

# Lessons from Australia's Millennium Drought



**National Water Commission**



**UNIVERSITY OF  
CANBERRA**



**INSTITUTE FOR  
APPLIED ECOLOGY**

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# Outline

- Policy context
- Millennium Drought
  - The prospect of things to come
- Key policy responses
  - Water allocation
  - Urban
  - Rural
  - Environment
- After the drought

# 20 years of water reform in Australia



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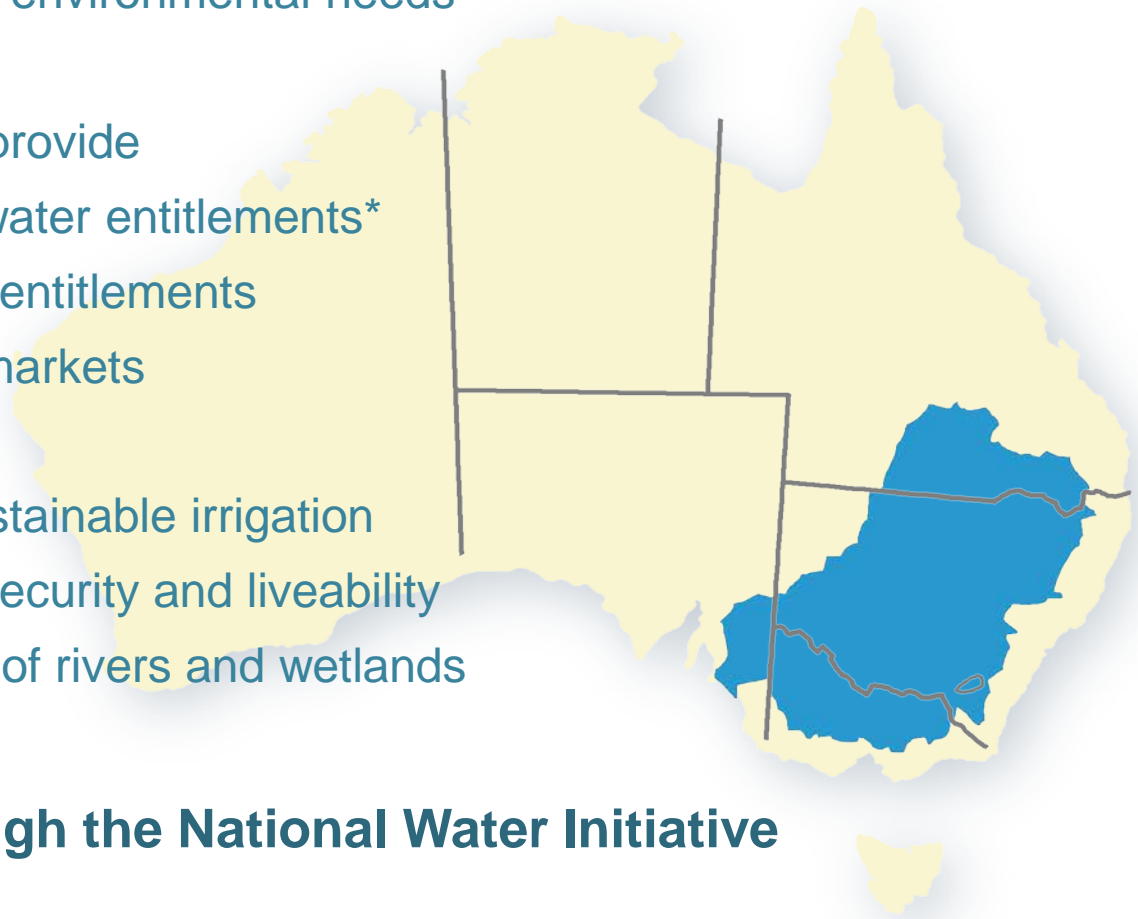


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# 20 years of water reform in Australia

**Goal:** Effective management of water resources to meet future urban, rural and environmental needs

- Water planning to provide
  - Clear, secure water entitlements\*
  - Environmental entitlements
- Functioning water markets
- Focus on efficiency
  - High-value, sustainable irrigation
  - Urban supply security and liveability
- Improved condition of rivers and wetlands

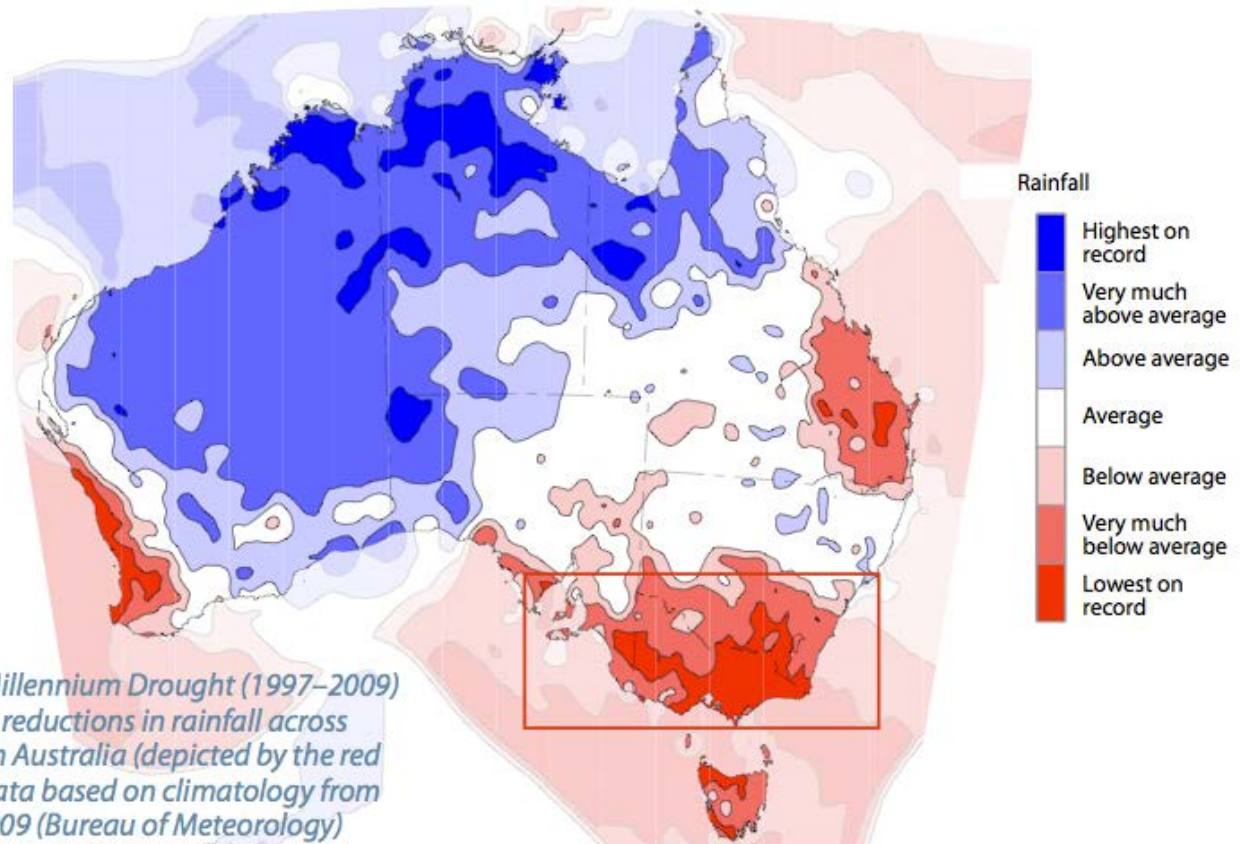


**Implemented through the National Water Initiative**

\* *water entitlements = water rights in California*

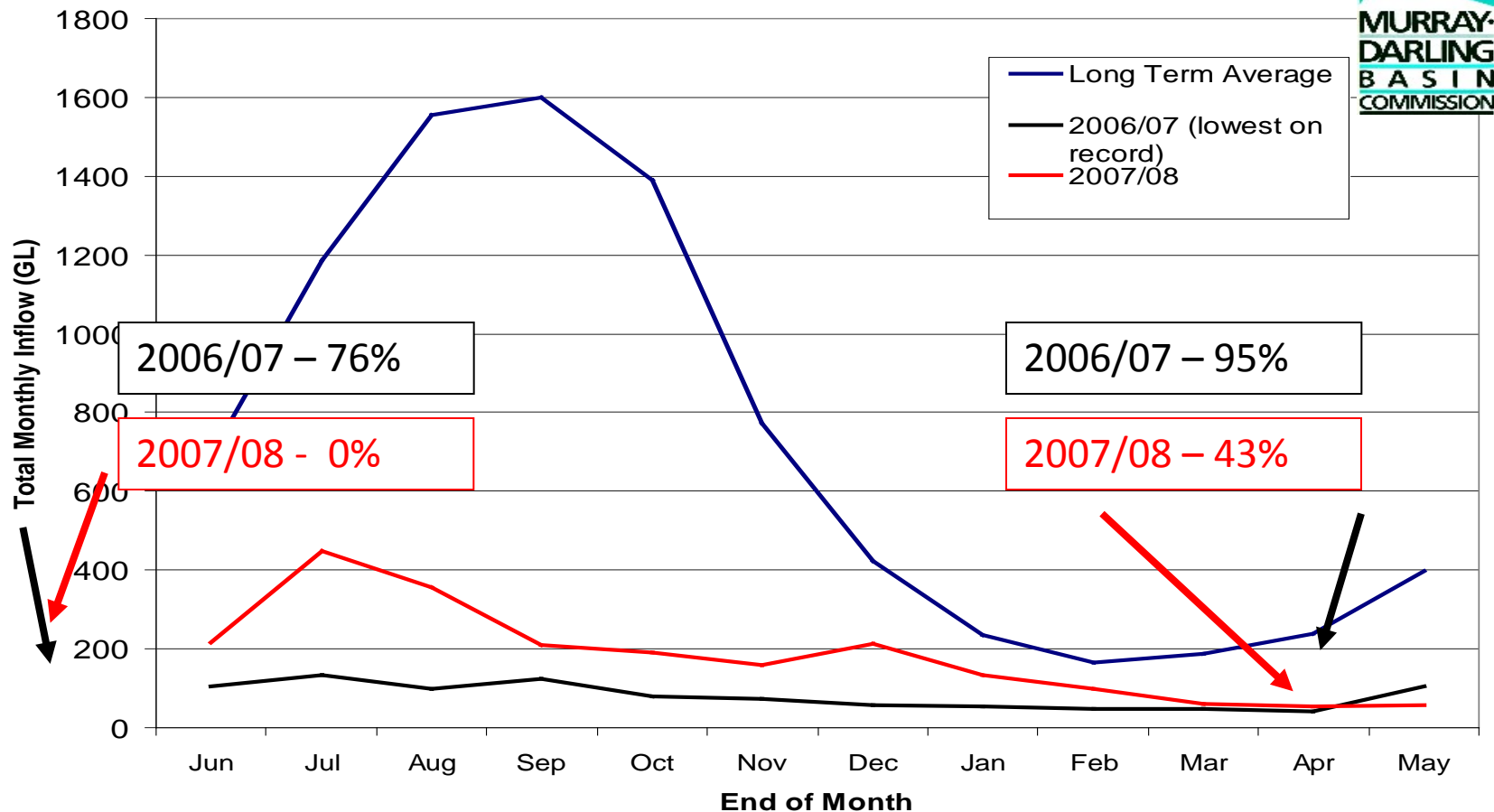
# Millennium Drought in SE Australia

- 1997 to 2009: Longest, most severe on record
- Equivalent to 'worst case' 2050 climate change scenario



# Inflows and allocations in the Murray River

Inflows to the River Murray (excluding Menindee and Snowy)  
Long Term Average and Selected Water Years





# Urban and agricultural impacts

- Urban
  - Water restrictions limited to *indoor only use*
  - Water carting to many small rural communities
- Irrigated Agriculture
  - Irrigation allocations: 0% -10%
  - 2002 – 2009
    - Rice 99% ↓
    - Cotton 84% ↓
    - 1/3 all vines sacrificed
  - Health impacts, foreclosures, suicides
- Economy
  - 2006-07: loss of ~1% of GDP
  - 2006-09: loss of 6,000 jobs in Murray region

# Environmental impacts



- Streamflows significantly reduced (some 5% of natural flow)
- Environmental flows restricted to provide for critical human needs
- Acidification of Lower Lakes
- Dying floodplain forests
- Multiple species at risk of extinction

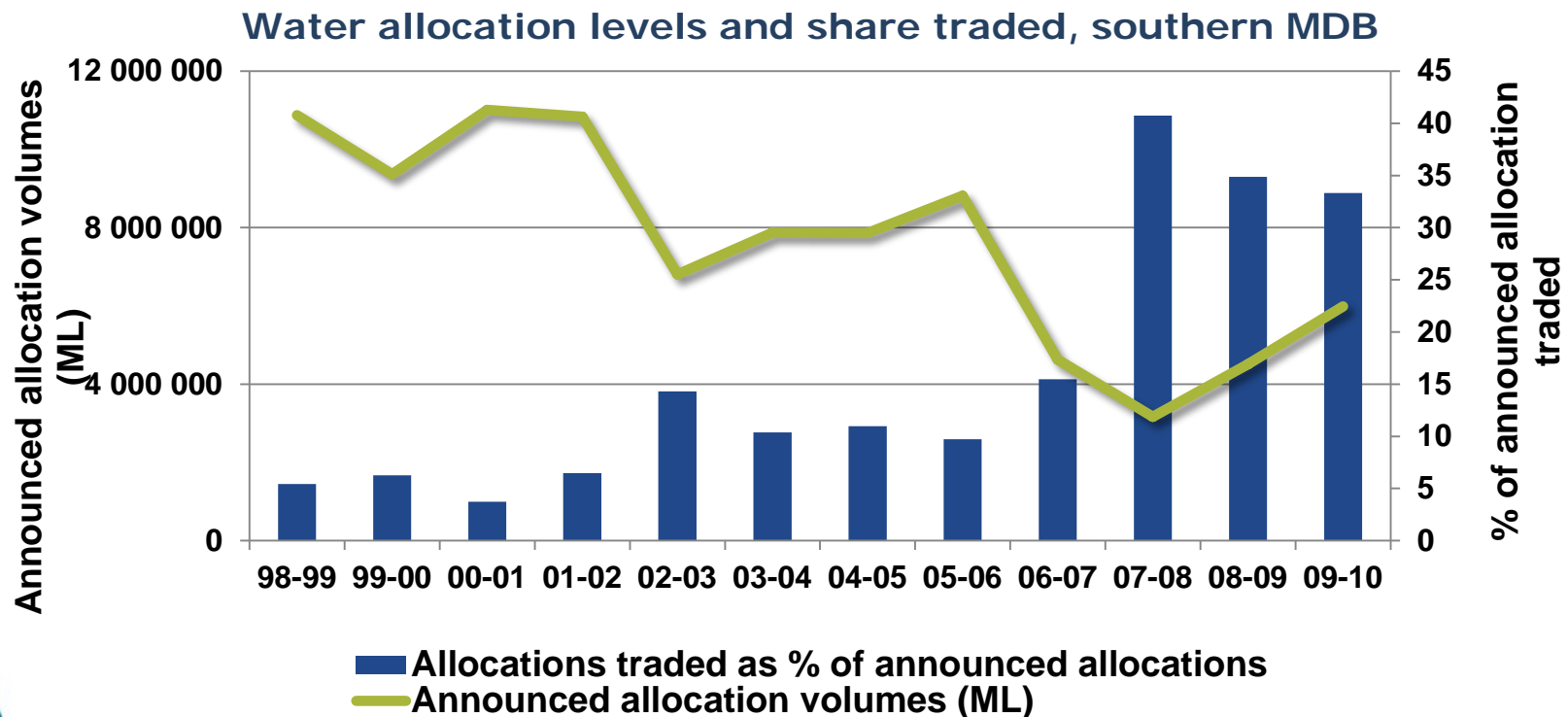


# Policy response and priorities

- Build on National Water Initiative reforms
- Balance economic, social, environmental outcomes
- Principles
  - Must work under drier/variable future climate
  - Improve efficiency and promote conservation
  - Entitlement (water right) holders manage risk
  - Facilitate water markets
  - Look for multi-benefit solutions
- New \$13B Murray-Darling Basin (MDB) Plan

# Water market - a critical element

- Needs some water to operate
- Needs it at the right time
- Systems need to be able to deliver



*1 megalitre (ML) = .81 acre-foot*

# Entitlements and markets

Entitlements protected, but improvements include

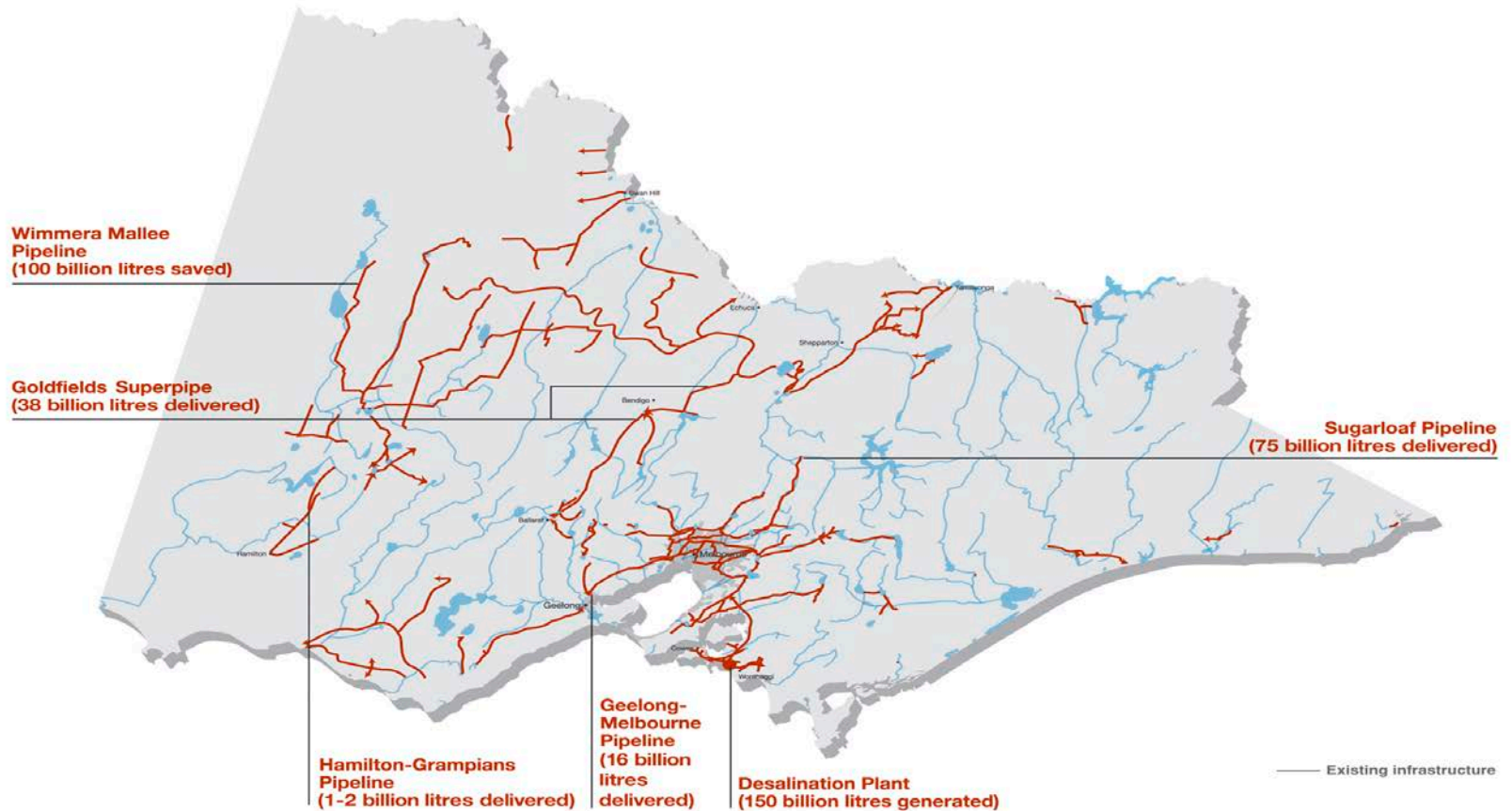
- Introduced carry-over
- Changed system reserve rules
  - Allows market to operate in all years
  - Provides certainty of delivery
- Clearer environmental entitlements with credit-for-return flows
- Improved Victorian water grid

# Urban management

**Goal:** Supply minimum level of service with demand management and – where needed – new supply.

- Demand management
  - Per capita water usage down 43 %
  - In 2011/12, average residential use in Melbourne: 149 L (39 gallons) per person per day
- Alternative, new sources
  - Recycled water, stormwater
  - Groundwater
  - Trading
  - Desalination
  - Pipelines and interconnectors

# Water grid additions 2007-2010



Some state-funded, many funded by customers  
- *Highly controversial*



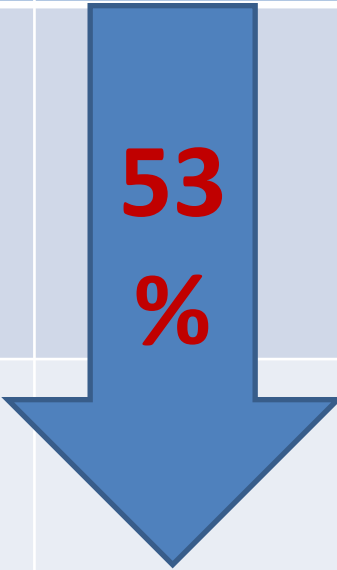
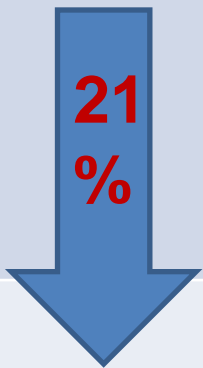
# Agricultural irrigation



- Market, carryover and system reserves
- Significant investment in irrigation modernisation
- Whole-farm planning and on-farm efficiencies



# Water use fell much more than farm revenue

	Water applied (estimate, GL)		Revenue* (\$m, real)	
2005-06	7,370 (6.0 MAF)	 <b>53 %</b>	5,522	 <b>21 %</b>
2008-09	3,492 (2.9 MAF)		4,349	

Source: Australian Bureau of Statistics (for Murray-Darling Basin)

\* Gross value of irrigated agricultural production

# New ecological management approach for the environment

**Goal:** Ensure assets survive drought and recover

- Policy framework for reduction of river flows for critical human needs
- Improve environmental water use efficiency
  - Seasonally adaptive approach to environmental water use
  - Complementary use of supply infrastructure
  - Trade seasonal allocations
- Establish environmental water portfolio
- Improve governance
  - Environmental Water Holder

# Strategic environmental watering in Northern Victoria 2007/08





# Red river gums saved by repeated watering using groundwater



August 2004



December 2004



May 2006



# Goulburn Broken wetlands provide drought refuge

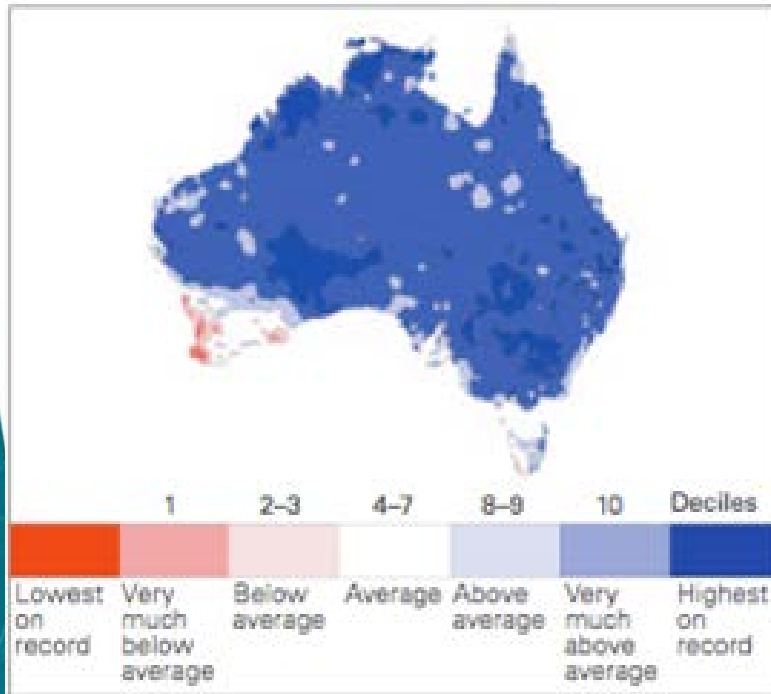


# In summary

- Economic, social, environmental outcomes considered together
- ‘This is the future’ not ‘we need to get through this’
- Efficiency by all sectors
  - Water grid: moves water around
  - Urban: households, industry
  - Rural: on-farm and irrigation systems
  - Environment: infrastructure, smart river management
- Entitlement-holders given tools to manage their own risk
- Water market must be able to operate
- Supply augmentation when required
- Environment policy: practical, pragmatic, easily understood



# And then the drought breaks



*July 2010 to March 2012 rainfall deciles  
(based on climatology of gridded monthly  
rainfall analyses from 1900)*

And you have to live with the consequences of reform

- Community backlash
- New government
- Water no longer a priority, but a nuisance
- Flood management and recovery becomes the new drought