

**Help Shape our Water Future – Ballarat and region
Submission by Hazen Cleary, 12 July 2014**

Extracts from consultation draft:

“...we will have sufficient drinking water for critical human needs over the next 10-15 years.”

Not a particularly comforting thought!

“The Moorabool and Leigh Rivers are highly stressed. The ratio of total water withdrawals is higher than the available renewable fresh water supply, making it difficult to keep sustainable levels of fresh water flows in the rivers. Extractions of fresh water from both of these rivers are over allocated and their locations mean that their management is split between several agencies and organisations, often in isolation from other parts of the water system. This makes it very difficult to ensure the rivers are managed in a sustainable and holistic way...”

“Projected changes in rainfall and higher rates of evaporation will be amplified in reduced stream flows, resulting in less water in dams and catchments. Decreases in rainfall and higher evaporation rates will mean less soil moisture and less water for rivers. Warmer temperatures and a growing population may also increase local water demand.”

I doubt strongly that the “community” has any real understanding of what such statements mean to the continuance of the way they are living and their wish to continue to do so into their forever future.

QUESTIONS ASKED: What do we need to do to ensure the Ballarat region’s waterways, rivers, parks, gardens, sporting fields and lakes thrive during the next drought? How can we reduce our dependency on catchments that also support other, drier, communities and agriculture?

*My basic response to the above questions is to **become as climate independent as possible, as soon as possible.***

In supporting the Consultation Draft’s proposals I believe that they do not go far enough. I would like to suggest that it is time that the softly, softly approach becomes a bit more pragmatic in terms of what is coming our way in the face of climatic changes and impacts to our communities and lifestyle. As our “lifestyle” is the major part of the problem (along with a growing population) tweaking around the edges won’t work.

Water availability and ensuring access to it should be in itself a strong motivating force for our community to become as “climate ready” as we can and basing our decision making on the “Precautionary Principle” should be the fundamental approach taken to achieve this.

The *Precautionary Principle* is a guiding framework for decision-making that anticipates how our actions will affect the environment and health of future generations. The Principle emphasises public participation and stakeholder collaboration in long-term environmental health and ecological policies and programs. The Precautionary Principle represents a paradigm shift in decision-making. It allows for five key elements that can prevent irreversible damage to people and nature:

Five Key Elements of the Precautionary Principle

1. **Anticipatory Action:** There is a duty to take anticipatory action to prevent harm. Government, business, and community groups, as well as the general public, share this responsibility.

2. **Right to Know:** The community has a right to know complete and accurate information on potential human health and environmental impacts associated with the selection of products, services, operations, or plans. The burden to supply this information lies with the proponent, not with the general public.

3. **Alternatives Assessment:** An obligation exists to examine a full range of alternatives and select the alternative with the least potential impact on human health and the environment, including the alternative of doing nothing.

4. **Full Cost Accounting:** When evaluating potential alternatives, there is a duty to consider all the reasonably foreseeable costs, including raw materials, manufacturing, transportation, use, cleanup, eventual disposal, and health costs even if such costs are not reflected in the initial price. These costs are not limited to just financial costs. Short and long-term benefits and time thresholds should be considered when making decisions.

5. **Participatory Decision Process:** Decisions applying the Precautionary Principle must be transparent, participatory, and informed by the best available science and other relevant information.

It is time to openly acknowledge that – *No, we can't eat our cake and keep it too!* It is time to stop asking people what they want and start asking them where/how are they prepared to compromise those “wants” to work towards an adequate and equitable future for all (forget “sustainable” such a possibility has long gone).

The draft states: “*The Ballarat region community has demonstrated a **passionate interest** in protecting their natural environment.....*” I would suspect that such “passionate interest” for the vast majority of community members, is rather more passive than active and as long as it doesn't interfere with their lifestyle choices. Everyone “likes” a nice green environment with fresh sparkling water for their enjoyment and leisure, few understand how much is required to maintain such environs.

“*...water cycle managers can make **informed** decisions based on community priorities...*” No, they can't if community “priorities” are not based on the future reality of a climate in transition. Community “involvement” does not indicate if the community is going to be provided with the “complete and accurate information” to guide the debate and involvement. Even if this did happen I suspect that it is likely to hit up against the paradox that we face everyday where the climate science forecasts become disconnected from day to day life and therefore responses of individuals (see the paradox tale below...).

Actively and meaningfully engaging the local community is a given but there must also be effective, open and consistent leadership actively pursuing the “common good”.

A Paradox tale:

I went to Dawlish the other day, where the railway line was washed into the sea recently, and the town took a complete pasting. I met an old man there who'd lived in Dawlish for many years and we sat and looked out over the town together and I asked him about the storm. He said, “It's the worst storm I've ever seen, I've never seen anything like it.” I said “so do you make any link between what you saw that night and climate change?” He said, “Oh I don't believe in climate change.” He said, “Do you?” and I said “I do, very much so.” He said, “Well I do believe that since the beginning of the industrial revolution we've poured huge amounts of gases and pollutants into the atmosphere and that has changed the climate, but I don't believe in climate change.” Can you explain that?

SOURCE: George Marshall on communicating climate change following extreme weather events

<http://www.transitionnetwork.org/blogs/rob-hopkins/2014-03/george-marshall-communicating-climate-change-following-extreme-weather-eve>

To be more specific I offer the following suggestions. I am sure that the following are already well known within the water management sector so I will not go into the detail.

1) Progressively move towards the introduction of Direct Potable Reuse (DPR) as a significant proportion of drinking water delivery to the Ballarat community. The Managed Aquifer Recharge project is a significant first step towards the implementation of such an initiative.

The following is taken from: *“Drinking Water through Recycling - The benefits and costs of supplying direct to the distribution system”*. A Report of a study by The Australian Academy of Technological Sciences and Engineering (ATSE) Australian Water Recycling Centre of Excellence October 2013 (attached).

“The science, technology and engineering associated with DPR have been rapidly advancing in recent decades. DPR is growing internationally and will be an expanding part of global drinking water supply in the decades ahead.

DPR is technically feasible and can safely supply drinking water directly into the water distribution system, but advanced water treatment plants are complex and need to be designed correctly and operated effectively with appropriate oversight. Current Australian regulatory arrangements can already accommodate soundly designed and operated DPR systems.

It is instructive to observe that there is a number of successfully operating DPR schemes internationally. The most established of these has been operating in Namibia since 1968 without observed negative impacts to public health. More recently, DPR projects have been developed in the US and South Africa, with both countries now actively considering additional developments within the next few years. Recent Guidelines for Water Reuse developed by the US Environment Protection Agency state that *“While DPR is still an emerging practice, it should be evaluated in water management planning, particularly for alternative solutions to meet urban water supply requirements that are energy intensive and ecologically unfavourable”*. The State of California, in particular, is currently investigating the feasibility of developing uniform criteria for DPR.

Potential benefits of DPR, relative to IPR, are likely to be highly case-specific. However, potential benefits include significantly lower energy requirements, construction costs, and operational costs. DPR can also provide an opportunity to allow potable reuse in situations where a suitable environmental buffer is not available for IPR.

Potential obstacles or disadvantages for DPR, relative to IPR, are primarily related to public perception and acceptance. Importantly, ATSE considers that the scientific and engineering hurdles to implementing safe and reliable DPR are manageable. However, a number of technical issues relating to the functions of an environmental buffer in IPR are described above and would need to be addressed to the satisfaction of the general community. Key among these issues is the need to ensure reliability.

It is apparent from a review of Australian legislation and regulations that existing frameworks for the planning, approval, management, and oversight of drinking water quality and recycled water in Australia could accommodate a well-designed and operated DPR project as a water resource management option. Advanced risk assessment and risk management tools are now available which can be considered for the implementation of DPR projects, relative to more established or conventional water sources.”

Indirect Potable Reuse (IPR) is however, a fact with Perth’s groundwater replenishment trial completed in December 2012, wastewater, treated to drinking water standards, is now being recharged back to the groundwater system for future use. In August 2013, the Western Australian Government announced that groundwater replenishment would continue as an alternative water source for Perth’s public drinking water

supply. Under Stage 1 plans, 7,000 ML/year of wastewater will be recycled via this process, with plans to increase to 28,000 ML/year (20% of Perth's water use) in the longer term.

For Ballarat 10 to 15 years of water security seems little comfort when by then the influx of another 40,000+ people into Ballarat will need to be accommodated for many decades into the future and which will coincide with a changing climate starting to make its presence felt more substantially. As when politicians finally "get it" and start implementing what is often termed "drastic measures" (is it the 10% trigger of an empty dam??) the bottom line is that community/people have to "get over it" and stop being so precious.

SOURCE:

<http://www.watoday.com.au/environment/water-issues/get-over-it-grylls-urges-acceptance-of-recycled-water-20110531-1fdv7.html>

Ballarat needs to move into the next phase of IPR as soon as the MAR has provided the testing ground for its feasibility, if DPR cannot be implemented beforehand. By starting the planning and consultation with the community NOW this 10-15 year gap provides an excellent lead in time to not only ensure the infrastructure is in place but also the time to bring the community along with it for the introduction of DPR.

In anticipation of handling potential **community "outrage"** at such a suggestion I offer the following study (attached) for some useful insights and ways forward in this regard: *"When Public Opposition Defeats Alternative Water Projects - the Case of Toowoomba Australia"*: By: A. Hurlimann, University of Melbourne and Sara Dolnicar, University of Wollongong.

It is interesting to note the increase of acceptance from the public over the two year trial period of the groundwater replenishment trial. *"At least three in four West Australians have flushed away common fears of drinking recycled water and now support adding it to the main supply, according to a Water Corporation survey. Support for the controversial practice that includes treating sewerage has steadily increased since the state government started a two-year trial in November 2010."*

SOURCE:

<http://www.watoday.com.au/wa-news/we-want-to-drink-recycled-water-survey-20120323-1vpct.html#ixzz36eQX1Ypn>

Sewer Mining: Maybe a less controversial initiative that could be added to the mix for non-potable water delivery. In several States there is a number of sewer mining schemes. Most of these produce recycled water to irrigate green spaces. Some also meet demand in commercial buildings and industrial sites. There is potential for increased private sector involvement in such schemes.

Sewer mining can be cost competitive with other recycling options, where the use is close to a sewer main while being remote from a WWTP. Sewer mining schemes are likely to be most viable for new developments where groundwater is scarce. They may also be viable in regional areas where scheme water supply augmentation is costly.

SOURCE:

<https://www.watercorporation.com.au/-/media/files/about%20us/planning%20for%20the%20future/sewer-mining-information-sheet.pdf>

I also strongly support the following key findings from the National Water Commission – National Water Account Summary 2013:

- The keys to managing water supply under a diminishing resource are forward planning, integration and diversification of water sources, and community involvement. Together, these enhance resilience of the system and provide managers with more options and greater flexibility.

- Utilise all water sources from a portfolio of supply options; use fit-for-purpose water for appropriately planned and designed infrastructure and property developments.
- Water management must take account of the need to minimise impact on ecosystems and sustain biodiversity. Key policy actions must identify and protect refuges to maintaining resilience, especially for freshwater- and groundwater-dependent ecosystems.
- Encourage demand reduction and lower levels of outdoor use; inform the public and train workforces to enable adaptation.
- Maintain a secure low-cost water supply for more vulnerable consumers.
- Water management to be integrated into land planning decisions. Under a changing climate, thresholds can be assigned to trigger management responses, infrastructure investment and/or shifts in supply sources.
- Communities need to understand and support changes in water supply and demand management.

As climate independent infrastructure is energy intensive, investment in renewable energy and low carbon technologies need to be incorporated into the planning and costing phase to enhance its sustainability in a carbon-constrained world.

ANOTHER QUESTION ASKED: How can we balance affordable water services with the need for ongoing investment in new and upgraded water infrastructure?

The dilemma that water service providers face is that on the one hand they are required to support/ encourage water efficiency by its customers to conserve the water resources they access but then their income is derived from that same customer base. Therefore the natural outcome is that if they are good at getting their customers to use less water their income also decreases. It is much like the vampire managing the blood bank analogy or electricity generators and their retailers (coal based) encouraging their customers to go renewable. It's not logical and in the end doesn't work.

To get around this anomaly the **water service providers need to broaden their income stream to cover such revenue raising as: the selling water efficiency systems/ products, and installation, water quality and advisory services.** This could also be expanded to include partnership ventures with the private sector to develop and implement innovative water solutions. Profits generated would then be used for further investment and to ensure water pricing is kept fair and equitable.

The above expansion of income streams sit well with Central Highlands Water's "mission" and "guiding values" stated in their Annual Report:

Mission:

"Providing quality water and wastewater services fairly, efficiently and sustainably to communities..."

Guiding Values:

"Through innovation we offer industry leadership, manage limited resources and provide products and services to meet customer needs."

IF CHW is constrained by legislation to expand its revenue base then it needs to be changed. IF CHW is not constrained by legislation then what is stopping such expansion?

If legislation is a constraining factor, there was a similar situation in WA where the Busselton and Bunbury Water Boards were unable to expand their revenue base do to legislation.

Extracts from Aqwest (Bunbury Water Board) Annual Report 2013

"CEO's Summary Financial Performance

In May 2013, we borrowed \$610,000 through the West Australian Treasury Corporation. Prior to this, we had been debt free since 1999. As indicated in prior annual reports, the Board would prefer to remain debt free but this is not a position supported by the Economic Regulation Authority's pricing model.

Selling less water obviously results in less income. In that sense, the *water industry is particularly unique since it actively promotes programs requesting customers to use less of the product*. This means the ability for utilities to adequately cover ever increasing fixed costs is an ongoing challenge.”

SOURCE: http://aqwest.com.au/Portals/0/Forms&Downloads/Annual_Reports/AnnualReport2013.pdf

In 2012 the WA *Water Services Legislation Amendment and Repeal Bill 2011*, was passed which allowed the following:

EXTRACT FROM EXPLANATORY MEMORANDUM

“The primary purpose of this Bill is to repeal the Water Boards Act 1904 and amend the Water Corporation Act 1995 to enhance the operations of the Busselton and AQWEST-Bunbury Water Boards. This will enable the Boards to provide the same range of services and operate under the same governance arrangements as the Water Corporation.

This Bill will implement the legislative reforms recommended by the 1999 National Competition Policy (NCP) Legislation Review of the Water Boards Act 1904 and the 1999 Busselton and AQWEST-Bunbury Water Boards Competitive Neutrality Reviews. The recommendations of those reviews were endorsed by Cabinet in December 1999 and in February 2004.

The key legislative amendments recommended in the Reviews and embodied in this Bill are as follows:

- National Competition Policy Review of the Water Boards Act 1904;
- enable the Water Boards to provide services outside their water area;
- allow Water Boards to provide a full range of water services (including sewerage, drainage, and irrigation);
- enable the Water Boards to make a profit;
- enable the Water Boards to enter into business arrangements;
- facilitate the adoption of a more commercial approach to service provision consistent with the principles of competitive neutrality”

SOURCE:

[http://www.parliament.wa.gov.au/Parliament/Bills.nsf/822B613F136FD75C4825789C001CFC08/\\$File/EM-Bill201-2.pdf](http://www.parliament.wa.gov.au/Parliament/Bills.nsf/822B613F136FD75C4825789C001CFC08/$File/EM-Bill201-2.pdf)

Aqwest extract Annual Report 2013

“Corporatisation

The progress in 2012-2013 of the Water Services Bill and Water Services Legislation Amendment and Repeal Bill was pleasing. This legislative change, once enacted, will result in Aqwest becoming a corporation known as the Bunbury Water Corporation but will continue to trade as Aqwest. We look forward to the opportunities that legislative change will ultimately deliver.”

In conclusion the following article from Stuart Khan is Associate Professor in the School of Civil & Environmental Engineering, University of New South Wales, provides an interesting summary of IPR versus DPR in the Australian context.(5 May 2014)

“Why do our elected leaders wait until crisis point before making decisions about water supply for Australians? We should start talking about solutions to the next drought now.

IT WAS ONLY A FEW years ago that Australia was in the grip of the 'Millennium Drought' (approximately 2001 to 2007). As drinking water supplies for some of our major cities dwindled, water supply planning decisions were made with an extreme sense of urgency.

How quickly we forget; much of Australia is now experiencing secure levels of water availability. Now, there appears to be little immediate urgency to identify and assess potential additional water sources. However, it is essential that such assessment be conducted at this point in the climate cycle, rather than waiting for the next drought to arrive.

Planning early facilitates sober analysis of all issues associated with water supplies. Furthermore, it enables necessary community debate and public awareness-raising to be initiated in the absence of a perceived emergency and with adequate time to proceed.

It is arguable that there are now a number of large water supply infrastructure projects that were initiated during the last decade that are now seen to be an imperfect fit for addressing long-term water management needs. This is reflected in some large water recycling and seawater desalination infrastructure which is currently not producing water or operating well below design capacities.

As the Millennium Drought progressed, some Australian cities began to focus on various approaches to reclaiming municipal wastewaters for reuse to supplement drinking water supplies. This involves taking the treated effluent from sewage treatment plants and subjecting that water to very high levels of treatment. The largest project, known as the [Western Corridor Recycled Water Project](#), collected effluent from six sewage treatment plants around Brisbane, 'polished' that water at three new advanced water treatment plants in preparation for some of it to be used to augment raw water supplies in Lake Wivenhoe, Brisbane's largest drinking water reservoir.

However, soon after the plants were constructed and pipes laid, the drought broke. Water storage in Lake Wivenhoe is now so ample that the Western Corridor project sits idle and the Queensland Government is examining options to free itself from the financial burden of continuing to maintain it.

Unlike the east coast of Australia, the drought in Perth never broke and hasn't for nearly 40 years. During that time, the population was sustained by extensive groundwater extraction until 2006 when the first of two seawater desalination plants began operation.

However, after a successful three-year trial, a large recycled water project is now under development for Perth. This project, known as the [Groundwater Replenishment Scheme](#), will take treated wastewater effluents through an advanced water treatment process and use them to recharge Perth's groundwater supplies. The project is projected to provide up to 20 per cent of Perth's drinking water supplies by 2060. These two projects represent two quite different approaches to supplementing drinking water supplies with recycled water: either by boosting surface water supplies or by recharging groundwater.

However, they both involve returning highly treated, reclaimed water back to a traditional environmental water source in preparation for it to be re-extracted from that source and then suitably treated for supply as municipal drinking water. Water engineers refer to the environmental water source as an 'environmental buffer' and the overall process as 'indirect potable reuse' (IPR).

An alternative approach that is rapidly gaining interest in Australia, the USA and South Africa is known as 'direct potable reuse' (DPR). That is, municipal wastewater is highly treated to a quality suitable for direct use as a drinking water supply, without the inclusion of an environmental buffer.

In the right mix of circumstances, there appear to be many potential advantages of direct potable reuse compared to IPR. Among the most important are reduced energy requirements, which come largely from the often significantly reduced need to pump water over long distances and uphill to the environmental buffer reserves. With reduced energy also come reduced greenhouse gas emissions and reduced costs.

A recent assessment undertaken by engineering firm [GHD](#) revealed that in some circumstances, DPR could provide drinking water with about 30 per cent less energy than required by a comparable IPR scheme and 60 per cent less energy than seawater desalination. In addition, there are a number of other possible advantages of DPR, which are yet to be explored in detail. These include improved water quality and system reliability as a consequence of reduced vulnerability to environmental factors such as extreme weather events and other catchment-related risks.

Furthermore, DPR has the potential to [mitigate flooding for some cities such as Brisbane](#). By providing a component of drinking water through direct potable reuse, existing reservoirs such as Lake Wivenhoe could be maintained with lower storage volumes without compromising water supply security. If this alternative management approach were applied to the Western Corridor Recycled Water Project, enormous value would be gained by the improved prevention of major flooding events such as those experienced by Brisbane in recent years.

A reliable supply of high quality water is essential for all Australian towns and cities. Secure water availability facilitates agriculture, commerce, recreational activities, improved amenity and healthy lifestyles. As such, safe, reliable water supply is fundamental to the provision of high quality urban living. The advantages of wastewater recycling and direct reuse would both facilitate our water supply adaptation to climate change as well as reduce our further impacts to climate change resulting from carbon emissions. Along with issues of water quality and costs, these must surely be key priorities as we plan for the future of Australian cities.

Now — not in the middle of the next drought — is the appropriate time for Australia to begin to consider the issues associated with DPR as a potential future water resource. We have much to gain by developing a national taste for drinking recycled water.”