



AUSTRALIAN
WATER
ASSOCIATION

Australian Water Association

**STATUS OF WATER IN SOUTH
EAST QUEENSLAND
for
THE COURIER MAIL**

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Level 2, 44 Hampden Road
PO Box 388, Artarmon NSW 1570
Tel: (02) 9413 1288 **Fax:** (02) 9413 1047
Email: info@awa.asn.au **Web:** www.awa.asn.au
ABN 78 096 035 773

Executive Summary

The report has been prepared by AWA as the basis for a series of articles that will feature in the Courier Mail on water in South East Queensland (SEQ). The focus of the report is urban water supply and use for the local government areas included in the South East Queensland Regional Plan. There are 18 Local Governments in South East Queensland

The estimated residential population of SEQ for 2004 is 2 667 000. Current medium projections for the region are 3 709 000 by 2026, an increase of around 1.04 million people, or almost 50 000 each year on average.

Bulk Water Suppliers

South East Queensland Water Corporation owns and operates the three major water storages in South East Queensland, Wivenhoe, Somerset and North Pine Dams. Water is supplied from these three storages to as far west as Withcott, north to Caboolture and to the northern end of the Gold Coast. Water is also supplied from Wivenhoe Dam to Tarong Power Station, Swanbank Power Station (at times) and various communities near the storages themselves.

On the Sunshine Coast Aquagen's water supply source originates from Lake Baroon located between Montville and Maleny. Lake Baroon, with a capacity of 61 000 ML, supplies the Lander's Shute Water Treatment Plant near Palmwoods. Aquagen supplies all of the treated water requirements of Caloundra City Council (with the exception of Maleny which has its own treatment plant) and approximately 65% of the requirements of Maroochy Shire Council.

SunWater is a Queensland government owned corporation (GOC) providing bulk water supply services to 6 000 customers and water consultancy services to a range of industry clients. The SEQ water supply schemes managed by Sunwater are;

- Borumba Dam – Providing water to Noosa, Cooloola Shire (Gympie), Maryborough and rural users
- Maroon Dam – Providing water to Beaudesert, some industrial users and rural users
- Moogerah Dam – Providing water to Boonah and Swanbank Power Station

Water Sources

There are 22 dams, 12 weirs and 3 groundwater resources in South East Queensland. These sources can be broken up into seven different service areas as follow:

- Brisbane and Surrounds: - Brisbane, Gatton, Laidley, Esk, Ipswich, Brisbane, Logan, Gold Coast, Redcliffe, Pine Rivers, Caboolture Kilcoy & Nanango (not in SEQ).
- Boonah.
- Beaudesert.
- Toowoomba and Surrounds: - Crows Nest (not in SEQ), Rosalie(not in SEQ), Jondaryan(not in SEQ).
- Redland.
- Caloundra & Maroochy.
- Noosa and Surrounds:- Cooloola (not in SEQ), Maryborough (not in SEQ).

Infrastructure

To deliver the water to the existing 1 035 700 properties in SEQ the following infrastructure is in place;

- Water Treatment Plants - 37
- Booster Pumps - 321
- Elevated Tanks and Reservoirs – 368
- Length of reticulation and mains – 18 700km



Water Usage

Water supplied in SEQ in a one year period is approximately 480 000 ML. This is generally comprised of:

- Average Residential Demand – 300 L/p/d
- Average Unaccounted-for water – 50 L/p/d
- Average Industrial demand – 110 L/p/d

Based on the implementation of measures to use ‘water efficiently, and managing consumer behaviour and demand for water’, coupled with reduced water losses as a result of new improved reticulation and loss prevention measures, the SEQ Regional Water Supply Strategy has projected demands for new developments as:

- Average Residential Demand – 270 L/p/d by 2010
- Average Unaccounted-for water – 27 L/p/d
- Average Industrial demand – unable to project because industrial development is difficult to predict.

Comparison of Supply and Demands

A comparison of the supply and demand for each of the catchments is included in the table below.

Comparison of Supply and Demand

| System | Comments ⁽¹⁾ | 2003/04 Population ⁽³⁾ | Year Safe Yields Exceeded |
|--|--|-----------------------------------|------------------------------|
| Brisbane, Gatton, Laidley, Esk, Ipswich, Brisbane, Logan, Gold Coast, Redcliffe, Pine Rivers, Caboolture Kilcoy & Nanango ⁽²⁾ | Existing allocation to SEQ water will be exhausted in about 2010. Total yield of the system would be reached by about 2025, assuming that full distribution of resources can be achieved. | 2 110 406 | 2025 ⁽⁴⁾ |
| Boona | Assuming that the operating regime can address the drought issues recently experienced, there is sufficient water for urban use. A process is being developed “Moreton Water Resource Planning Process” to address the reliability issue. | 8 567 | Not defined |
| Beaudesert | Assuming that the proposed revisions to the Interim Resource Operations Licence for the Logan River are effective, there is expected to be sufficient water in the Logan system to accommodate Beaudesert’s needs until at least 2015. | 59 393 | 2015 |
| Toowoomba, Crows Nest ⁽²⁾ , Rosalie ⁽²⁾ , Jondaryan ⁽²⁾ | Based on yields determined pre December 2004, existing supplies would be approaching safe yield by 2010. However based on a yet to be published review of yield by DNR&M (which indicates a 28% reduction in yield) safe yields were exceeded in 1998. | 128 547 | 1998 |
| Redland | Assuming that the North Stradbroke Island supply system can be at least partially extended, Redland should have sufficient water for until well past 2025. | 127 777 | Not defined – well past 2025 |



| System | Comments ⁽¹⁾ | 2003/04 Population ⁽³⁾ | Year Safe Yields Exceeded |
|---|--|-----------------------------------|--|
| Caloundra & Maroochy | Existing supply from Baroon Pocket Dam and the South Maroochy system are expected to be exhausted by about 2017, after which additional supplies will be needed. Re-commissioning of Ewen Maddock Dam for water supply purposes may extend this slightly to about 2021. Based on existing agreements, Caloundra and Maroochy do not necessarily reach their available capacity at the same time. | 227 537 | 2017 |
| Noosa, Cooloola ⁽²⁾ , Maryborough ⁽²⁾ | Reliability of supply became an issue in an earlier drought, and a Drought Management Plan was implemented to secure urban supplies. SunWater is currently preparing a proposed revision to the Interim Resource Operations Licence to alter the operating rules and improve reliability. | 108 825 | Not Defined - Past 2020 ⁽⁵⁾ |

- Note:
- (1) Source: DNRM&BCC, 2004 – p48
 - (2) Shires not in SEQ
 - (3) Total population, including properties without reticulated water supply
 - (4) Assumes future allocations will be for urban use
 - (5) Community perception is that they are out of water now

It is important to note that system yields are based on hydrologic models of the river systems. As computer technology advances and longer periods of stream flow data become available, the models used to predict future yields of storages also improve. Knowledge of the various factors involved in the hydrology of catchments is also increasing. This evolution of hydrologic models accounts for the changes of storage yield estimates published over time.

Supply Quality

The quality of treated water in SEQ usually meets or exceeds world health standards and is well regulated and reported. These water quality systems are well established and managed.

Bridging the Supply and Demand Gap

To bridge the supply and demand gap there are four alternatives, find new resources, reduce water demands, stormwater harvesting or recycle water.

Demand Management

WaterWise is a long-term strategic campaign designed to increase public awareness about water issues and to encourage more efficient use of water without diminishing quality of life. The campaign encourages society to treat water as a valuable resource. The primary focus of WaterWise is to educate the community so that they are able to gain an understanding of the economic and ecological benefits of reducing water consumption. This campaign, in combination with several other initiatives, has reduced water demands by up to 18% in some Local Government areas in SEQ.

- User-Pays pricing and universal water metering,
- Encouragement of the installation of water efficient devices using Rebates
- Routine restrictions on Garden Watering
- Incentives regarding plumbing checks
- Educational campaigns

Some other initiatives that may be implemented to reduce demands are;

- Integrated Water Cycle management
- Rainwater Tanks
- Irrigation of recycled water

Water Losses

It is estimated that 'unaccounted-for' water represents an average of 11% of the total water consumption in SEQ. This loss of water occurs for many reasons including leaking pipes, lost or stolen water, burst mains and fire fighting. Many Local governments in SEQ are investigating ways of addressing this issue, for example Gold Coast Water has recently commenced a large scale pressure reduction trial to reduce system leakages and are hoping to reduce losses by up to 10 000 ML/yr in the long term.

Evaporation contributes to significant water loss from surface water storages. The evaporation losses from Wivenhoe, Somerset and North Pine Dams is approximately 300 000 ML/yr. At this stage evaporation reduction methods for storages of this size are still impractical.

Recycling

The amount of water available for recycling is considerable, with the advantage being that there is a guaranteed supply which is not dependant on the weather. Approximately 40-50% of the total water supply needs could be provided by recycled water, but because of the difficult issues involved, few authorities have progressed beyond the planning phase in this respect.

Assuming 50% of the existing consumption of about 480 000ML goes to sewer and is recyclable, 240 000 ML of water should be available now for recycling. Only 6% of this is recycled at this stage, most of this being for purposes that do not supplement the existing water supply (Water recycling is at its most effective when it genuinely substitutes for the treated water supply). The amount available will increase to nearly 315 000 ML in 2026 (that is 50% of the predicted 2026 usage of 630 000 ML). By comparison this is about 82% of the predicted annual yield of Wivenhoe and Somerset Dams and it is a secure supply that is largely independent of variable rainfall.

Some forms (and mechanisms) of water recycling include:

- Indirect Recycling via a river or water storage
- Aquifer Storage and Recovery of recycled water or stormwater
- Industrial recycling
- Dual reticulation supply of recycled water
- Direct recycling
- Grey and Blackwater Recycling

Stormwater Harvesting

Given the rainfall characteristics of SEQ and the sensitive nature of our receiving waters, stormwater harvesting (to catch stormwater runoff, store it and reuse it) has both water supply and water quality benefits. Preliminary estimates based on projects in Adelaide indicate useful water yields are achievable.

New Water Sources

There are three potential water sources that are available in SEQ: additional surface water storages, desalination and groundwater.

About half of the possible dam sites in South East Queensland have already been developed. The remaining sites will be more remote, possibly less productive, more costly and more likely to have impacts on existing land use and the environment. More importantly, the amount of water available is small by comparison to the existing Wivenhoe/Somerset system on the Brisbane River.

Desalination is one of a suite of proven alternatives that could provide a reliable source of potable water without being reliant on rainfall. In spite of major advances in operating efficiency, major issues involving high energy consumption and disposal of the waste brine solution still exist.

There is some groundwater available on North Stradbroke and Moreton Island. Due to environmental concerns with utilisation of these resources, it will take much more detailed study and community discussion before these resources could be considered as practical options.

Current Initiatives

The Queensland Government has introduced a number of initiatives to help meet SEQ future water needs these include;

- Updating the Water Act 2000
- Setting up the Queensland Water Efficiency Taskforce
- Investigating alternative supply options
- Dam cover trials to reduce evaporation losses
- Drought management plans
- Resource Operation Plans

Most local governments are actively investigating ways of meeting future water demands. Some of the more notable initiatives are;

Ipswich Recycling Strategy is a strategy designed to reduce the industrial demands on the existing water sources by using recycled water as an alternative water source for industry.

Brisbane Water for Today and Tomorrow: - Brisbane currently produces a total of 13 ML/d of reuse water, with customers including businesses, golf courses and treatment plant use. BCC customers are increasingly asking for access to reuse water. Council's approach is to develop reuse water as an alternative product to potable water.

Gold Coast Waterfuture:- The purpose this strategy is to achieve a water balance of water sources so the Gold Coast no longer has to rely on one single dam to supply its water needs. The idea is to have diversity and therefore greater security in the bulk water sources available. Sources of water include desalination, raising of Hinze Dam (for flood mitigation and water supply), recycling water, use of rainwater tanks and leakage management.

Toowoomba's Waterfutures project involves indirect recycling to Cooby Dam. This involves recycling water by treating effluent to a very high quality (better than drinking water) and discharging it to Cooby Dam. This is the only viable water source for Toowoomba as there are no options for further major dams on the Darling Downs and piping water from Wivenhoe would involve large pump lifts and is unlikely to be accepted by State Government due to other allocations of this water. It is vital that Toowoomba finds an alternative source of water as the annual water demands exceeded available water yields in 1998. Indirect water recycling has the additional advantage of not having to rely on the weather.

Where are we at?

The successful management of potable water supply and quality throughout South East Queensland has been a critical factor in the rapid growth in the region over the last 25 years.

In spite of this, there remain significant challenges for the future. Demands on limited water supplies continue against the back-drop of increasing community consciousness of environmental issues and a drying climate.

AWA's assessment is that the building of new dams cannot alone provide the complete solution to the challenge of meeting increasing demands. Major catchments providing the easy and cheap

water yields have already been developed. With lowered rainfall predicted to continue into the future, existing dams are also not as reliable.

Additionally, water supplies are inherently energy demanding due to the pressures required to transport water as well as the energy consumption of advanced treatment. This is another challenge due to our obligations to reduce greenhouse gas emissions. Alternative supplies that require high amounts of energy will result in rising costs for water. However, to put this into perspective the energy use per household to supply potable water is on average 100 times less than the average household energy consumption and 25 times less than the energy used by each household for transportation. Mains delivery of water also uses about half the energy of rainwater tank supplies when on-site booster pump operation and tank manufacturing energy use is taken into account.

The Future

Given these issues, what are the alternatives for a sustainable future in water?

- A cap on growth
- Desalination
- Potable water recycling

Diversity of sources is certainly the most sensible way to plan for the future. Reliance on one source of supply is no longer viable from a risk management perspective.

AWA's assessment is that water treatment technology has advanced to a point where issues involved in the implementation of indirect water recycling are no longer technical but are rather to do with the social acceptance of using recycled water. Successful schemes are already in operation in many countries and we are well placed to draw benefit from these initiatives. The AWA wishes to actively assist in taking the community through the journey to a better understanding and acceptance of water recycling.

Governance and Management of Water

Historically, Queensland has evolved with many small and isolated local governments each responsible for management of water supplies to their communities. In addition to local government, the management of water is spread over numerous state government agencies. This can lead to a lack of integration with the consequence that policy on recycled water and water discharged to streams is disjointed. Greater integration of Government Departments, and integration of initiatives with respect to water management water is needed to ensure that the usage of water in all its forms is optimised.

Commercial Dilemmas

All water businesses face the commercial dilemma that the cost of water is linked to the volume of water produced. Where a reduced volume of water is required to be produced as a result of demand management initiatives or enforced restrictions, Council's income from the water business will be reduced. Council's normally plan for such contingencies but it does raise the dilemma that as water per capita water consumption reduces the unit charge must increase. Many Council's Water Departments are also required to pay a dividend to their Council. In some cases Council's use income from water and wastewater operations to subsidise other activities. COAG acknowledges that this does happen but recommends that any such cross subsidies be fully transparent. There are also activities carried out by Council's which are termed Community Service Obligations (CSO's) and these activities may or may not be confined to the water and sewerage business sectors of Council. CSO's could include such things as subsidies for water and sewerage rates the elderly or community organizations for example. There is currently some debate regarding how Council's should be allowed to invest for future works. One issue that is frequently raised is should the water business be allowed to retain a sinking fund for future investments or should this be the prerogative of Council itself.

State and Local Government need to confirm a standard of reliability the community are willing to accept and pay for. This then gives Government clarity for investment and service delivery and the community and business clarity on water reliability.

Community Engagement

The community requires knowledge and understanding of water management so that they can make informed decisions about the level of service and reliability of supply they require in their own local circumstances. There is a lack of understanding in the industry of the benefits of community support and lack of recognition that community education is a long-term and vital investment. An adequately funded commitment to reinforce the community's trust in the industry is needed.

The Way Forward

It is undeniable that harvested rainwater through our existing sources will not satisfy future demands if we use it only once. The existing resources are barely able to meet current demands as demonstrated by the current drought. To allow for future growth it is imperative that our limited resources be subjected to recycling, rather than the current wasteful once off use and disposal.

Multiple sources and uses need to be explored, tested and implemented in the immediate future. Community engagement and trust will be critical to the successful implementation of new water initiatives on a local basis.

Water sanitation has been the single most important factor on public health and allowing civilisation to proliferate. Without the collection and treatment of water, disease in populated regions would proliferate and would jeopardise not only the quality of life but the longevity that the developed world has come to enjoy. In the regions of the world where the 2 billion people reside without adequate water treatment, life expectancy and the quality of life is gravely diminished.

As a society we must change our current water use and management culture on a permanent basis. The current drought has made people aware of their water use and wastage, and opened their minds to new ideas and solutions. When the drought eventually ends, we will need to continue with the positive initiatives of the last few years so that we are prepared for the next drought.

Only through a continued focus on water efficiency, diversity of sources, recycling, and community agreement on reliability standards, will we be able to develop a sustainable water supply to guarantee the long term future prosperity of South East Queensland.