An account of this connection is described as:

“This country was made by the ancestors. **Wawi** the Rainbow Serpent came up through the springs, he came from Nakabo springs, Ngilyitri country. Wherever he travelled he left ochre to show where he had been. The springs were entry and exit points. He came out of the earth, travelled along its surface, and then back into the earth. Wawi travels, and is still there. We know he’s still there.”

It is further explained that in Ngiyampaa country the Wawi came from the east, travelling underground, coming up in a spring in the Manara Range, where he had a fight with Robin Red Breast, which he lost and is now stuck in the rockhole, Wawi rises out and returns as the water in the rockhole rises and falls.

Walmadjari men in times of drought [‘lalga], go to a big permanent waterhole, remove excess sand or soil from the hole and add to the height of the walls, making the hole deeper. Then they shout out very loudly with special cries to tell the wanambi or giant carpet snake they need water and to come and fill the well for them. It is believed the seeping water comes because the giant hidden snake yields it to them. From a hydrogeological sense, these Walmadjari men have dug into the saturated zone, thus allowing groundwater to seep into the hole



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The association between the giant carpet snake and permanent water holes in the desert regions is so closely related, for instance when a water hole dries up it is believed the snake has died. Under tribal lore if a person mistreats a water hole that affects the snake, punishment is inevitable.

These lores and customs would have been a survival trait, mainly to specifically protect the water quality and quantity. Some examples of this are: "at some waterholes, in order to avoid contaminating the water, people are not allowed to put their hands in to scoop water out" so drink by sipping the water without using their hands for hygiene purposes, also a Traditional Owner talks of protecting a stream called Darrangay in Arnhem Land: "upper pools was used for drinking and the downstream pool was used for swimming". Another example is by discouraging children from playing in springs by stating a serpent or bad spirit will take them - these were simple ways to protect water quality.

The Rainbow Serpent is also culturally significant for the Baakantji people. A story that links a waterhole at Union Bend, Wilcannia (Western NSW) with the Ngatyi or Rainbow Serpent. This site is a series of Ngatyi waterholes along the Darling River that are important to the Baakantji.

The Karajarri peoples of north western Western Australia describe Pulany or water snakes and serpents which reside in or have made permanent water sources – jila (spring) or pajalpi (spring country). The presence of Pulany in a spring is often indicated by the panyjin reed, and is a warning sign for children, not to swim there. Strangers should not approach a jila without the presence of a countryman for that area, who will call out to warn the Pulany of their presence and state their relationship.



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ABORIGINAL SURVIVAL AND GROUNDWATER

My Story

A senior Karajarri man from the Great Sandy Desert, John Dudu, describes life without groundwater –

‘Water is the life for all of us. It’s the main part. If that water go away, everything will die. That’s the power of water. He connect with the land’.

Under their law, Karajarri are responsible for looking after their water; this would have been similar all through Aboriginal Australia.

(As reported in Yu P, Yu S and Fisher P (1999) The Kimberly Living Water. In Habitat Australia pp 24-27. Australian Conservation Foundation Australia)

The ability of Aboriginal people to survive in the Australian landscape and especially in desert regions engulfing approximately seventy percent of the continent as mentioned previously is somewhat astonishing. These regions of Australia undergo climatic extremes such as low rainfall with high evaporation and large temperature variations between night and day. This ability would not have happened in an instant; it would have developed over many thousand years, and each aspect of knowledge gained by elders or tribes people would have been passed down to the next generation. This suggests a highly developed and sophisticated culture of learning and the will to survive using all resources available.

Aboriginal people developed a precise classification system for sites within their country. Their survival was dependent on this and failure of this system would be fatal for the tribe. It was necessary to be precise when talking about waterholes, as life may depend on going to the right place at the right time. A principal site for a tribe would have been a place where to obtain water. Groundwater sources would have been significant, especially where water bodies such as rivers or high rainfall were not a factor. However this was not the case for Sydney Aboriginal tribes, isn’t as the Sydney region is in the semi-arid and arid regions of Australia. Examples are given of such Sydney groundwater sources; Tinker’s Well on the Pyrmont peninsula and Emma’s Well at Vacluse.

Descriptions of Living Water or Ngapa Kunangkul of the Karajarri people, who lived around these permanent waters, particularly in the hot season

or laja, when less permanent water supplies such as soaks or lirri dried up. Living water may be surface waters such as springs or sites that require digging soaks. They are all said to be connected to the underlying groundwater, whether regional or local. Therefore over thousands of years and to this day Aboriginal people still know how to find or dig for water that has seeped up from subterranean sources.

The Walmadjari tribes’ classified water systems including groundwater sources. These include, waters trapped in deep sand which are classed as soak waters or [‘tju:mu]. Permanent waters are classed as [‘tjila] and [‘tjaramara], which include natural springs (Joanna Springs in Mangala territory).

Finding groundwater sources, Aboriginal people would use all their available resources and natural indicators, which Tindale (1974) describes: “in the arid zone, wild dingoes preformed a service to Aboriginal people by locating and digging open water soakages”. Following this, a digging stick would have been used to further dig out soakages to keep soakages clear of debris. Tindale (1974) also mentions on the Nullarbor Plain where “a line of ants going down into a sinkhole in the limestone, can represent subterranean cave water”, karst groundwater.

Another Aboriginal classification system for identifying groundwater sources is through art. Aboriginal art is described as the oldest continuous tradition of art known. There is no known fixed notion of traditional Aboriginal art, for it is not a static relic of a bygone era but a vital and pertinent expression of current human concerns. Through their art Aboriginal people celebrate the ancestral mythologies which form the basis of their life.

Aboriginal art has played a significant role in classifying, representing and describing significant groundwater sites for Aboriginal tribes, for as mentioned throughout the report - knowledge of water sources is so important for a tribe’s survival. Aboriginal art was not only painted on canvasses or linen as modern society now demands, but Aboriginal people used many mediums such as on the body for ceremonies, rock shelters and platforms, ground designs (sand drawings and ground mosaics also for ceremonies), implements or artefacts, ceremonial poles and the bark off a tree.



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Aboriginal art especially originating from desert regions of Australia and in the dot art form such as the Warlpiri and Pintupi Language Groups of the north central part of Australia will constantly make reference to and represent groundwater sources such as soakages and springs. Some good examples of desert art indicating groundwater sources (springs); along with explanations is given in Stokes (Desert Dreaming. Rigby Heinemann Melbourne Australia, 1993).

Aboriginal art uses traditional symbols which can be read in many ways. Because of this, even the secret/sacred parts of a story can be painted but still protected, for the artist is the only person who fully understands the meaning.

Considering the indicators, Aboriginal people had to then access the aquifer for the precious water, a prime example of Aboriginal ingenuity is where the activities of the Central Lakes people, situated east of the Western Desert had constructed tunnel reservoirs to access underground water in the same way settlers later tapped artesian bores. Other structures and various formations, some natural, others man-made show a high degree of expertise and knowledge in assessing and preserving precious groundwater. The works were an integral aspect of their culture, it was carried out with simple tools as pottery and metals had not been introduced.

Aboriginal water use is described in Lloyd (Either Drought or Plenty, Water Development and Management in New South Wales. Department of Water Resources New South Wales, 1988): 'Australian Aborigines were exploiters, conservators, managers and manipulators of water resources. They were able to prevent the pollution of water, to filter it before drinking, to reticulate it, and to store it so as to reduce evaporation. Indeed, very little of the fundamental elements of hydrology and hydraulics eluded them.'



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ABORIGINAL PEOPLE AND GROUNDWATER TODAY

Aboriginal people would have chosen their place of settlement primarily for cultural, survival and social reasons. Aboriginal permanent settlements have now replaced the former nomadic lifestyle, with many communities consisting of over 1000 people. Most of these settlements are in remote locations and rely on groundwater tapped with bores, and supplying water to these communities is an ongoing challenge. The challenge for remote Indigenous communities in Australia is to provide adequate supplies of potable and non-potable water to achieve health outcomes and meet cultural needs while minimising the economic, social and environmental costs.

A report by the Human Rights and Equal Opportunity Commission (2001) mentions that the number of remote indigenous communities had grown over the preceding 20 years, largely due to the outstation movement. Further to this Indigenous communities as we know them today are a legacy of settlements around ration stations or mission establishments. Settled mixes of different family, tribal and skin groupings are new and many of the social issues arise from the new types of community living that has no traditional basis for Aboriginal people. Examples from NSW demonstrate that the land Aboriginal people are forced to settle on is usually land of low value, highly degraded, unfamiliar country (not traditional lands) or adjacent to the local councils' activities such as waste management centres and sewage treatment plants.

The availability of water for these communities is a crucial decision. Water availability and in particular, permanency, are often described as critical factors influencing the settlement patterns of Australian and other land foragers. Water availability also pre-determines the

distribution of plant and animal species. From an archaeological sense a review of inland Australia displayed a close relationship between permanent waters which have a wider variety of archaeological materials while scatters near ephemeral waters were generally described as being less diverse. This however may vary around Australia, due to the significance of the water source to a tribe.

My Story

I was born in north-western NSW at Euraba Mission 1918. Not long after my birth, the whole community was moved to Old Toomelah. Then in 1938 the community was forced to move again to the current Toomelah settlement situated on the banks of the Macintyre River. All of the moving was due to the fact that there was a lack of available potable water. The community currently uses groundwater tapped bore as their potable supply.

B. Bengé pers. comm. 2002

In desert regions rainfall is unpredictable along with temperature extremes. The unpredictability of rainfall directs communities to groundwater for the main water supply. The total number of Aboriginal communities with a population of 100 or less using groundwater are summarised in Table 1. The discrete communities represented are concentrated in the more remote areas of the Kimberley and central desert regions and Arnhem Land.

[Grey-Gardner R. and Walker B W (2002) **What Lies Beneath, Sustainable Groundwater Management for Communities of Indigenous People**. Centre for Appropriate Technology (CAT), Alice Springs, Northern Territory].

TABLE 1. Groundwater supplies for Indigenous communities with a population of 100 or less.

Source: Grey-Gardner and Walker (2002), page 1.

State* or Territory	Number of communities	Number of communities on bore water	Percent of communities on bore water	Reported populations in communities on bore water
NT	588	417	71%	8226
NSW	35	6	15%	425
TAS	1			
WA	235	182	78%	4365
SA	90	47	52%	730
QLD	109	22	20%	393
Total	1058*	674		14139

* Victoria and the Australian Capital Territory do not have communities with a population of 100 or less.

** Six NT communities did not state their type of water supply.



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Communities situated in remote areas using groundwater experience difficulties in securing access to bore water supplies of sufficient quality and quantity. The use of technology with regard to these supplies adds complexity to the supply infrastructure.

Within Aboriginal communities there is a constant fluctuation in residency numbers as movement between large centres and country maybe influenced by a number of reasons:

- Schooling;
- Family eg. 'sorry business' (funerals);
- Ceremonial or cultural reasons;
- Business or political meetings;
- Sporting events;
- Medical; and
- Shopping.

These fluctuations in community numbers will place a strain on the communities' infrastructure i.e. water supply and waste water disposal.

It is integral for service providers to understand the cultural obligations of Aboriginal people (this will differ from region to region). Planning the infrastructure for communities depending on the cultural activity decrease a settlement to zero for up to six months or the population may double for periods of time. Therefore peak loads and demand will vary and the appropriate systems have to be in place to accommodate this.

Sustainable groundwater and community living are not universal principles. These two concepts are relatively new to indigenous people as they are the assumed incumbent responsibility.



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