

**SEQ WATER STRATEGY**

# A water plan for future generations

Water – Defining the limits of our future  
Critical Horizons Series

24 July 2008

Jamie Quinn, Commissioner, Queensland Water Commission


**WATER FOR TODAY, WATER FOR TOMORROW.**



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# South East Queensland Integrated Water Grid



A photograph of a tractor driving through a field at sunset. The tractor is in the center, moving towards the viewer, and is kicking up a large cloud of dust that fills the lower half of the frame. The sky is a warm, golden-orange color, and the field is a mix of green and brown. The overall mood is nostalgic and evocative.

*'I love a sunburnt country  
a land of sweeping plains  
of ragged mountain ranges  
of drought and flooding rains'*

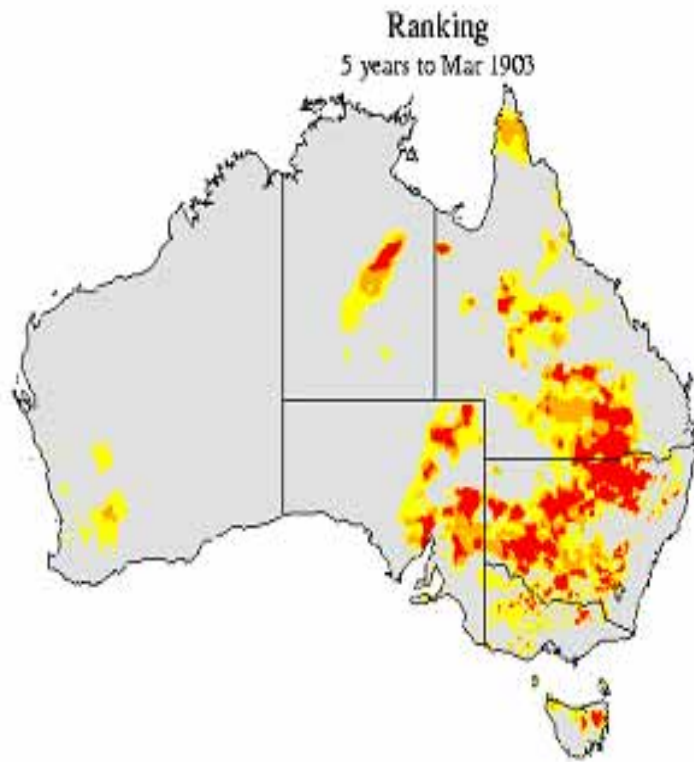
*'My Country' by Dorothea Mackellar*



# Comparison between droughts

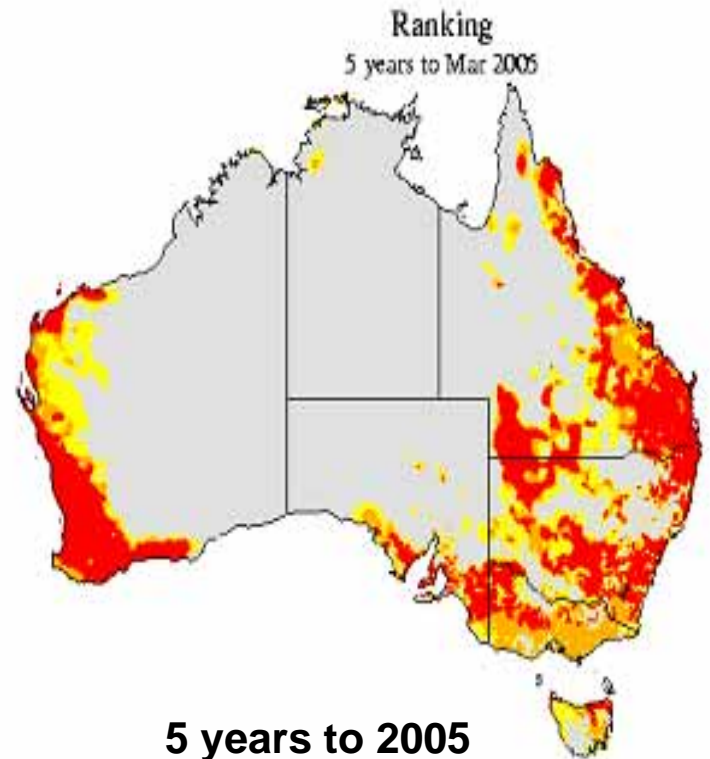


## “Federation” Drought

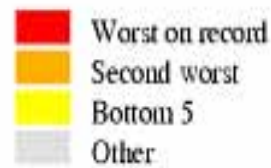


5 years to 1903

## “Millennium” Drought



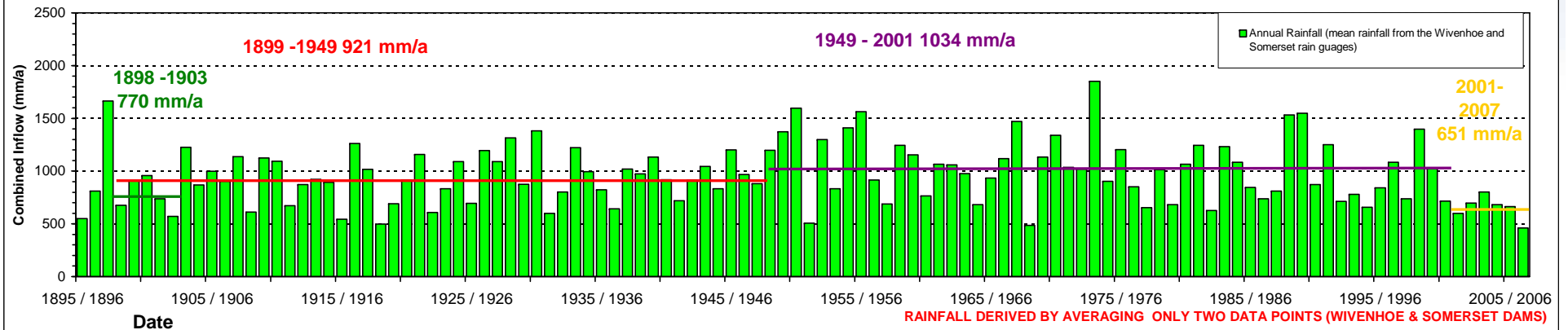
5 years to 2005



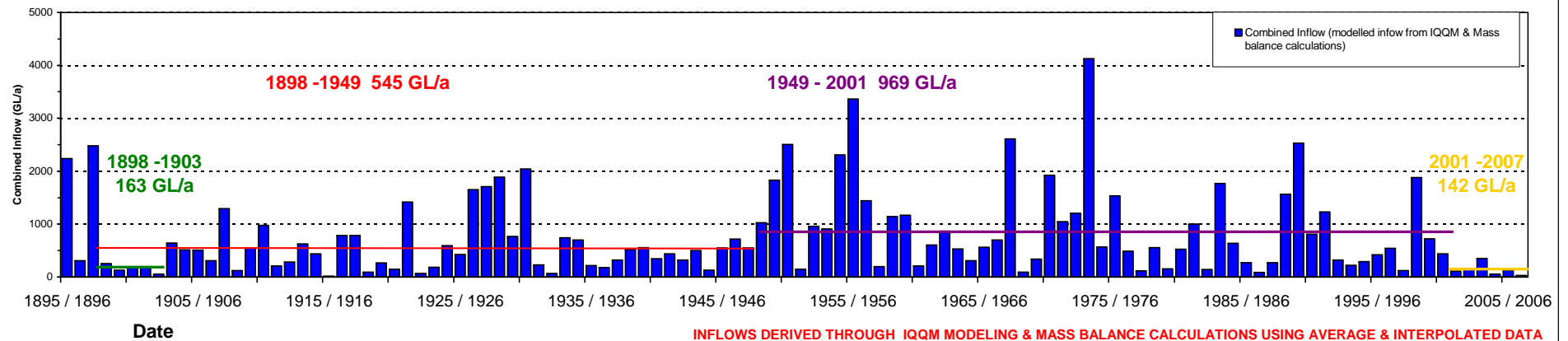
# Wivenhoe / Somerset Dams



Average Rainfall for Wivenhoe / Somerset Dams - Water year (Apr - Mar)



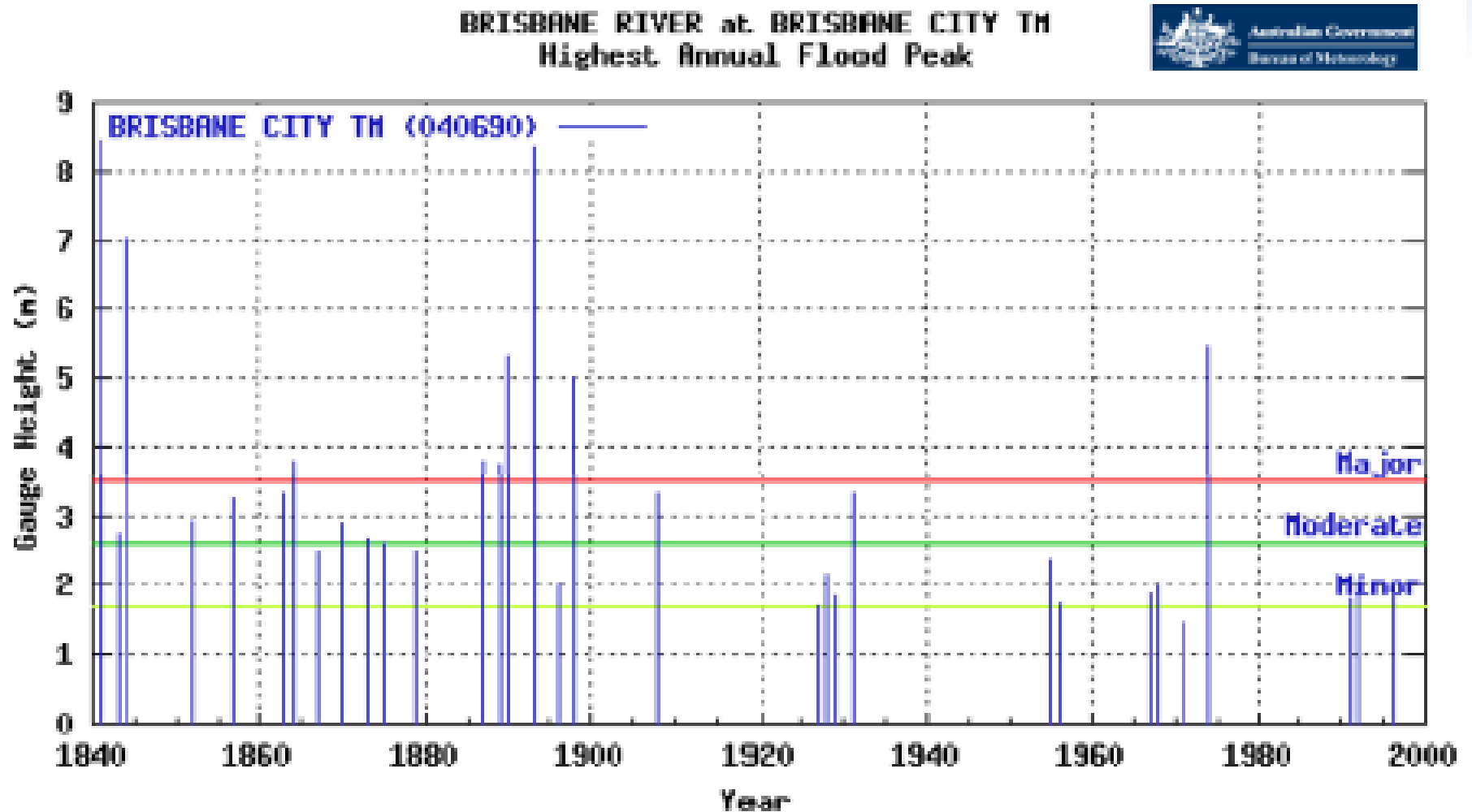
Inflows into Wivenhoe / Somerset Dams - Water year (Apr - Mar)



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# Water planning needs to work with the extremes...

- Brisbane's flood peaks



# Water planning needs to work with the extremes...

- Great Brisbane floods
  - The floods of 1841, 1893, 1887 and 1974 are marked on the Regatta Hotel



Brisbane, 1974



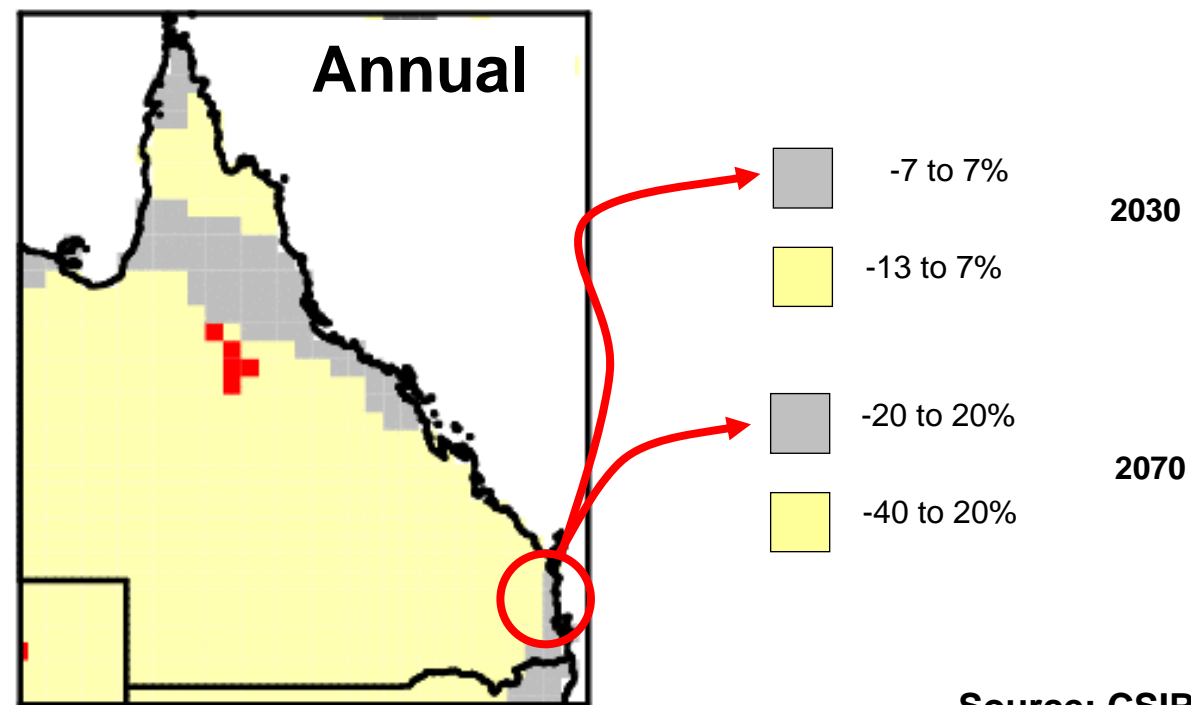
Droughts and floods....  
the extremes could get more extreme





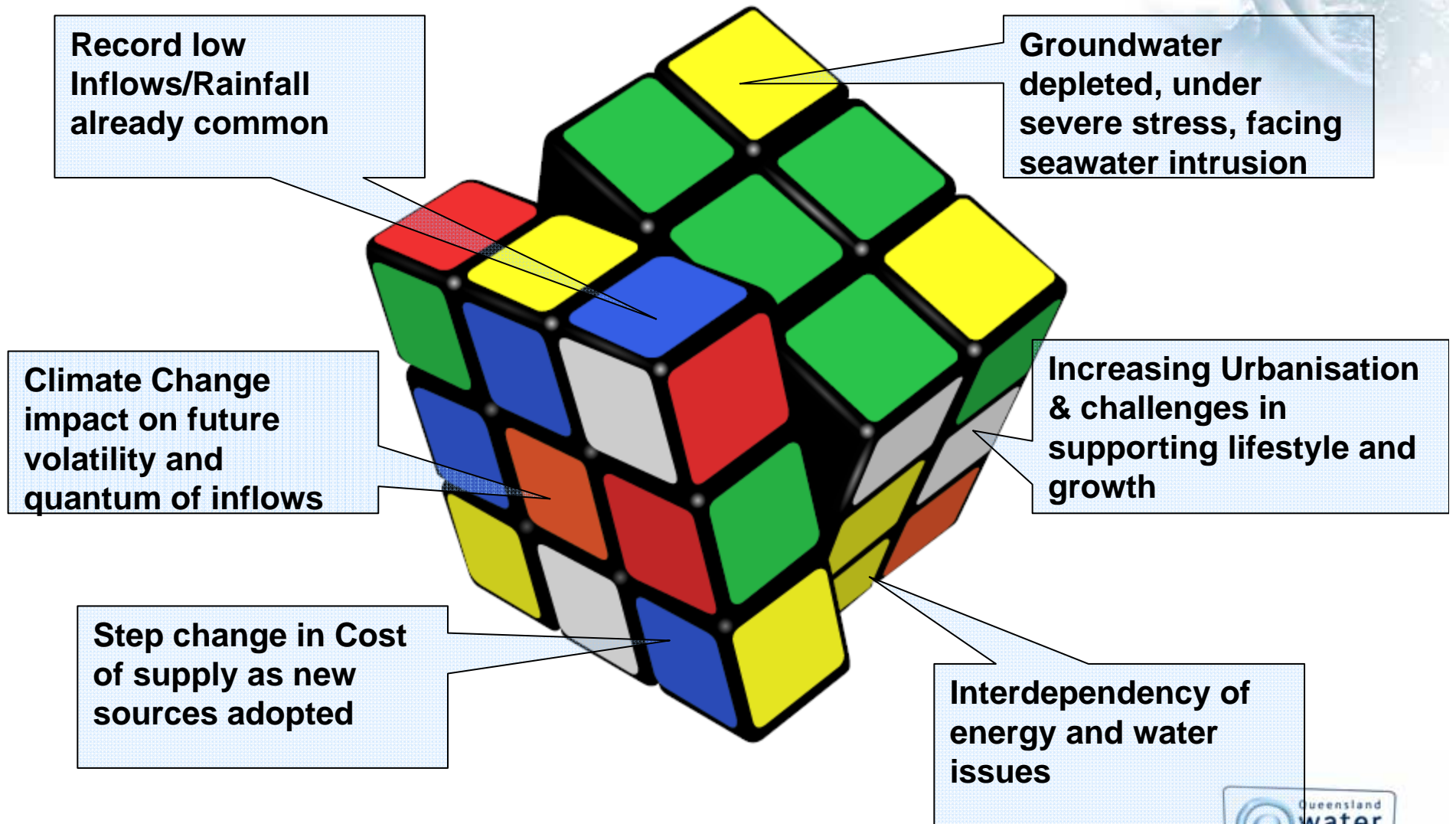
# Climate change scenarios – Queensland rainfall

- Increases in extreme rainfall are expected despite declines in average rainfall



Source: CSIRO 2005

# Global Challenges, Local Solutions



# Global Challenges, Local Solutions

**Increasing source  
diversity and climate  
resilient supply**

**Structural and  
Institutional Reform**

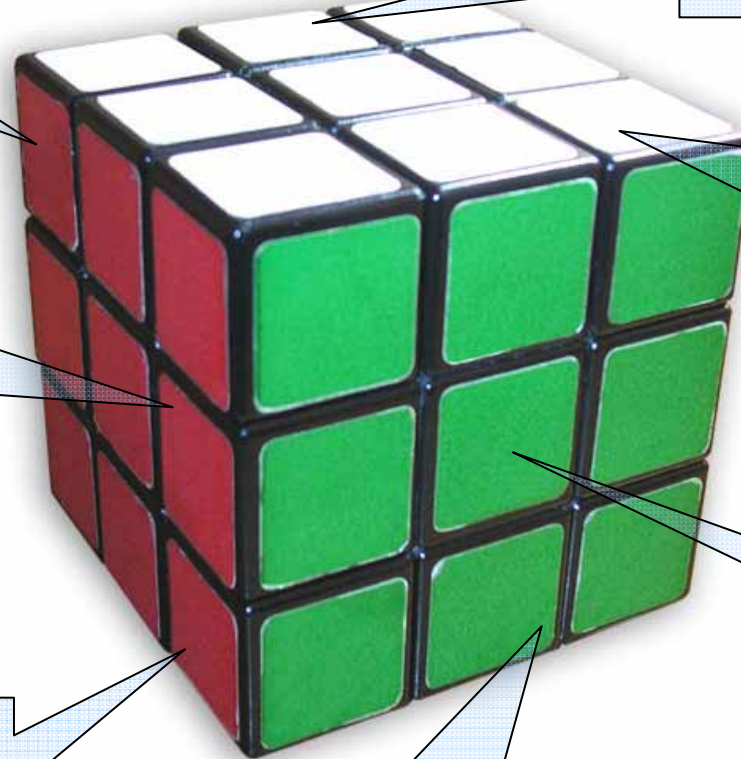
**Increasing recycling  
and reclaimed  
wastewater**

**Planning Reforms  
based on total water  
cycle and  
empowered  
communities**

**Increasing geographic  
diversity through inter -  
catchment management**

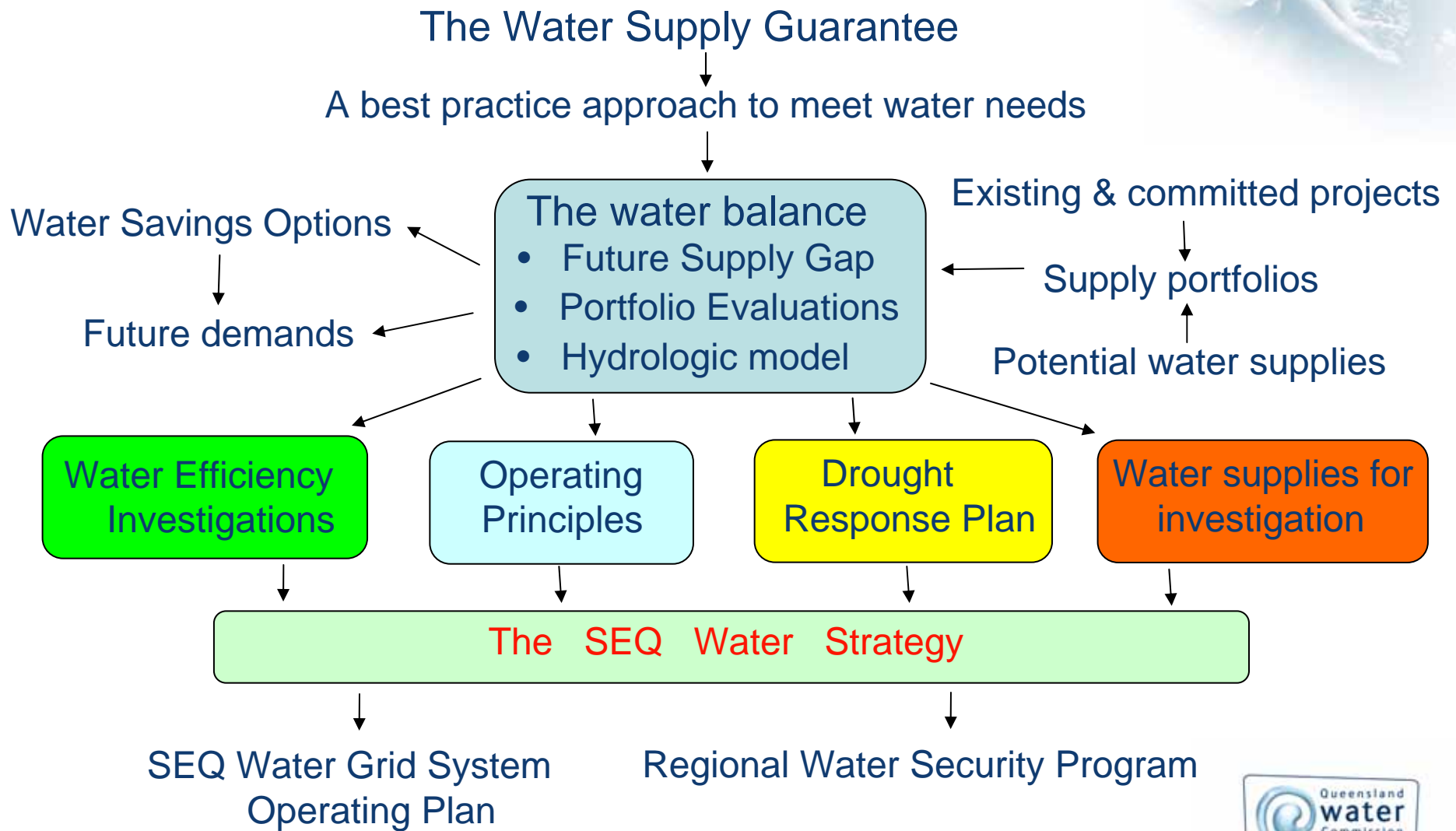
**Increasing Water  
Efficiency and  
Demand Management**

**Reducing System  
Losses**



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# SEQWS - water for today, water for tomorrow





# The SEQ Water Strategy



- Purpose:
  - to provide a secure and sustainable water supply for the 2.8 million residents of SEQ
- Water supply guarantee:
  - there will be sufficient water to support a comfortable, sustainable and prosperous lifestyle while meeting the needs of urban, industrial and rural growth and the environment
- Permanent water conservation measures:
  - Demand management to minimise water wastage and deliver sufficient water to satisfy average urban demand of 375 l/p/d (including 230 l/p/d residential – Target 230)



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# New urban water planning approach



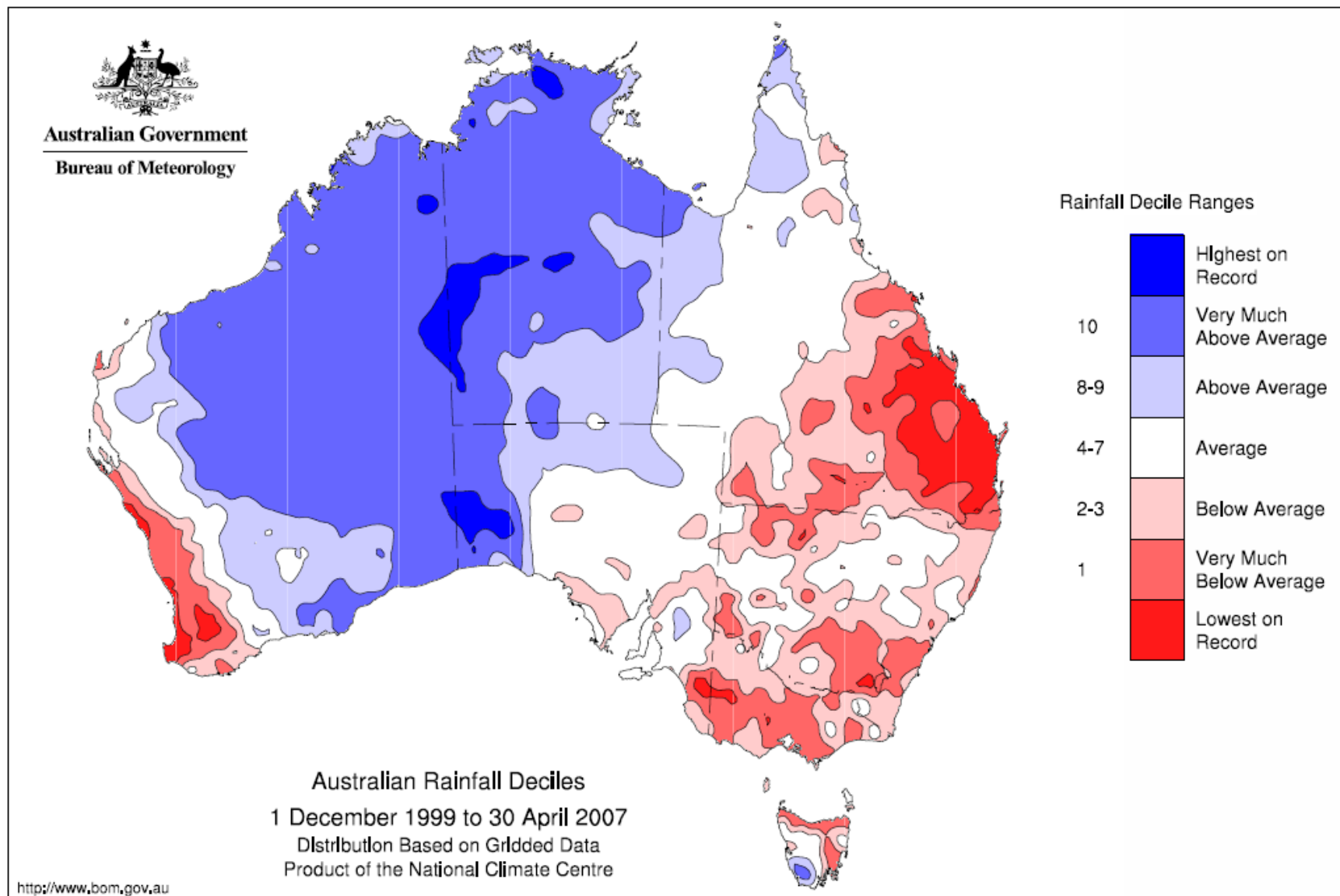
- Water planning in SEQ previously relied on:
  - Historical no failure yields
  - Very high reliance on surface water supplies
  - Limited consideration of demand management
  - Reactive response to droughts
- New strategy based on:
  - Sustainable catchment management,
  - Robust hydrological modeling
  - Drought preparedness based on level of service objectives
  - Diversification of supplies
  - Active demand management
- New strategy builds on current initiatives:
  - Demand management program (rainwater tanks, Target 140, retrofits)
  - Committed drought infrastructure

# Challenges for SEQ

- Population growth
  - 2.8 million people in 2005 to 5.2 to 6.4 million at 2056
- Climate variability – the worst drought on record
- Climate change uncertainty
- Limited existing diversity of supply
  - 95% of existing supplies from surface water

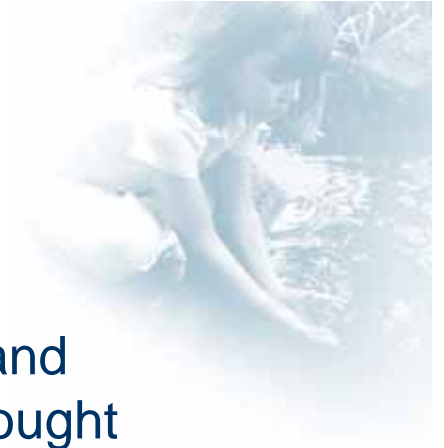


# Australia in drought... rainfall Dec 99 to Apr 07





# SEQ Water Strategy



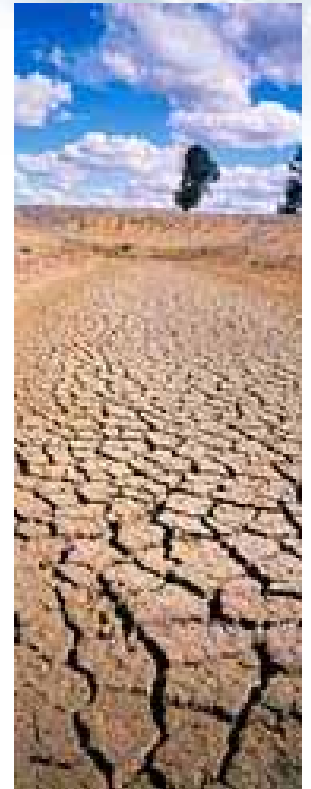
- SEQWS is the plan for managing the supply and demand balance and mitigating the risk to supply caused by drought
- SEQWS released in draft for public consultation to 31 July 2008 and final SEQWS will form the basis of QWC's advice to Government for the next water security program for SEQ
  - More information and feedback at [www.qwc.qld.gov.au/SEQWS](http://www.qwc.qld.gov.au/SEQWS)
- 80 activities or initiatives are recommended to implement the Strategy
- Success of the SEQWS involves managing risk across a range of complex issues



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# Delivering the water supply guarantee

- Involves managing risk across complex issues:
  - Sustainable catchment management
  - Water grid construction
  - The water balance
  - Drought preparedness based on levels of service
  - Demand management
  - Future water supply options
  - Sustainable operation of water grid



# Start from a sustainable base

- Catchment water resource planning is a prerequisite to any regional water supply planning
- The Qld Department of Natural Resources and Water has undertaken water resource planning for SEQ over several years leading to water resource plans (WRP) and resource operations plans (ROP) for the Mary, Moreton, Logan and Gold Coast catchments
- WRP's and ROP's provide a sustainable base for the SEQ water strategy



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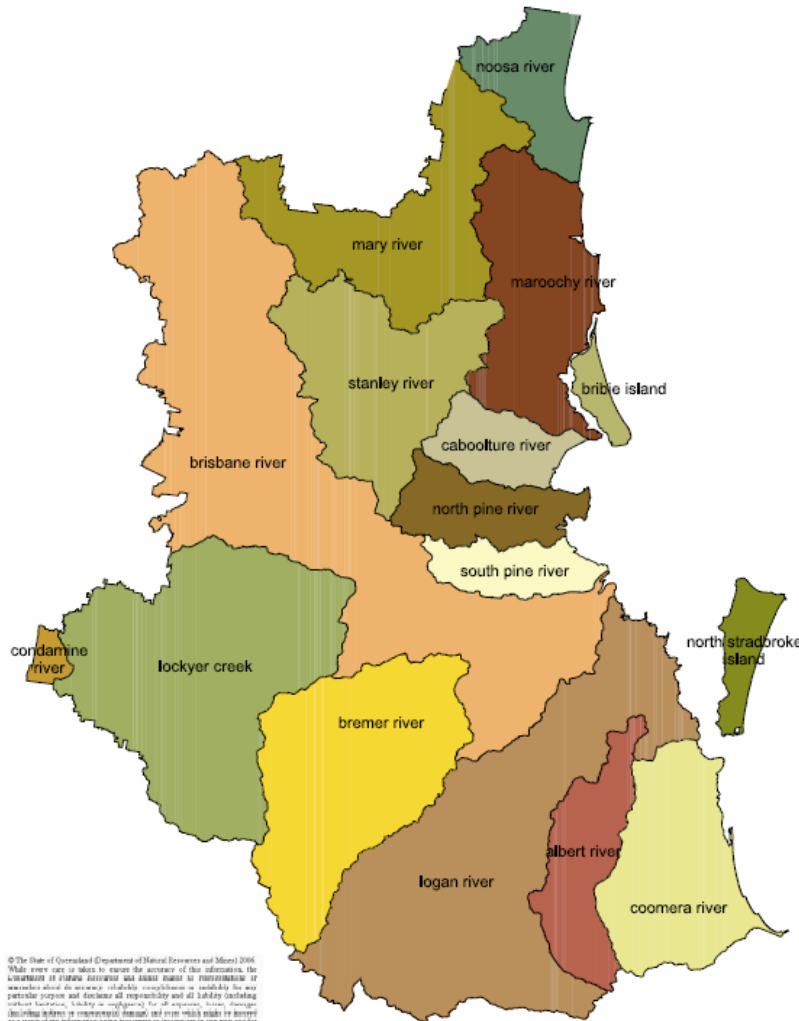
# Water resource and operations plans

- A water resource plan establishes the strategic objectives and framework to manage and allocate water to meet the social, economic and environmental needs of the catchment in a sustainable way
- A resource operations plan specifies how the water resources will be managed from day to day to meet the strategic objectives and outcomes of the water resource plan



# Catchments and planning areas

Figure 2. South East Queensland Catchment Boundaries

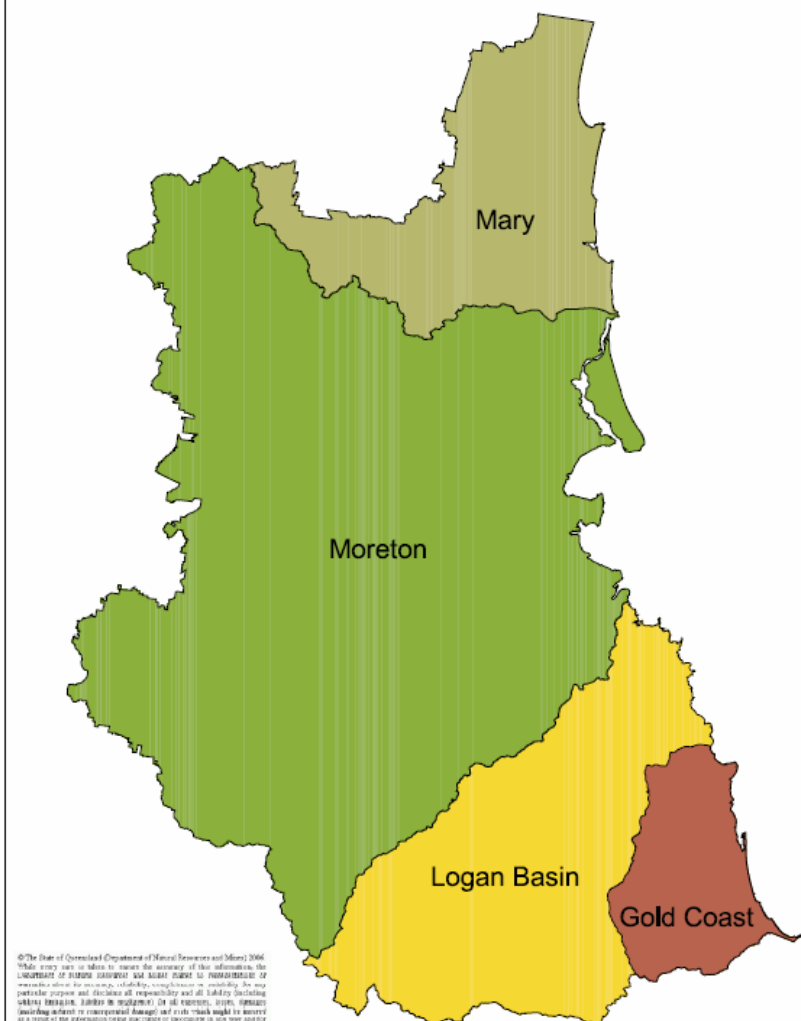


South-East Queensland Regional Water Supply Strategy  
Securing the future of South East Queensland's water supply

20 10 0 20 Km



Figure 10. SEQ Water Resource Planning Areas



South-East Queensland Regional Water Supply Strategy  
Securing the future of South East Queensland's water supply

20 10 0 20 Km

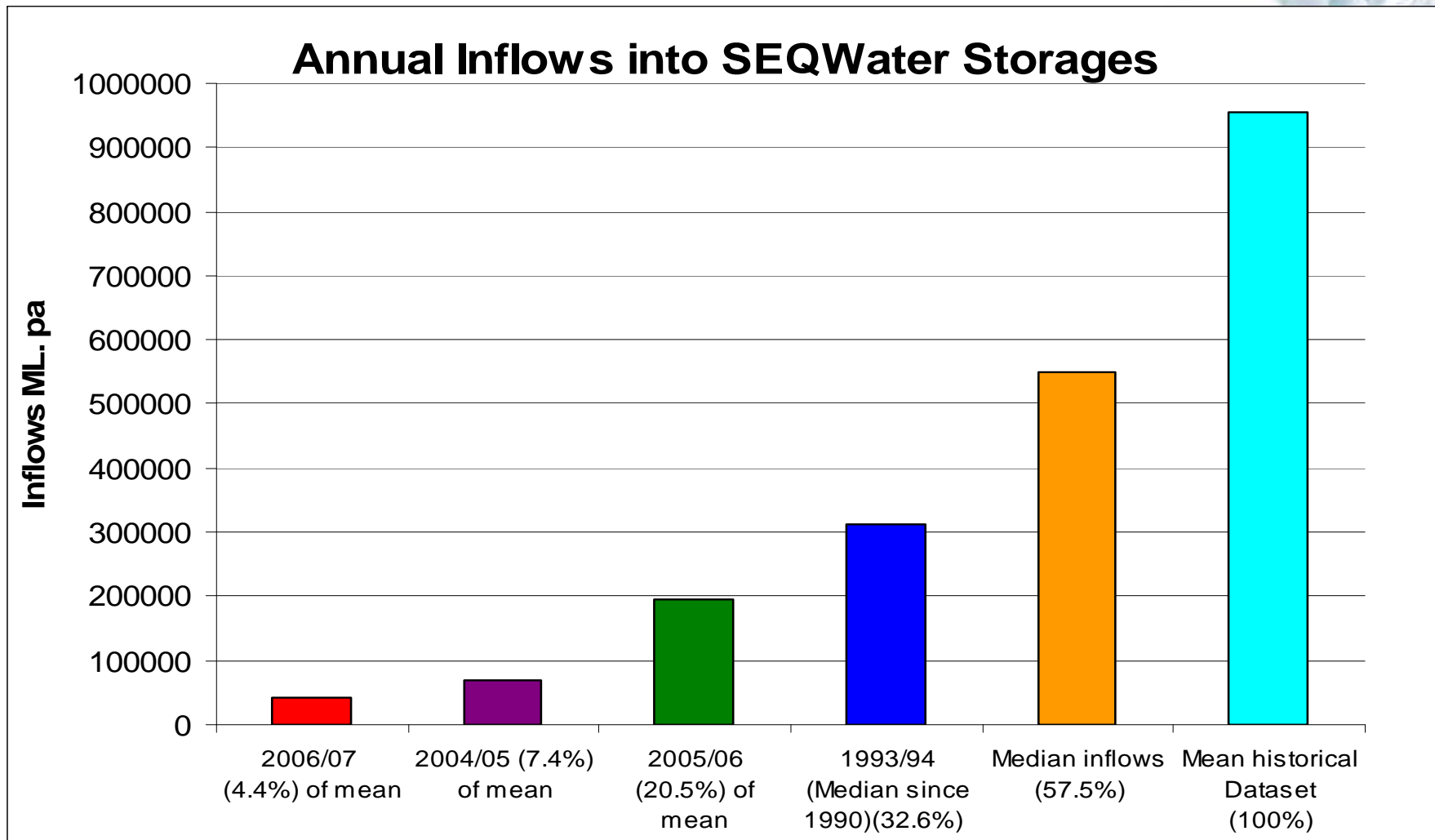


# Water Grid construction

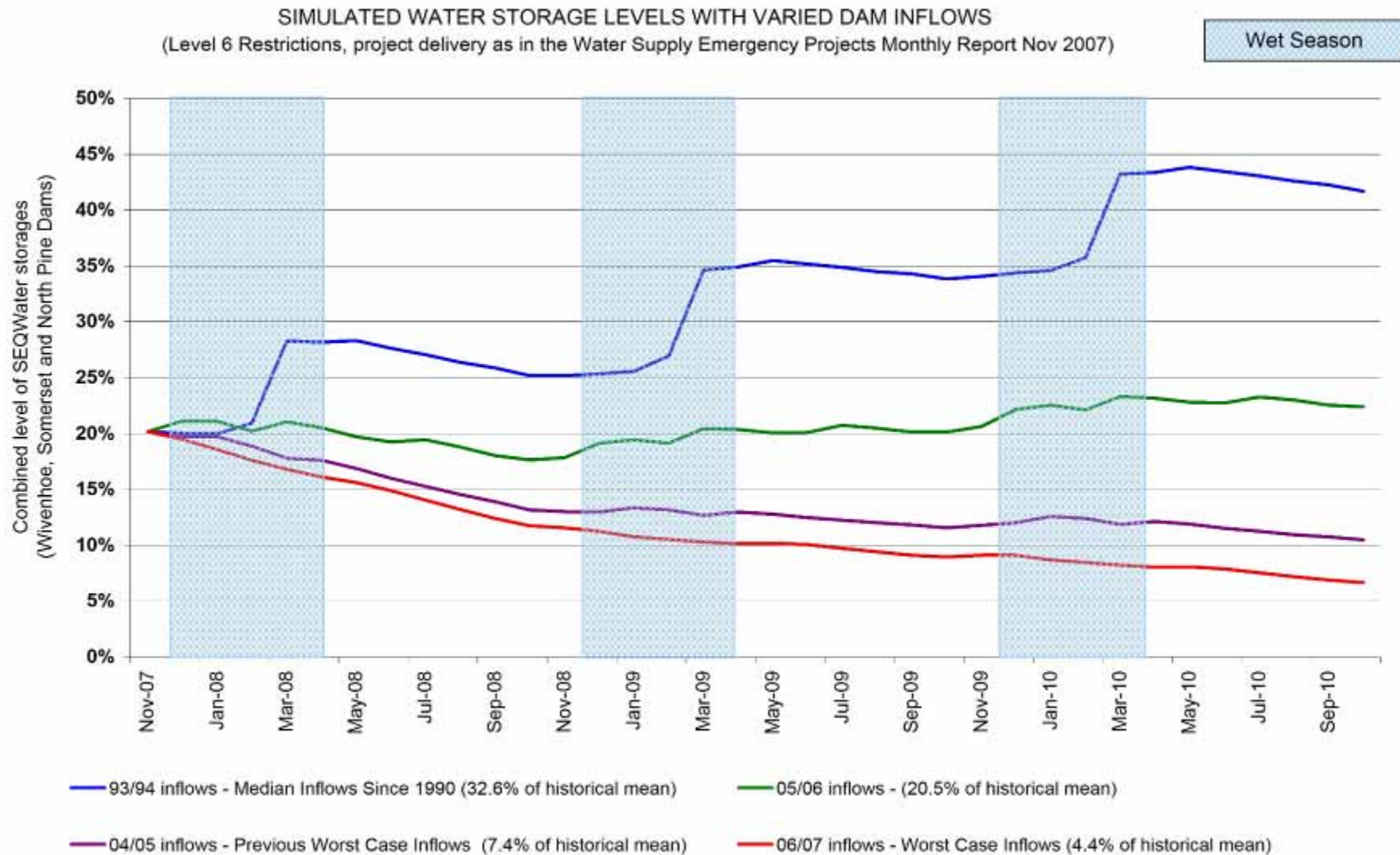
- Advance Water Security Program establishes water grid - integration improves yield:
  - The August 2006 Water Emergency Regulation established an advance SEQ water security program based on the SEQ water resource plans and the strategy work undertaken by State and Local Government
  - Provides a coordinated set of actions to be undertaken by State and Local Government
  - Specifies project measures, outcomes, timelines and target water volumes to be undertaken to end 2011
  - Establishes the SEQ Water Grid, which is currently under construction



# Comparison of Inflows

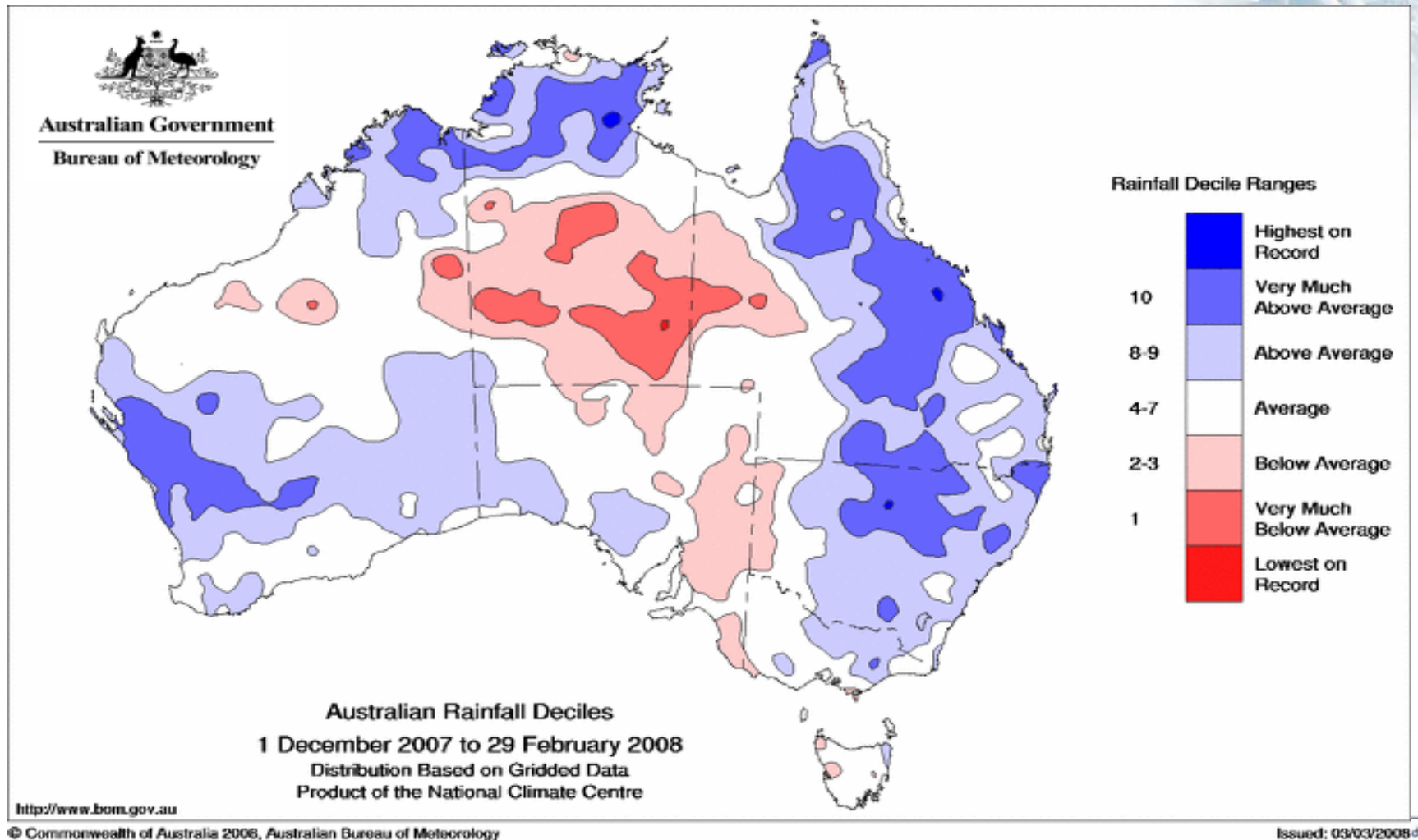


# Managing risk (water supply situation Nov 2007)

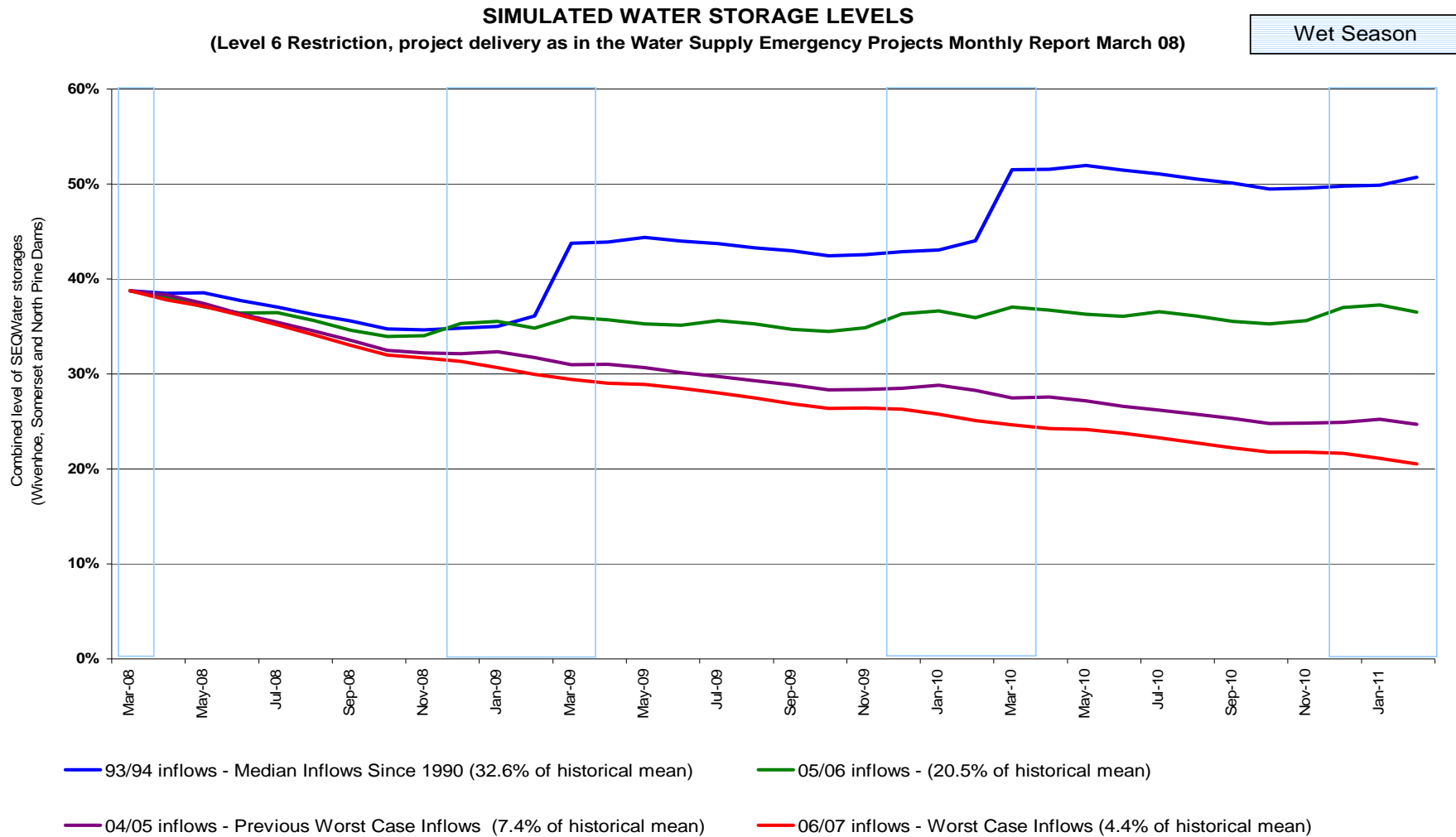




# Rainfall from December 2007 – March 2008



# Impact of recent inflows

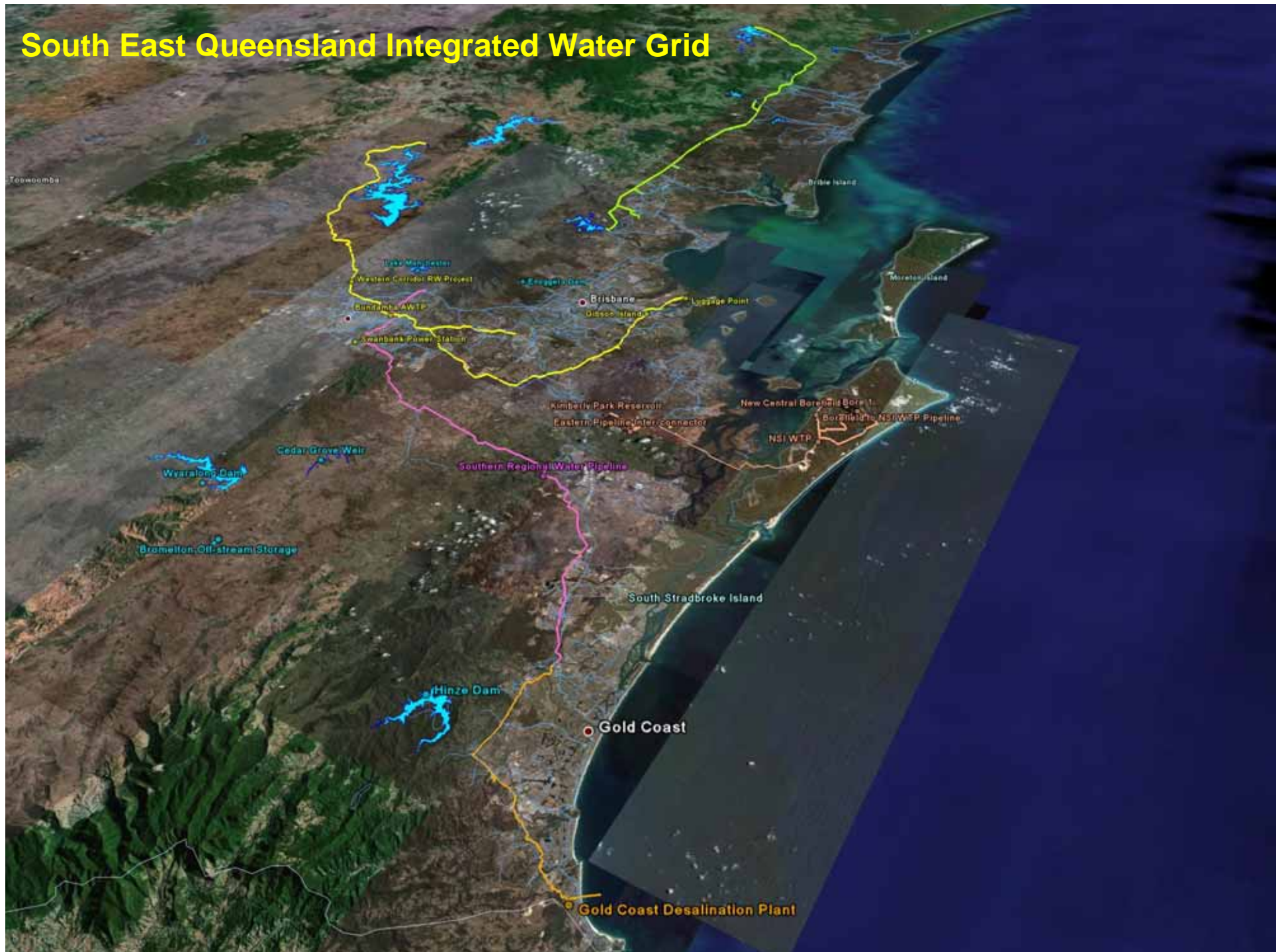


# Increased yield through integrated and centrally managed grid



- Completion of SEQ water grid in 2011 increases the system yield by 268,000 ML/a from 416,000 ML/a (64% increase)
- 59,000 ML/a of this yield increase (14%) is attributable to centrally managing the integrated grid
- The Water Grid Manager is critical to the success of the SEQWS and water grid

# South East Queensland Integrated Water Grid



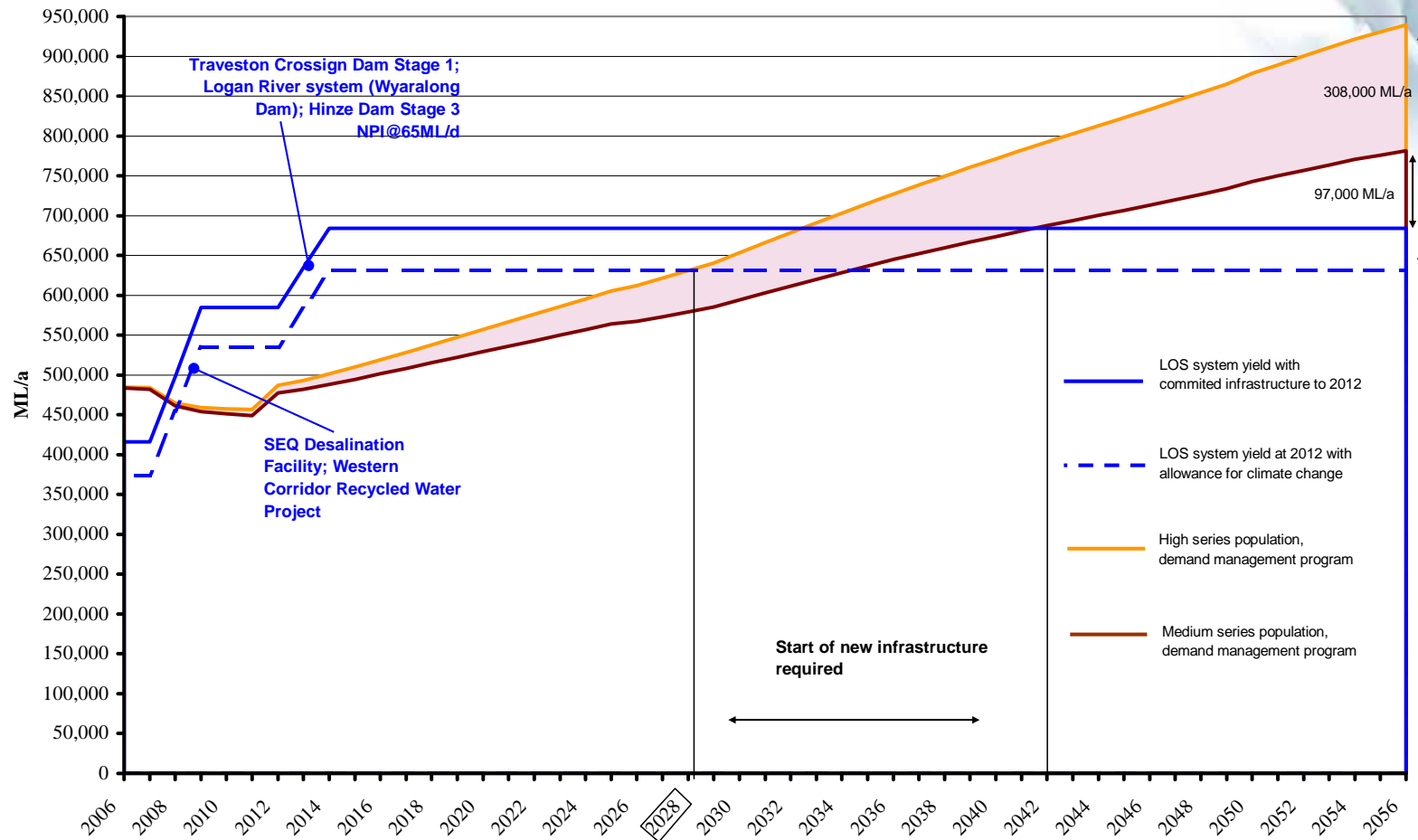


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- The map illustrates the South East Queensland Water Supply Scheme, showing the main water supply routes from the western dams to Brisbane and the Gold Coast. The routes are color-coded: green for the main supply to Brisbane, red for the supply to the Gold Coast, and blue for the supply to the Gold Coast Desalination Plant. The map also shows various smaller dams and reservoirs throughout the region.
- Key Dams and Reservoirs:**
- Western Dams:** Borumba Dam, Traveston Crossing Dam, Somerset Dam, Whivenhoe Dam, North Pine Dam.
  - Other Dams:** Murgon, Wondal, Kingaroy, Nanango, Yarraman, Blackbutt, Benarkin, Toogoolawah, Cressbrook Dam, Cooby Dam, Perseverance Creek Dam, Gatton, Lowood, Bundamba, Swanbank Power Station, Wyralong Dam, Boonah, Hinze Dam, Nerang, Tugun.
  - Reservoirs:** Lake Manchester, Cameron's Hill Reservoir, Oxley, Goodna, Kimberly Park Reservoir, Greenbank Reservoir, Lake Moogerah, Lake Maroon, Little Nerang Lake, Advance Town Lake.
  - Other Features:** Gold Coast Desalination Plant, Gold Coast Water Treatment Plant, Gold Coast Sewerage Treatment Plant, Gold Coast Wastewater Treatment Plant, Gold Coast Stormwater Treatment Plant.



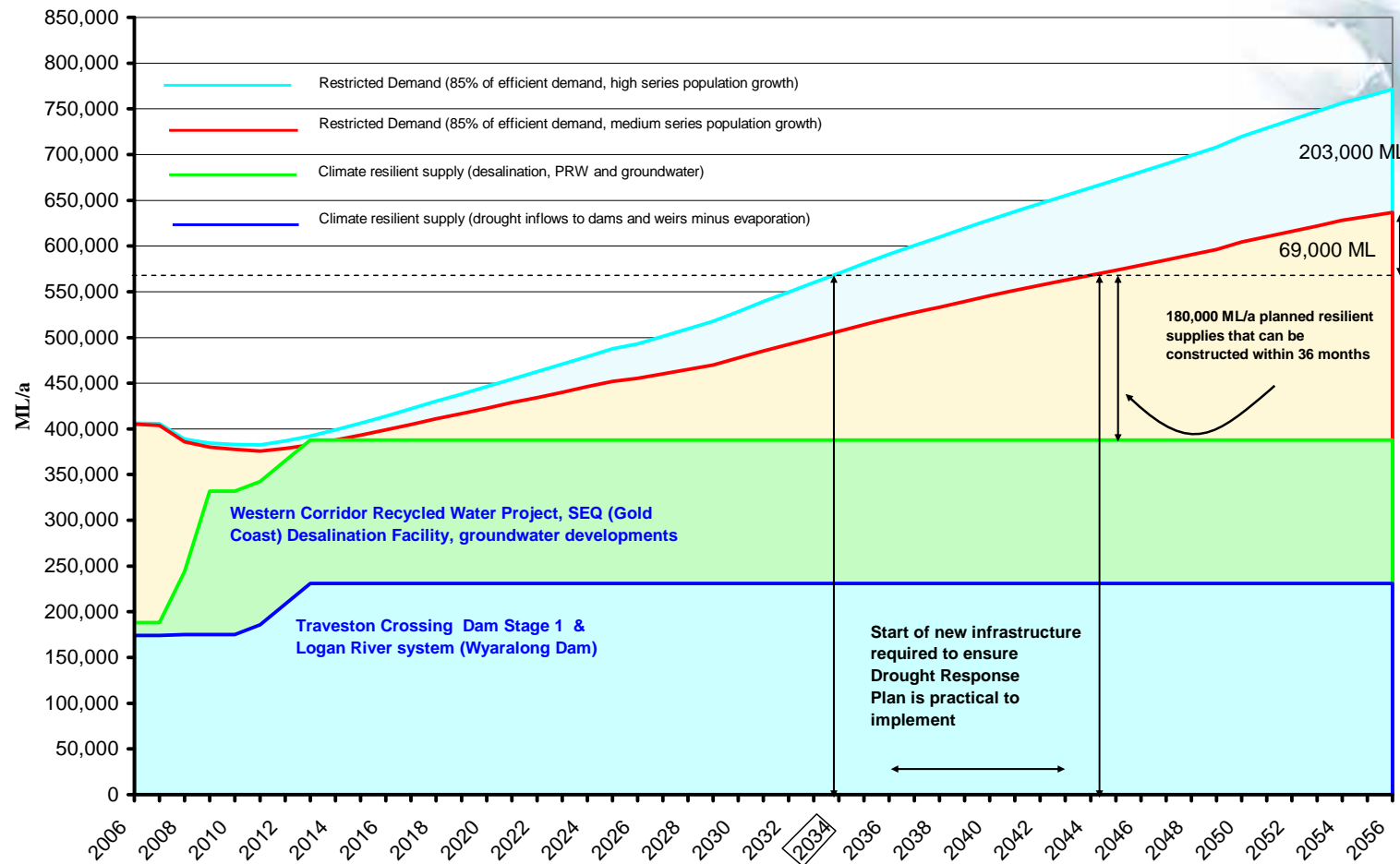


# Normal Operating Mode



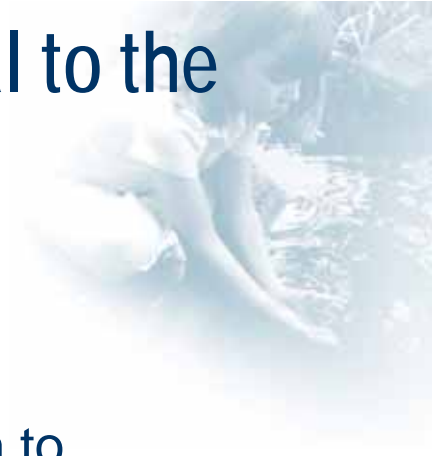
- Regional supply gap in normal operating mode
- Implementation of Strategy ensures supply gap does not eventuate

# Drought Response Mode



- Forecast supply and demand in drought response mode
- Indicates drought response climate resilient requirement

# Planning for drought preparedness is central to the SEQWS and is based on levels of service objectives:



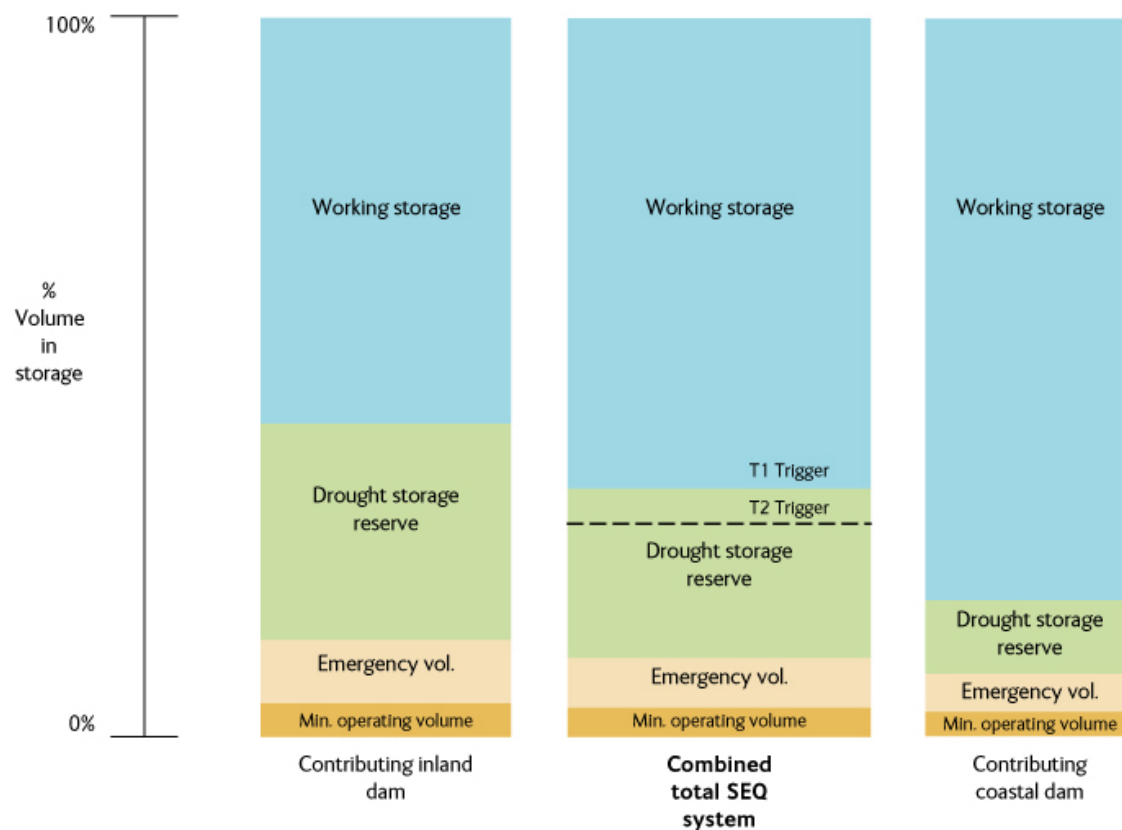
- Sufficient timely investment in the water supply system to ensure medium level restrictions:
  - will not occur more than once every 25 years, on average
  - will last longer than 6 months no more than once every 50 years, on average
  - will achieve targeted reduction in total urban consumption of 15%
- The frequency that combined regional storage reserves will reach 10% of capacity will be not more than once every 1,000 years
- Regional storage must not reach minimum operating levels



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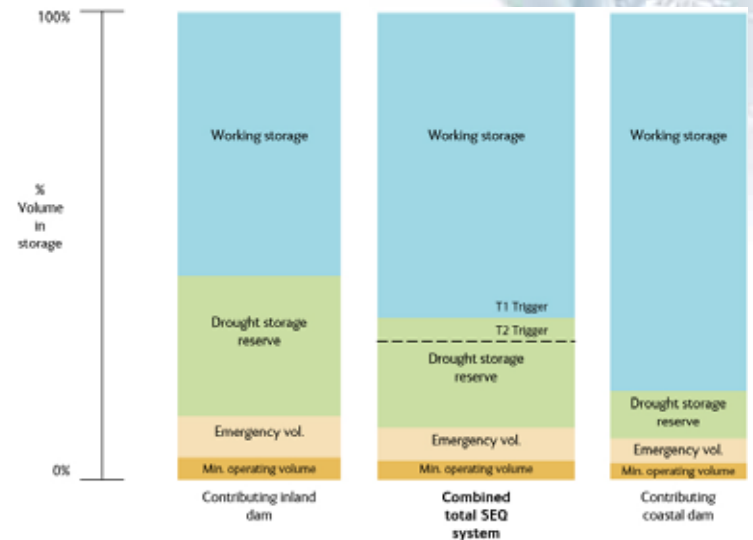
# Drought Planning - Drought Storage Reserve

- Combined regional Drought Storage Reserve, optimised by modelling
- Reserve nominally holds 36 months of water



# Drought Response Plans

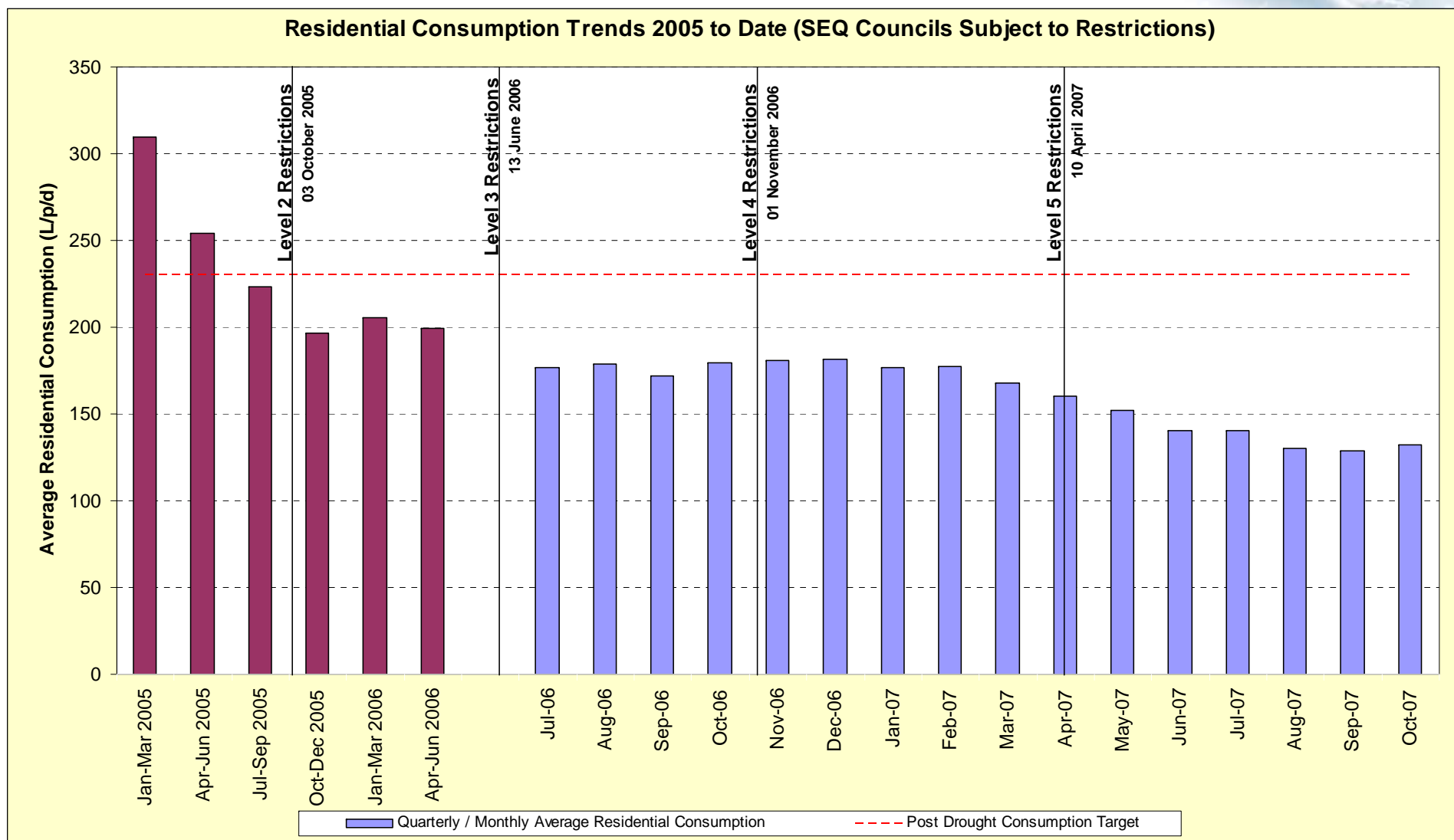
- Drought Response Plan based on levels of service has two phases :
  - Preparation Phase (T1)
  - Construction Phase (T2)
- Projects scoped to increase climate resilient water supplies
- Includes identification of sites eg for desalination, PRW
- Early preparation works – prelim design, approvals etc
- Medium level water restrictions to deliver 15 % reduction in demand.



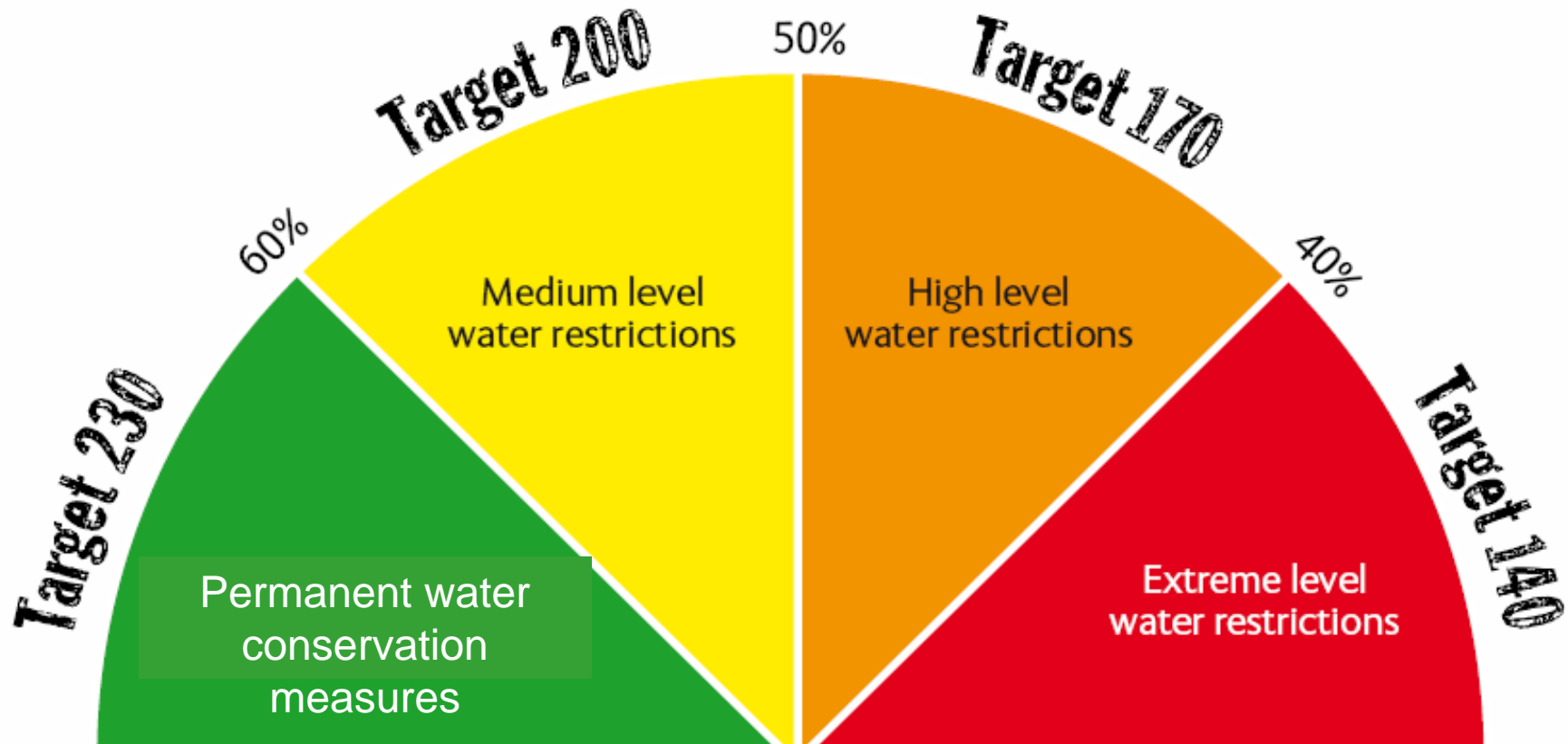


# Demand Management – Millennium Drought

Level 1 to Level 5 restrictions (56% residential reduction, 47% overall reduction)



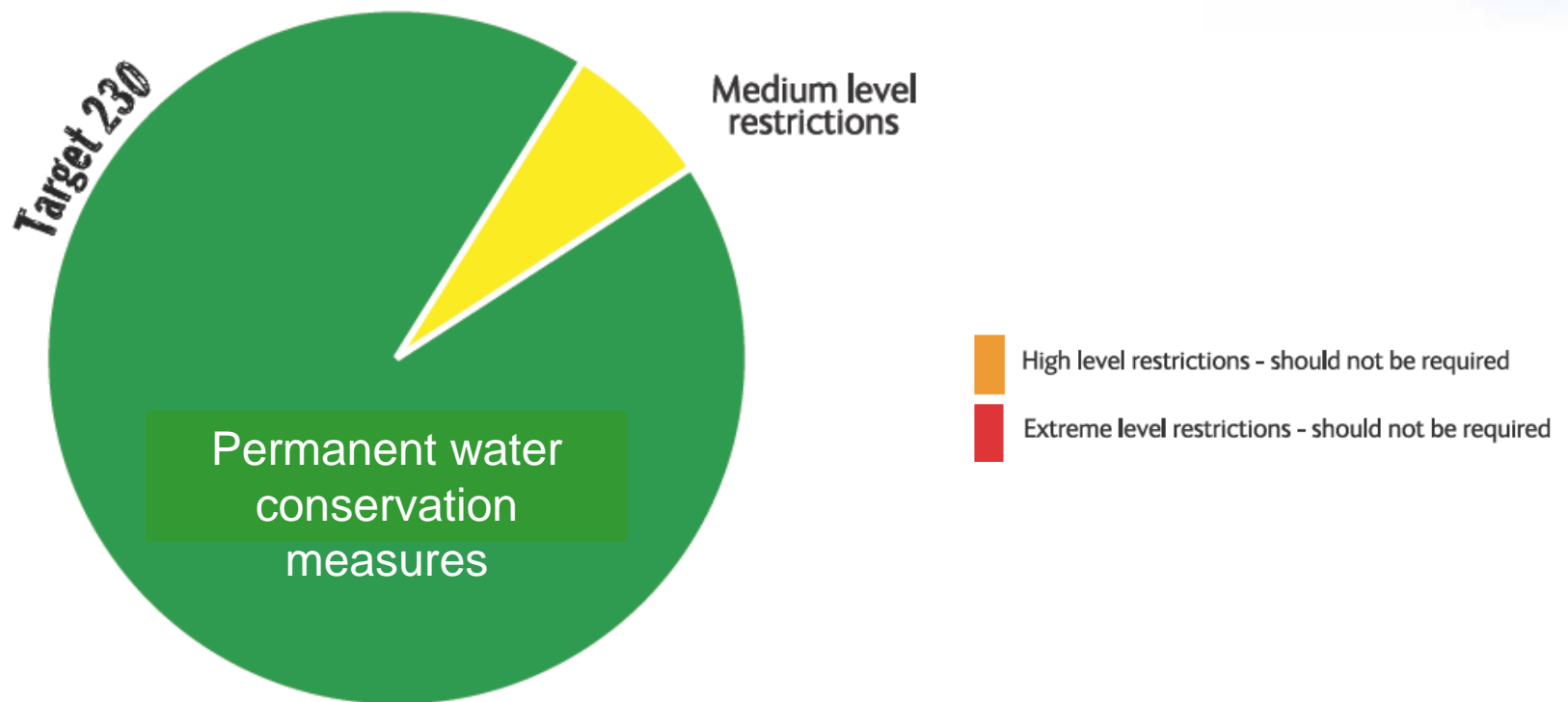
# Drought exit strategy



# Permanent water conservation measures

- Sufficient water to satisfy average urban demand of 375 l/p/d (including 230 l/p/d residential – Target 230)
- Demand management to minimise water wastage
  - Residential:
    - Target 230
  - Non-residential:
    - Water Efficiency Management Plans, efficiency guidelines, retrofitting equipment and fittings

# Medium level restrictions in drought response



# Future water supply options

- Dams and weirs – some opportunities
- Purified Recycled Water (PRW)
- Desalination – opportunities identified
- Groundwater – very limited opportunities
- Others
  - stormwater, rainwater tanks (demand management), trading, local recycling





# Future water supply options – Dams and weirs

- Opportunities constrained by Water Resource Plans to ensure sustainability
- Opportunities limited to suitable sites
- Potential beyond current commitments is ~120,000 ML/a (330 ML/d), including:
  - Borumba Dam Stage 3
  - Traveston Crossing Dam Stage 2

# Future water supply options – Purified Recycled Water (PRW)

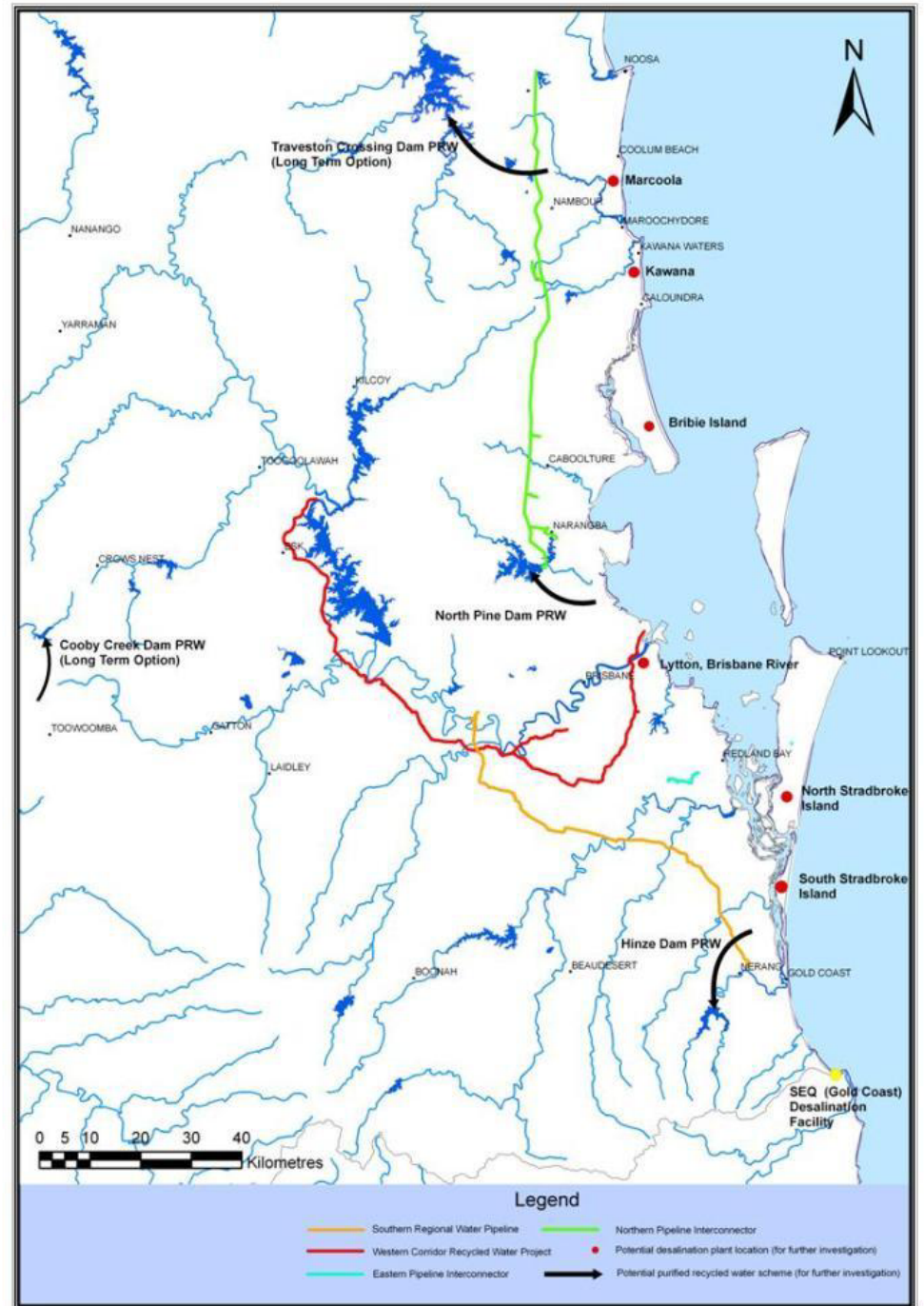


- Climate resilient supply
- Potential PRW schemes:
  - replenishment of Hinze Dam
  - replenishment of North Pine Dam
  - Replenishment at Sunshine Coast (long term)
  - Replenishment at Toowoomba (long Term)
- Potential volumes up to ~100,000 ML/a (275 ML/d).

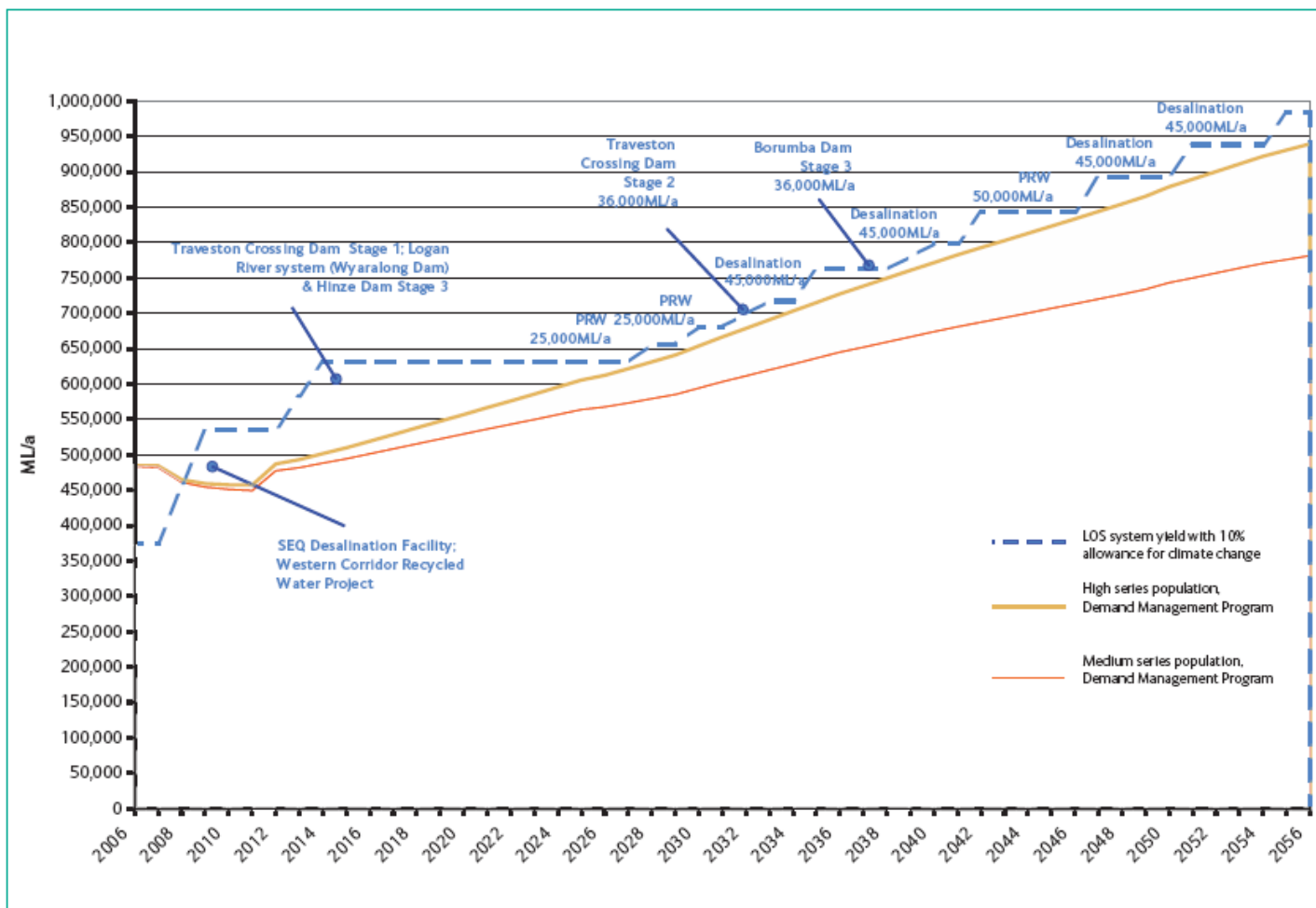
# Future water supply options – Desalination

- Climate resilient supply
- Potential desalination sites:
  - Marcoola > 146,00ML/a (400ML/d)
  - Kawana maximum 146,00ML/a (400ML/d)
  - Bribie Island > 146,00ML/a (400ML/d)
  - Lytton (Brisbane) maximum 36,500ML/a (100ML/d)
  - North Stradbroke Island > 146,00ML/a (400ML/d)
  - South Stradbroke Island maximum 146,00ML/a (400ML/d)

# Potential PRW and Desalination Sites



# Potential Infrastructure Program

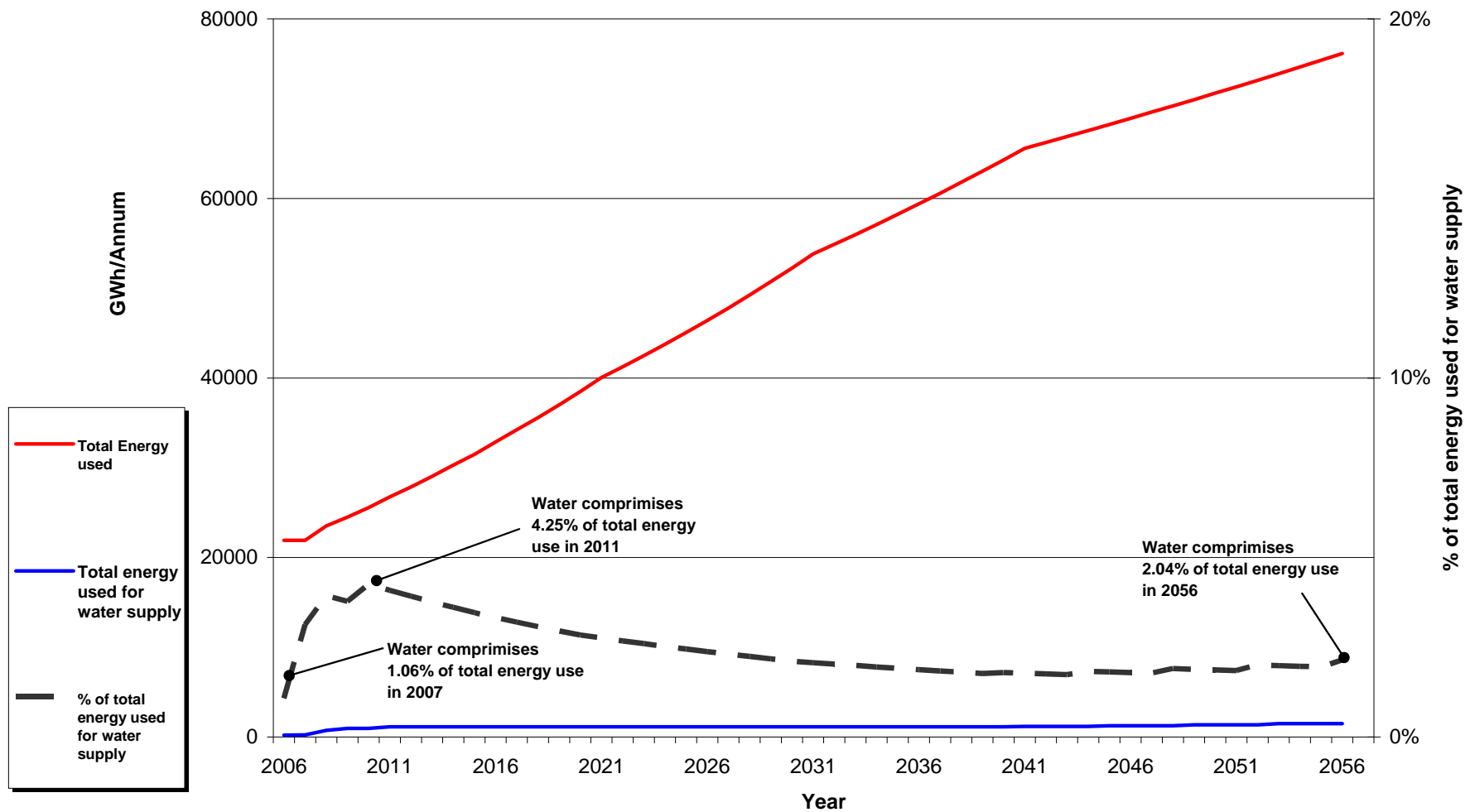


**Figure 6.9** Draft projected infrastructure program: 2012 to 2056 (high series population growth to 6.2 million and allowance for climate change)



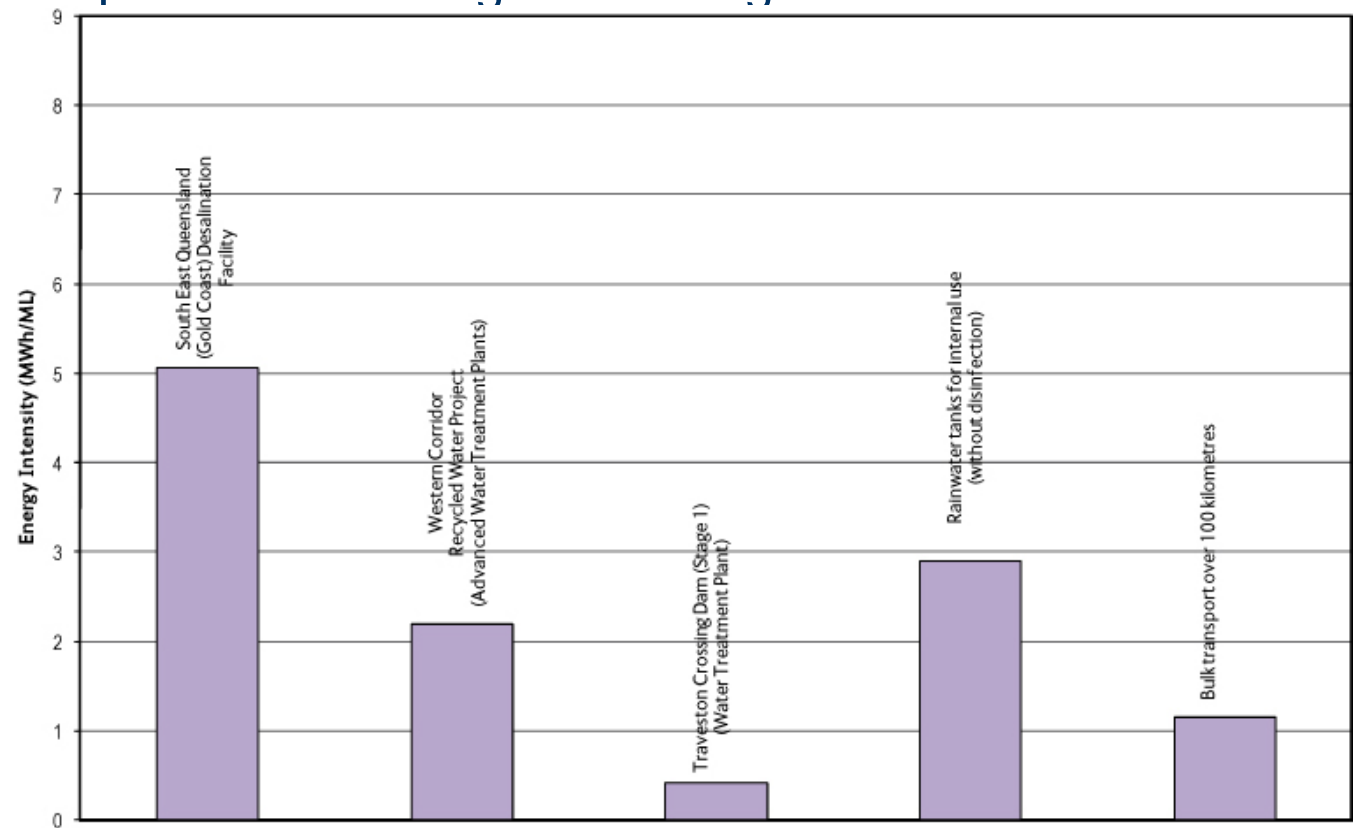
# Energy Impacts

- Energy for water is a small fraction of total regional energy use



# Energy

- More water = more energy
  - Increase in energy use reduced through demand management
  - All options are relatively energy intensive, including rainwater tanks
- Energy consumption will be mitigated through efficient Water Grid operation



# Rural Water – Towns and villages

- Aim to achieve the same LOS for all reticulated communities – connected and not connected to the Grid.
- SEQ residents without reticulation can supplement supplies from the water grid – by carting.
- Further work required in partnership with local governments:
  - Future water demands
  - Supply options: augmentation, grid connection
  - Drought response planning



# Final Institutional Reform Model



- Queensland Government confirmed final structural model in September 2007 based on reform proposals in QWC Report titled *'Our Water- Urban Water Supply Arrangements in SEQ, May 2007'*
- Government consideration followed
  - Extensive consultation with Councils, Unions, WSPs and other stakeholders
  - Finalisation of Local Govt Reform Commission position on council amalgamations



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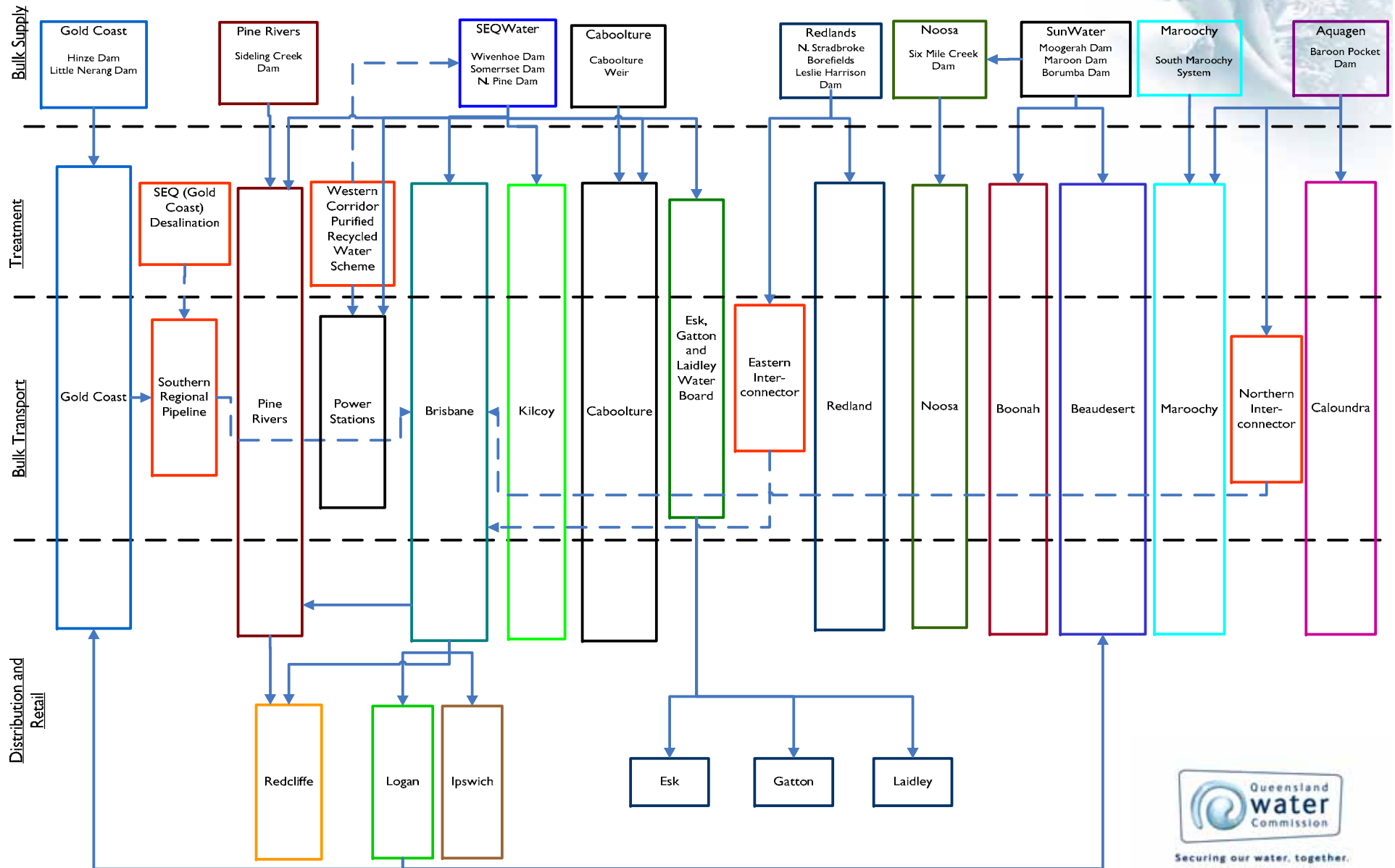
# Objectives of water reform

- Enhanced water security
- Clear accountabilities
- Greater transparency
- Efficient costs
- Appropriate and timely asset upgrades and maintenance
- Greater skill specialisation and capacity



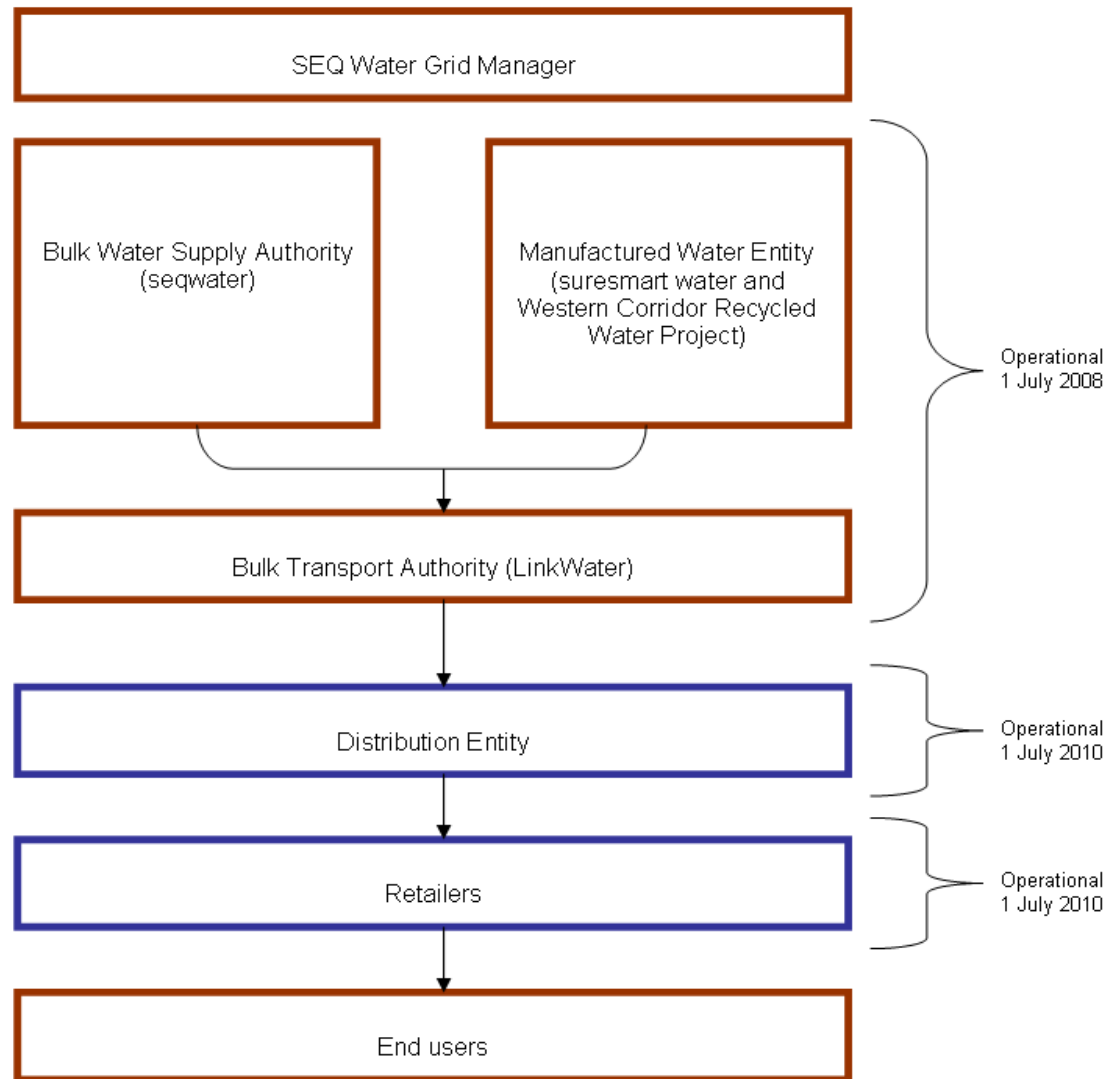
# Current industry structure

Current Urban Water Arrangements in South East Queensland



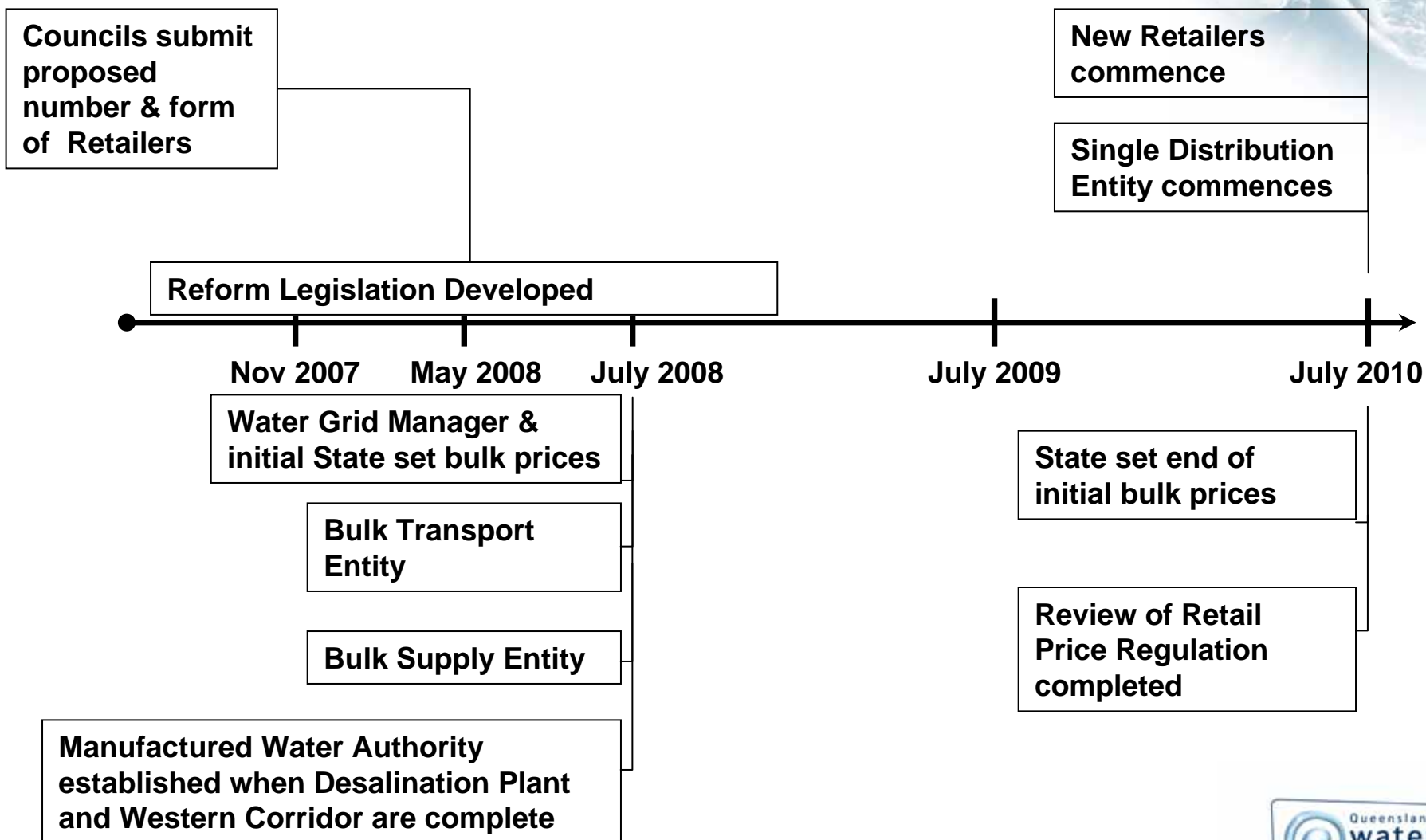


# Final Reform Model



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# Implementation and timing



# Sustainable operation of SEQ water grid

- System operating plan (SOP) prepared by QWC
- SOP implemented by Water Grid Manager
- SOP water supply works
- Maximum volume of water managed under contractual arrangements
- Levels of service objectives

# Sustainable operation of SEQ water grid

## Operating rules:

- Water security rules
- Cost minimisation rules
- Reduced priority contracts

## SOP supported by:

- Market rules
- Operating protocols
- Contracts



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# SEQ WATER STRATEGY

[www.qwc.qld.gov.au](http://www.qwc.qld.gov.au)  
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