



A RESEARCH PROSPECTUS FOR THE GREAT ARTESIAN BASIN

(as revised June 2009)

AN INTRODUCTION [see www.gabcc.org.au for full text]

Purpose

The Great Artesian Basin (GAB) is the world's largest fresh water artesian aquifer system and one of Australia's most important water resources. Landholders and governments have invested many millions of dollars in the GAB to rehabilitate bores, renew water delivery infrastructure and improve knowledge about the Basin and the benefits that it provides. With this investment comes the opportunity to improve GAB management and support the values attached to the GAB. However, our knowledge of the Basin is incomplete. Additional research is required on the structure, functions and values of the GAB, the infrastructure used to access GAB resources, higher value uses for GAB resources and GAB management and investment. The Great Artesian Basin Coordinating Committee, a national advisory group to government on management of the GAB, with representatives from all stakeholder groups, is well placed to work with research and funding organisations to encourage and facilitate priority research.

The aim of the *Research Prospectus* is to identify priority GAB research. It is hoped that this *Prospectus* will guide the preparation of new research proposals that provide an opportunity for researchers, industry and resource managers to collaborate in meeting the needs of the management of the Basin into the future.

In principle:

- research should focus on identified areas of strategic priority, and inform/influence practice and policy.
- research findings should be accessible to a wide audience, and
- cooperation should be maximised and duplication minimised.

In this context, research is defined as any form of inquiry seeking evidence to increase knowledge and includes activities that expand, clarify, reorganise and/or create knowledge. It includes not only traditional scientific research but also approaches like surveys, literature reviews, case studies, statistical analysis and focus groups.

What is the GAB?



The Great Artesian Basin (GAB) is one of the most important water resources in Australia covering over 1 711 000 square km. It underlies approximately one-fifth of Australia and extends beneath arid and semi-arid regions of Queensland, New South Wales, South Australia and the Northern Territory, stretching from the Great Dividing Range to the Lake Eyre depression. It is the only source of reliable water for human activity and water-dependent ecosystems over much of this area.

The GAB was form

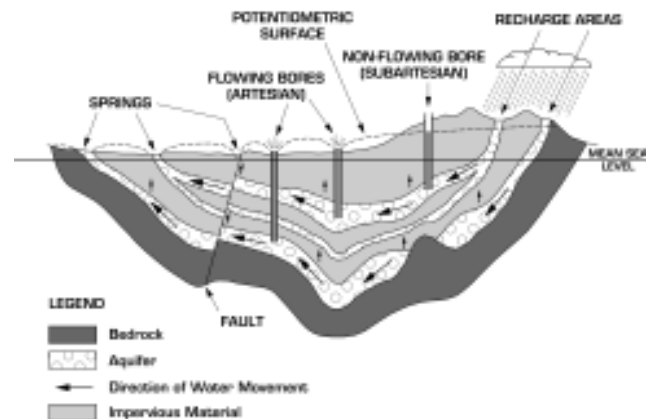
ed between 100 and 250 million years ago and consists of alternating layers of waterbearing (permeable) sandstone aquifers and non-waterbearing (impermeable) siltstones and mudstones up to 3000 metres thick. The overlying impermeable rocks confine the aquifers and the water becomes pressurised and can flow to the surface through bores or natural springs.

It is estimated that more than 65,000 million megalitres (ML) of water are stored in the GAB, at pressures of up to 1,300 kilopascals. The aquifers are recharged by infiltration of rainfall and leakage from streams into outcropping sandstone, mainly on the eastern margins of the Basin along the Great Dividing Range, and also along the western and south-western margins.

Groundwater flows under the influence of gravity and pressure from these recharge areas toward natural discharge springs in the west and southwest. This movement is slow, at about 0.1 to 5 metres per year, and in some parts the discharging water is up to 2 million years old.

Of the bores distributed across the Basin, approximately 5,000 are artesian in nature, with water rising naturally above ground under hydrostatic pressure. The discovery and exploitation of these water resources has been instrumental in development of the pastoral industry and in settlement of many areas overlying the Basin, as the only source of reliable water for stock, domestic, industrial and mining purposes. Individual bore depths vary up to 2,000 metres with the average being 500 metres.

Many bores initially flowed at rates of over 10 megalitres per day (ML/d), distributing water around the landscape to stock through bore drains. However, even in well-maintained drains, up to 95 per cent of this water can be wasted through evaporation and seepage. Since then, artesian pressure and water discharge rates have declined, while the number



of bores has increased. The majority of flows are now between 0.01 and 6 ML/d. Springs have become extinct and ecosystems have been lost. In addition, it has become difficult for new water users in or near the Basin to obtain access to groundwater resources.

Management of the GAB

Following almost a century of efforts by landholders and governments to improve the management of GAB resources, a Basin-wide Strategic Management Plan (SMP) was completed in 2000. Since that time, governments and landholders have worked cooperatively to invest in the best science and technology available to understand the resource and its values, rehabilitate bores, improve water delivery infrastructure and change practices to ensure that water is used judiciously. Substantial gains are now being made in eliminating waste and restoring pressure. Commitments have been made to complete the task.

Substantial changes have occurred in water policy, water management technology and the management of other natural resources. Land use in the Basin is changing, new industries continue to develop, and the relative value of water, energy and other resources is rapidly shifting. The impacts of climate change are also yet to be understood.

A present challenge is to develop a clear vision of how the GAB can best be used into the future. It is safe to assume that demand for the GAB water saved will increase its value, and that the GAB will continue to be a vital resource for industries and other developments that are planned and yet to be conceived. There will be a continuing need to maintain the health of the GAB and the water dependent ecosystems that it supports. A policy framework to manage the GAB into the 21st century must be underpinned by a thorough understanding of the physical resource, and the economic, social and environmental values it supports.

Who are the GABCC?

The primary role of the Great Artesian Basin Coordinating Committee (GABCC) is to provide advice from community organisations and agencies to State, Territory and Australian Government Ministers on efficient, effective and sustainable whole-of-Basin resource management and to coordinate activity between stakeholders. While the groundwater resource is the central issue, the Committee is expected to consider the usage aspects by industries, communities and the environment.

Specific responsibilities of the Committee include:

- reviewing the progress of programs
- reporting on the implementation of the Strategic Management Plan
- promotion/publicity and communication about whole-of-Basin values
- objective analysis of policy issues and provision of advice to Ministers
- coordination of policy/management across sectors where appropriate
- coordination of technical activity (e.g. standards) and research
- examination and preparation of recommendations to Ministers on cross-border issues.

The GABCC has the following responsibilities in regard to obtaining, collating and brokering knowledge:

- to develop and maintain a strategic scientific contact network and knowledge base for GABCC to support improved management of the Basin, which is accessible by researchers, managers and other stakeholders
- to develop and maintain a register of past, current and proposed research, technical development and related outputs in the Basin as an integral component of the knowledge base

- to identify and prioritise strategic management information needs in relation to the economic, social and environmental implications of implementation of the GAB Strategic Management Plan
- to actively influence and encourage research and technical development to address strategic knowledge gaps
- to act as a key broker of knowledge on the GAB and ensure relevant research outputs and other information are appropriately incorporated into the Committee's communication strategy
- to coordinate technical activity (e.g. standards) and research; and
- to make recommendations on ways to showcase research on the GAB, e.g. workshops and seminars.

Addressing the questions

The GABCC has identified important knowledge gaps in a range of research areas. The GABCC invites potential researchers/contractors to provide proposals to address the priority research questions outlined below. These questions have been grouped under five themes: 1. Understanding the resource; 2. GAB access infrastructure; 3. Monitoring and measurement; 4. Higher values uses; and 5. Valuing investment and allocation.

Further information

Partnerships

The Committee is not well placed to directly undertake research. However, the Committee is well placed to

- provide leadership and focus strategic research
- broker relationships within the research community and between industry, policy and research groups
- build a knowledge base, and
- communicate research to a wide audience.

Scholarships

The GABCC has established two PhD top-up scholarships, each valued at \$5,000 per annum over three years. These top-up scholarships are intended to supplement the funding of primary scholarship holders who intend to conduct innovative research that will address priority research questions and themes identified in the *Research Prospectus*.

How to get involved

For further information on the *Research Prospectus*, potential for partnering or the PhD top-up scholarships, or to indicate your interest, please contact the GABCC Secretariat or complete a registration of interest form – see www.gabcc.org.au for further information.