

Quality of drinking water supplied to Aboriginal communities - Western Australia: causes, implications and protection measures.

K.J. Ketteringham, A.T. Laws, J. Brown, D. Collard, N.I. Brooks & N.P. Mantle

Aboriginal communities

Some 300 communities are home to about 17 000 people. Of these:

- about 45 are Aboriginal town-based communities (ATBC)
- about 20 Remote Area Essential Services Program (RAESP) communities have a population over 200, with Bidadanga the largest with 850
- about 91 are remote communities with populations exceeding 50, and serviced through the Remote Area Essential Services Program (RAESP)
- the remaining discrete communities have a population less than 50, and are generally located in remote areas of the state

The poster describes the current and proposed models for the provision of drinking water to this diverse range of Aboriginal communities.



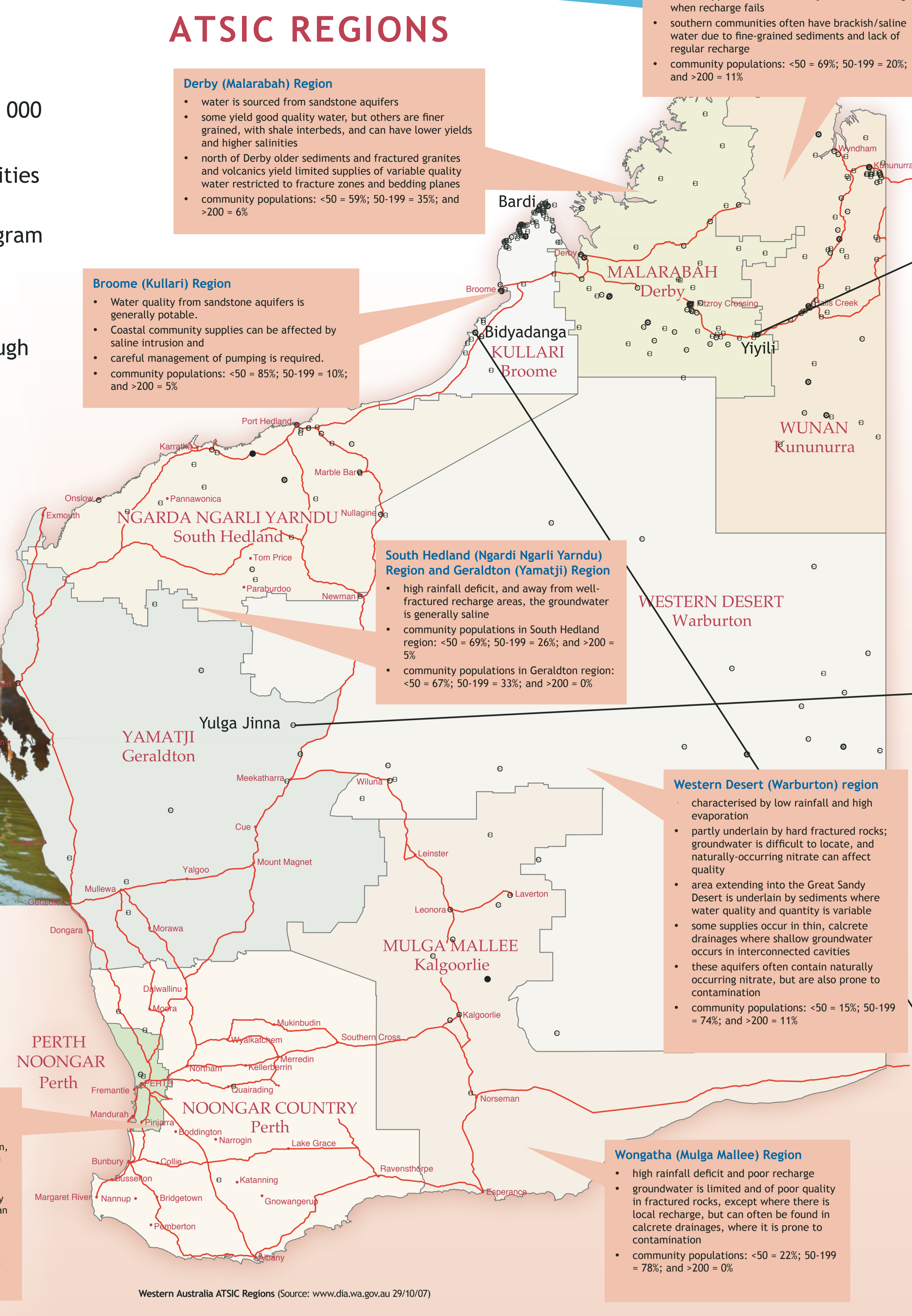
(Source: Tourism WA 27/11/07)

Location

- Communities are located within nine main regions shown on the Aboriginal and Torres Strait Islander Commission (ATSIC) map.
- Most indigenous people live in the mid-sized to large communities with populations greater than 50.

Southwest (Country Noongar) Region and Metropolitan (Perth Noongar)

- highly variable rainfall and evaporation
- area to the west is underlain by the Perth Basin, and to the east by the Archaean Yilgarn Craton
- most of the communities are underlain by the latter or are on scheme water in Perth
- inland water supplies are obtained from deeply weathered bedrock where the water quality can be poor and often brackish to saline
- community populations in Southwest region: <50 = 100%; 50-199 = 0%; and >200 = 0%
- community populations in Metropolitan region: <50 = 67%; 50-199 = 33%; and >200 = 0%



Derby (Malarabah) Region

- water is sourced from sandstone aquifers
- some yield good quality water, but others are finer grained, with shale interbeds, and can have lower yields and higher salinities
- north of Derby older sediments and fractured granites and volcanics yield limited supplies of variable quality water restricted to fracture zones and bedding planes
- community populations: <50 = 59%; 50-199 = 35%; and >200 = 6%

Broome (Kullari) Region

- Water quality from sandstone aquifers is generally potable.
- Coastal community supplies can be affected by saline intrusion and
- careful management of pumping is required.
- community populations: <50 = 85%; 50-199 = 10%; and >200 = 5%

South Hedland (Ngardi Ngarli Yarndu) Region and Geraldton (Yamatji) Region

- high rainfall deficit, and away from well-fractured recharge areas, the groundwater is generally saline
- community populations in South Hedland region: <50 = 69%; 50-199 = 26%; and >200 = 5%
- community populations in Geraldton region: <50 = 67%; 50-199 = 33%; and >200 = 0%

Western Desert (Warburton) region

characterised by low rainfall and high evaporation

- partly underlain by hard fractured rocks; groundwater is difficult to locate, and naturally-occurring nitrate can affect quality
- area extending into the Great Sandy Desert is underlain by sediments where water quality and quantity is variable
- some supplies occur in thin, calcrete drainages where shallow groundwater occurs in interconnected cavities
- these aquifers often contain naturally occurring nitrate, but are also prone to contamination
- community populations: <50 = 15%; 50-199 = 74%; and >200 = 11%

Wonthatha (Mulga Mallee) Region

- high rainfall deficit and poor recharge
- groundwater is limited and of poor quality in fractured rocks, except where there is local recharge, but can often be found in calcrete drainages, where it is prone to contamination
- community populations: <50 = 22%; 50-199 = 78%; and >200 = 0%



A typical small remote community
(Source: Department of Water 05/11/07)

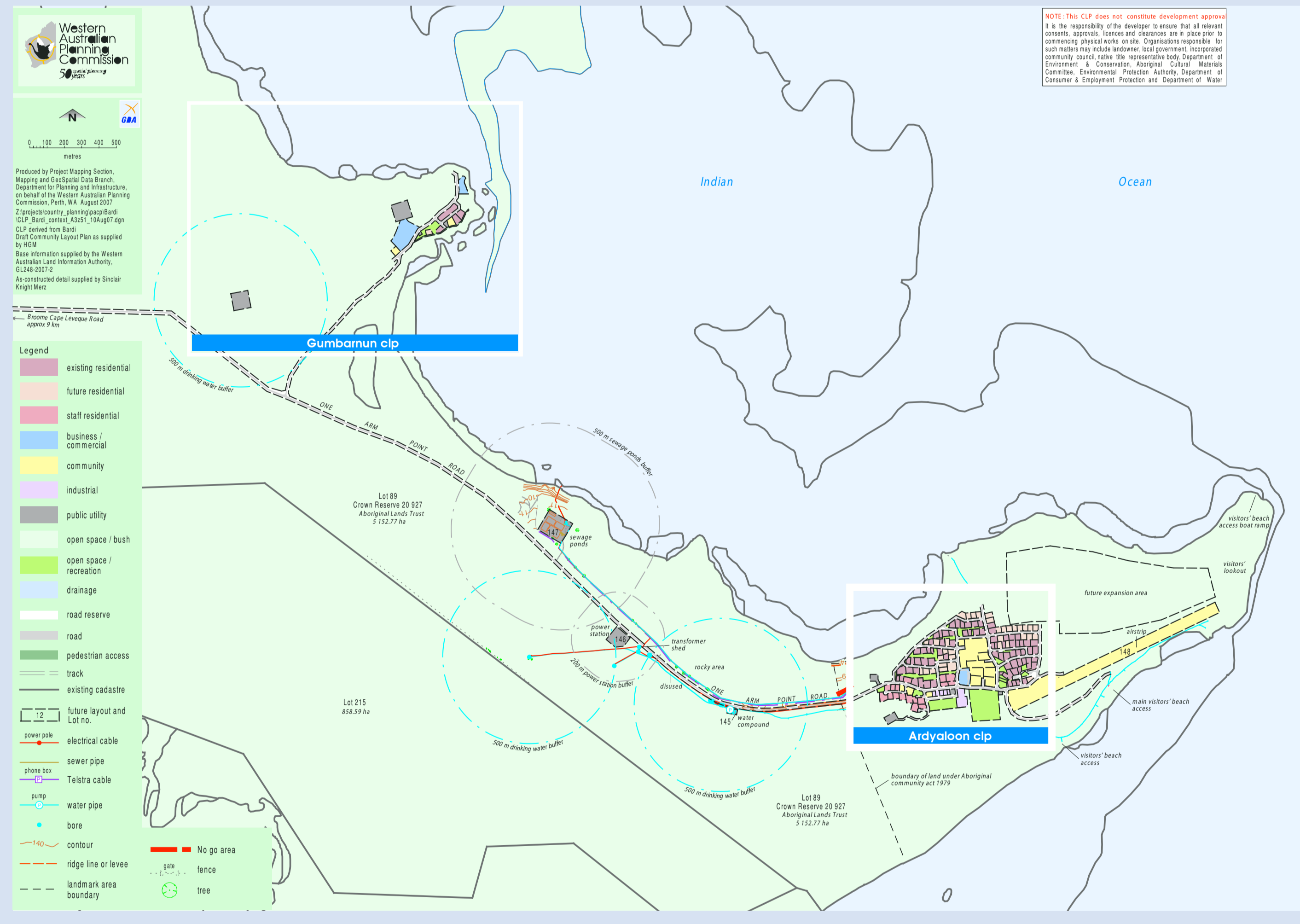


A typical medium sized remote community
(Source: Department of Water 05/11/07)



A typical large remote community
(Source: Department of Water 05/11/07)

Current protection measures



A community layout plan for Bardi (Ardayaloon) (Source: www.wapc.wa.gov.au 29/10/07)

Remote Area Essential Services Program (RAESP)

A joint federal/state program managed by the Department of Housing and Works has delivered and maintained water, power and wastewater services since 1997 through contracted state program managers (CSPM).

RAESP measures currently include:

- hydrogeological investigations and drilling
- development of water source protection and management plans (20 to date).

Advisory Committee for the Purity of Water (ACPOW) measures include:

- review of monthly water analyses from the CSPM in line with the Australian Drinking Water Guidelines.

Concerns for remote communities:

- the lack of water source protection for many small, and the more remote, non-RAESP communities
- variation between the modes of water service delivery.

Variations:

- Communities close to a town usually receive town-supplied services to the community boundary, but the communities are responsible for infrastructure within the community. Emergency breakdowns are supported through the Town Reserves Regularisation Program managed by Department of Housing and Works.

- For remote communities managed under RAESP, and regional service providers, the CSPM is responsible for infrastructure, monitoring and treating water supplies, and conducting emergency repairs.
- The water and wastewater services for communities < 50 people used to be supported through ATSIC. While they now receive support for emergency repairs of infrastructure through RAESP, water quality is not frequently monitored.

Community layout plans (CLP) and future protection measures

Community drinking water source areas (CDWSA) for non town-based, remote communities are protected through various protection measures.

- Some already have water source protection and management plans prepared under the RAESP program, which can be incorporated into CLP developed by Department for Planning and Infrastructure (DPI).
- DPI is developing and reviewing CLP for remote communities not already covered by a town planning scheme.
- CLP development involves community and government stakeholders.
- A buffers policy being developed by DPI will include protection zones around drinking water sources.
- Protection measures will be enhanced in line with a new water services delivery model currently being considered.

Water quality issues



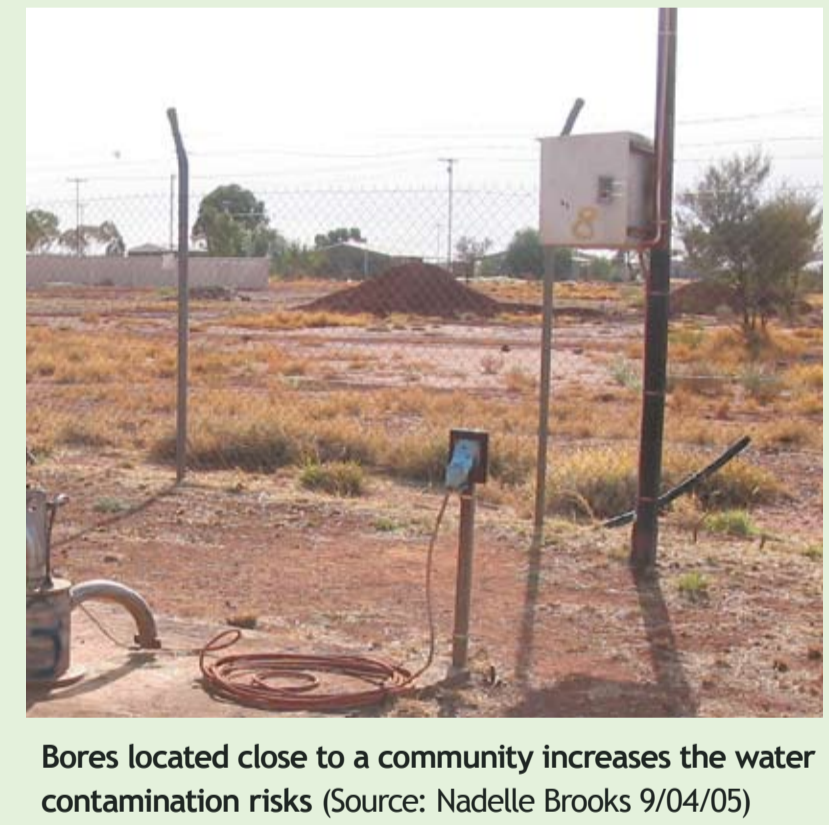
Wild camels in the Western Desert region damage water infrastructure and contaminate borefields (Source: Nadelle Brooks 10/04/05)

- Some communities experience water quality problems associated with regional groundwater quality issues - nitrate, uranium, arsenic and heavy metals have been detected at levels that require treatment to meet the ADWG.
- In larger RAESP communities, health-related issues are being resolved by treatment, but for some smaller communities drinking water is being carted in.
- Contamination of water sources can be caused by community infrastructure (e.g. location of wastewater disposal and power stations adjacent to water bores). When community development occurs upstream of the water source bores contamination risk is increased.

- Small community supplies are not frequently tested for water quality. This issue is being considered in the new service delivery model.

Cultural issues:

- Aboriginal heritage areas and culturally sensitive sites (e.g. birthing places, ceremonial areas, men's and women's areas) require protection. These sites can limit or assist the opportunity to safely locate bores.

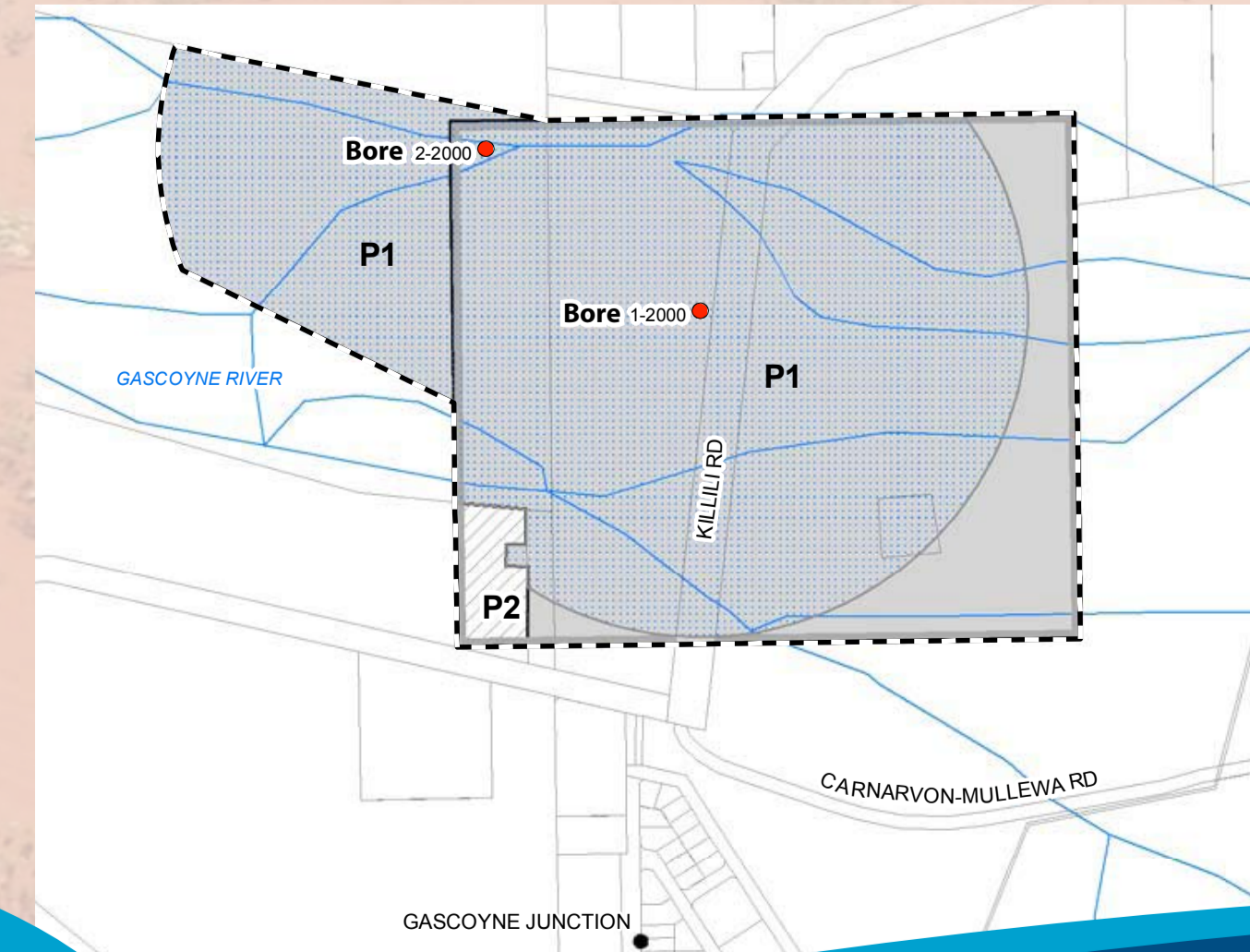


Bores located close to a community increases the water contamination risks (Source: Nadelle Brooks 9/04/05)

The way forward

- Water sources for town-based communities are protected through the existing Drinking Water Source Protection Plans (DWSPP) for each town's Public Drinking Water Source Area (PDWSA).
- Proclamation of PDWSA under the *Country Areas Water Supply Act 1947* enables by-laws to be applied to prevent contamination.
- Priority areas, protection zones and land-use planning ensure that source protection is achieved.

Below is an example of a DWSPP developed by the Department of Water for a small town. This approach could be applied to Aboriginal communities.

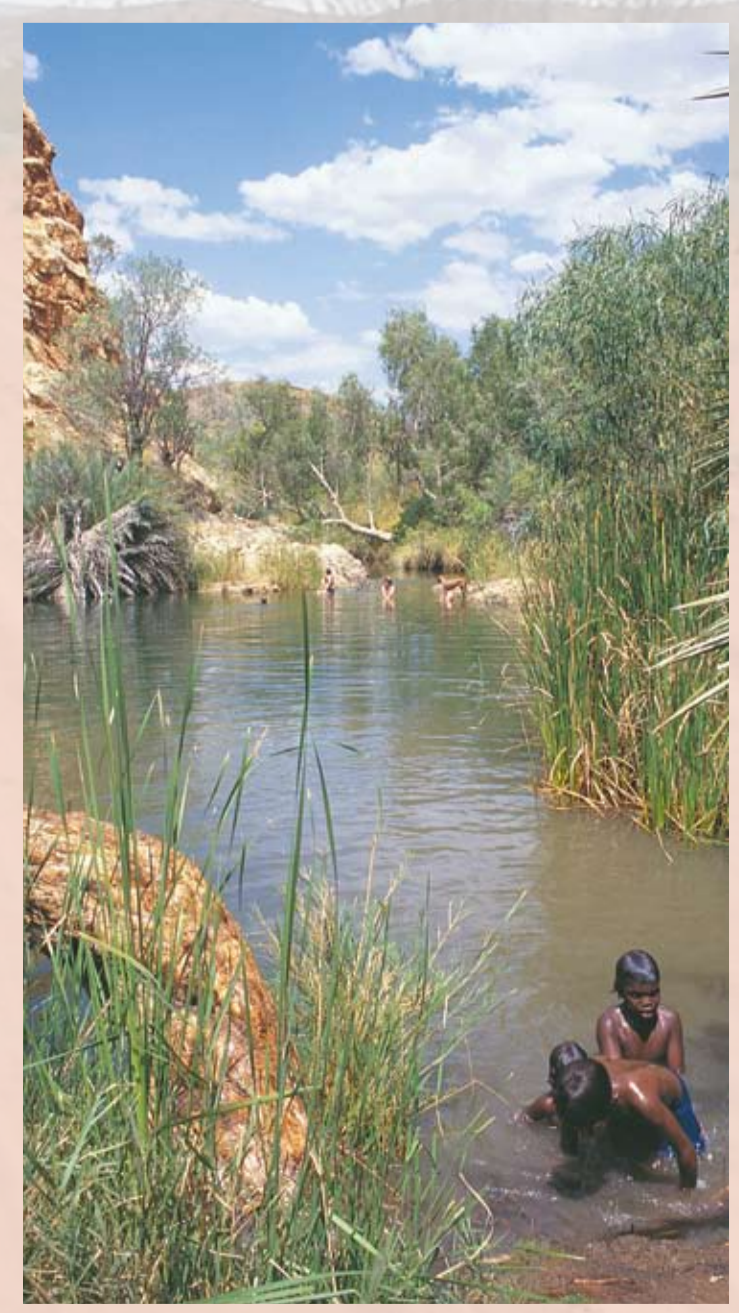


Essential services delivery model

- The Department of Water is working with other government agencies to improve water services to Aboriginal communities through a single service delivery model appropriate for the nature and remoteness of the various communities.
- This proposal will improve essential service provision to Aboriginal communities in the state, and bring them up to the same standard as for comparable 'mainstream' towns.

Conclusion

The delivery of a good quality water supply and its protection for most Aboriginal communities in Western Australia is currently under review. A new model is being developed to improve water source protection and water services for Aboriginal communities.



(Source: Tourism WA 27/11/07)

