Senate Inquiry into Urban Water Management 2002

- we do not use water sustainably
- we know we have to change
- we have the technology and expertise

BUT WE ARE NOT DOING IT!

The following websites provide more information on recycling and how you can help to conserve water:

The Australian Water Association

www.awa.asn.au

The Environmental Protection Agency

www.epa.qld.gov.au/environmental_management/water

The Mary River Catchment Coordinating Committee

www.widebay2020/qld.gov.au/icm/mrccc

Save the Mary River

www.savethemaryriver.com

The Australian Academy of Technological Sciences and Engineering

www.atse.org.au

Sunshine Coast Environment Council

www.scec.org.au

Mary River Catchment
Coordinating Committee
42 Tozer St, Gympie
PO Box 1027, Gympie 4570
Phone: 07 5482 4766
Fax: 07 5482 5642
Email: mrccc@ozwide.net.au

DONATIONS TO THE MARY CATCHMENT PUBLIC FUND ARE TAX DEDUCTIBLE

"Waste water is mostly water – a 200 litre drum of it contains about 1 tablespoon of dirt. The dirt consists of organic molecules, inorganic molecules, micro-organisms and fine particles that are suspended in the water."

Recycled water is safe to drink and is a secure supply, largely independent of rainfall.

Is water already being recycled?

Yes, most of us live downstream, so many millions of people drink water every day that has been used before. Wherever proper treatment, management and monitoring practices are in place, there are no problems. Most of the recycling happens informally but a growing proportion is deliberate and carefully managed.

How do we know that recycled water safe to drink?

A multi-barrier risk management approach that is based on sound science has been adopted to ensure that the drinking water is free of unwanted chemicals and pathogens. Any pollutants in six-star water are at non-detectable levels. This means they are at less than one part per trillion – equivalent to one minute in 2 million years. We drink 2 litres of water daily, so a person drinking only six-star water would need 138,000 years to consume the equivalent of one 100 mg tablet of a pharmaceutical product. The risk of catching a treatable viral infection from recycled water is less than being struck by lightening or the chance of winning Division 1 in the lottery.

What is reverse osmosis?

Osmosis is the mechanism by which plant cells take in water. The cell wall of a plant is a membrane that allows only water molecules to pass through. The water passes from the weaker solution outside the cell to the more concentrated one inside the cell and sets up a pressure within the cell, making it swell. In reverse osmosis pressure is applied to the concentrated solution so that water passes out though the membrane. If the pores in the reverse osmosis membrane were compared to a ping-pong ball, a water molecule would be of a similar size and be able to pass through. Chemical contaminants, such as hormones and drugs, would be the size of a football, a virus as big as a truck and a bacterium would be as big as a house.

Desalination

The sea offers an infinite source of water but contains so much salt that it is unsuitable for most of the purposes for which we need water. However seawater can be desalinated to obtain drinking water and this has the advantage that it is an alternative to dams and provides diversification of supply. Desalination is a very expensive and energy-intensive process using membrane filtration and is probably best seen as an emergency supply.

How do recycling plants and desalination plants compare?

Although reverse osmosis membranes are used for both desalination and water reclamation, plants are not easily interchangeable because of different pre-treatment requirements. The plants should be purpose designed and built. Desalination plants need to be close to the sea and occupy expensive land whereas reclamation plants can be built adjacent to the Sewage Treatment Plant where there is usually spare land that is set aside as a buffer zone around the plant. The intake and outfall for the desalination plant have to be carefully located and designed and can add considerably to the cost of the plant if it is doesn't have close access to deep clean water.

It has been estimated (Healthy Waterways 2006) that, if further deterioration of our waterways is to be avoided, 100% reuse of the effluent discharges will be required by 2020. Using recycled water to overcome the water shortage problem will facilitate this, whereas desalination will have no similar benefit.

How much do the options cost?

Capital cost

A convenient way to compare the capital cost of each of the options is to consider the amount required to produce a ML of water per day.

	Recycling	Desalination	Desalination Tugan	Stage 1 Traveston Dam	Wyaralong Dam
Cost $M/ML	1.0	2.5	4.7	8.9	6.7

Operating cost

The basic operating cost to treat and recycle water using the dual membrane process is about 55c/KL in addition to the cost of treatment to 3-star effluent. Additional costs are dependant on how far recycled water has to be pumped to the end user or back to the supply reservoir.

In comparison, seawater desalination costs are about $ 1.40/KL and additional costs are also dependant on how far reclaimed water has to be pumped and how far the waste stream has to be pumped into the ocean for it to be safely discharged to the marine environment.

Operating costs for the dams are not yet available but also include water transport costs.

Desalination and recycling have considerable cost benefits in that it is possible to build the plant in stages and increase the capacity of the plants as required.

"We do not have a water shortage in Sydney or in Brisbane. We have a shortage of management and preparation." Hon. Malcolm Turnbull, Parliamentary Secretary to the Prime Minister.

Our limited water resources are facing pressure from increasing population at the same time as we are facing a prolonged drought. As a consequence, we are using water at a faster rate than supplies are being replenished. We cannot continue to do this.

A change in the way we manage water is needed

How much water do we use?

The estimated residential population of SEQ for 2004 was approximately 2,667,000. We currently use 480,000 ML/a. 60% of this is residential use, 10% is unaccounted for (firefighting, mains flushing, leakage), 15% commercial and 15% industrial and big users such as hospitals. We currently use 300 litres per person per day but there are plans to reduce this to 230 litres per person per day by 2026.

Our population is expected to be 3,709,000 by 2026, an increase of around 1.04 million people, or almost 50,000 each year. The increase is expected to continue and a population of 5 million is expected by 2051. With climate change and increased population there will be a shortfall of at least 240,000 ML/a by 2040.

What are the alternatives?

There are short-term measures that DEFER providing a new source.

These include demand management, rainwater tanks, decentralised systems, groundwater and recycling for industrial use or dual reticulation.

Can demand management solve the problem?

No — demand management is an essential, affordable and important part of the water shortage solution but it is not the silver bullet! It includes such measures as leak reduction, water efficient appliances, pressure reduction, education and permanent watering restrictions. It has been shown that 10% to 12% of water can be saved in this way and rainwater tanks can provide a further 6% to 8%. Much of the "low-hanging fruit" has been gathered and further reductions are more difficult and expensive to achieve and sustain.

What about industrial recycling?

About 15% of the water used in Brisbane goes to the 'big' users that, as well as industries, include institutions such as hospitals. All these major users are recycling as much water as possible and have effective strategies to minimise their water use. Recycling and economies by industry help to defer the need for a new supply of water but do not solve the problem.

And dual reticulation (the third purple pipe) and decentralised systems?

These are only feasible in new, Greenfield developments. It is estimated that they can save up to 60% of the water used in the development but this is only about 5—10% of the total water demand.

Do we have any groundwater?

Groundwater resources are limited in SEQ and insufficient to solve the problem.

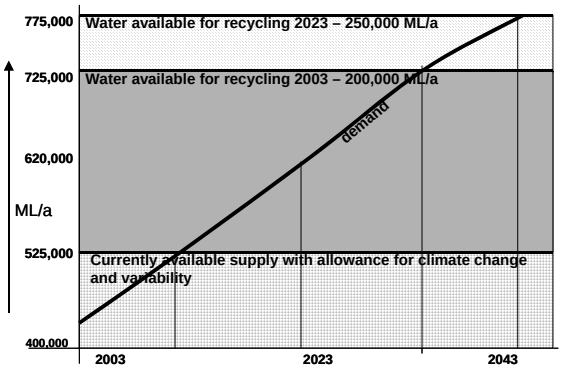
Measures that reduce demand on the reticulated supply are very important and should be strongly encouraged and subsidized. They can defer the need for a new source but not indefinitely. Even with optimum implementation, a new supply source will still be needed.

There are only three ways to PROVIDE a new source:

- **Recycling water back into a storage**
- **Desalination**
- **More dams.**

Recycling water back into a storage (Indirect Potable Reuse – IPR)

How much water is available for recycling in SEQ?



Currently, the amount of water supplied in SEQ is 480,000 Megalitres per year. Half of this (**240,000** ML per year) finds its way to a Wastewater Treatment Plant and is available for recycling.

At least 80% of this can be reclaimed yielding 200,000 ML per year

The amount increases with population, so by 2023 another approx 50,000 ML/yr will be available.

This is over **80%** of the predicted annual yield of Wivenhoe Dam.

From SEQRWSS Stage 2 Interim Report and AWA Status of Water in South East Queensland, 2005

How much water can we recycle in SEQ?

Most of the water available for recycling in SEQ can be recycled. The Western Corridor Scheme is designed in Stage 1 to recycle water for industrial use, including Swanbank Power Station that currently uses 5% of the water from Wivenhoe and Somerset Dams. Stage 2 is being designed so that up to 300 ML/day can be recycled. This is 100,000Ml/a, similar to the hoped-for yield of Traveston Dam. The recycled water will come from the six sewage treatment plants that produce 65% of Brisbane's effluent. The largest of these is Luggage Point that produces 140 ML/day. Recycling from this plant alone would yield over 50,000 ML per year.

Further recycling is possible as well – for example, both the Sunshine and Gold Coast could recycle nearly all their effluent.

There is no need for recycled water to be stored. Its production and our water demand are both daily events!

What quality of water would we recycle?

Waste water is mostly water - a 200-litre drum of it contains only about 1 tablespoon of dirt. The dirt consists of organic molecules, inorganic molecules, microorganisms and fine particles that are suspended in the water.Water is treated to six-star quality that is as pure as it is possible for water to be. The treatment train comprises of several barriers to each pollutant so that if the first barrier does not remove it, several others will follow. The Australian Drinking Water Guidelines recommend a risk assessment and management approach that is based on sound science. …as do the draft National Recycling Guidelines and the Queensland Water Recycling Guidelines.

What technology do we use to make sure recycled water is safe?

Two-stage membrane filtration, which includes reverse osmosis, is complemented by advanced oxidation and disinfection to produce the six-star water. On-line monitoring is important and ensures the plant is working efficiently. There are many examples of this technology around the world and within Australia.