

# Drought resilient water supplies

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**Jacobs**

Challenging today.  
Reinventing tomorrow.



## Never blame the drought

- "Plans are nothing, planning is everything"
- If you think someone else is responsible for anything mentioned today make it your responsibility that it is done



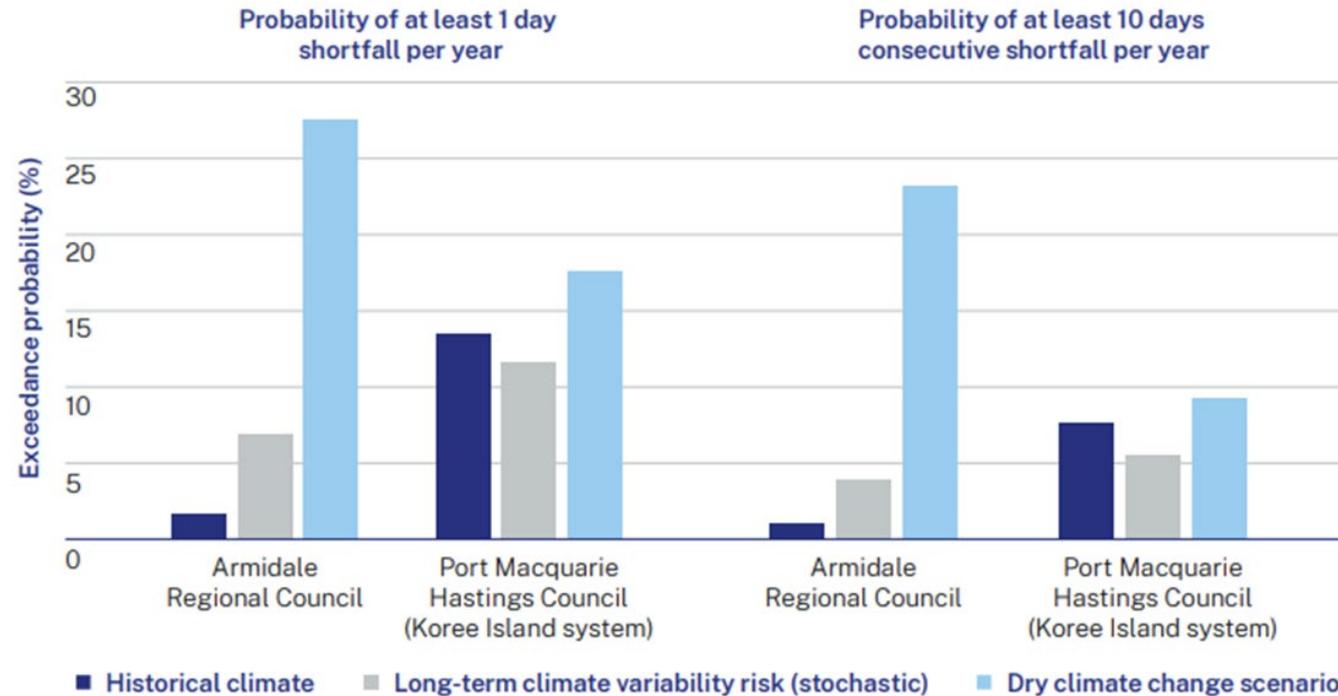
## Tinder Box Drought - 2019

- There will always be a bigger and better drought
- We need to be better prepared
- Luckily, this drought was short
- Enduring level of supply concept



# Regional Water Strategies post Tinder Box

Figure 14. Probabilities of modelled supply shortfalls for different parts of the North Coast region



- Move towards an enduring level of supply for large towns
- Establish a coordination approach to town-water related actions
- Develop measures for managing extreme events
- Water conservation and efficiency measures
- Innovative water management approaches
- Immediate and long-term water solutions for Bathurst, Orange and surrounding towns
- Reduce uncertainty in groundwater security for the region's towns
- Capacity building for local water utilities

## Drought Response Plan

- Always starts with Water Efficiency 100% of the time that ramps up during a drought
- Restriction schedule – go soft often or hard rarely?
- As the storage levels go down the risk of day zero goes up
- Environmental flow rules get relaxed
- Is day zero running out of water completely or only being able to supply the enduring minimum supply of water?
- If you can cart and meet “normal” supply that is not day zero
- Knowing how you supply the enduring supply of water no matter how long the drought goes for and when you need to implement those actions is essential otherwise not a drought response plan

## Enduring level of supply

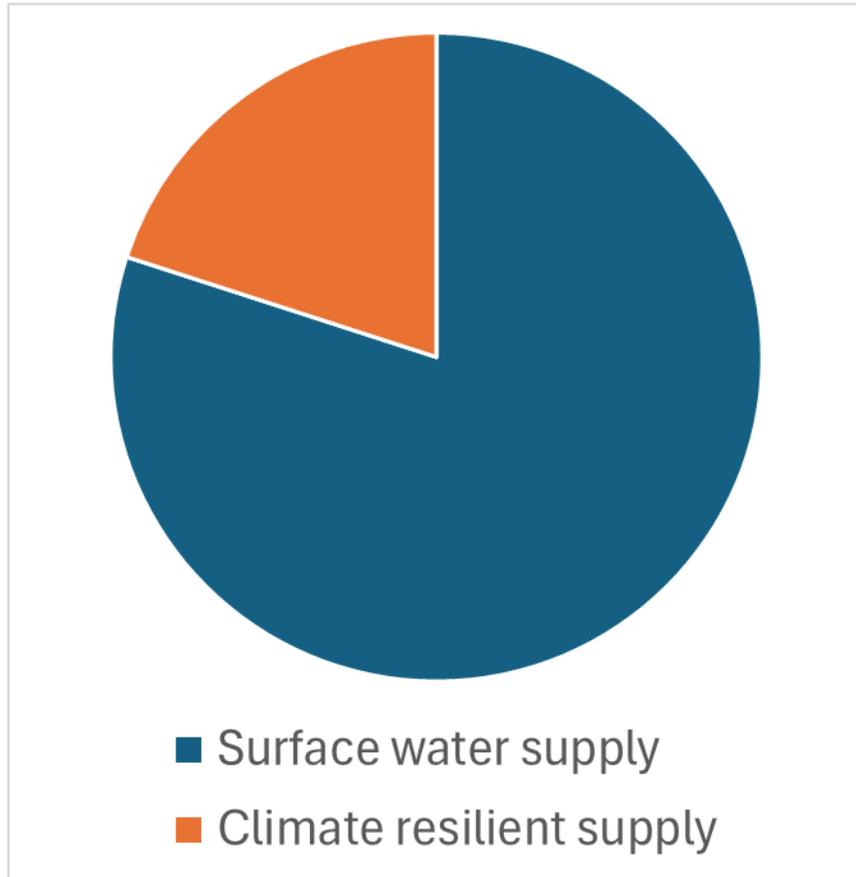
- Hunter District has consulted with the community re what is an acceptable enduring level of supply being 200 lpd total or 100 lpd residential
- Every community will be different but 200 lpd is not a bad starting point
- London/England are aiming for rota cuts no more frequently than 1 in 500 years by 2035 or around 80 lpd residential

## Duration matters

- The longer the duration of an event the tolerance for reduced supply reduces
- Reason for the disruption may also matter
- Droughts not considered an emergency event



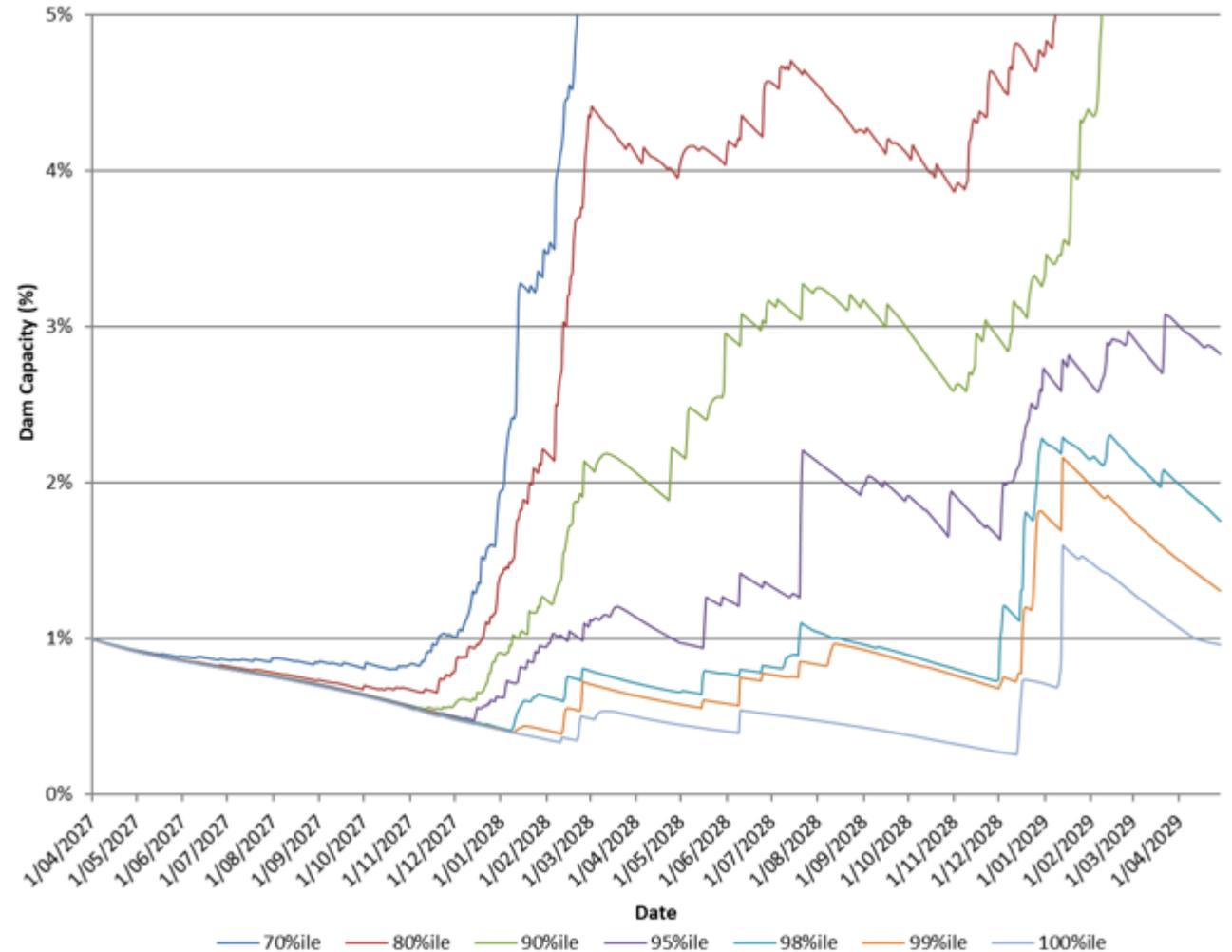
## Climate resilient supply



- Would be nice to have enduring minimum supply that is 100% climate resilient
- You need to define what you have now and what may be able to be provided in response to a drought
- Residual is what you will still need from a surface water supply

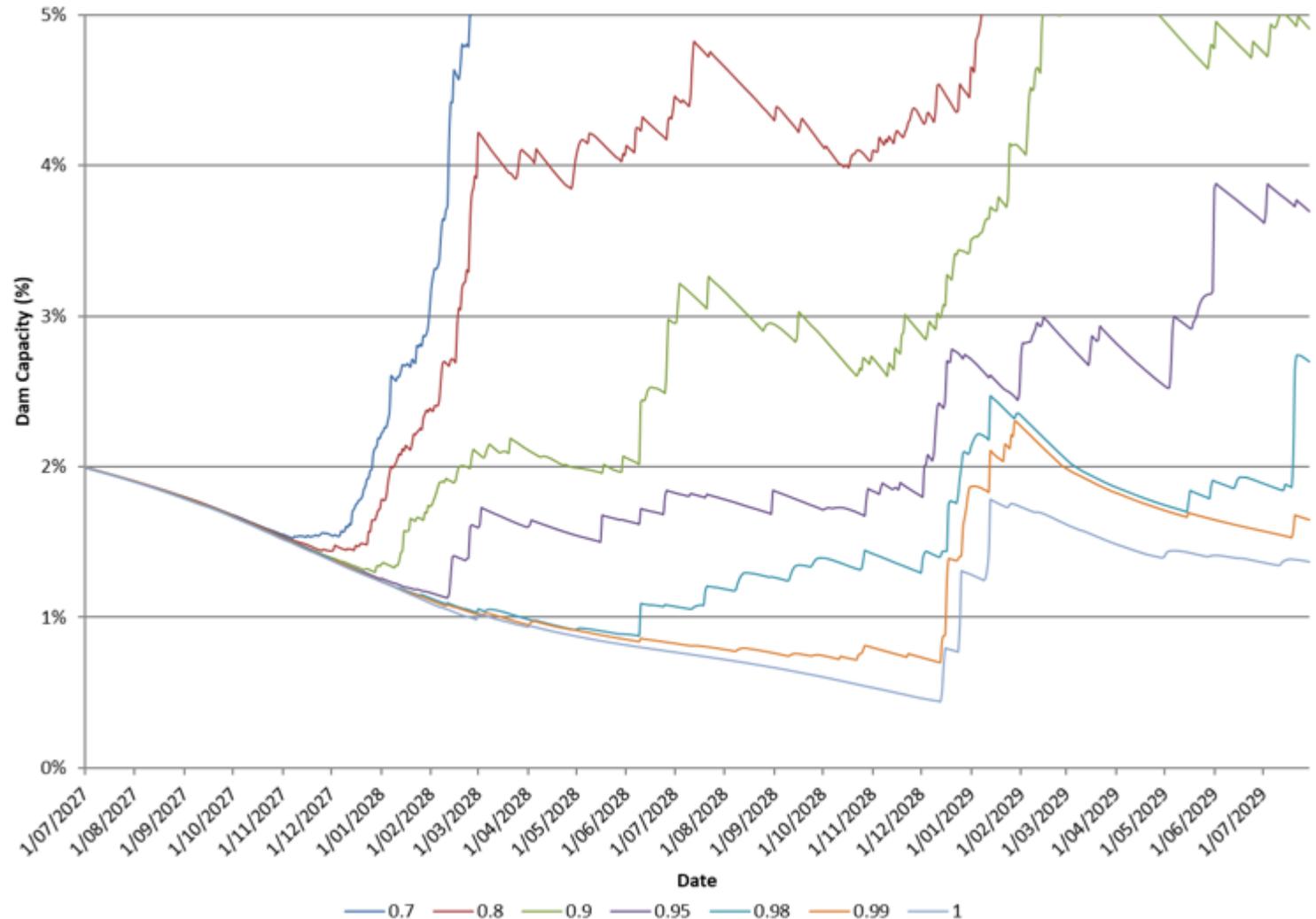
## Short Term 2-year drawdown model from 1%

- If we wait until 1% before we introduce enduring level of supply restrictions this is an example of what may happen
- Lowest storage level reached is 0.1 to 0.25%, but only 1% probability
- Probability of 0.5% is 10%
- Need to react earlier due to siltation and other unknowns



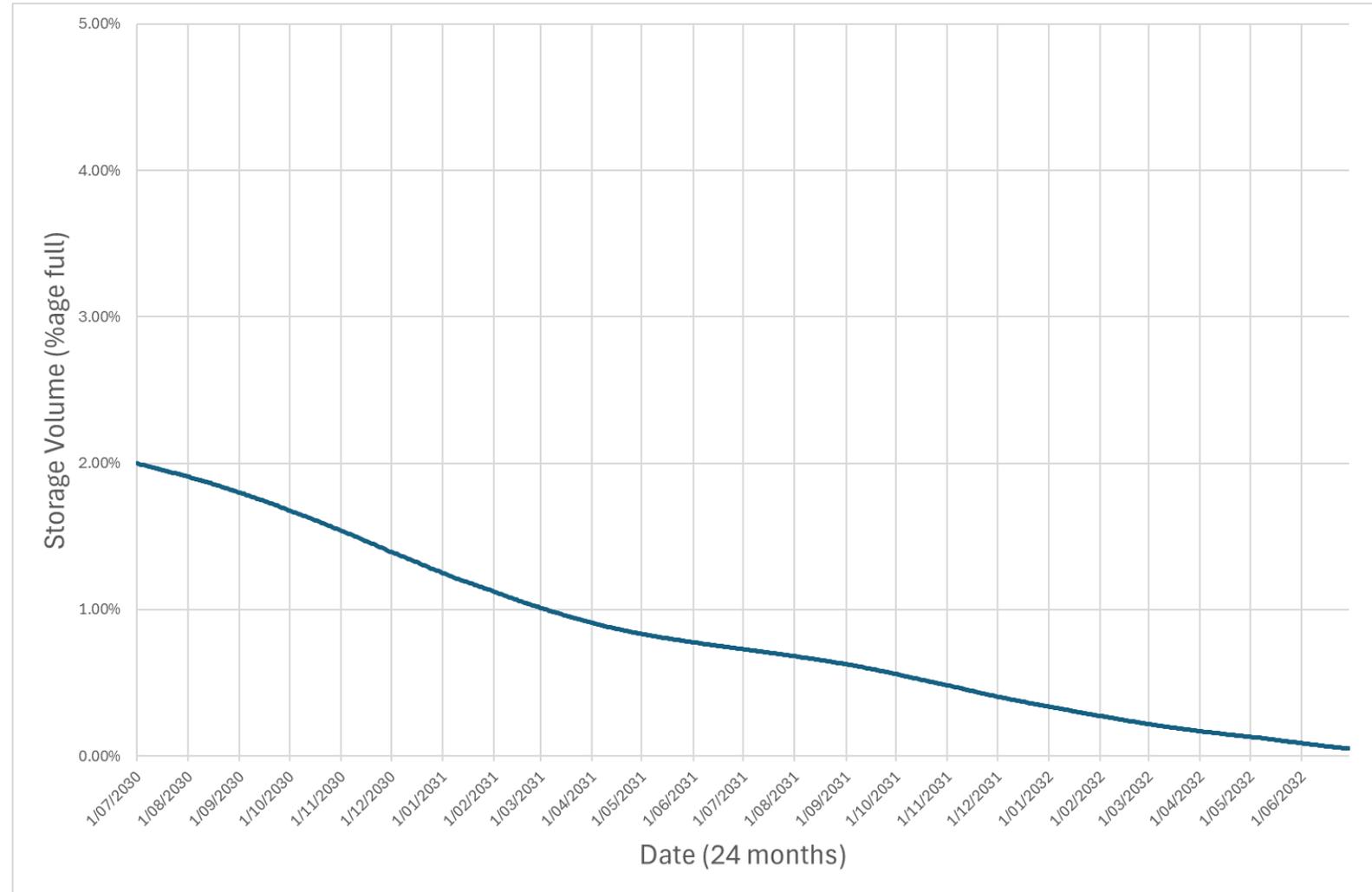
## Short Term 2-year drawdown model from 2%

- If we start at 2% with enduring level of supply restrictions this is an example of what may happen
- Lowest storage level reached is 0.44%, but only 1% probability
- Probability of 0.5% is 1% and minimum operating volume is 4%
- Probably acceptable?



# What happens if zero inflows?

- Supply failure in 25 months
- Recovery or duration unknown
- Have 2 years to build a climate resilient supply



## Evacuation

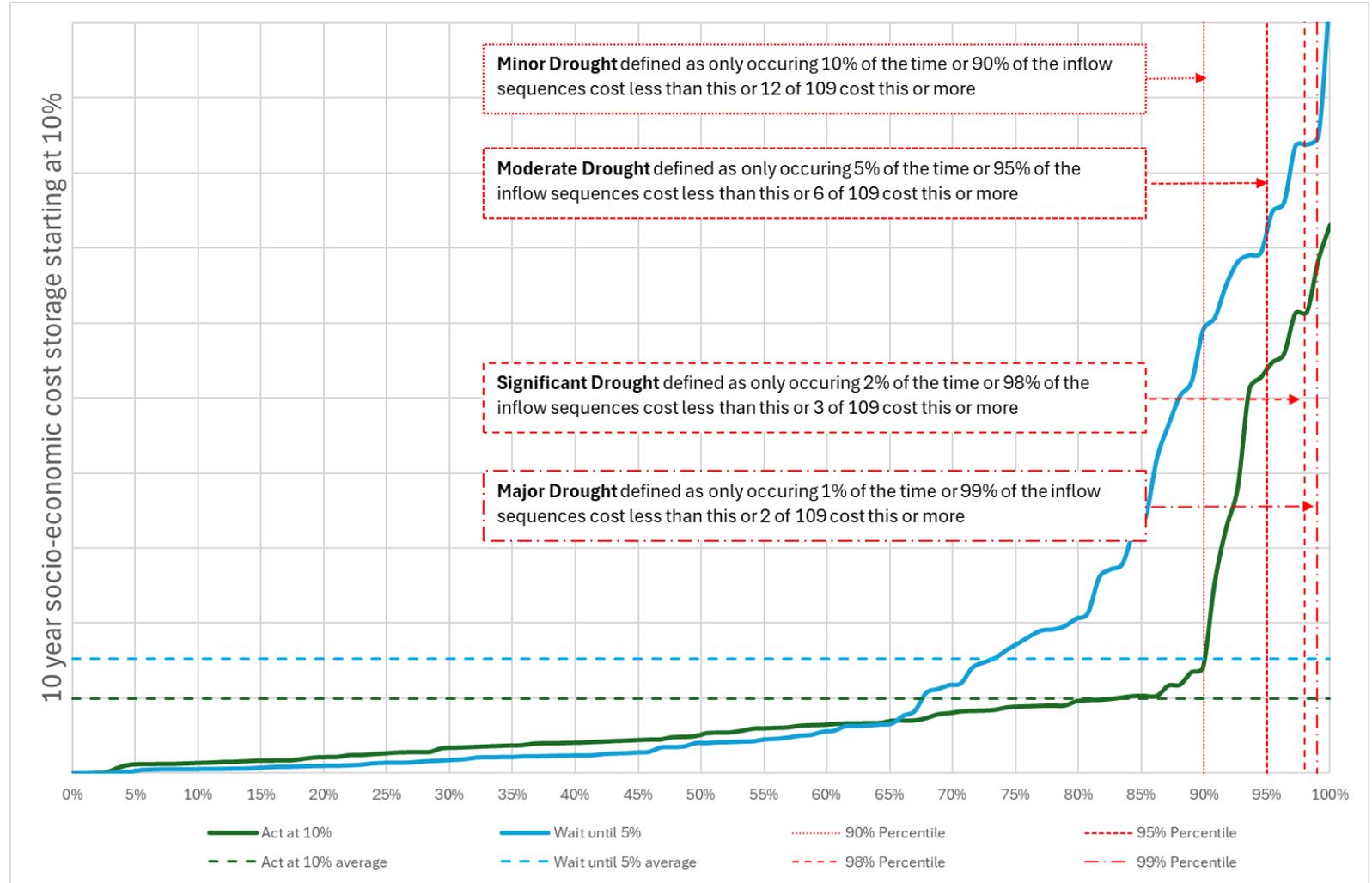
- If you cannot meet the enduring minimum supply volume evacuation may be the only option
- Was “acceptable” for Cyclone Tracy over 30,000 of 47,000 left the city
- Is this acceptable for a drought that we can see coming?
- As the storages get lower the risk will become real and action will be taken
- Need to have a plan

## Need to start planning for when the storage is empty

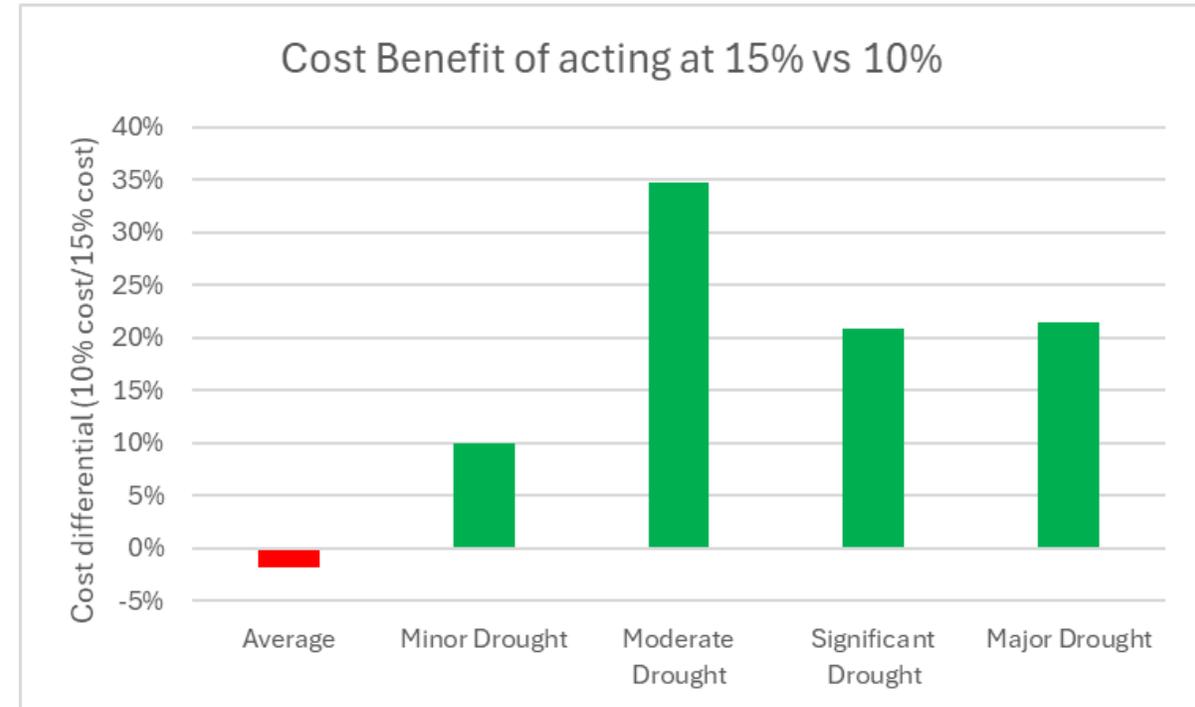
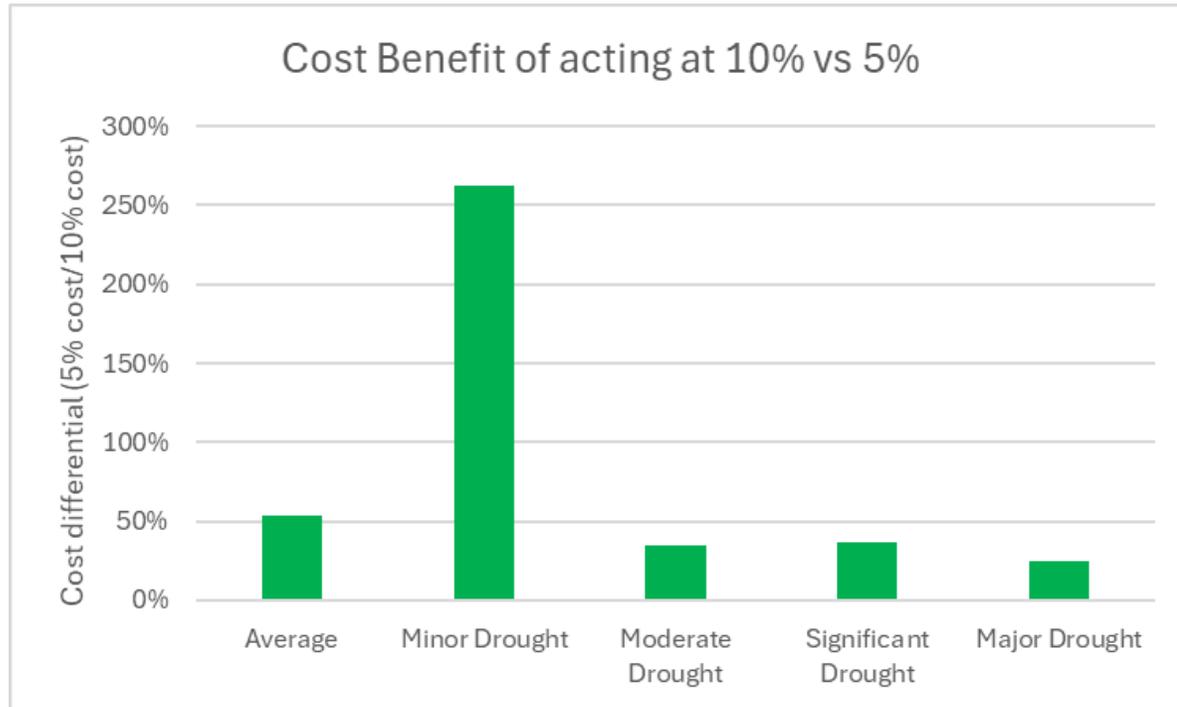
- Do not need to act now but need to know what we will do ignoring what the probability is of getting there
- Regional strategies still use the top-down approach and assess the probability of day zero or restriction frequency and duration
- False sense of confidence and no action plan
- You need an accepted Drought Response Plan

# Earlier decisions

- Can use socio-economic costs
- 65% chance of cost being greater if we act at 10% rather than wait until 5%
- Cost savings if drought continues substantial



## Value of water gets lower as the storage level increases



- Same decision at 15% vs 10% cost benefit much lower and 90% chance of cost being greater if you act now so you wait

## Conclusions

- We need to be ready to respond to drought regardless of long-term yield expectations
- By planning from the bottom-up we can have more informed discussions today and be better prepared by knowing what we want to avoid
- Short term probabilistic economic analysis is better understood by the decision makers and enables spending and drought preparation earlier

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