Adelaide River Off-stream Water Storage (AROWS)

Comments by Grusha Leeman, NT
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Thank-you for taking my views into consideration when assessing the validity of this proposed dam near the Adelaide River. I am a long term Territorian with a degree in Environmental Management from NTU.

The Darwin water story has not been enacted

When PowerWater published The Darwin water Story 2013,[1] they reported Darwin used triple the national average of water and suggested a pile of useful ways to bring this into line, like greywater reuse and leak detection and smart meters. It did not mention planning on reducing watering the public gardens like they have in Victoria: we don't have to have green lawns everywhere! It did not suggest cheaper water bills for residents for a basic water usage and higher if they want to use the water excessively. Still many residents believe we are water rich, and so use it very freely. Basically, there are plenty of ways we can be more efficient with the water we have.

So massive it must be properly assessed

With a projected disturbance area of 5,610.5 hectares or 56 square kilometres, it is a huge project and therefore should automatically be referred for full environmental, social and cultural assessments.

The Darwin region is unsuitable for dams

Dam country has good topography and regular precipitation and the Darwin region lacks both as it is flat and the rain comes all at once. This means the water storage must be huge and shallow, which means it is hotter and more prone to evaporating and dispersing into the ground below. The Darwin water consumption rates are way above the national average and very little has been done to attempt any level of curtailment of this waste. Before we need to kill thousands of old growth trees, we need to plan water conservation and recycling systems. Even the Councils water the middle of the roads and the parks whilst it's sunny or do so to excessive levels. There used to be a ban on rainwater tanks and gutters and even a small amount of effort could see a dramatic improvement in our excessive consumption levels. Covering of pools and ending leaking taps and discouraging overwatering are vital steps that this proposal seems to have ignored.

Changes to evapotranspiration due to extreme climate change have been ignored

Although it was suggested[2] there to be *"an assessment of forecast climate change on the simulated system, to understand the potential impacts associated with this potential change,"* the project is proceeding assuming this will be insignificant and wont have cascading impacts across other areas of importance. Climate change impacts rainfall, groundwater reserves, surface water flows, and

[1] https://www.livingwatersmart.com.au/sites/default/files/2018-02/darwin_water_story.pdf
[2] https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/1467642/appendix-d-hydrology-impact-assessment.PDF

changes how humans use water. What the CSIRO projects[3], is that in the NT potential evaporation will increase, with the largest absolute rates in summer by 2090.

The Sea is rising

Our climate is rapidly changing and our sea level will continue to rise. Rising sea levels will exacerbate the impacts of storm surges and other extreme sea-level events and are likely to affect water infrastructure and can result in water contamination issues. This project facilitates the Middle Arm factories which will ramp up extreme climate change and ensure high levels of sea level rise are observed. This will flush upstream and may reach the project area in decades to come.

Increased rainfall variability will make this project unsustainable.

Increased variability of the Top End's wet season will see dry years, where there is insufficient water to be removed from the Adelaide River. Any take in these years, which often happen sequentially, will be extremely detrimental to the already vulnerable ecology. This project will exacerbate vulnerable species on the edge. If there are businesses that rely on a sustainable flow of water and the provider is in the negative, will the take be dramatically reduced? Some years it starts to look like it will be a good Wet and then it's a fizzer and there is no guarantee we will keep reliably getting the Monsoon as we've observed this year with only a weak short and very late Monsoon so far. I see no sustainability built into this project, as in such dry Wet years, the evapotranspiration is likely to be elevated and having a shallow hot water storage is not a reliable way to store our precious water.

Threatened species are further threatened

It must be clear that the limitations on the flora and fauna surveys mean that the results are insufficient to adequately interpret the presence of vulnerable and threatened biota, and this is unsatisfactory. When there are clear recommendations, further surveys are necessary, are these straight out ignored? How can we assess the environmental impact properly if the ecologists say more surveys are necessary to make assessments? The extreme prevalence of fire across the whole site, especially in combination with the abundance of noxious weeds like gamba and ferals like cane toads means this region is already under severe environmental pressure.

The conclusion this project has unlikely impact on Partridge Pigeons completely misses the fact that the most important threat to this endangered bird is probably altered fire regimes,[4] so it is eliminating the too frequent fire and the fire grass weeds like gamba that would likely improve chances for this bird to return, rather than that this is not suitable habitat for it. The seeds it needs to eat are not there as they were burnt or displaced by weeds.

What is the point of assessing endangered species if the proposed project is found to definitely have a huge impact? For example, the report found the flooding will kill at least two-thirds of the *Helicteres macrothrix* in the area, and maybe even see the decline in the other third. This species only has two other populations[5]. This is very significant and can conclude that this project will speed extinction of this pretty pink flowered plant, and although this is found in the report: , "*the loss of at*

[3]https://denr.nt.gov.au/__data/assets/pdf_file/0011/944831/state-of-the-science-and-climate-change-impacts-final-report.pdf
[4] https://nt.gov.au/__data/assets/pdf_file/0003/206355/partridge-pigeon.pdf
[5] https://nt.gov.au/__data/assets/pdf_file/0006/405537/helicteres-macrothrix-mapped-distribution.pdf

least 25,000 plants may interfere substantially with the recovery of the species,"[6] this has not hampered the progress of this project and therefore its demise.

The Northern Quolls, although critically endangered, were assessed as not being impacted by this huge project, and I consider this erroneous. The report suggested that the population observed in nearby Bamboo Springs would not be impacted even though during the breeding season, the home ranges for males cover about 100 hectares.[7] So the flooding could see the demise of the nearby population as it removes a large part of the foraging habitat. Although it was recommended that proper assessment requires further surveys, there seems no clear plan or acknowledgement for the point of doing this, besides mere lip service. This is Australia's largest carnivorous marsupial, and therefore precious, and its population is in serious decline. It is entirely probable that the nearby population might expand into the full basin were proper control of the rampant fire, weeds and feral species dealt with.

It did not appear that the cumulative effects of the extent threatening processes were combined with the impending climate catastrophe. Rising temperatures and sea levels, as well as climate-induced changes in fire regimes, and extreme weather events will intensify existing threats such as habitat loss, invasive species and drought, and the species that are assumed in satisfactory abundance are likely to be impacted.

Agriculture will be detrimentally impacted by this project

The climate is changing and most crops we grow in the Top End will not be economic to grow in decades to come. It is likely that proposals for agriculture will fail, especially as this project facilitates the Middle Arm factories which will enable the fracking of the Beetaloo and the massive carbon bombs offshore.

Heat stress decreases productivity and increased temperatures lead to higher water demand by both crops and grazing animals. Variability in weather and rainfall can be expected to cause changes to the risks associated with pests and diseases and thereby potentially increase the cost to manage these impacts. Crops such as mangoes depend on a cold flush to flower and climate change is already seeing a diminishing in the cool nights of the Dry. A time is coming when the Dry will regularly fail and so many crops will be uneconomic.

Floodplain harvesting is as damaging as damming a river.

Both the CLP and ALP recently declared they do not support dams on flowing rivers, yet the evidence is clear that Wet Season flushes of the catchment are vital to the health of the rivers and to the lifecycle of important species, including barramundi and prawns. Floodplain harvesting at the scale planned for this AROWS project is likely to be extremely detrimental to the Adelaide River biota, in the catchment and downstream. The nearby floodplains rely on the big floods for their magnificent biodiversity. Draining the water from the river will mean a potential of a half metre drop in standing water in the floodplains which impacts on most species there. It means the water will dry faster, possibly months faster and so can end the full reproduction of invertebrates and obligate floodplain species like *Oryzas* that feed important and iconic species like Magpie Geese, already under severe

[6] https://ntepa.nt.gov.au/__data/assets/pdf_file/0011/1467641/appendix-c-arows-threatened-species-assessment.PDF
[7] https://nt.gov.au/__data/assets/pdf_file/0005/205475/northern-quoll.pdf

pressure. Major potential threats to Magpie Geese include wetland degradation and climate change leading to saltwater intrusion in freshwater wetlands and rivers, and this assessment seems to ignore these likely damages.

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Image[8] of the Adelaide River, showing the floodplains in seasonal flood, should this water be removed such environments will suffer.

Climate change is likely to be exacerbated by this project

Power and Water's water story[9] also made it clear we have a huge issue due to our rapidly changing climate:

> *Power and Water has … adopted a mid-range emissions scenario developed by CSIRO for its water supply planning. Climate change is expected to impact on the Darwin region's water supply system yield. Modelling has identified significant potential impact on the yields available from Manton Dam and Darwin River Dam…*
> *Increased rates of evapotranspiration in the catchment will lead to reduced inflows. Combined with increased evaporation from the dams themselves, this will lead to a reduction in available water for the region's water supply.*
> ***Modelling has identified the potential for a 13% reduction in yield** from Darwin River Dam and a 3% reduction in yield from Manton Dam by 2030…. Power and Water has adopted a 3% increase in demand associated with climate change by 2030 for its water supply planning.*

[8] https://ntindependent.com.au/public-consultation-for-arows-projects-environmental-impact-opens/
[9] https://www.livingwatersmart.com.au/sites/default/files/2018-02/darwin_water_story.pdf

As we are accelerating all systems go to release as much methane as we can as fast as we can, it is prudent to dump this pretense that the mid-range emissions scenarios are the ones to follow. Australia is a world leader in exporting fossil gas and coals and as such we are *still* expanding our emissions. The NT is a gas export haven and exporting gas is 33% worse in terms of greenhouse gas emissions over a 20-year period compared to coal[10]. We are now heading into the dirty bottom of the barrel gas mines like Barossa, which essentially is a carbon dioxide mine with a methane byproduct. Carbon capture and storage and offsets are expensive hobbies and not even remotely useful for saving our climate.

The Northern Territory is especially vulnerable to the impacts of climate change with a predicted increase in extreme heat days (over 35^0 C), an increase in the severity of extreme weather events, changes to water availability, and an increase in the rate of sea-level rise and number of extreme sea-level events. CSIRO modelling estimates that without climate action the number of days above 35^0 C in Darwin could increase from 47 days (1981-2010 average) to 288 days per year in 2090[11]. That's ten months a year that are swelteringly hot! It used to be only 6 such hot days a year in Darwin.

The thing is that this project is not being done for water to drink or shower in, it is being done to service the factories proposed for Darwin Harbour's Middle Arm. Well at least half is. Middle Arm is a project that will undoubtedly ensure Darwin is unlivable by the time the hundred years of the timeline for this project expires. So the conclusion is this project will see the demise of a strong economy and a stable population in the Northern Territory so should be rejected.

What we Territorians need most for a thriving future is a safe climate.
It is possible to live much more sustainably in the NT, it's just not been pursued. It's time to.

[10] https://earth.org/lng-33-worse-for-climate-than-coal-over-20-year-period-groundbreaking-research-reveals/
[11]https://denr.nt.gov.au/__data/assets/pdf_file/0011/944831/state-of-the-science-and-climate-change-impacts-final-report.pdf