

CARNARVON ARTESIAN BASIN ADVISORY GROUP (CABAG)

The Project Manager and the Carnarvon Artesian Basin Advisory Group (CABAG) will work with landholders in the Carnarvon Artesian Basin (CAB) to develop artesian water management plans for each property, in accordance with the principles and guidelines outlined in this document.

Completed plans will be submitted to the GMS Board for funding approval as part of the normal GMS funding process. Because artesian water management works will often need to be linked to other on-ground works not catered for by this project (eg: additional reticulation, Total Grazing Management systems, etc), landholders will be invited to submit their plans as part of a broader Implementation Proposal to the GMS Business & Industry Development Grants Program. However, this is not a requirement.

The CABAG will provide the GMS Board with recommendations for funding of each artesian water management plan, according to the principles and guidelines outlined in this document. Funding of artesian water management plans will not be competitive.

Landholder participation in the GMS Carnarvon Artesian Basin project is voluntary.

1.2 Goal

better long-term land and water management through rehabilitation and reticulation of flowing bores in the Carnarvon Artesian Basin.

1.3 Objectives

- Reduced number of uncontrolled bore drains
- Increased pressure in artesian basin
- Reduced water wastage
- Improved grazing management
- Improved weed and feral animal control

1.4 Benefits

through integration with other programs of the GMS, the project will deliver substantial economic and environmental benefits to the region, including;

- Increased management of total grazing pressure through better distribution of domestic animals and greater control of non-domestic species
- More efficient, productive and sustainable use of natural resources through better distribution and control of artesian water supplies
- Increased access to controlled artesian water supplies for other land uses including horticulture, aquaculture and tourism

1.5 Definitions

Carnarvon Artesian Basin (CAB) is the area within the Gascoyne-Murchison where artesian water flows to the surface through man-made bores. It includes 23 pastoral leases in the Shires of Exmouth, Carnarvon and Shark Bay.

Carnarvon Artesian Basin Advisory Group (CABAG) the artesian bore-user based group appointed by the GMS Board to advise it on development of policy and allocation of funds for the implementation of this project

2. OPERATING PRINCIPLES

The following operating principles will guide decision-making for the project.

2.1 Purpose of funding

Funding will provide for the services and works required to implement approved artesian water management plans, including

- i. Decommissioning of existing bores;
- ii. Rehabilitation of existing bores;
- iii. Drilling and equipping of new bores; and
- iv. Installation of new reticulation (as described in 2.1.3)

Works and services will be provided to the minimum level necessary to ensure

- i. a minimum of existing access to artesian water supplies
- ii. increased management and control of artesian water supplies
- iii. reduced wastage of artesian water

Reticulation

- i. will be provided up to the equivalent of replacing existing winter access to water from bores subject to works as part of this project
- ii. will include the provision of the minimum number of watering points (to minimum standards set by the CABAG) required to service the area currently serviced by existing systems (minimum two watering points and 5km piping per replacement bore or rehabilitated bore)
- iii. existing piping will be upgraded where it can be demonstrated that it is unsuitable for distribution of artesian water for an extended period under altered flow conditions

Funding will be on a cost-sharing basis, such that

- i. the Commonwealth and State each provide 40%, and the landholder provides 20% of the overall costs of implementation (the '40:40:20 split')
- ii. the landholder contribution can include 'in kind' contributions
- iii. the landholder provides a cash contribution of 10% of total costs, before work commences

Landholder contributions

- i. may include approved 'in-kind' labour, machinery use and materials provided by the landholder
- ii. should be recorded in detail by the landholder as they are provided
- iii. (cash) may be reimbursed, in whole or in part, at completion of the works on demonstration of total in kind contribution (cash deposit - value of in-kind = amount reimbursed)
- iv. will be in accordance with recognised standards, specifications and rates (eg, current Farm Budget Guide listings)

General

- i. participants will be advised of any taxation implications applying to application of funding, including: capital gains, income, repairs/replacements and depreciation
- ii. recommendations will at all times seek to maximise efficient use of project funds

Conditions and standards

All works must comply with

- i. recommendations relating to 'significant' wetlands dependant on artesian supplies, based on CABAG advice to the GMS Board

- ii. materials and construction standards and specifications set by Water and Rivers Commission (WRC) that are based on national (ARMCANZ) standards, as they apply to bore conditions in the CAB
- iii. project requirements for maximum serviceable life-span at acceptable costs

For bores rehabilitated according to these standards, as part of this project,

- i. minimum flow rates will be guaranteed before commencement of works

Project management

here works are undertaken by external contractors,

- i. the Project Manager will have management responsibility for all contracts
- ii. landholders may supervise works in conjunction with the Project Manager, but will not be required to manage contracts

The Project Manager and the CABAG will ensure that adequate funding reserves are available to meet costs of unforeseen events and emergencies affecting the successful implementation of artesian water management plans, up to a reasonable period after the completion of works

Ongoing arrangements

All new and reconditioned bores will be licensed to ensure that

- i. appropriate conditions of use and management continue to apply
- ii. ownership of bores will not change as a result of works undertaken

Arrangements will be made for all new and reconditioned bores to be monitored

- i. to assess changes to aquifer performance resulting from works associated with this project
- ii. for purposes of future aquifer management

Planning and funding process

Planning and implementation of artesian water management

- i. will generally be on a property-by-property basis, not bore-by-bore
- ii. can extend over several adjoining properties where this allows significant benefits and is agreed-to by all participating landholder

CARNARVON ARTESIAN BASIN REHABILITATION PROJECT – STAGE 2

Project Summary:

This project is a sub-project of the Gascoyne Murchison Strategy and focuses on the control of artesian bores in the Carnarvon Artesian Basin and the reticulation of artesian water.

Project Description:

Funding will soon run out to complete the initial CABRP program. Substantial achievements have been made to date, with the program redrilling (& relining) 14 bores, that has enabled 26 bores to be decommissioned. This is a saving of 5385 ml of water per year, resulting in benefits to the water resource and natural resource management for land systems from replacing bore drains.

\$600,000 is sought for **high priority** planned works which could not be achieved because of cost increases resulting from:

- CPI increases (associated with introduction of GST);
- falls in the Australian Dollar increasing the price of casing and drilling fluids;
- increased price of petroleum increasing the price of reticulation materials.

\$400,000 is sought to complete **other priority CABRP work** not completed due to a shortage of funding. These bores were not considered further in the existing CABRP work, due to the higher productivity benefit than environmental benefit.

\$1.376 million is also sought to tackle those artesian bores that have **large environmental benefit** but no (or limited) productivity benefit and therefore do not fit into the guidelines of the existing scheme. These are predominantly bores that have ceased flowing at the surface, or are only low flowing bores. No replacement drilling will be undertaken for these bores, though some may require piping to replace existing watering points.

Sustainable Yield of the Basin:

Our rehabilitation work on the Carnarvon Artesian Basin has shown that the aquifer heads are around 40m AHD (Australian Height Datum) and that the bores flow at 7 cubic meters/ hour per meter of head. If a bore has stopped flowing at the surface and is because of a break out in the limestone or calcrete zone at around sea level (so the bore may be at 10 mAHD, but the break out is 10 meters below the surface) then water is rushing into the limestone with the assistance of a 40 meter head (58 psi).

Current experience shows that as a worst case scenario the water may be flowing at over 6,000 cubic meters per day – larger than any flow seen at the surface. It is also possible that the reason the bore has stopped flowing is because the shales have squeezed in at the bottom of the hole, resulting in no wastage of water. Also it can be some combination of both scenarios, were shales are squeezing in restricting the flow which is then flowing into the limestone/ calcrete zone. Presuming only 10% of these bores that have ceased to flow or are low flow'ers. The leaking into the sub-surface aquifer is likely to be up to 12,000 ML per year (twice the volume so far saved). It is therefore imperative we plug these.

Project Objectives:

- a) Reduced number of uncontrolled bores and bore drains.
- b) Increase pressure in the artesian basin.
- c) Reduced water wastage.
- d) Improved grazing management. Reticulation of water to controlled watering points will improve grazing management and assist with overall control of the total grazing pressure.

Improved weed and feral animal control – The even distribution of stock through strategic placement

By way of introduction the Water & Rivers Commission with the Carnarvon Artesian Basin Advisory Group (CABAG) implements the GMS' Carnarvon Artesian Basin Rehabilitation Program (CABRP). Following a recent meeting of CABAG an issue was raised where we seek the PLB's assistance.

Background

The CABRP is a voluntary program that brings previously uncontrollable flowing bores under control through the rehabilitation of bores and subsequent reticulation of the water. This program is funded 80:20 from Government and pastoralist respectively, of which, the 20% pastoralist contribution can be in-kind.

When the CABAG and pastoralist agree to undertake a program, an agreement is signed-off by both parties that outlines the timing, costing, work schedule etc, etc.

Under this agreement the rehabilitation of the bore/s is accomplished first. Following the successful commissioning of the new/rehabilitated bore the reticulation system is required to be established within 12 months. In all cases the pastoralist undertakes the reticulation component and the cost of this reticulation provides the majority of the pastoralist' contribution to the 80:20 funding arrangements.

Carnarvon Artesian Basin: Work to do.

Boolathana Station. Originally 12 artesian bores, only 3 still flow at the surface.

9 were originally good to exceptional flowers
1 was moderate flower (pastoralists wants to reline, but a CABAG low priority)
2 were low flowers

Boologoroo Station. Originally 3 bores, all still flow.

2 are part of CABAG program
1 currently low, with no early information. Access will be a problem

Brickhouse Station. Originally 7 bores

2 are high priority for CABAG but pastoralist not on board
5 were big flowers but only flow small now.

Callagiddy Station. Originally 3 big flowers

3 are part of CABAG program

Carbla Station. Originally 9 artesian bores and 2 sub artesian.

2 are part of CABAG program
1 is a high priority for CABAG awaiting pastoral support.
5 were moderate to large flowers, are now low flowers and still used.
1 is a moderate flower, but could be technically impossible to decommission.

Cardabia Station. Originally 3 artesian bores.

1 to be decommission as part of CABAG.
1 unknown location.
1 no longer flows by use to be a big flower.

Edaggee Station. 8 artesian bores originally.

2 to be decommissioned as part of CABAG.
6 others were big flowers but are small now.

Ella Valla Station. 1 sub artesian bore.

Faure Island Station. 1 artesian bore.

Small CABAG priority, but is in Shark Bay World Heritage Area.

Giralia Station. 1 artesian and 1 sub artesian.

1 part of CABAG

Gnaraloo Station. 1 artesian bore.

A low priority for CABAG (never was big flower). Would be a large priority for productivity. Need a redrill.

Hamelin Station. 6 artesian bores.

1 – is in good condition, no further action required.

2 are part of CABAG program

2 are moderate CABAG priority.

1 use to be very exceptional flower, but doesn't flow at surface anymore.

Marron Station. 2 artesian bores and 1 sub artesian bore.

2 bores are part of CABAG.

Mia Mia Station. 9 artesian bores originally.

3 location unknown

1 part of CABAG

2 were good flowers but don't flow now.

1 was a small flow and doesn't flow now.

2 have unknown original flow and are small or not flowing now.

Minilya Station. Originally 11 artesian bores.

6 are location unknown

5 are to be decommissioned under CABAG.

Nanga. Originally 5 artesian bores.

2 are in good condition.

2 are high priorities for CABAG but await funding from CALM

1 is low currently but was probably better originally.

Peron Station. 7 artesian bores.

3 are in good condition.

1 is lost

2 still flow well.

1 is a low flow but use to be a good flower.

Quobba Station. 1 sub artesian

Tamala Station. 4 artesian bores originally.

4 were good flowers originally but no longer flow at surface.

Wahroonga Station. 6 artesian bores originally.

2 are part of CABAG

1 was a good flowers but are now small flowers

3 were good flowers but no longer flow.

Warroora Station. 2 originally.

2 are part of CABAG program.

Wooramel Station. 14 artesian bores originally.

6 are part of CABAG.

3 are high priorities for CABAG dependent on pastoral and project funding

1 is a low priority for CABAG dependent on funding.

2 are missing

2 had good flows but no longer flow.

Yaringa Station. Had 10 artesian and 3 sub artesian bores originally.

5 are high priority CABAG dependent on pastoral and project funding

3 are low priority for CABAG.

1 use to be a moderate flow but no longer flows.

1 has no original flow information and no longer flows.

Shire of Carnavon have one bore that is a good flower but has not been considered further.

Hamelin Telegraph station have an artesian bore in good condition.

Overlander Roadhouse have a sub artesian bore.

Project Summary

Over 120 artesian bores have been constructed since the early 1900's on the Birdrong Sandstone aquifer that extends from Exmouth in the north to Shark Bay in the south. Of these some 40 artesian bores remain flowing at the surface of which this project aims to rehabilitate 38 of those identified as significant threats to the sustainability of the aquifer.

The project provides funding for services and works required to implement approved property-level artesian water management plans, including

- Decommissioning of existing bores;
- Rehabilitation of existing bores;
- Drilling and equipping of new bores; and
- Installation of new reticulation

Funding arrangements for this project are similar to those existing for the Great Artesian Basin in Queensland. Natural Heritage Trust provides 40% of the project funds through the Gascoyne Murchison Strategy (GMS). State funding provides 40% through the Water and Rivers Commission, with pastoralists contributing the remaining 20%.

The partnership approach between government and industry is further reinforced in the establishment of the Carnarvon Artesian Basin Advisory Group. This seven member Advisory Group contains four pastoralist members and three government representatives. The group interprets and decides if applications before it comply with the 'operating principles and guidelines for planning'.

Environmental Specifics

The project delivers substantial economic and environmental benefits to the region, including:

- Increased management of total grazing pressure through better distribution of domestic animals and greater control of non-domestic species
- More efficient, productive and sustainable use of natural resources through better distribution and control of artesian water supplies
- Increased access to controlled artesian water supplies for other land uses including horticulture, aquaculture and tourism
- Will establish and demonstrate best-practices for use and management of artesian water supplies for possible inclusion in sustainability accreditation schedules

There are no recorded artesian springs in the basin. Bore drains feed by artesian bores in the basin support several artificial wetlands. The WA Department of Conservation and Land Management (CALM) have identified one site worthy of preservation, the other sites are seen as environmental nuisance.

The one site, which has been registered by CALM, does not fall into the CAB program as the pastoralist restored the bore several years ago. Though as a point of interest the pastoralist is continuing to maintain the water level in this wetland, but the inflow of water can be modified to suit the seasons.

Progress to date 2001

- The completion of the geophysical logging and investigation of 38 bores
- Artesian water management plans for 17 pastoral stations
- Rehabilitation of 8 artesian bores on six stations with four additional bores decommissioned
- Eleven pastoral stations have now signed onto the program.

Next steps

- Continue to rehabilitate 8 artesian bores and decommission a total of 31 free flowing artesian bores
- Installation of reticulation to replace current open bore drains on 16 bores to be rehabilitated
- Continue to negotiate with seven pastoralists to join the program