Lowering Warragamba Dam is only the first step towards Sydney's climate resilience **10** 10 10 10

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Committee for Sydney

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The future of Warragamba Dam has dominated NSW politics for years. As Sydney's main source of drinking water supply, and much discussed role in flood mitigation in the Hawkesbury Nepean Valley, this is not about to change anytime soon.

The former Coalition government's position to raise the Warragamba Dam wall has now been replaced by a new Minns government proposal¹ to lower the holding capacity of Warragamba Dam to achieve the same flood risk reduction result. The Committee has always argued that what happens with Warragamba Dam is only one part of the solution for Sydney's water future:

- <u>We need to talk about Sydney's drinking water</u>, 2022
- <u>Warragamba Dam: To raise or not to raise... That is the</u> <u>question, or is it?</u> 2022
- <u>Stopping the cycle of disaster in Sydney</u>, 2022
- Its time to move people out of the path of floods, 2022
- Submission to Parliamentary Inquiry on Warragamba Dam, 2021
- Building Back Better may mean building somewhere else, 2021

Lowering the full supply level of Warragamba Dam will provide flexibility, delivering increased evacuation time for residents and businesses in some situations. We know of at least two major floods, and numerous other major inflows in the last 25 years, that would have been catastrophic had our Dam been full when they happened.

But lets be very clear, while we support this change in policy, it is not a panacea for the rising flood risk in Western Sydney. More needs to be done now, and into the future.

The proposal to lower the full supply level of Warragamba Dam also creates a golden opportunity to reset water policy for Greater Sydney and NSW, balancing the future drinking water needs of our state against the rising risks of climate change. Simply put, Sydney urgently needs to create more climate independent drinking water supply.

Warragamba Dam's sole function currently is to provide the bulk of Sydney's water supply – a function that is becoming more and more difficult in the face of a changing climate. Drought proofing is needed to combat a reduction in the quantity of water flowing into Warragamba Dam, while storm proofing is needed to reduce vulnerability during major rainfall events that reduce the quality of water.

So, while reducing the full supply level of Warragamba Dam may create benefits in terms of flood risk, it would also decrease Greater Sydney's drinking water security. We need to invest in both purified recycled water for drinking, and additional desalination capacity, to create alternative sources of climate independent drinking water supply.

We believe that the lowering the full supply capacity of Warragamba Dam is only the first step. There are 3 further actions needed to build Sydney's climate resilience for today, and generations to come.

- 1. Accelerate investment in additional drinking water security;
- 2. Treat our wastewater closer to where it is created; and
- 3. Implement a combination of immediate and long-term flood risk mitigation measures.

<u>1. https://www.smh.com.au/environment/conservation/a-big-weight-off-the-shoulders-warragamba-dam-wall-raising-shelved-20230418-p5d1f4.html</u>

1. Accelerate investment in additional drinking water security

Sydney is one of Australia's most rainfall dependent cities, with our water supplies highly reliant on Warragamba Dam (80%), with the remainder coming from a number of sources including upper-Nepean Dams (Cataract, Nepean, Cordeaux, Avon), Worronora Dam, and Tallowa Dam on the Shoalhaven River. Sydney's Desalination plant at Kurnell provides up to 15% of Sydney's daily water needs, replacing any supply gaps from Sydney dams.

Water is not just important for healthy communities, it's also needed for healthy rivers and ecosystems, to help cool our sweltering city, and to give businesses the confidence to keep investing.

In a worst-case scenario, we can go from full dam to draining our drinking water supplies within five years. That's without Sydney growing — we can expect over 1 million extra people by 2036 and a growing economy supporting more jobs and businesses.

If the full supply capacity of Warragamba Dam was lowered by 12 metres, as has been proposed by the Minns Government, this would reduce the long-term sustainable supply in Sydney by 80 GL/year, or the equivalent to one new desalination plant.

The 2021 Greater Sydney Water Strategy² illustrates how lowering the storage level of Warragamba Dam by different amounts reduces the time that it would take for dam levels to reach critically low levels under very low inflow conditions similar to those experienced during the 2017-2020 drought.

2. https://www.dpie.nsw.gov.au/water/plans-and-programs/greater-sydney-water-strategy

LOWERING WARRAGAMBA DAM IS ONLY THE FIRST STEP TOWARDS SYDNEY'S CLIMATE RESILIENCE PG3



Figure 1 shows a dark blue line which represents the most recent drought, with the red line modelling a similar drought from a starting point of 12 metres lower capacity³ - the implication is that if we were starting from 12m lower capacity, Sydney was on track to reach Stage 5 water restrictions by the time is started raining in 2020⁴.

Replacing the lost drinking water capacity from lowering Warragamba Dam accelerates the urgency to find alternate climate independent drinking water options to ensure we are less reliant on a single major source of supply.

Planning is underway to grow the capacity of Sydney's existing desalination plant. But servicing the vast sprawl of our city by piping water east to west would incur huge additional infrastructure costs. Desalination also uses 3 times the energy of recycled water, which matters on our city's journey to net zero.

It is now time to elevate the role that purified recycled water for drinking plays in the long-term water security for Greater Sydney. Figure 1: Impact of reducing the full supply level (FSL) of Warragamba Dam on time to reach critical dam levels Graphic sourced from Greater Sydney Water Strategy Figure 17 https://www.dpie.nsw.gov.au/water/plans-and-programs/greater-sydney-water-strategy



3 Noting that Sydney has never implemented level 4 or level 5 water restrictions 4 Note: A formal decision in 2019 to change the operation of the desalination plant means that it will now run continuously, providing baseload water to Sydney. This means that the hypothetical red line will drop with a more gradual gradient than presented in Figure 1.

Purified recycled water is now a core component of drinking water supplies in over 35 cities around the world (See Figure 2), including Perth, San Francisco, Singapore. Cape Town, South Africa – a city that came within 90 days of running out of water - is another city that is moving towards adopting purified recycled water as part of its strategy to create climate independent water supply.

Sydney Water will soon complete construction on its Purified Recycled Water Discovery Centre at Quakers Hill. The water will not be added to Sydney's drinking supply, rather used as a testing facility as well as an opportunity to engage the public about purified recycled water and the role it can play in Sydney's future water security.

Global experience shows that building this structure, and using it to enable the community to see, touch and taste, is the most important first step. Sydney is home to diverse cultural communities, with people from over 180 different countries residing in just the one local government area of Blacktown.

Purified recycled water for drinking often takes up to 10 years to reach community acceptance, so we need to commit to the journey now, and continue planning for additional capacity in the interim.

Its clear that Sydney needs both additional desalination capacity along with purified recycled water for drinking to enhance Sydney's climate independent water supply.

Figure 2: Global Locations using purified recycle water for drinking levels⁵



5. Image sourced from Water Services Associate Australia

https://www.wsaa.asn.au/sites/default/files/publication/download/Places%20using%20blackblue.pdf

2. Treat our wastewater closer to where it is created

Sydney is already sending huge volumes of recycled wastewater from across the City to be disposed in the ocean. Our wastewater infrastructure is at capacity across the suburbs meaning decision need to be made now. Investing in new underground pipes to transport wastewater to the coast, as has been done for over 100 years, would cost billions of dollars.

By treating our wastewater closer to where it is created, we have the opportunity to re-invest some of that saved money into a solution that will address both our wastewater and drinking water challenges in one. We also have an opportunity to make better use of all that wastewater.

In Singapore, drinking water security is seen as a top priority across government and the community. The city state seeks to ensure firstly that every drop of rainfall that lands on Singapore – a city with the same number of people as Sydney but on an area 17 times smaller – is collected and used. Second, all wastewater and runoff is collected, recycled and combined with rainwater, desalinated water, and water from Malaysia, before being piped to residents. This strategy is known as Singapore's '4 taps'.

Figure 3: One of Singapore's 4 'taps', 'NEWATER', is treated wastewater.⁶



WATER FROM LOCAL CATCHMENT



IMPORTED WATER



NEWATER



DESALINATED WATER

6. Image sourced from https://thelogicalindian.com/news/singapore-water/



Sydney doesn't have the option of piping in water from another country, but it does have the opportunity to invest in another 'tap', by treating our wastewater where it is generated using technology that has been proven in other cities around the world, and adding purified recycled water to our drinking water supply for Sydney.

Lowering the full supply capacity of Warragamba Dam will reduce our drinking water supply.

The costs of replacing this lost drinking water capacity with purified recycled water would be significant, but these costs would be offset by reducing the need to build new wastewater pipes from the west to the east to handle the population growth in western Sydney, and reducing the need to build new pipes to transport desalinated water from east to west.

3. Implement immediate and long term flood risk mitigation measures

Building alternative climate independent drinking water supply creates the opportunity for Warragamba Dam to take on more than a water supply function, increasing the flexibility of our flood mitigation infrastructure, and reducing the costs of flooding to government, business and the community from recurrent 'significant' floods such as those experienced over the past 2 years.

By lowering the full supply capacity of Warragamba Dam by 12 metres, we will create spare capacity (795 GL) in our flood mitigation approach by creating additional dam capacity to handle major inflows. This is equivalent to 1.6 Sydney Harbors' worth of water.

We know of at least two major floods, and numerous potential floods, in the last 25 years that would have been catastrophic had Warragamba Dam been full when they happened. The new flexibility in the function of the Dam would mean that we could then release the water that has been held progressively over the following weeks. We would not be in the situation we are now where we have 100% dams that can't be let out, with more rain coming.

But let's be clear, lowering the full supply level of Warragamba Dam does not remove the risk alone. The Hawkesbury-Nepean floodplain is fed by rainfall from four catchments, with the Warragamba Dam reducing run-off from just one. And once that additional (12 metre) dam capacity is reached, the water will continue to overflow into the floodplain.





During recent intense rainfall events Warragamba has spilled 20-30% of its capacity in a day. Which is why lowering Warragamba Dam can buy time for evacuation if there is 'spare capacity', but for long rainfall events it doesn't necessarily change the risk of flooding to properties and infrastructure.

Flooding in these parts of Sydney is not going away, and climate change projections indicate rainfall events like those of 2021 and 2022 will become more frequent and more intense into the future.

There is an opportunity now to change the risk equation for residents of flood-exposed Sydney – we believe government should do five things:

- 1. Implement a moratorium on future development on the floodplain through the planning system
- 2. Enhance flood evacuation infrastructure to reduce the risk to life safety through both hard (roads) and soft (information campaigns) infrastructure
- 3. Increase transparency about current and future hazards properties are exposed to, so residents can take on risk with their eyes wide open
- 4. Move people out of the path of recurrent floods, using voluntary buybacks
- 5. Develop a long-term strategy to reduce the number of people at risk to floods, introducing tactics like land swaps and transferable development rights to enable a safer future for our city

Next Steps

Given the precariousness of our drinking water supply, Sydney can't reduce the capacity of Warragamba Dam until we have made big strides in our efforts to offset this loss of drinking water supply. Equally, it may be easier politically to accelerate purified recycled water if it's connected to the flood mitigation outcome.

Purified recycled water for drinking often takes up to 10 years to reach community acceptance, so we would need additional desalination capacity along with purified recycled water for drinking. Both would enhance Sydney's climate independent water supply. We recommend that any lowering of the Warragamba Dam full supply level is in line with the addition of alternate drinking water supply capacity being secured.

Sydney's growing drinking water security challenges highlights the need to accelerate planning for a citywide investment in climate independent drinking water infrastructure – both desalination and purified recycled water for drinking - that will both increase the resilience of our cities drinking water, and unlock flexibility in Warragamba Dam to support flood mitigation in the Hawkesbury Nepean Valley.

None of these considerations should prevent the Government from taking urgent steps to reduce flood risk for communities today, initiating effective planning for the long-term reduction in the density of risk on the floodplain, and building Sydney's climate resilience for generations.





Keep in touch

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