



# Groundwater Management in a Drying South West

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# Research Project Information

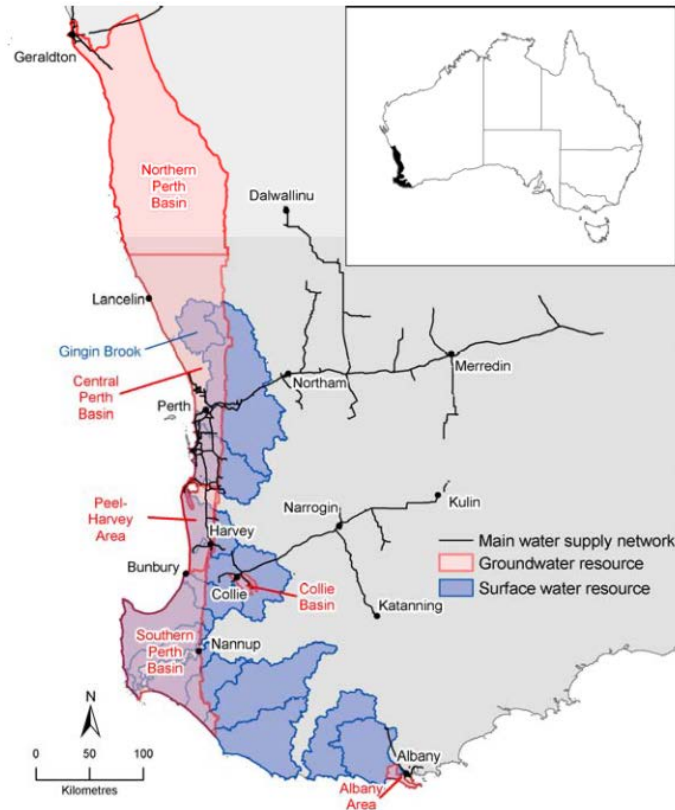


- Further information on the project 'A Regulatory Framework for Management of Groundwater in a Drying South-West Climate' is available at
  - <http://www.law.uwa.edu.au/research/water-resources-reform/regulatory-framework-for-management-of-groundwater>
- The project is supported by Commonwealth research funding provided through the National Centre for Groundwater Research and Training:
  - <http://www.groundwater.com.au/>

# Outline of presentation

- The South West: climate change and groundwater management challenges
- Areas of reform in the National Water Initiative that may help meet these challenges:
  - Improved water planning
  - Broader regulatory coverage
  - A new water entitlements regime
  - Expanded water markets

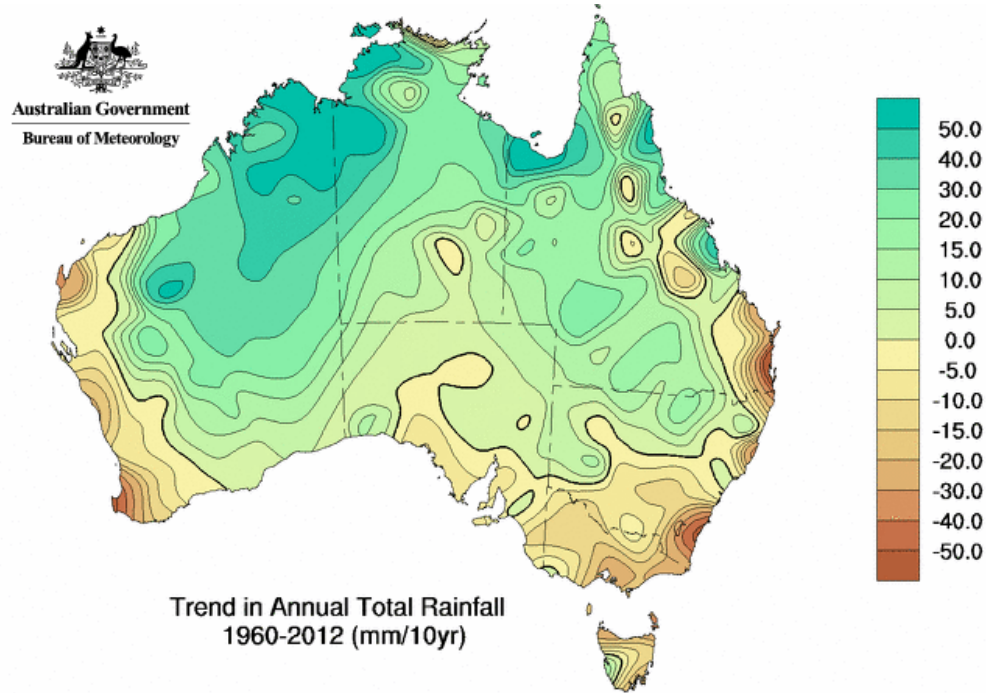
# South West WA



- Water resources provide economic and social benefits through urban uses (45% of water use), irrigated agriculture (38%), mining (7%) and industry (5%)
- Water also sustains the natural environment, including internationally-significant wetlands
- Challenge to meet increasing water demand in drying climate

CSIRO (2009)

# Rainfall trends



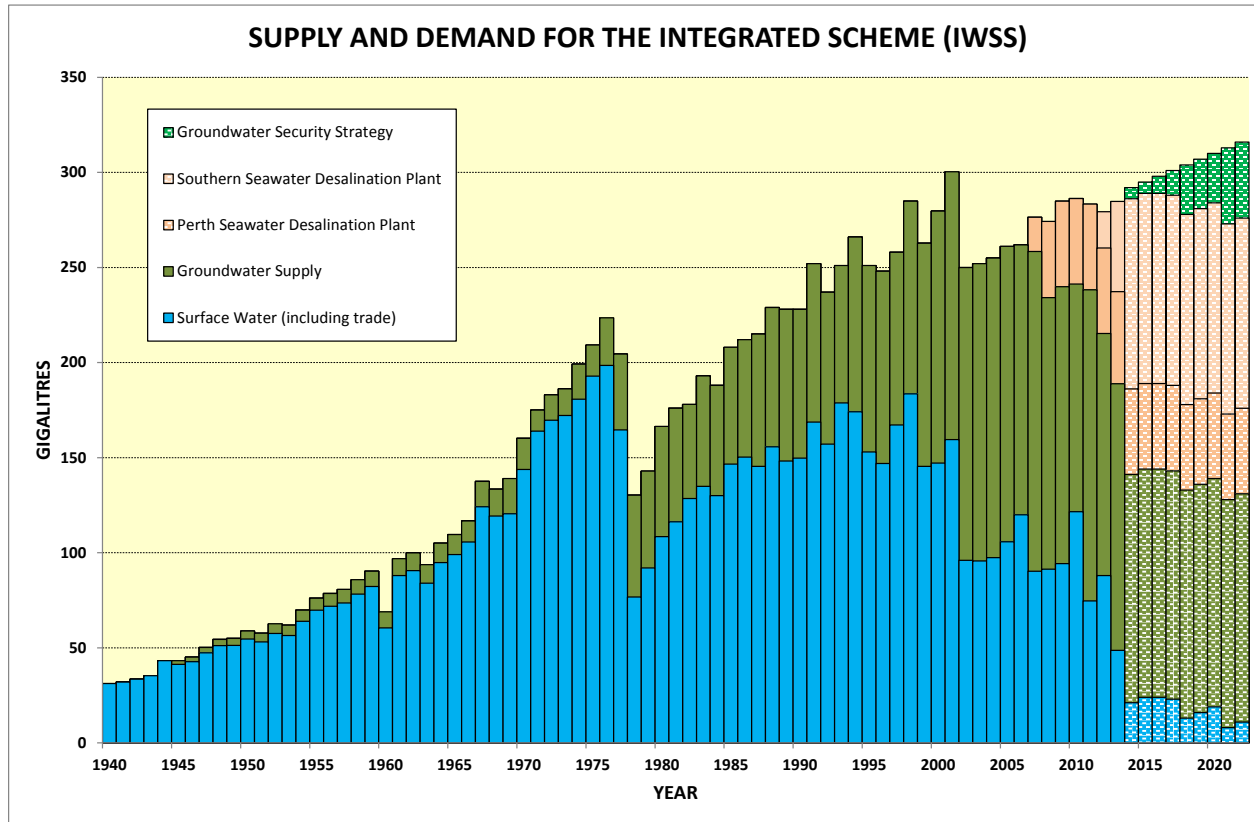
# Human-induced climate change



*“The observed patterns of large-scale atmospheric change associated with SWWA rainfall reductions are consistent with what would be expected in an atmosphere influenced by increasing greenhouse gas concentrations.”*

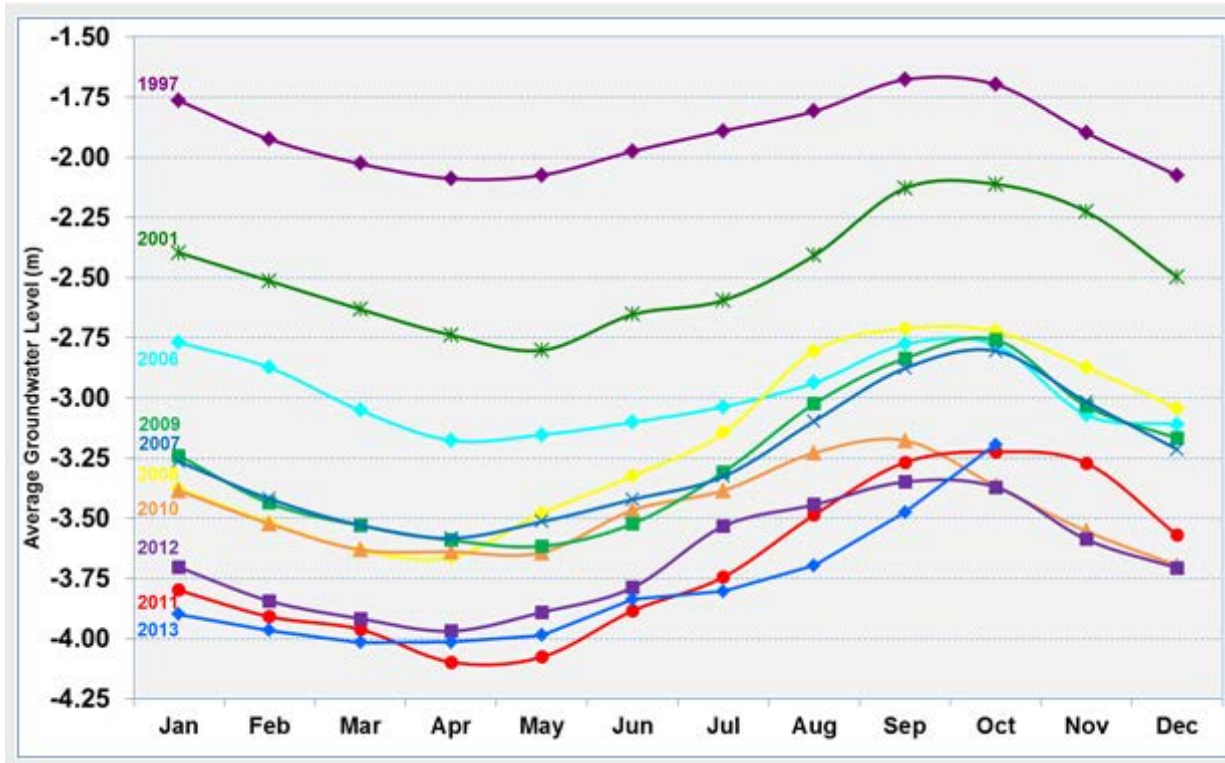
Indian Ocean Climate Initiative (2012), 9-10.

# Changing water supply strategies



# Groundwater impacts

Average groundwater levels: Gnamptara Mound





# Yarragadee water levels, Perth, 1973-2008



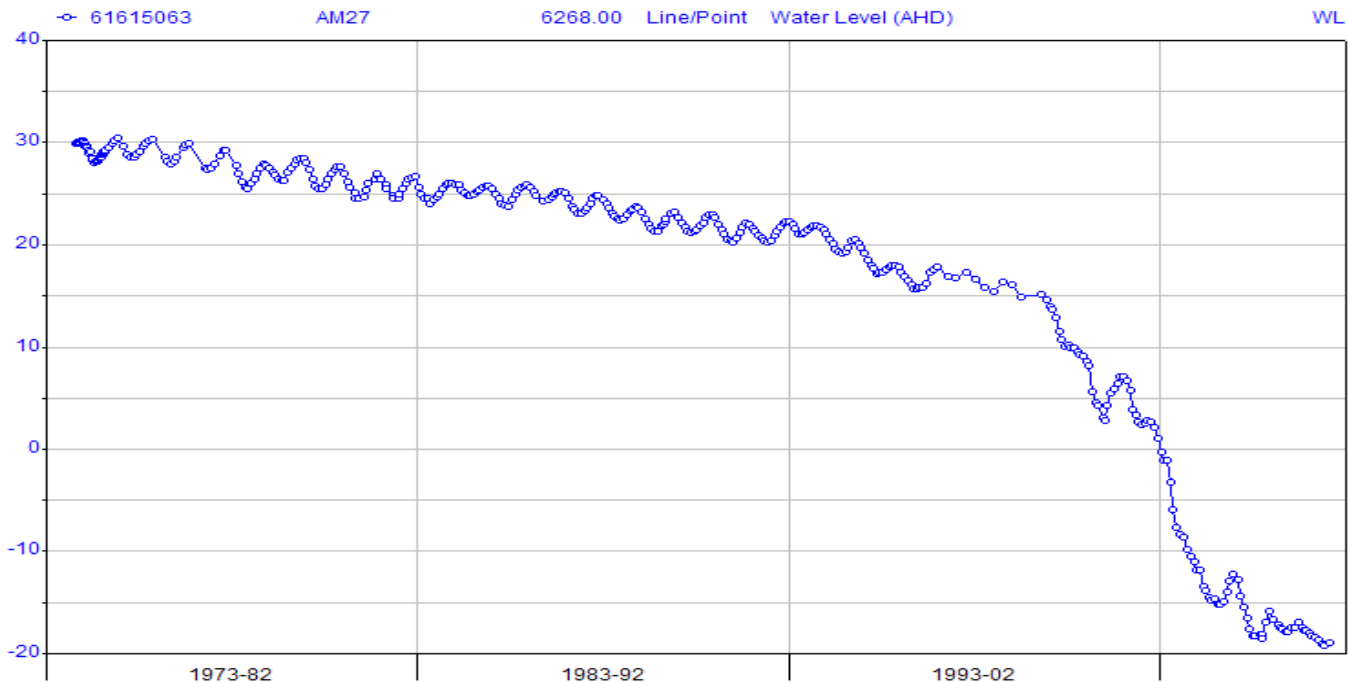
## Department of Water

HYPLOT V129 Output 03/09/2007

Period 35 Year Plot Start 00:00\_01/01/1973

1973-08

Interval 1 Month Plot End 00:00\_01/01/2008



# Likely future for the south-west



- CSIRO modelling in 2009 of water yields & demands to 2030
- Reduced water yields:
  - average surface water yields could be 24% lower
  - average groundwater yield 2 to 7% lower, but up to one third in Gnangara, Blackwood, Albany
- Increased in water demand of about 35%

# The NWI Model



- Water planning determines:
  - formal legal allocations of water to environment;
  - adjustment to environmentally sustainable take on transition to NWI water access entitlements (WAE)
- WAE confers *perpetual entitlements* as shares of available consumptive pool, determined as *annual allocations* to water account
- All extractions to be metered, reported and clearly accounted
- Regular reviews to re-set plan regime & entitlements

# Groundwater management challenges



- How should water be shared between environmental and consumptive uses?
- How can over-allocation be avoided in a drying climate?
- How to promote efficient and productive use of scarce water?

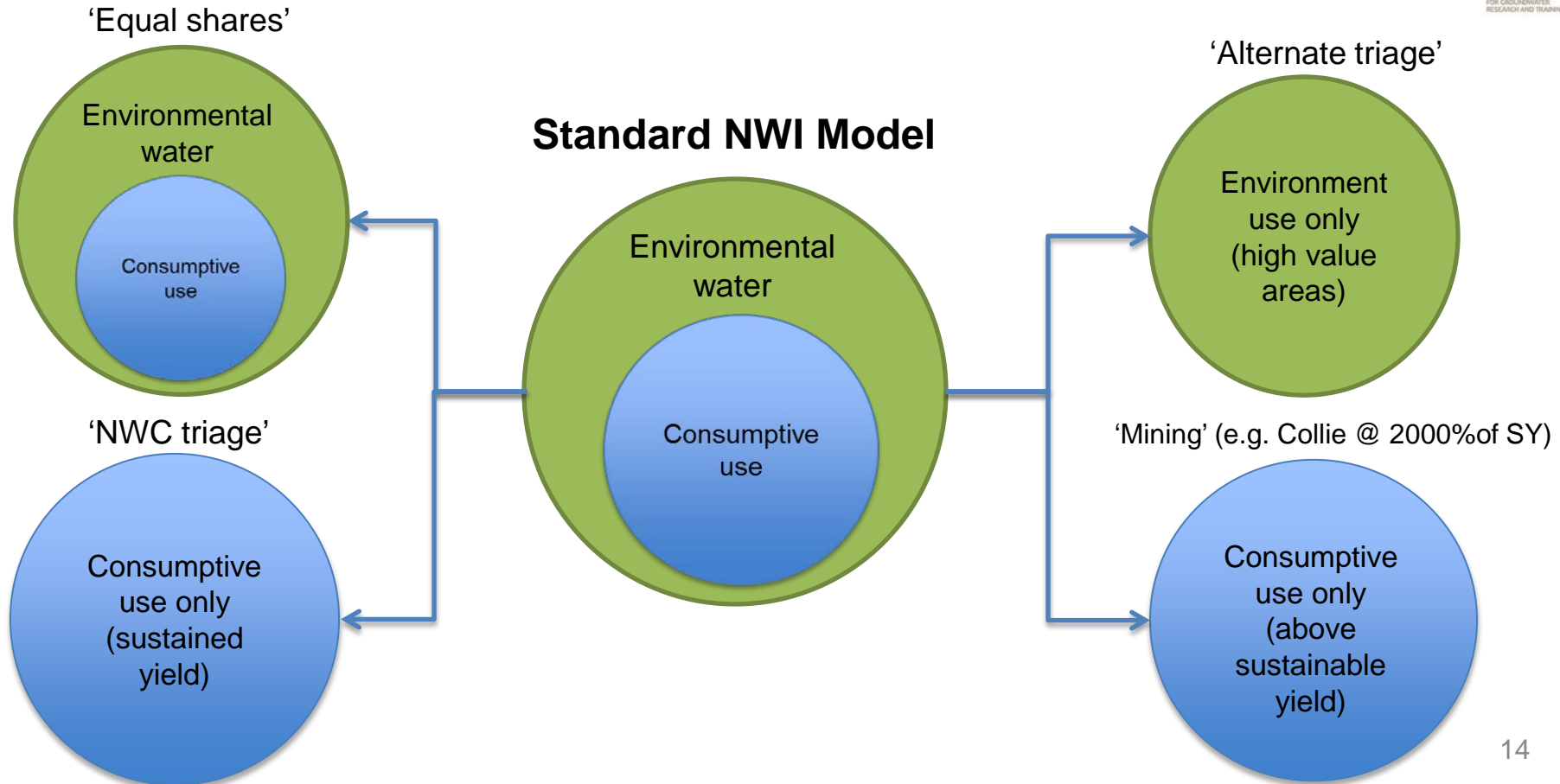
# Hard choices in a drying climate



*Future adaptation responses may involve making difficult ‘triage’ decisions in managing water-dependent ecosystems. They may include decisions about whether to continue to water already degraded sites that are unlikely to survive due to climate change.*

National Water Commission (2012), xiv

# Consumptive Pool Options

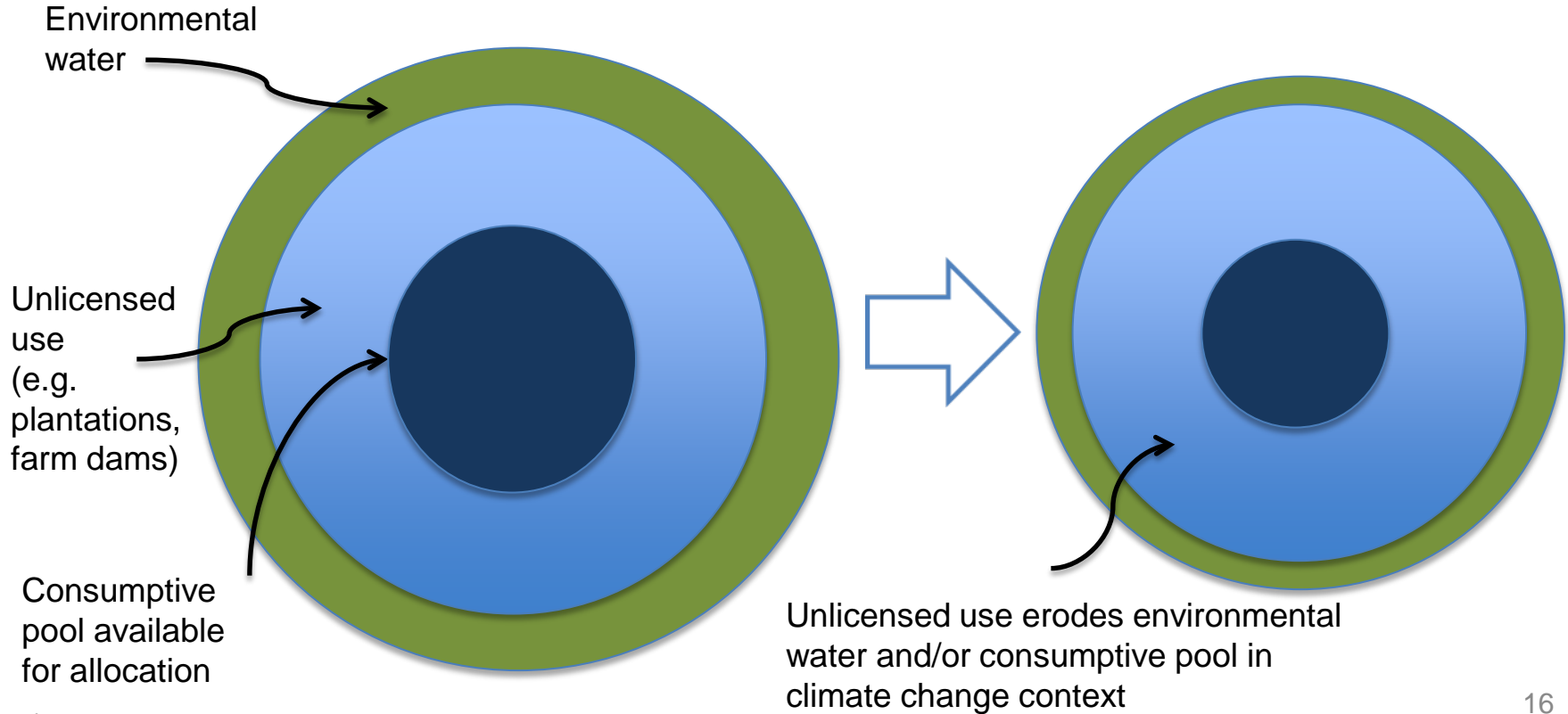


# Statutory guidance for water plans

## - Some legislative options

- Plan must address climate change risks
  - e.g. *Water Act 2007* (Cth) s22
- Allocation limits must be environmentally sustainable
  - e.g. *Water Act 2007* (Cth) s23(1)
- Priority for environmental water over some consumptive uses
  - e.g. *Water Management Act 2000* (NSW) s5(3), 9, 20(2)(f)

# Risks of unlicensed use





# Groundwater management challenges



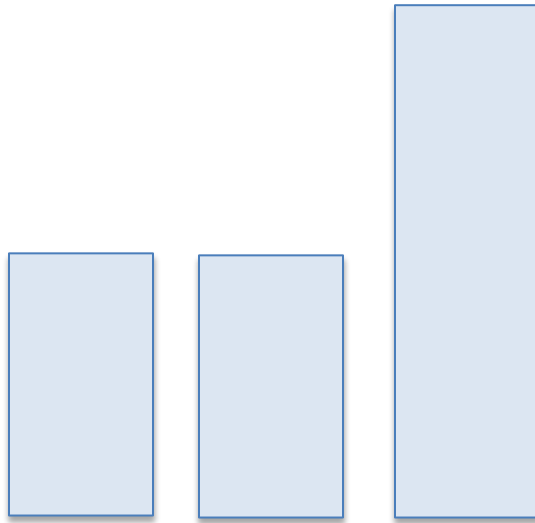
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# Approaches to avoiding over-allocation

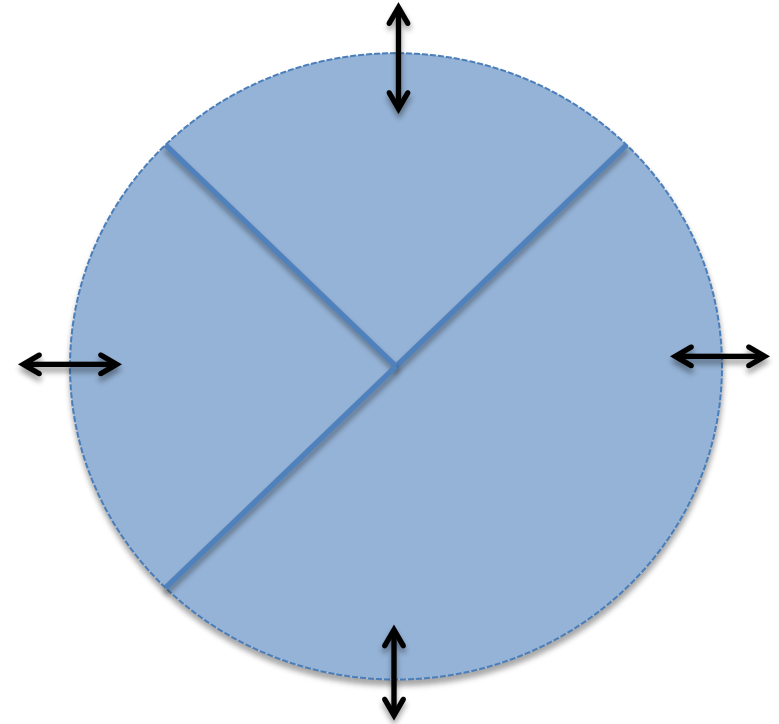
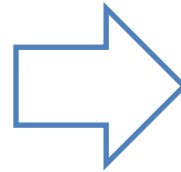


- One approach:
  - conservative, regularly-reviewed allocation limits
  - short term licences to take a fixed annual volume water
- NWI approach:
  - perpetual entitlements to a share of a consumptive pool

# Transition to NWI entitlements

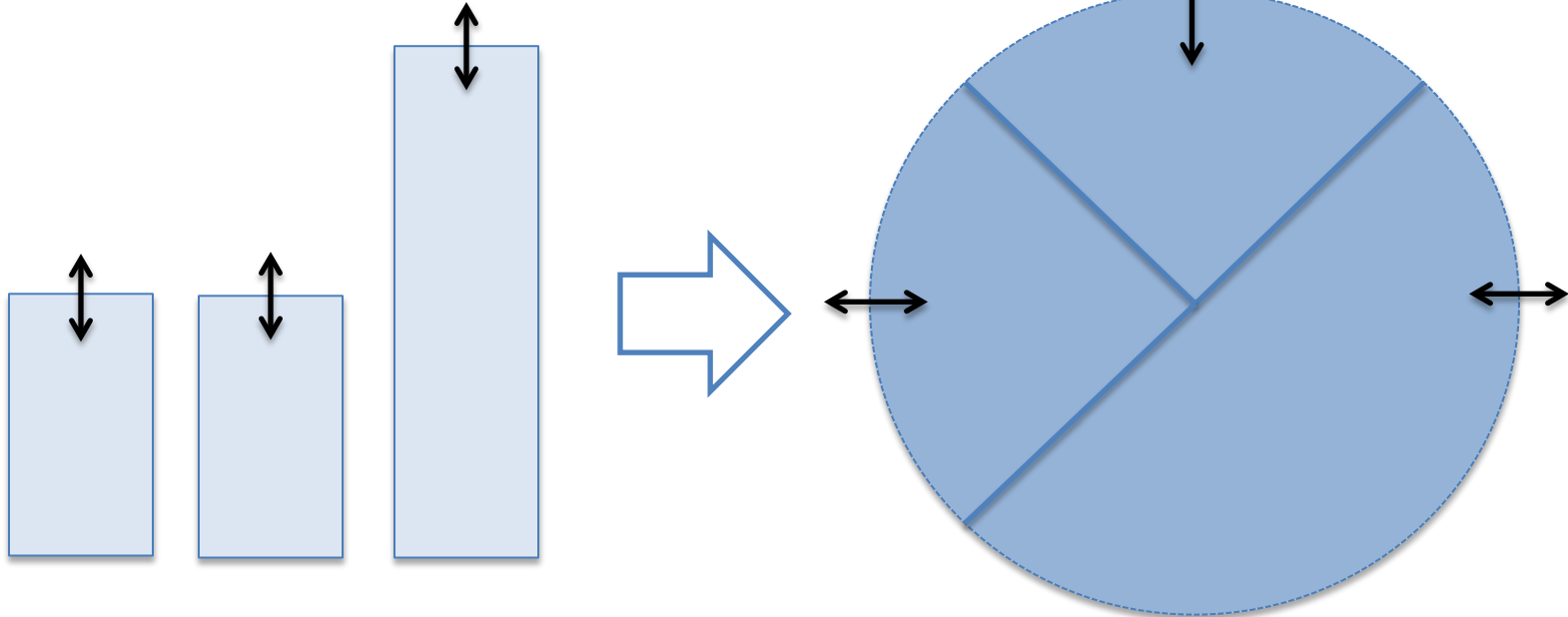


Current fixed volume  
entitlements



NWI Share entitlements

# Periodic allocation variation under current system vs NWI



- Fixed term licences (e.g. 10 years)
- Administratively difficult to vary volume
- Complex compensation rights

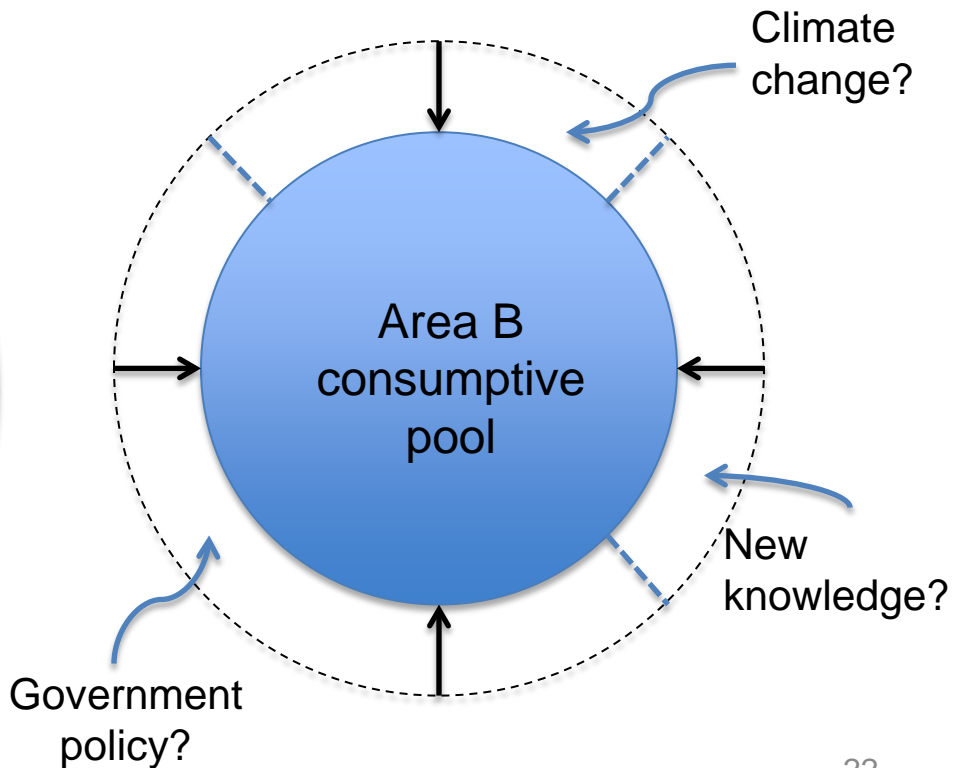
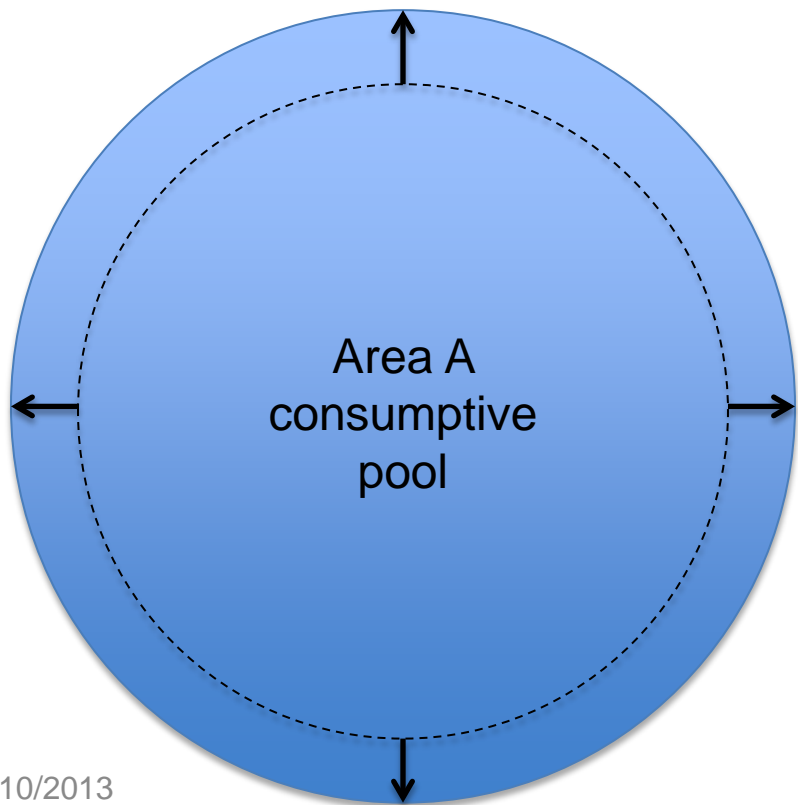
- Perpetual entitlements & periodic allocation
- Administratively easier to vary volume
- No compensation rights

# Risk assignment for plan reductions in consumptive pool

- NWI risk assignment rules (in absence of agreed alternative approach)

Risk	Responsibility for risk
Weather, climate, natural events	Holders of water access entitlement
Changes of government policy	Relevant government
Improvements in knowledge of water systems	Shared between entitlement holders, State/Territory and Cth Governments

# Plan amendment & Issues with risk assignment rules



# Groundwater management challenges



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# Water markets in a drying climate

*Water markets have proven to be effective in reallocating water to its highest valued uses, particularly during severe droughts. Because climate change is likely to lead to both rapid and cumulative changes in water supply and demand, water markets will be an important adaptation mechanism to ensure that maximum value is obtained from Australia's scarce water resources.*

National Water Commission (2012), 63.



# Water markets: NWI commitments

- To the extent practicable, unallocated water should be released through market-based mechanisms
  - NWI para 72
- Facilitate the operation of efficient water markets and opportunities for trading
  - NWI para 58(i)

# Water markets: potential reforms



- Initial release of unallocated water:
  - Auction water, rather than allocating for free on 'first in-first served' basis
- Water trading
  - Reduce restrictions on trading (e.g. remove landholder eligibility requirement)

# Conclusion

- We need to prepare for a drying south-west climate
- Groundwater regulatory framework could be improved by:
  - Stronger planning provisions
  - Broad regulatory coverage
  - Share-based water entitlements
  - Expanded water markets

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