



**GREAT ARTESIAN BASIN
STRATEGIC MANAGEMENT PLAN:
PROGRESS AND
ACHIEVEMENTS TO 2008**



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Great Artesian Basin Strategic Management Plan: Progress and Achievements to 2008

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GREAT ARTESIAN BASIN STRATEGIC MANAGEMENT PLAN: PROGRESS AND ACHIEVEMENTS TO 2008

ABOUT THIS DOCUMENT

Preparation of this document is one of a number of recent initiatives undertaken by the Great Artesian Basin Coordinating Committee (GABCC) in response to an end-of-stage review of the Great Artesian Basin (GAB) Strategic Management Plan (SMP) which was undertaken in 2006.

The SMP was published in 2000. Since that time, significant changes have occurred in technical, social and political contexts affecting management of the Great Artesian Basin (GAB).

The review of the SMP indicated that the SMP needed to be brought up-to-date by incorporating contemporary issues and developments, and needed a tighter focus with fewer objectives, clearer strategies, and practical performance targets.

The SMP is sufficiently comprehensive to remain a useful guide to strategic management of the GAB resource at the whole-of-Basin scale. However, it does not contain sufficient detail or defined focus for implementation in the next phase; it does not include adequate mechanisms for assessing and reporting progress; and it does not identify responsibilities.

Rather than rewrite the SMP, the GABCC has developed two complementary documents:

Great Artesian Basin Strategic Management Plan: Progress and Achievements to 2008 - a retrospective analysis setting out changes in context which have taken place since 2000
Great Artesian Basin Strategic Management Plan: Focus & Prospects 2008-2015 - defining a sharper focus for implementation of the SMP during the period 2008-2015, and in particular those elements most affected by changes which have taken place since 2000.

Both documents are intended to aid communication with stakeholders and to help guide the next rounds of State and Territory water planning.

This document provides a summary of **Progress and Achievements to 2008**. Its retrospective nature provides important context for understanding the focus and prospects for the remaining term of the SMP.

The structure of this document is as follows:

Executive Summary

2 pages

Part A - Background

A brief overview of the Great Artesian Basin as a resource to the nation

Past approaches and the historical context in which the Strategic Management Plan was developed

3 pages

Part B – Achievements to 2008

Progress in Strategic Management Plan implementation

6 pages

Appendix: Changes in context 2000 to 2008

Significant changes which signal the need for altered or refocused approaches to implementation of the Strategic Management Plan in the future

10 pages

Note: Changes in context have been documented up to 2008, representing the half-way point in the term of the Strategic Management Plan.

EXECUTIVE SUMMARY

The Great Artesian Basin (GAB) is one of the most important water resources in Australia. It has been instrumental in development of many areas overlying the Basin, as the only source of reliable water for stock, domestic, industrial and mining purposes.

The total value of production supported by Basin water is about \$3.5 billion per annum.

The fundamental issue at the heart of the GAB Strategic Management Plan (SMP) was, and remains, the judicious use of bore water discharged from the Basin, to counter historic wastage and unsustainable practices which gave rise to degradation of economic, social, and environmental and heritage values.

The SMP, the GAB Sustainability Initiative (GABSI) and the establishment of the GAB Coordinating Committee (GABCC) and its antecedents, were all multi-partite responses to shared concern about addressing this issue.

Key Achievements in implementing GAB SMP objectives since 2000 are set out in **Part B**. In summary, these include:

Widespread attitude and practice change in GAB water management

Increased understanding of GAB values

Renewed and broadened community interest in the GAB in media coverage, conferences, field days, tourist and education information

Emphasis on GAB values at government level through GABSI and national water reforms and programs

Development of robust partnership approaches between jurisdictions

Shifts in accepted industry practice to rehabilitated bores and closed water delivery systems

Sharing and increased adoption of new technologies and knowledge for water use

Landholder, industry and government cooperation for GAB spring protection

Progress in bore rehabilitation and piping across the Basin to maximise public benefit

(To end June 2008) under GABSI and earlier programs, control of more than 1,080 bores, deletion of nearly 17,700km of bore drains, replacement with more than 30,000km of piped reticulation systems, resulting in estimated savings of 284GL of GAB water per annum.

Estimated government expenditure on infrastructure replacement under the GABSI program to date, in the order of \$125 million

Evidence of pressure recovery as a result of capping and piping

Examination (2003) of costs, benefits and risks from bore capping and piping and landholder contributions to GABSI

Review of GABSI phase 1 in 2003 and mid-term review of phase 2 in 2007 showing progress and growing support; and continued funding of phase 3 to 2014

Experimental work on new technologies for greater water savings and durability of bore rehabilitation works, and improved environmental and production outcomes

Improved training in design and maintenance of bores and piped systems

Plans to examine performance of works funded under GABSI and related programs, to guide best practice design, installation and maintenance of works under GABSI phase 3

State water planning across most of the Basin which engages the community in decisions to meet multiple objectives

Preparation of State plans for management of GAB water in SA, Queensland and NSW in the period 2004 to 2008

Identification of potentially conflicting objectives in water management such as trade-offs between recovery of pressure and allocation of water for new users

Effective engagement with emerging national water policy frameworks and coordinated approaches in State water planning

Cessation of the GAB Consultative Council in 2002 and establishment of the GABCC in 2004

Review of GAB groundwater management across State borders ('SKM report' 2004)

New legislative frameworks to manage and allocate water in South Australia, Queensland and New South Wales, consistent with the National Water Initiative (NWI)

Reconstituted State GAB advisory bodies

State water plans which address cross-border impacts, with agreement on thresholds requiring consultation

Strategic consideration of cross-jurisdictional issues for attention in the next generation of State water plans

Adoption of zonal boundaries which are consistent across the whole Basin

Progress on a consistent Basin-wide bore monitoring network

Joint convening of a Regional NRM Forum with Lake Eyre Basin and Murray-Darling Basin Community Advisory Committees (2006) to develop joint approaches for coordinated management

Continued over

EXECUTIVE SUMMARY (Continued)

Active management and conservation of environmental and cultural heritage values

Listing of the GAB springs ecological community as a matter of national environmental significance under Commonwealth legislation

Funding of major research projects to fill strategic knowledge gaps about GAB Springs

Significant attention to GAB springs in State policies, plans, education and investment

Conduct of Spring Researcher Forums to share knowledge and understanding and to set directions for continued enquiry

Establishment of a Friend of Mound Springs group to broaden engagement on GAB springs

Improved opportunities for input of Indigenous values and knowledge in management of GAB springs

Priority under GABSI phase 3 to be given to works that will assist in protecting GAB springs

Active enquiry into impacts of piped delivery to previously water-remote ecosystems

Water allocations which sustain current users, while identifying capacity for development and higher value uses

State water policies and plans which have met the needs of current users while making substantial savings and achieving environmental goals

Retention of sufficient water for new and emerging uses that will enhance the socioeconomic value of the Basin

Application of NWI guidelines to ensure that costs of management are met and that new allocations bring the best returns to the community

Documentation of a social profile of the GAB (2004) and review of the GAB SMP (2006)

Explicit socioeconomic objectives in State water plans from macro allocation policy level to local spring protection level

Improved knowledge of the resource, improved modelling and better informed estimates of water availability

A more robust basis for planning and allocation of water, and for assessing impacts of water allocation on Basin pressure and springs

Commencement of a project to update the GAB Resource Study

Identification of important knowledge gaps about the GAB, springs, water delivery infrastructure and water management

Investigation and research into areas such as recharge zones, water balances, diffuse discharge and inter-aquifer leakage

Establishment of new collaborative relationships to encourage integration of scientific, technical and local information improved resource management

Release of a partnership-focused Prospectus for GAB research & development investment

Establishment of two three-year PhD top-up scholarships to support research that improves knowledge of the GAB

Assembly of available field data on bore rehabilitation and infrastructure

Trialling of innovations in system design for water infrastructure

This pattern of progress has been achieved against a backdrop of **Changes In Context** affecting management of the GAB. These are set out in the **Appendix**, and include:

Coordination

Cessation of the GAB Consultative Council in 2002 and establishment of the GAB Coordinating Committee in 2004

Natural Resource Management arrangements and investment

Establishment in 2001 of new Ministerial reporting arrangements for natural resource management (NRM); and

Regional delivery of NRM funding and programs

Water reform and investment

Inter-governmental agreement on the National Water Initiative in 2004 (building on the 1994 COAG agreement)

Preparation of State water plans in SA, Queensland and NSW 2004-07

Review of GAB groundwater management issues across State borders ('the SKM report') in 2004

Australian Government listing under the EPBC Act of the GAB spring ecological community, release of a draft recovery plan, and concurrent increased emphasis on springs in State jurisdictions

Review of GAB Sustainability Initiative (GABSI) phase 1 in 2003; and continued funding (phase 2 to 2009 and phase 3 to 2014)

Prolonged drought and sharper focus on climate change impacts and adaptation

The natural resources boom and subsequent economic downturn; and

Heightened national focus on water reform

Landholder attitudinal change

Demonstrated change in attitudes of landholders in participating in GABSI and other positive land management opportunities as a result of investment in capping and piping

PART A – BACKGROUND

OVERVIEW OF THE GREAT ARTESIAN BASIN AS A RESOURCE TO THE NATION

The Great Artesian Basin (GAB) is one of the most important water resources in Australia. It underlies an area of 1.7 million square kilometres, approximately 22% of the continent and almost 70% of Queensland. It is the only source of reliable water for all human activity and water-dependent ecosystems in much of the arid and semi-arid landscape overlaying the Basin in Queensland, New South Wales, South Australia and the Northern Territory.

Formed between 100 and 250 million years ago, the Basin comprises alternating layers of water-bearing (permeable) sandstone aquifers and non-water-bearing (impermeable) siltstones and mudstones. The impermeable rocks confine the aquifers, causing the groundwater to become pressurised. In most areas the water is under sufficient pressure to provide a flowing source once it rises to the surface through artesian bores and natural springs.

It is estimated that more than 65 million gigalitres (GL) 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. The predominantly fresh water emerges at temperatures which average 30 to 50°C and may be as high as 100°C.

Of the bores distributed across the Basin, approximately 5,000 are artesian in nature. The discovery and exploitation of these water resources has been instrumental in the development of the pastoral industry and in the settlement of many areas overlying the Basin, as the only source of reliable water for stock, domestic, industrial and mining purposes. The total level of production supported by Basin water is estimated at \$3.5 billion per annum.

The concept of sustainability in the Basin is not the same as for surface water. Much of the discussion regarding sustainability is about maintaining the artesian nature of the Basin, rather than about maintaining supply of volumes of water.

This includes sustainable communities and industries, enabled by GAB water, as well as sustained environmental flows to springs.

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 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.

Developing a clear vision about how the GAB can best be used in the future is problematic. 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. It can also be assumed that the need to maintain the health of the GAB and the water dependent ecosystems that depend on it will not change.

Implementation of the GAB Strategic Management Plan during the period 2008-2015 seeks to ensure that bore rehabilitation works and water management reform continue.

It also seeks to utilise new water policy and industry policy to refocus the GAB as a vital resource with the capacity to support new developments which continue to add value for the community and for the nation as a whole.

HISTORICAL CONTEXT IN WHICH THE STRATEGIC MANAGEMENT PLAN WAS DEVELOPED

The Strategic Management Plan (SMP) for the Great Artesian Basin (GAB) set out to provide guidance and direction to relevant governments, water users and other stakeholders on policies, programs and actions to attain optimum economic, environmental and social benefit from access to and use of the resources of the Basin.

For more than a century the pastoral industry in the Basin relied on access to artesian water from the GAB and developed management practices which rely on delivering water to stock through open drains. However, the volume of water flowing from hundreds of uncontrolled bores into bore drains far exceeded that required by stock, and led to an unacceptable reduction in artesian pressure, as well as a number of land use and land management problems.

Issues caused by uncontrolled artesian bores were recognised more than ninety years ago and since that time successive attempts had been made to reduce waste and manage GAB water better.

Legislation for the management of the GAB was passed in Queensland in 1910 and in New South Wales in 1912. South Australian Pastoral Legislation around the turn of the 20th Century proclaimed travelling stock routes and made provision for surveyed water conservancy areas around bores for the watering of travelling stock and the convenience of travellers on pastoral leases in the GAB.

Concern for diminishing flows led to five interstate conferences on the Artesian Water of the GAB between 1912 and 1928. In October 1914 the Chairman of the Interstate Conference on Artesian Water, Mr E F Pittman, stated in his report to the Queensland Premier:

'insomuch as the artesian supply is a national asset, every member of the community has an interest in its conservation. We venture to urge, therefore, that no person should be allowed to put down a bore unless he be prepared to observe the precautions necessary to minimise waste or leakage.'

The 1939 Interstate Conference commissioned a report from the Artesian Waters Investigations Committee on the structure of the Basin and the issue of declining pressures. Although this report was completed in 1945, it was not until 1954 that each of the State jurisdictions agreed to address its recommendations. During the next three decades each of the State jurisdictions made some gains through licensing regulation and investments in bore rehabilitation.

In 1977 the South Australian Government began a bore rehabilitation and control program, and in the early 1980s both New South Wales and Queensland began substantial investments in capping and piping programs. An interstate technical working group was formed in 1987 to fill some of the knowledge gaps about the physiography of the GAB. This working group later took on an *ad hoc* policy advice role for governments with jurisdiction over parts of the Basin.

During the 1980's Basin-wide concern continued to grow amongst all interest groups including users and governments. However, even with the gains that had been made in the first three-quarters of the 20th century and improvements in the technology to control high pressure and temperature bores, it was evident that institutional arrangements in separate jurisdictions were unable to stem the unacceptable impacts being caused by the loss of artesian pressure and the waste of GAB water.

By the mid 1990's more than 3,000 bores continued to flow freely into more than 34,000km of bore drains, with an estimated discharge of 1,560 ML per day. As a result, approximately one-third of the original artesian bores had ceased to flow and more than 1,000 natural springs, along with their groundwater dependent ecosystems, had been lost. The State of the Basin was as much a result of inconsistent and unsustainable government policy as it was bad practices by GAB water users or inadequate infrastructure, and it was clearly time for a change.

The GAB Consultative Council was established in 1997 'to bring together the disparate and geographically diverse stakeholders in the Basin and to promote the sustainable use of its groundwater resources'. The Council provided advice to relevant state and federal government ministers, with its main role to 'seek consensus on Basin-wide strategic direction and policy for groundwater management and sustainable use'.

The SMP was developed under the auspices of the Council, commencing in 1997. Its development was informed by the Technical Working Group (TWG) and the Bureau of Rural Science (BRS), with substantial input from lead agencies in each State, the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) and Environment Australia, State advisory committees in Queensland and New South Wales, and the statutory Arid Areas Catchment Water Management Board in South Australia.

A draft SMP was launched in November 1998 by relevant Commonwealth and State/Territory Ministers. Public consultation was promoted widely and the comment period covered nearly six months duration. The SMP was agreed to and published in September 2000, about two and a half years after its development had commenced. It is notable for having taken a whole-of-Basin perspective on 'a natural resource of national importance' and for highlighting relationships between technological, social, environment, physical and financial issues. It also expanded the focus for policy and action beyond bore capping and piping to deriving maximum community benefit from the resources of the Basin, and placing community partnerships at the centre of management.

At about the same time as the release of the SMP, the Commonwealth Government initiated the Great Artesian Basin Sustainability Initiative (GABSI) which aims to preserve the pressure of the GAB through rehabilitating uncontrolled bores and replacing bore drains with polyethylene pipes, tanks and troughs for livestock water and domestic supplies. Arrangements for the delivery of GABSI were negotiated between the Commonwealth, State governments and landholders. The Commonwealth Government committed \$31.8 million over five years 1999-2004 for bore capping and piping programs, with matching investment from State governments, and with landholders required to make contributions.

Although programs in each State operated slightly differently, partnership agreements with the Commonwealth ensured a consistent aim of increasing bore pressures and saving water.

The establishment of the GAB Consultative Council, the SMP and the GABSI were all multi-partite responses to shared concern at the 'core problem of declining artesian pressure brought about by uncontrolled discharge and related degradation of dependent economic, social and environmental values'. Additional challenges included:

- lack of appreciation of GAB values by governments, community and water users
- waste of water and environmental degradation, including spread of woody weeds and feral animals, and detrimental grazing pressures
- inconsistency and lack of coordination in policy and management between jurisdictions
- uncertainty of user access to water and uncertainty about user responsibilities
- the need for multiple values to be addressed
- ageing and inadequate infrastructure with insufficient investment
- knowledge gaps related to GAB operation, and Indigenous, social, environmental and cultural heritage values.

These challenges, as part of the responsibility for implementing the SMP, were taken on by the GAB Coordinating Committee (GABCC) from its inception in 2004.

PART B – ACHIEVEMENTS TO 2008

SMP Objective 1: Change attitudes and behaviour to improve Basin management and stimulate investment

Gaining widespread attitude and practice change in GAB water management has been a significant achievement since publication of the SMP.

This has been pursued through **communication and education** activities which promote environmental, social and economic values. This in turn increases understanding and recognition of the need for improved Basin management, support for bore rehabilitation and closing of bore drains, and water user investment in management and infrastructure maintenance.

Renewed interest in the GAB resulted in media coverage, conferences, field days, tourist and education information

Marking an **attitudinal shift** at government level, the GAB is now accepted as a nationally-important water resource. From 2000, the SMP and related efforts triggered investment in capping and piping for three five-year phases of the GAB Sustainability Initiative (GABSI).

Additional investment in improving knowledge and management has been stimulated by **development of partnerships**. For example, in 2006 the Australian Government Water Fund enabled a project 'Allocating Water and Maintaining Springs in the Great Artesian Basin' through a partnership between the SA Arid Lands NRM Board, SA Department of the Environment & Heritage, SA Department of Water Land & Biodiversity Conservation, and the Northern Territory Government.

Attitudes and perceptions of pastoral water users in the GAB have shifted from focusing on bore drains for water delivery to widespread acceptance that **acceptable industry practice** requires closed water delivery systems. Water managers and users recognise the need to control and manage GAB water for sustained productivity and for conservation/ heritage protection objectives. Landholders increasingly recognise the positive outcomes of closed water systems for property management purposes. For example they report reduced labour costs, better stock management, and ability to manage total grazing pressure and to control weeds and feral animals. However, issues remain with regard to maintenance and repair of bores and associated water distribution infrastructure.

Further awareness and engagement was fostered among governments and landholders during processes for review of GABSI phase 1, and for mid-term review of phase 2 in 2007.

Activities have been undertaken to encourage awareness, sharing and adoption of **new technologies and knowledge**, building connections between landholders and technology developers. For example, GABCC engaged with the WaterSmart project to conduct workshops and develop information materials, and supported attendance by GAB landholder champions at a national conference to share their stories.

Broader **community awareness** about Basin values has been addressed through programs and interviews about the GAB on television and radio, tourist information and displays on the GAB developed in Longreach Qld, Moree NSW, and along the Birdsville and Oodnadatta Tracks; publication of information brochures, education packages, maps, technical reports and scientific journal articles; as well as scientific and technical conferences on the GAB and GAB Springs.

In 2004 a new Web site (www.gabcc.org.au) was established as a focal source of information. It includes archival resources from the previous GAB Consultative Council.

In 2007 a multimedia DVD entitled '*Water Down Under: The Great Artesian Basin Story*' was released. More than 2,000 copies have since been circulated across the region underlain by the Basin, as well as to other parts of Australia and to international enquirers. The DVD provides background on: the formation of the Basin; its significance to Indigenous people; the importance of its water to unique ecological communities; the history of its use; and its role in exploration, settlement, pastoral development and tourism.

Issues and management associated with **GAB springs** have gained a higher profile within the pastoral and mining industries, while a Friends of Mound Springs group has formed in South Australia to provide a focus for community involvement in monitoring, research and management of the springs.

SMP Objective 2: Manage, quantity, quality and pressure of Basin flows to maximise socioeconomic, environmental and cultural heritage values

Significant progress has been made in bore rehabilitation and piping across the Basin to maximise public benefit.

State water planning addressing most of the Basin has engaged the community in resource management decisions to meet multiple objectives.

A significant undertaking to meet this objective has been **control of artificial outflows** through renewal, rehabilitation and maintenance of bore casings and headworks, and plugging of unwanted bores, as well as **replacing open bore drains** with closed (piped) water distribution systems. Much of this effort has been undertaken jointly by state and federal governments and landholders under GABSI, and by industry. Anecdotal and local observations suggest some pressure recovery and increased flow to springs.

To the end of June 2008:

- 1,087 bores had been controlled (about 41% of these under GABSI)
- 17,660km of bore drains had been removed (about 82% under GABSI)
- 30,121km of piped reticulation systems had been installed (about 82% under GABSI); and
- an estimated total of 284, 416ML of GAB water was being saved per year (about 56% achieved under GABSI)

At that time, some 637 GABSI-eligible bores remained to be controlled, and 10,400km of bore drains were yet to be removed.

Estimated government expenditure on infrastructure replacement under the GABSI program to end June 2008 was in the order of \$125 million

Progress against GABSI targets would have been greater but for the impact of a variety of factors, including rising prices for petroleum products (including piping), shortages of drillers (partly due to the resources boom), and protracted drought conditions which inhibited the ability of landholders to make contributory payments.

Experimental work has been undertaken to ensure application of the most appropriate technology for bore infrastructure and piping systems. For example, some work has related to design and operation of bore casing, headworks, and cooling grids. Other work on appropriate piping for high temperature high pressure bores has resulted in the use of piping (up to a certain temperature) rather than the use of cooling grids in some areas.

Closure of bore drains has supported development of new cost-effective technologies which contribute to production and environmental outcomes, addressing pump efficiency, telemetry for remote monitoring and water control, and waterpoint management and distribution.

Progress has been made in developing and implementing a bore and piped water reticulation **maintenance training program** for bore owners and operators, such as the program in South Australia.

GABCC initiated an **infrastructure performance review** of works funded under GABSI and related government programs with a view to recommending best practices for design, installation and maintenance of works funded under GABSI phase 3.

State water plans have been completed for the respective parts of the Basin in South Australia, Queensland and New South Wales. These groundwater management plans involve a whole-of-resource approach and integrate consideration of Indigenous, cultural, land, water and vegetation values. They seek to identify and reconcile potentially conflicting objectives in water management such as trade-offs between recovery of pressure and allocation of water for new users.

State water plans have incorporated broad **public consultation** arrangements, in which Indigenous input has been a key component.

State and Territory jurisdictions have adopted **consistent zonal boundaries** across the whole Basin.

The Australian Government has funded establishment of a consistent Basin-wide **monitoring network**, which will expand the network beyond artesian areas and improve understanding of trends in pressure and water levels for input to State/Territory planning processes.

A series of **investigation and research** projects have been addressing such areas as: volumes and quality of water in GAB recharge zones; and impact on water balances of diffuse discharge and inter-aquifer leakage.

SMP Objective 3: Establish legislative and administrative frameworks for sustainable water management and use

Establishment of the GABCC and the reconstitution of State advisory bodies have enabled effective engagement with emerging national water policy frameworks and coordinated approaches in State water planning

Following a review of the governance and funding arrangements for the GAB Consultative Council, the Council ceased to operate in 2002, being replaced by the **GAB Coordinating Committee** in 2004. The Committee membership comprises representatives from State, Territory and Australian Government agencies, industry sectors, local government and community interests, with technical support.

During 2003, several **reports** were prepared to examine aspects of Basin management. These included an examination of 'Farm costs, benefits and risks from bore capping and piping in the GAB' and 'Landholder contributions to the GABSI'.

Also significant was a **review of GAB groundwater management** across jurisdictional boundaries, undertaken by SKM, which reported in 2004. The GABCC responded to this report, noting that most of the recommendations were being addressed through processes to develop State water plans, with GABCC continuing to coordinate on whole-of-Basin matters.

South Australia, Queensland and New South Wales have put in place the necessary **legislative frameworks** to manage and allocate water, and have developed **water plans** for their respective parts of the GAB. South Australia and Queensland plans have been adopted, with the plan for New South Wales still in process. The Northern Territory proposes to prepare a plan in the next few years.

In line with the whole-of-Basin approach of GABCC, these plans address cross-border impacts, with agreement on thresholds requiring consultation.

State and Territory jurisdictions have signed on to the **National Water Initiative (NWI)**, which aims to establish nationally consistent arrangements for security of access and entitlement to water. This also assists development of compatible systems for water allocation and pricing, including use of financial instruments to foster water use efficiency and create clear incentives for sustainable use of Basin groundwater resources.

During 2006, **State GAB advisory bodies** were reconstituted in South Australia, Queensland and New South Wales. These bodies are represented in the membership of the GABCC, facilitating interaction between Basin-wide and State level considerations.

Delivery arrangements for **GABSI** were evaluated in the review of phase 1 in 2003 and in the current mid-term review of phase 2. These reviews have taken into account the emerging context of higher costs and the shift to regional NRM delivery.

Reflecting these altered arrangements for **regional delivery of NRM** programs, in 2006 GABCC convened a Regional NRM Forum jointly with the Lake Eyre Basin and Murray-Darling Basin Community Advisory Committees. This was attended by representatives of most of the NRM regions which are underlain by the Basin, and included information sessions followed by workshops to develop **joint approaches** to coordinated management.

SMP Objective 4: Maintain and enhance environmental and cultural heritage values affected by use of Basin groundwater

Collaborative efforts between resource management groups have enabled active management and conservation of environmental and cultural heritage values, while ensuring that extraction, distribution and use of Basin water do not lead to unacceptable impacts.

One notable direction for this has been a comprehensive suite of measures, operating at several levels, for **expanded understanding** of the values and management requirements of GAB springs.

The GAB Consultative Council had convened five **Spring Researcher Forums** up to 2002, and another was convened by South Australia in 2006. These Forums enabled sharing of knowledge and identification of directions for continued enquiry.

At the national level, the Australian Government listed the community dependent on natural discharge of groundwater from the GAB as a **threatened ecological community**, establishing under legislation that the community is a matter of national environmental significance. The draft recovery plan was released for public comment early in 2008.

Priority for funding under **GABSI phase 3** will emphasise completion of works that improve flow to GAB springs.

Other **springs-related initiatives** were undertaken from State level, but on a whole-of-Basin basis.

South Australia appointed a full-time GAB Springs officer in 2004 and undertook a range of significant projects, including:

- development of a GAB Springs **bibliography** with more than 700 references from 1858 to present
- a central **database** for GAB springs data
- staging of a sixth Spring Researchers Forum in 2006

South Australia also undertook:

- high resolution **mapping** of more than 4,000 spring vents
- detailed **threat assessment** for SA GAB spring groups
- an integrated **weed and feral animal control** program at Dalhousie Springs, incorporating restoration activity; and monitoring of recovery, and management **partnership with traditional owners** in the Iwanyere community.

South Australia has accrued extensive monitoring information on pressure near some GAB springs, while BHP/WMC have about 20 years of monitoring data on spring flows.

Other projects with wider application included development of integrated management tools incorporating ecology, genetics and hydrology to enable micro- and macro-scale conservation management of springs.

State **water plans** have made specific provision for spring protection and rehabilitation, and a number of significant projects (some cross-border) were undertaken to focus on spring protection, drawing on a range of funding sources.

In Queensland an Artesian Springs Protection Scheme was introduced to provide increased subsidy under GASBI for landholders with both an uncontrolled bore and a high value spring.

In South Australia major spring complexes have been afforded protection in dedicated **conservation reserves**. Trials to investigate the most effective spring management practices are underway on pastoral and Aboriginal lands.

Regulations in SA protect springs from impact and disturbance that may result from pressure reduction or interference with groundwater dependent ecosystems.

Establishment of a **Friends of Mound Springs** group in 2006 has further broadened engagement with their conservation.

A number of initiatives have specifically addressed **spring monitoring and research**.

Queensland initiated a pilot spring monitoring project, as part of requirements under the GAB Water Resources Plan. Spring monitoring had not previously been undertaken in Queensland and this project is designed to test a methodology that may be implemented on a wider scale across the Basin in Queensland. An overview of the spring monitoring pilot is expected to be available in March 2009.

The States continued to share experiences, knowledge, technology and management techniques for springs. Projects related to this work have been co-funded by the National Water Commission, and include:

- 'Allocating water & maintaining springs in the Great Artesian Basin – South Australia and the Northern Territory'; and
- 'Identification of Source Aquifers to significant springs that are dependent on groundwater from the GAB' (subject to finalisation of funding).

The Australian Government-funded Basin-wide **monitoring network** will also conduct foundational work for spring monitoring.

The collective research into spring ecology and the hydrology of GAB Springs can usefully inform **next-generation plans** in the area of spring protection.

For example, the study 'Allocating water and maintaining springs in the Great Artesian Basin' could extend its focus on spring hydrogeology, and spring ecology to evaluate methods for monitoring spring flow and spring health.

That study is also concerned with spring classification, adaptive management, acceptable impacts and regeneration of springs. An 'End Users Group' will advise on the best management outcomes to pursue. Outcomes from this should inform planning processes that establish or modify allocation and management rules.

Queensland has taken initiatives to understand better impacts of GAB extraction and distribution on **water-remote ecosystems**, which has relevance to management of rangelands generally.

Similarly, South Australia has developed a framework for Waterpoint Management Plans to address native vegetation management where GAB water is spread into previously ungrazed areas. These require approval by the Pastoral Board. A project officer has been employed to work with pastoral lessees to develop the waterpoint plans.

State planning and consultative processes have sought to integrate **Indigenous values and knowledge** into groundwater management. GABCC and State GAB advisory bodies include Indigenous representatives. This is complemented by active liaison with the Lake Eyre Basin Community Advisory Committee and its six Indigenous members.

SMP Objective 5: Maintain and enhance socioeconomic values affected by use of Basin groundwater

The control of artesian bores and the development of associated regulatory frameworks have enabled water allocations to sustain current users while identifying capacity for development and higher value uses.

Each jurisdiction has met the needs of current users while making **substantial savings** to achieve environmental goals and retain sufficient water to identify judicious uses requiring **additional allocation** that will enhance socioeconomic values of the Basin.

In South Australia, Queensland and New South Wales applications have been received from mining, petroleum and agriculture, as well as new emerging industries to access GAB water.

The **NWI guidelines** are being applied to ensure that costs of management are met and that new allocations bring the best returns to the community.

Examples of **documents** setting out socioeconomic values include 'A Social profile of the GAB' prepared in 2004, and the review of the GAB Strategic Management Plan in 2006.

Socioeconomic objectives are explicit in State **water plans**, from the broadest level, such as providing options for economic development that utilises GAB water, to site specific levels such as managing selected artificial wetlands fed by GAB water with controlled flows for their social and amenity values, and active management of GAB springs for visitors and tourism development.

SMP Objective 6: Enhance the knowledge and technology base to improve resource management practices and support better decision making

Improved knowledge of the resource, improved modelling and better informed estimates of water availability have resulted in a more robust basis for planning and allocation of water, and for assessing impacts of water allocation on Basin pressure and springs.

The GABCC has undertaken a significant project to update the **GAB Resource Study**, which was originally prepared by the GAB Consultative Council in 1998.

The high level of interest in the GAB has generated investment in **investigations and research** that improve our knowledge and inform management of GAB water. Examples include studies of the eastern and western recharge zones, diffuse discharge/near surface leakage, and recharge rates

There is now greater understanding of **knowledge gaps**, such as inter-aquifer leakage, western recharge processes, leaking sub-artesian bores, interconnectivity between surface water and GAB springs, which suggest target areas for future investigations.

GABCC has released its **Research Prospectus** to identify priority GAB research and guide preparation of new research proposals. This will provide opportunities for researchers, industry and resource managers to collaborate in meeting the needs of the management of the Basin into the future.

GABCC has established two three-year PhD top-up scholarships to support innovative research that will make a contribution to the management of the GAB. This may be from a variety of disciplines including science and engineering, economics and social science.

Collaborative relationships have been fostered to encourage integration of scientific, technical and local information to make continual improvements in management practice desirable and feasible.

Relatively good field data on bore rehabilitation and infrastructure has been amassed.

Trials such as those for cooling grids have generated better technical information and a better understanding of system design for water infrastructure.

Other research has focused on utilising closed water delivery systems to deliver better environmental and production outcomes.

This had led to **innovation and new opportunities** for industry. Examples include in-line pumps, better tracking systems for solar pumps, improvements and reduced cost of telemetry systems, and hot water high pressure pipes. Much of this innovation has spread to other parts of the grazing industry outside the GAB area.

APPENDIX – CHANGES IN CONTEXT 2000-2008

SUMMARY

Significant changes in the context of GAB management since release of the Strategic Management Plan (and up to late 2008) have led to adjustments in approach or practice.

More detail on each of the changes is provided below. Continuing implications are explored further in the companion document: *GAB Strategic Management Plan Focus & Prospects 2008-2015*.

Context change	Implications for Focus & Prospects
<p><u>Natural Resource Management governance</u></p> <ul style="list-style-type: none"> ▪ Cessation of the GAB Consultative Council in 2002 and establishment of the GAB Coordinating Committee in 2004 ▪ Establishment in 2001 of new Ministerial reporting arrangements for natural resource management (NRM) ▪ Regional delivery of NRM funding and programs 	<p>Consideration/integration of a wider range of values, objectives and activities at the land/water interface Greater focus on, and more effective attention to, biodiversity and Indigenous cultural heritage values Broader range of outcomes being considered and broader range of stakeholders affected Expanded range of potential investors and partners</p>
<p><u>Water reform and investment</u></p> <ul style="list-style-type: none"> ▪ Prolonged drought and focus on climate change ▪ Heightened national focus on water reform, leading to inter-governmental agreement on the National Water Initiative and the subsequent National Groundwater Action Plan 	<p>More specific attention to National Water Initiative principles and consistency Market approaches to reallocation of water savings to new users/uses, addressed in State water plans Greater focus on infrastructure security and drought resilience Greater focus on protection of GAB springs through environmental flow Attention to improved water accounting, monitoring and measurement Risk-based approaches to groundwater planning Attention to information/knowledge gaps and research needs</p>
<ul style="list-style-type: none"> ▪ Review of GAB Sustainability Initiative (GABSI) phase 1 in 2003; continued funding (phase 2 to 2009 and phase 3 to 2014) 	<p>Specific attention to recovery of flow to GAB springs Integration of capping & piping with NRM activities e.g. through property management planning Attention to improved alignment and consistency, reducing barriers to participation</p>
<ul style="list-style-type: none"> ▪ Preparation of State water plans in SA, Queensland and NSW in the period 2004 to 2008 ▪ Review of GAB groundwater management issues across State borders ('SKM report') in 2004 and GABCC response to that review 	<p>Action to improve alignment and consistency of standards and approaches, to be strengthened in subsequent generations of State/Territory water plans</p>
<ul style="list-style-type: none"> ▪ Australian Government listing under the EPBC Act of the GAB springs ecological community, release of a draft recovery plan, and concurrent increased emphasis on springs in State jurisdictions 	<p>Greater focus on biodiversity values, now recognised nationally Greater connection with Indigenous valuing and knowledge of springs</p>
<p><u>Socio-economic factors</u></p> <ul style="list-style-type: none"> ▪ The natural resources boom and subsequent economic downturn ▪ Changed attitudes of landholders in participating in GABSI and other positive land management opportunities as a result of investment in capping and piping. 	<p>New policy responses from States/Territories for greater consistency and improved monitoring Enhanced engagement with sectoral representatives, addressing knowledge gaps Stronger relationship between GAB and broader NRM issues</p>

Natural Resource Management governance

Establishment of GAB Coordinating Committee

The GAB Consultative Council, which had developed and published the SMP, ceased operation in December 2002, when the emphasis shifted from the development of the SMP to its implementation, in cooperation with regional NRM bodies.

Following the cessation of the GAB Consultative Council in December 2002, the Natural Resource Management Ministerial Council (NRMMC) decided early in 2004 to establish the **Great Artesian Basin Coordinating Committee** (GABCC).

The primary role of GABCC is to provide advice from community organisations and agencies to the NRMMC on efficient, effective and sustainable whole-of-resource management of the GAB and to coordinate activity between stakeholders.

To assist the Committee to deliver on its primary role, the Committee:

- undertakes objective analysis of policy issues and provides advice to the Ministerial Council
- coordinates policy across sectors where appropriate
- prepares and submits recommendations to the Ministerial Council on GAB & cross-border issues
- reviews and reports on the progress of relevant programs
- reviews and reports on the implementation of the Strategic Management Plan
- liaises with other bodies on relevant Strategic Management Plan issues
- provides promotion/publicity and communication about whole-of-Basin values; and
- facilitates, coordinates, assesses and monitors technical activity (e.g. standards and research).

New programs for natural resource management

A number of national programs have provided resources for organisations and agencies engaged in projects related to improved management of GAB resources

In 2000, the Council of Australian Governments (COAG) agreed to endorse a **National Action Plan for Salinity and Water Quality** (NAP), underpinned by an Intergovernmental Agreement and bilateral agreements between the Commonwealth and each State/Territory government. COAG agreed that the NAP would build on the achievements of the Natural Heritage Trust (NHT), along with other state-based NRM

initiatives, encouraging regional communities to use coordinated and targeted action to address the issues of salinity and water quality through landscape scale change.

In 2008 the Australian Government instituted the **Caring for our Country** program to integrate delivery of the Commonwealth's previous natural resource management programs, the NHT, NAP, National Landcare Program, Environmental Stewardship Program and the Working on Country Indigenous land and environmental program.

New Ministerial structures for natural resource management

The **Natural Resource Management Ministerial Council** (NRMMC) and the **Primary Industries Ministerial Council** (PIMC) were established in 2001 by agreement of the Australian, State and Territory Governments.

These Councils subsumed all or part of the work of the Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ), the Australia New Zealand Environment and Conservation Council (ANZECC) and the Ministerial Council on Forestry, Fisheries and Aquaculture (MCFFA).

The NRMMC was established to develop a coordinated approach to issues affecting NRM in Australia and to oversee the joint implementation of the NHT and NAP programs (and subsequently the Caring for Our Country program) by State, Territory and Australian Governments.

In 2008 the COAG established the Climate Change and Water Working Group which reports directly to COAG on urgent issues.

However, the GABCC continues to report to the NRMMC, via the **Natural Resources Policies and Programs Committee** (NRPPC) and **Natural Resource Management Standing Committee** (NRMSC).

Regional delivery of NRM funding and programs

In 2002 the NRMMC agreed to a fundamental change in the delivery mechanism for the NAP and NHT, based on regional needs. Fifty-six regions were identified covering all of Australia, with each to develop a single accredited NRM plan and a single investment strategy to consider all environmental, social and economic impacts of natural resource management decisions on a regional basis.

The plans are to be developed by local communities and supported by government and the best available science to improve the management of natural resources on a regional scale. These are to be complemented by monitoring and evaluation processes, communications strategies, capacity building strategies and the development of market-based instruments and environment management systems.

Recognising that the GAB underlies all or parts of nineteen NRM regions, the Operating Arrangements for the GABCC require the Committee to encourage and assist NRM regional bodies to address GAB values and issues.

The NRMMC published a number of framework documents which were aimed at NRM regions, but which are relevant to the work of GABCC. These include the 'National Framework for Natural Resource Management Standards and Targets', and the 'National Natural Resource Management Monitoring and Evaluation Framework' (both dated October 2002).

From 2008 the Caring for our Country program maintained the focus on delivery in partnership with regional NRM groups, local, state and territory governments, Indigenous groups, industry bodies, land managers, landcare groups and other community groups, and non-government organisations. However, it is based on separate, complementary funding arrangements rather than joint State and Commonwealth funding.

Water reform and investment

Prolonged drought and focus on climate change

Much of Australia experienced severe drought throughout the first years of the 21st century, leading to claims of 'the worst drought in 1,000 years'. The Bureau of Meteorology ascribed severity of this period to the combination of short term drought associated with the El Niño-Southern Oscillation phenomenon, and longer-term decreasing rainfall. The continent appears to be reverting to the drier conditions of the past, exacerbated by uncertainty arising from global climate change.

Specifically for the GAB, the drying trend will heighten dependency on groundwater resources across all uses.

For the nation as a whole, it is likely to require fundamental changes in the way water is used. This implies a need for significant strategic rethinking of water storage, desalination, recycling and better water usage, over and above previous initiatives.

Heightened national focus on water reform

The August 2003 meeting of COAG agreed to consolidate and refresh the 1994 COAG water reform agenda to increase the productivity and efficiency of water use, to sustain rural and urban communities, and to ensure the health of river and groundwater systems.

The resulting **National Water Initiative (NWI)**, was formally agreed by the COAG in June 2004, and set the water policy agenda for the ensuing ten years and beyond, to:

- improve the security of water access entitlements, including clear assignment of risks of reductions in future water availability and returning over-allocated systems to sustainable allocation levels, in consultation with affected stakeholders
- ensure ecosystem health by implementing regimes to protect environmental assets at whole-of-basin, aquifer or catchment scale
- ensure more transparent and comprehensive water planning to deal with key issues such as major interception of water, interaction between surface and groundwater systems, and provision of water for specific environmental outcomes
- ensure that water is put to best use by encouraging the expansion of water markets and trading across and between districts and States (where water systems are physically shared), involving clear rules for trading, robust water accounting arrangements, and pricing based on full cost recovery principles; and
- enable better and more efficient management of water in urban environments, including better use of stormwater and recycled water.

The **National Water Commission (NWC)** was established as an independent statutory body to drive national water reform under the NWI.

In 2006, with urgency heightened by continuing drought, the Australian, State and Territory governments engaged in a series of initiatives to address water shortages in rural and regional areas, and shortages being increasingly felt in urban areas.

The then Australian Government released an updated water policy paper, 'Securing Australia's Water Future', and established a new Office of Water Resources (OWR), under the Department of Prime Minister & Cabinet, signalling a heightened national focus on water reform. A national water summit was followed by announcements on water trading.

In January 2007, the Australian Government announced a **National Plan for Water Security (NPWS)**. This committed \$10 billion to improve water efficiency and address over-allocation of water in rural Australia.

The NPWS committed an amount of \$85 million for a third phase of **GABSI**. This acknowledged that at the end of GABSI phase 2 an estimated 60% of all bores would be capped and 75% of bore drains replaced.

Following the Federal election and change of government in November 2007, funding for the third phase of GABSI was included in the **Water for the Future** program, to be delivered through a ten-year, \$12 billion investment in strategic programs, improved water management arrangements, and a renewed commitment to deliver a range of water policy reforms in both rural and urban areas.

In its 2007 Biennial Assessment of Progress against the NWI, the NWC expressed concern about the management of groundwater throughout Australia and identified areas requiring urgent additional work, including:

- over-allocation of certain groundwater resources
- failure to manage groundwater and surface water as a connected resource
- lack of established measurement standards; and
- inadequate monitoring.

This resulted in the Australian Government establishing the **National Groundwater Action Plan**, with three major components:

- the National Groundwater Assessment Initiative - funding hydrogeological investigations to help overcome critical groundwater knowledge gaps
- the National Centre for Groundwater Research and Training - building knowledge and addressing a shortage of groundwater scientists and managers; and
- a Knowledge and Capacity Building component - delivering principles, guidelines and good practice examples for managers, users and water planners to improve understanding and sustainable management of groundwater resources.

The National Water Commission established a **Groundwater Technical Advisory Committee** (GTAC) to advise on groundwater direction setting and investment strategies to ensure that the groundwater program delivers outputs that are consistent with the NWI.

In 2008 the GABCC formally invited NWC to provide an observer to participate in all meetings.

Capping and Piping programs – GABSI

In the first phase of the GAB Sustainability Initiative the Commonwealth Government had allocated \$31.8 million over 5 years for bore rehabilitation and bore drain replacement, commencing in 1999-2000.

GABSI and associated State government programs were reviewed in October 2003 by Hassall and Associates, and a further \$42.7 million of Australian Government funding was committed over the five years 2004-2009 to continue this work.

A mid-term review of GABSI phase 2 was undertaken during 2007.

During the period 2004 to 2008 GABCC repeatedly discussed the rate of progress in implementing GABSI.

The Chair advised Ministers on several occasions that progress had slowed due to rising costs of materials (partly related to fuel costs), shortages of drillers (related partly to the minerals boom in Australia and industrial growth in China and elsewhere), and the impact of protracted drought on the ability of landholders to meet their financial contributions.

These constraints have implications for developing realistic goals and end points for capping and piping programs and in particular the third phase of GABSI (details above).

State and Territory water planning

Under the NWI, jurisdictions committed themselves to preparing statutory water plans for surface and groundwater systems, using comprehensive and transparent processes, using best available science, socio-economic input and community input, and dealing with key issues such as major interception of water and groundwater/surface water interconnectivity.

State water plans for the GAB have been completed in Queensland, South Australia and New South Wales. The plans provide secure access rights and clear understandings of rights and responsibilities.

Associated with these plans, State jurisdictions appointed new or reconstituted statutory bodies and/or advisory bodies. Key members of these bodies are community representatives on the GABCC.

The State plans have some differences in approach to GAB water management based on State legislation and/or local conditions. However, all jurisdictions uphold the following principles:

- protection of existing entitlements
- protection of flow to groundwater-dependent ecosystems
- management of potentiometric pressure to ensure the integrity of the GAB
- sustaining and enhancing community benefits supported by use of GAB water
- improvement in knowledge about the GAB and the implications of management practices
- retaining a whole-of-Basin perspective by requiring consultation where the cross-border impact of decision-making may exceed agreed thresholds
- education about the GAB and support for improved management practices
- requirement for volumetric licences for all water extraction other than for stock and domestic purposes

GABCC is analysing areas for improved cross-jurisdictional consistency, to have greater consistency embodied in the next generation of State/Territory water plans.

Review of cross-jurisdictional GAB groundwater issues (SKM report)

In 2004 Sinclair Knight Merz were commissioned to examine GAB groundwater management issues across State borders.

The project was to:

- identify differences in management approaches for groundwater between the States
- establish if the differences create significant issues for management; and
- recommend options to mitigate significant impacts on management.

The final draft of the report was delivered in September 2004. The report made thirteen recommendations based on its findings that:

- The majority of the same management tools were available to each of the States.
- There were often differences in how the States applied the management tools.
- The differences in application of the tools had led to a perception of management issues between the States, although actual examples of how these differences contributed to a cross border management issue were not able to be identified.
- The most significant difference between each of the States was the way in which the objectives of the SMP have been interpreted. This contributed to the observed differences in the way management instruments had been developed and used.
- The most substantial risk identified was that continued differences in the objectives of groundwater management within the GAB will result in perceived impacts becoming real impacts in the intermediate to long term.
- The opportunity existed for the current differences to be worked through and a consistent approach to groundwater management to be developed, whilst maintaining the independence of each State in use of its management instruments.
- To prevent differences in management approach between the States becoming long term management issues, greater definition of the strategic groundwater resource management goals for the GAB was required.

The GABCC considered the SKM report through several meetings in 2004-05 and forwarded its response to the NRPPC in November 2005. The response noted that:

- New South Wales, South Australia and Queensland were by then in the process of developing water allocation plans for the GAB.
- The then current drafts of these jurisdictional plans dealt with issues raised in the SKM Report in ways that the jurisdictions believed were consistent with the GABCC's comments on the report's recommendations.
- Consultation and communication between jurisdictions in the context of developing these plans was aimed at consistent management across the Basin.
- The GABCC would review the final jurisdictional plans to ensure that they remain consistent with the GABCC's comments on the report's recommendations.
- The GABCC would continue to coordinate communication between jurisdictions.

GABCC is analysing areas for improved cross-jurisdictional consistency, to be addressed in the next generation of State water plans.

The Natural Resources Policies and Programs Committee has requested GABCC to provide it with continuing advice about any financial implications of ensuring increased consistency across jurisdictional boundaries.

EPBC listing of GAB springs community

The Australian Government listed the community dependent on natural discharge of groundwater from the GAB as a threatened ecological community. The listing decision was based on the following findings:

Criterion 1 – Decline in geographic distribution brought about by excessive extraction of artesian groundwater from the GAB, leading to both the extinction of springs and a reduction in water flow of many of the remaining springs. Despite implementation of GABSI, on-going extraction of artesian water is likely to play a continued role in the decline of these springs. (*Vulnerable* under this criterion).

Criterion 2 – Small geographic distribution coupled with demonstrable threat noting that springs of the GAB are very restricted in patch sizes, ranging from a few cm to approximately 100m in diameter and that individual springs may be isolated by tens of kilometres from the next nearest spring. Existing and proposed threats include draw down of the waters of the GAB, grazing and trampling by livestock and feral animals, dam creation, and introduction of exotic pasture species. Although the impact of these threatening processes within a particular timeframe is unknown, it is likely that their continuation and intensification may cause the extinction of many more springs in the near future. (*Endangered* under this criterion).

As a result of its listing under the *Environment Protection and Biodiversity Conservation Act 1999*, the GAB springs community is a matter of national environmental significance. This means that any action with a significant impact on that community will require the approval of the Commonwealth Environment Minister.

The GABCC provided comments on the draft recovery plan and the final draft plan (2006-2010).

The plan was formally released for public comment and is not yet finalised.

Socio-economic factors

Natural resources boom and subsequent economic downturn

Against the background of protracted and severe drought, the Australian economy was buoyed by a resources boom. The boom was driven by strong and consistently rising demand for natural resources such as coal, oil, gas and metals, from emerging capital markets including China and India. World coal and iron ore prices rose markedly, largely influenced by increasing steel production and expanding industries in developing countries.

At the same time, international conflicts heightened the boom by threatening supplies of natural resources.

In the face of the boom, significant industrial growth, particularly in Western Australia and Queensland, resulted in development of new mines and associated towns. This promised to bring new wealth to areas which have suffered during the drought.

Supply of water is crucial for such developments, and the resources boom was bound to place increased pressure on groundwater resources, including those of the GAB.

The boom also resulted in shortages of drilling equipment and skilled drilling operators, which contributed to slowing of capping and piping programs.

The global economic downturn which commenced in the second half of 2008 has meant the outlook for the resources sector is uncertain, with commodity prices falling throughout late 2008 and into 2009.

Nonetheless exploration and development is likely to continue at some rate, particularly for the Coal Seam Gas (CSG) and Underground Coal Gasification (UCG) industries.

Landholder Attitudinal Change

For almost a century the GAB has been the only reliable source of water to support pastoral enterprises and domestic needs for many landholders. In that time delivering water to stock through open bore drains became engrained in the way landholders managed their country and their business. As water infrastructure technologies improved and evidence of falling artesian pressures mounted, governments began to offer incentives to cap and pipe bores.

Not surprisingly, these initiatives met firm resistance from some landholders. Many were reluctant to change long held practices, did not believe closed water delivery systems would benefit their operations, and did not believe there was sufficient justification to change. These attitudes were clearly enunciated in early consultations during the development of the SMP and the initial round of GABSI.

Attitudes to bore rehabilitation and closing bore drains changed, slowly at first, but more rapidly as increasing numbers of landholders experienced the benefits of capping and piping for their businesses, lifestyles and the sustainability of the GAB, and became advocates for change. Following the success of GABSI on their properties, many also made substantial investment of their own resources in water delivery infrastructure to augment subsidised capping and piping schemes.

Field days and workshops became popular across the Basin, focusing on new technologies to deal with hot pressurised water, improve water storage and delivery, utilise watering points to manage stock and control feral animals, and use telemetry to monitor and control watering points. In a series of workshops operated by the Desert Knowledge CRC Watersmart Pastoral Production project pastoralists unanimously supported the benefits of closed stock water delivery systems, the benefits of the GABSI schemes and the need to continue to improve the technologies available to improve the judicious use of GAB water.

Now there is a growing appreciation of the economic, social, cultural, and environmental benefits of utilising the GAB judiciously. Most landholders agree that GABSI is one of the best initiatives that governments have ever funded. They are pleased to champion bore rehabilitation and tell others about the returns that accrue from investing in well planned and well maintained closed water delivery systems.

EFFECT ON THE SMP OF CHANGES IN CONTEXT AND OTHER REVIEWS AND EVENTS

The Vision, Key Issues, Objectives, Strategies and Desired Outcomes in the SMP remain largely relevant, although altered in degree and impact by these changes in context and other developments and events.

Continuing implications for altered or refocused approaches to implementation are explored further in the companion document: *GAB Strategic Management Plan Focus & Prospects 2008-2015*.

These changes led to substantial amendment to administrative responsibilities for management of GAB resources, summarised in the diagram below:

