Modern Agriculture Under Stress: Lessons from the Murray-Darling

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Chief Executive

Murray-Darling Basin Commission

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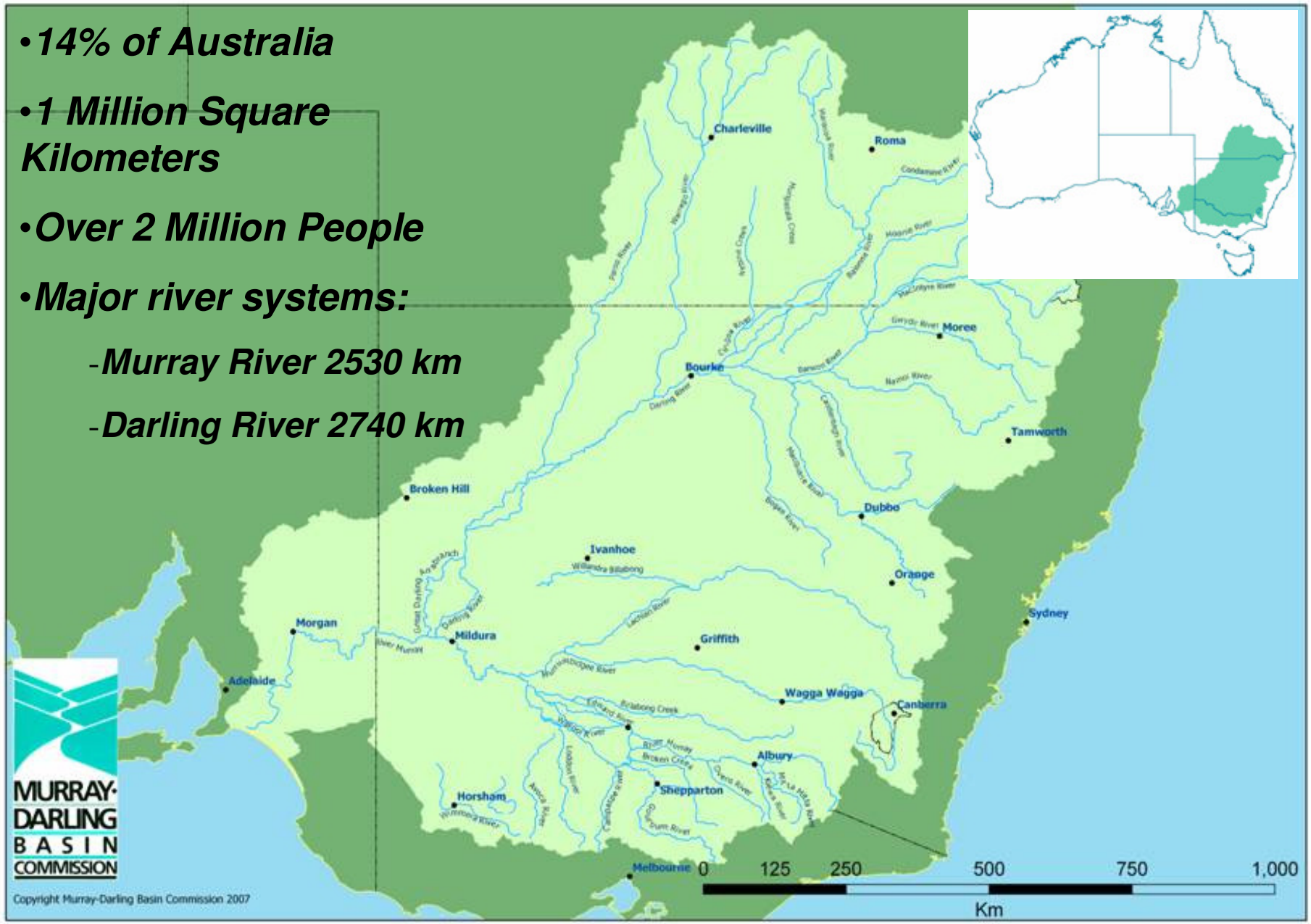
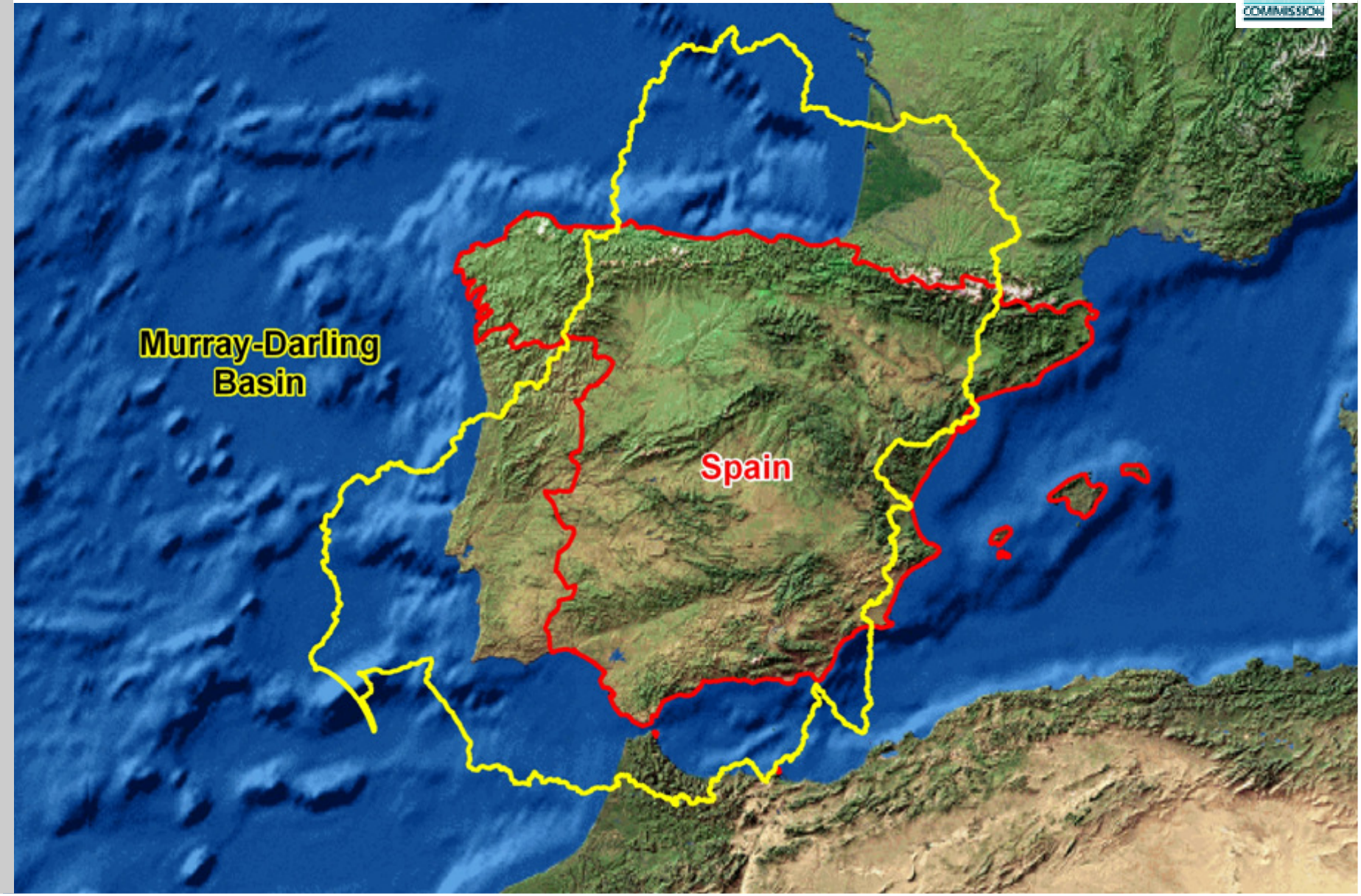
Murray-Darling Basin

- *14% of Australia*
- *1 Million Square Kilometers*
- *Over 2 Million People*
- *Major river systems:*
  - *Murray River 2530 km*
  - *Darling River 2740 km*



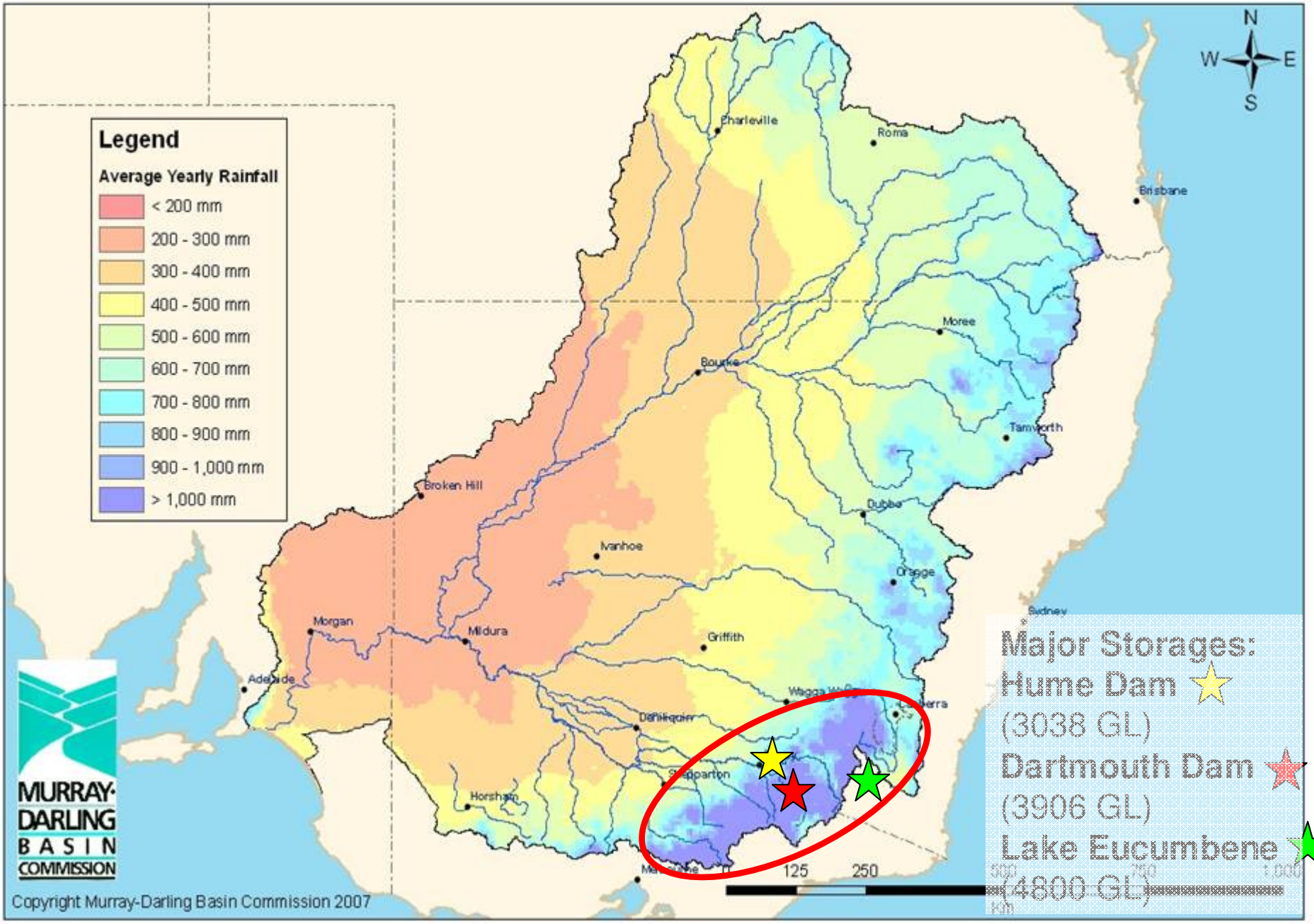

Murray-Darling
Basin
Spain

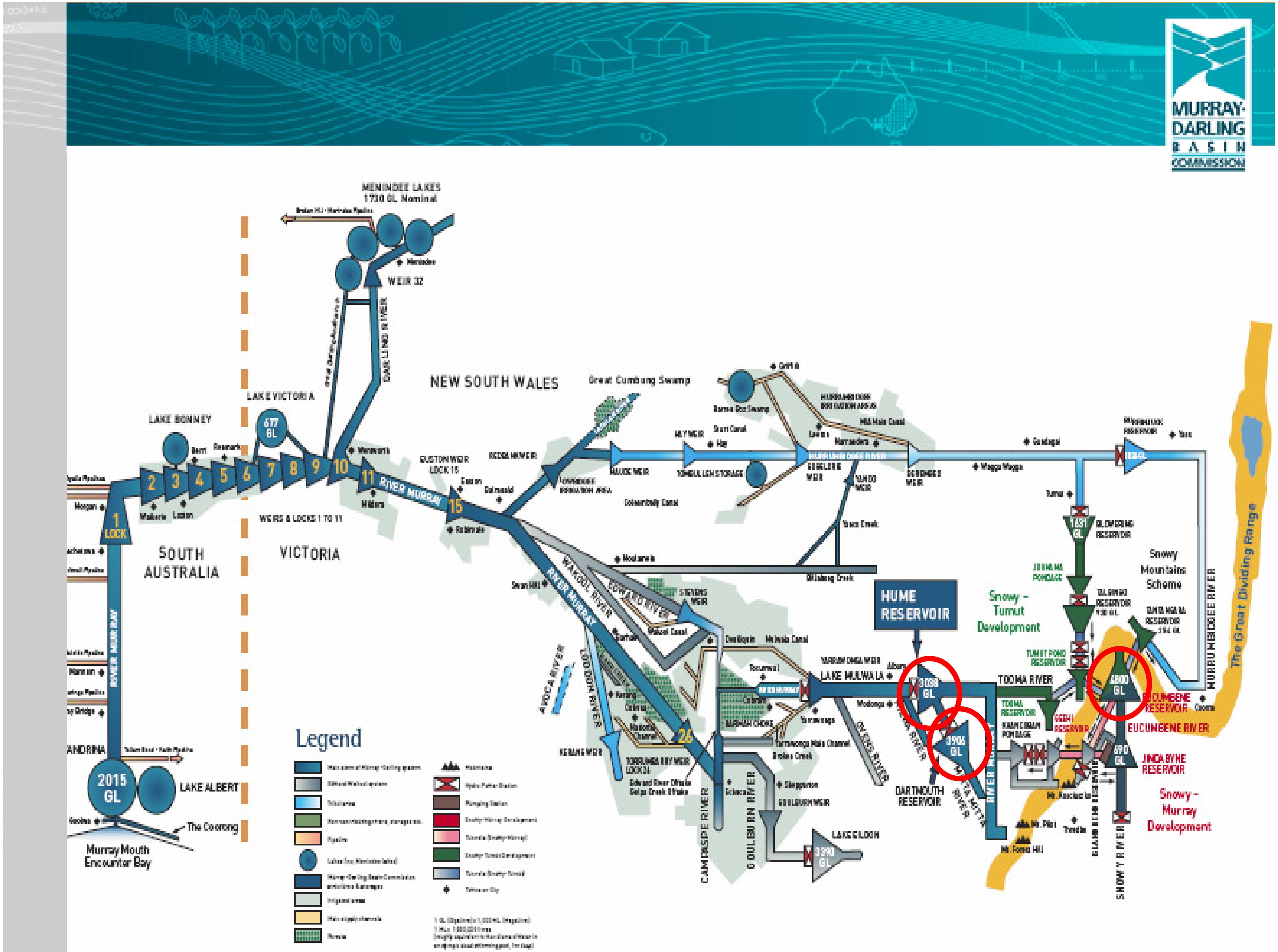
Highly Variable Flows

"A land of droughts and flooding rains"

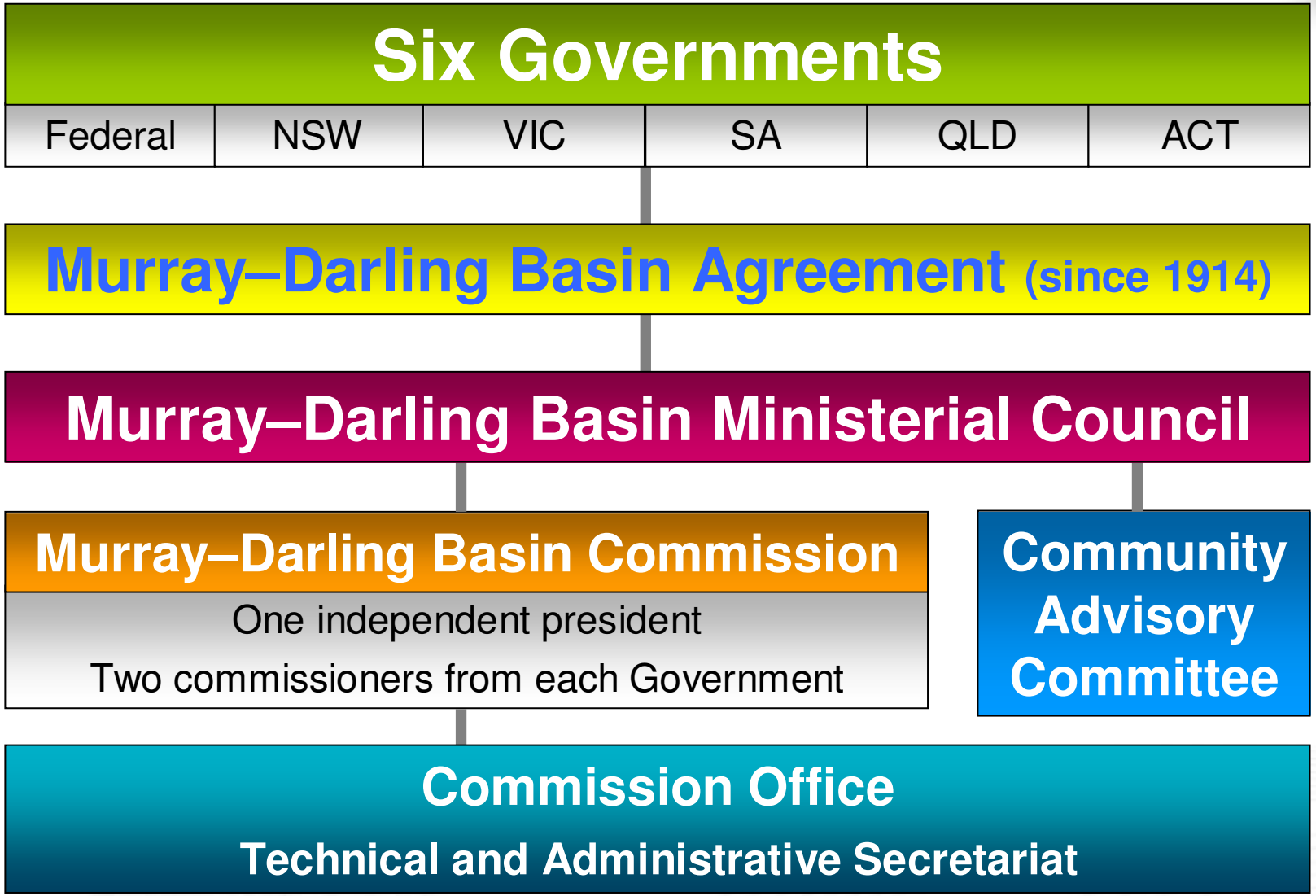
COUNTRY	RIVER	RATIO BETWEEN MAXIMUM and MINIMUM ANNUAL INFLOWS
BRAZIL	AMAZON	1.3
SWITZERLAND	RHINE	1.9
CHINA	YANGTZE	2.0
SUDAN	WHITE NILE	2.4
USA	POTOMAC	3.9
SOUTH AFRICA	ORANGE	16.9
AUSTRALIA	MURRAY	31
AUSTRALIA	DARLING	>4,000

Rainfall Distribution in the Basin




MURRAY-DARLING BASIN COMMISSION
MENINDEE LAKES
1730 GL Nominal
WEIR 32
DARLING RIVER
NEW SOUTH WALES
Great Cumbung Swamp
LAKE VICTORIA
677 GL
LAKE BONNEY
RIVER MURRAY
WEIRS & LOCKS 1 TO 11
EUSTON WEIR
LOCK 15
SOUTH AUSTRALIA
VICTORIA
LOCK 1
2015 GL
LAKE ALBERT
The Coorong
Murray Mouth
Encounter Bay
WAKOOL RIVER
EDWARD RIVER
STEVENS WEIR
AVOCA RIVER
LODDON RIVER
CAMPASPE RIVER
GOULBURN RIVER
GOULBURN WEIR
LAKE EILDON
3390 GL
HUME RESERVOIR
LAKE MULWALA
3038 GL
3906 GL
DARTMOUTH RESERVOIR
MITTA MITTA RIVER
OVENS RIVER
TOOMA RIVER
Snowy - Tumut Development
Snowy Mountains Scheme
BLOWERING RESERVOIR
1631 GL
TALBINGO RESERVOIR
TANTANGARA RESERVOIR
4800 GL
EUCUMBENE RESERVOIR
EUCUMBENE RIVER
JINDABYNE RESERVOIR
690 GL
SNOWY RIVER
Snowy - Murray Development
MURRUMBIDGEE RIVER
The Great Dividing Range
Legend

MDBC Structure



The MDBC Has Many 'On the Ground' Successes

MURRAY-DARLING BASIN COMMISSION

Day to Day River Management:

1. River Operations
2. Asset Management
3. Water Accounting
4. Interstate Water Trade
5. Drought Contingency Planning

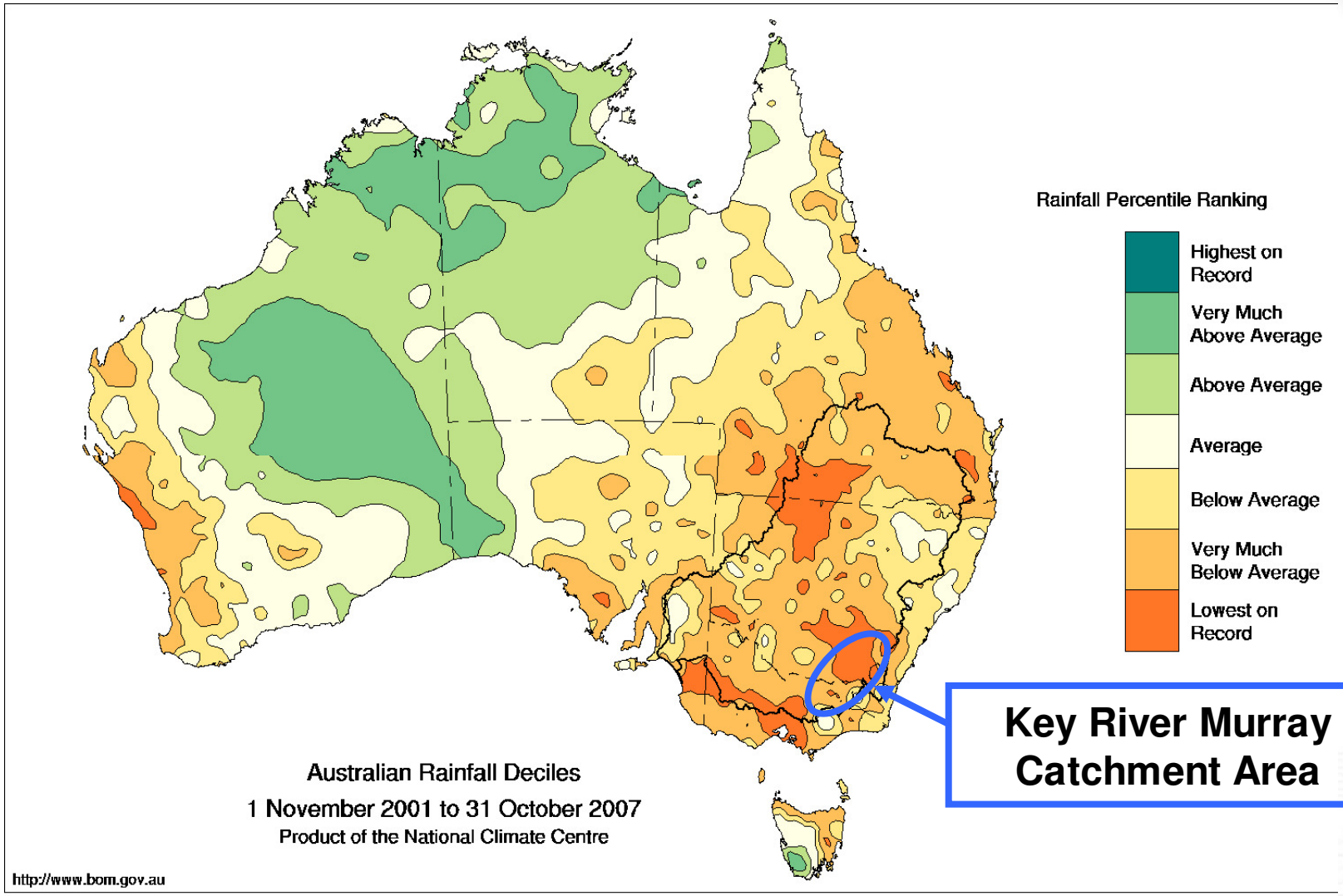
Sustainable Resource Management:

6. The Cap on Diversions
7. The Living Murray – Water Recovery
8. Water Quality Monitoring
7. Basin Salinity Management
10. Native Fish Strategy

Planning for the Future:

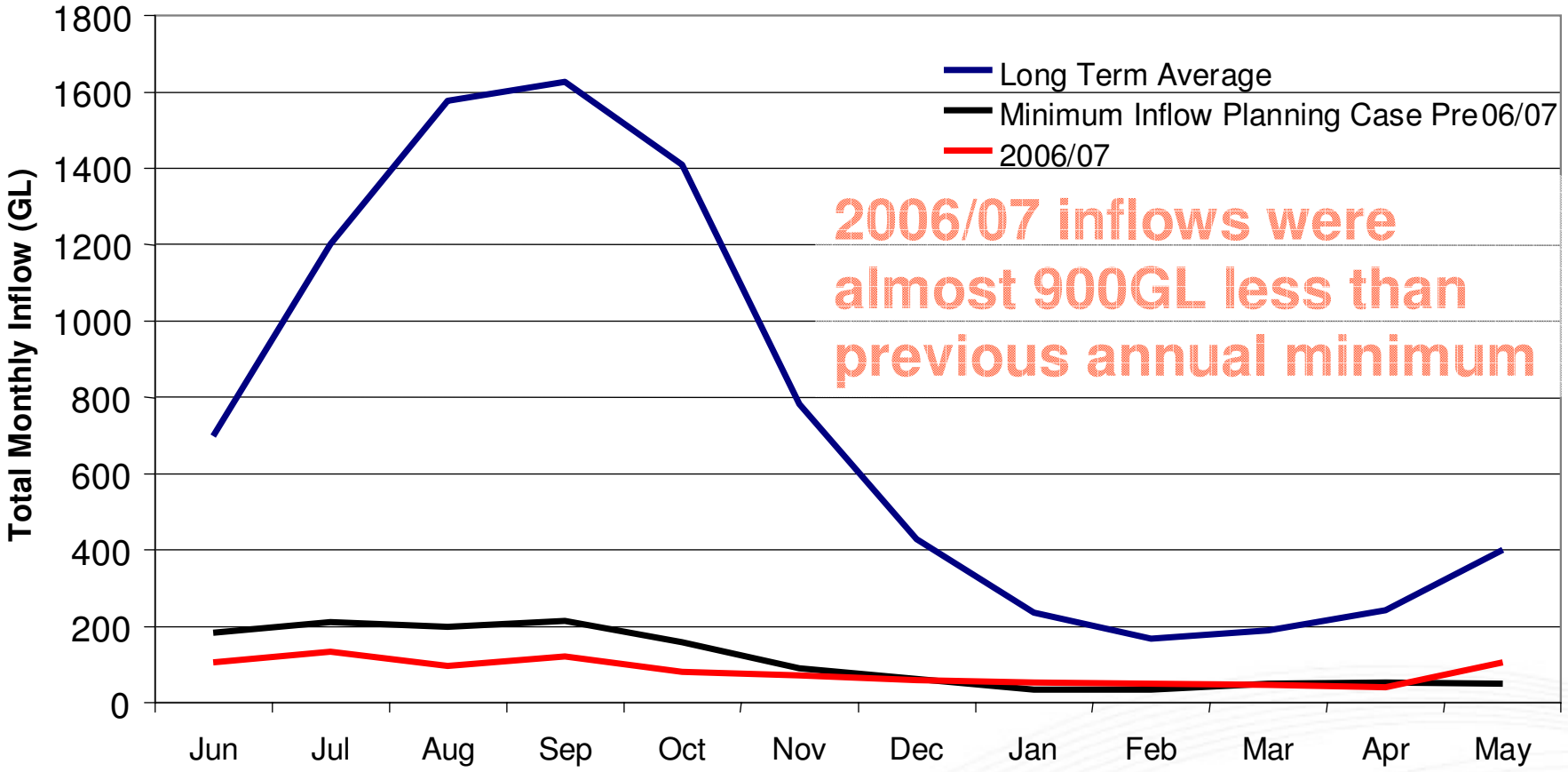
11. Sustainable Rivers Audit
12. Northern Basin Project
13. Integrated Basin Reporting
14. Risks to Shared Water Resources
15. Water Policy Development
16. River Murray Operations Review

Five Factors make this Drought Different

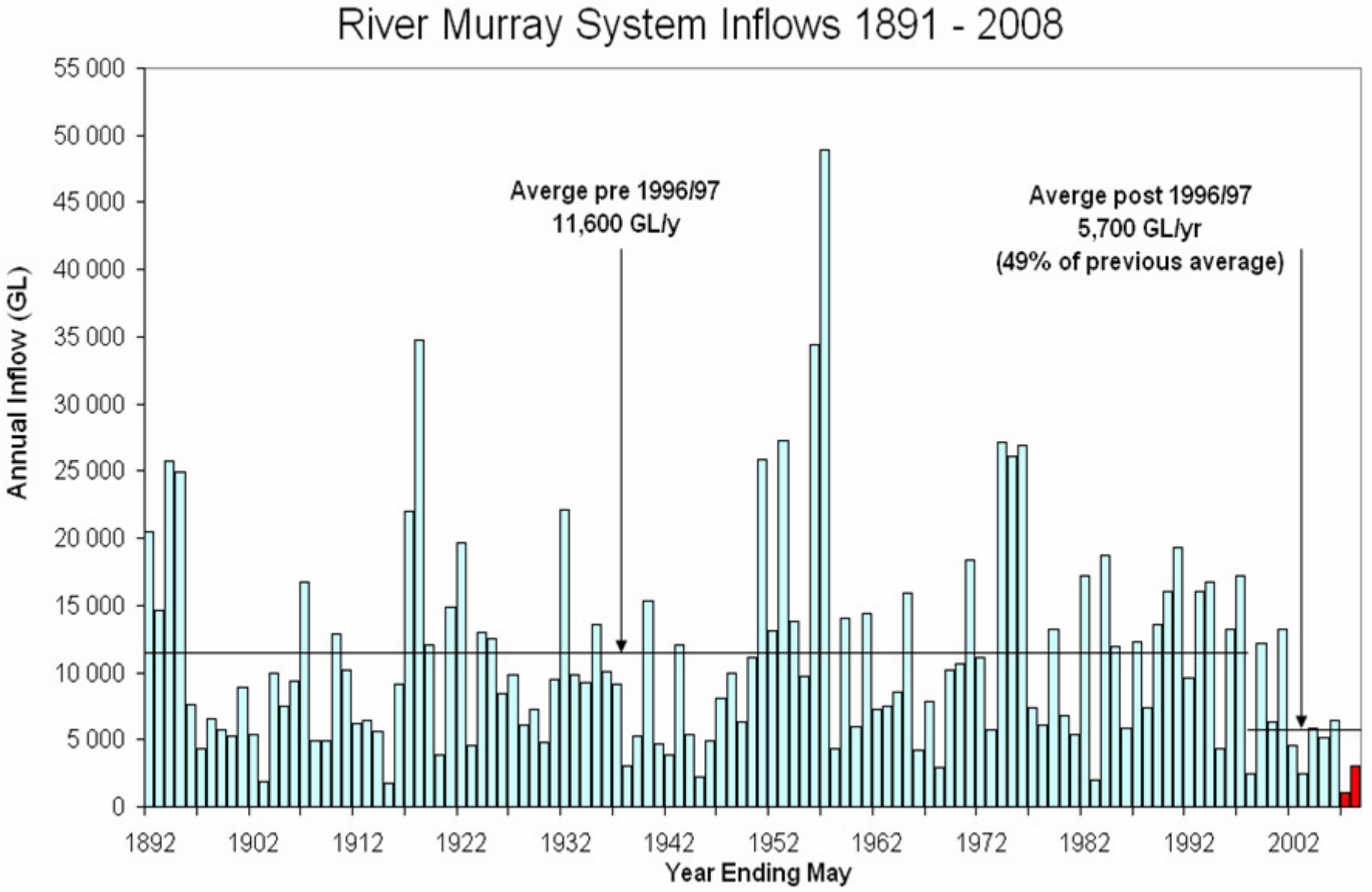


1. Record Low Annual Inflow 06/07

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

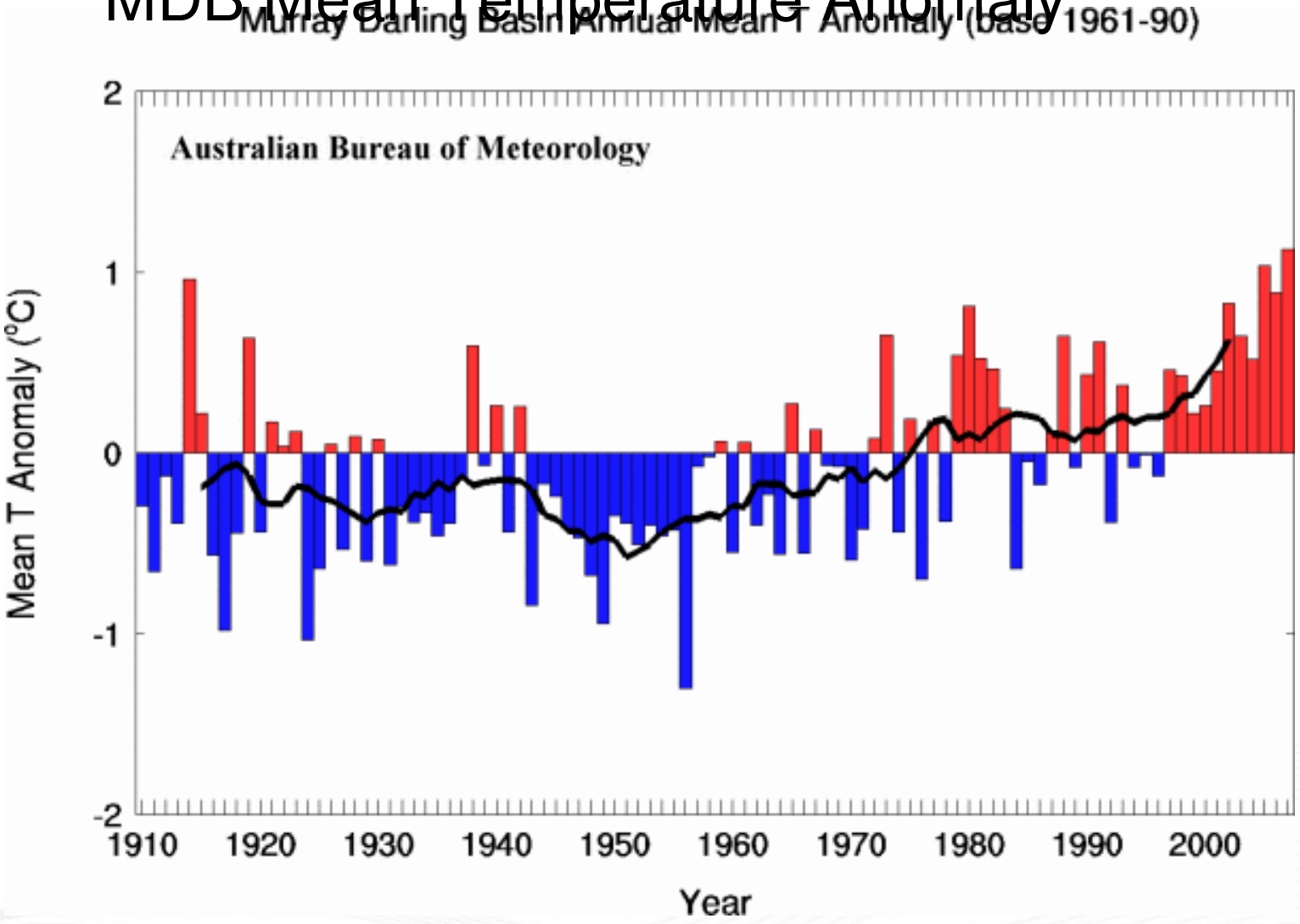


Murray-Darling Basin Commission January 2008

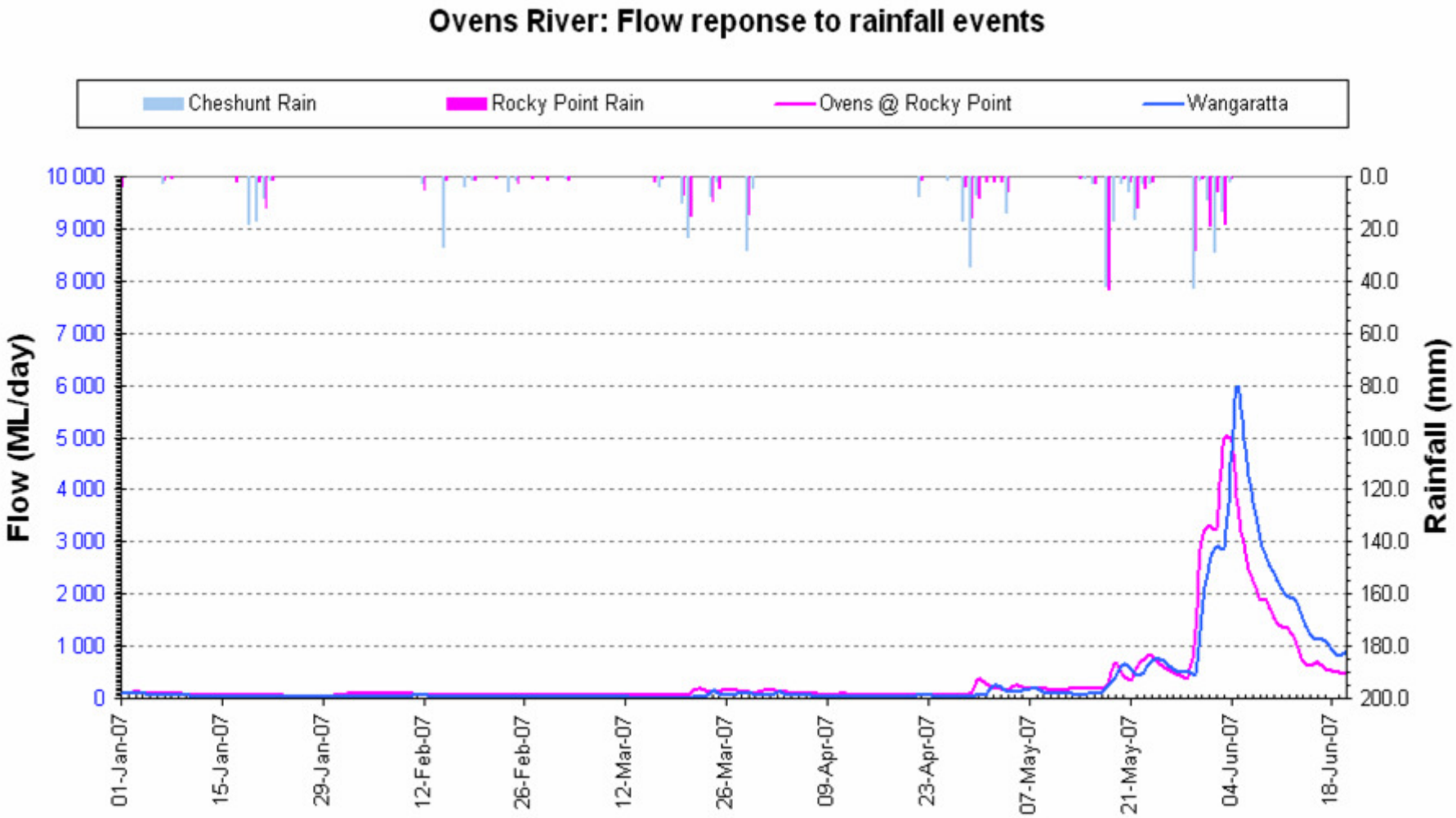

River Murray System Inflows 1891 - 2008
Annual Inflow (GL)
55 000
50 000
45 000
40 000
35 000
30 000
25 000
20 000
15 000
10 000
5 000
0
1892
1902
1912
1922
1932
1942
1952
1962
1972
1982
1992
2002
Year Ending May
Averge pre 1996/97
11,600 GL/y
Averge post 1996/97
5,700 GL/yr
(49% of previous average)

3. Record High Temperatures

MDB Mean Temperature Anomaly



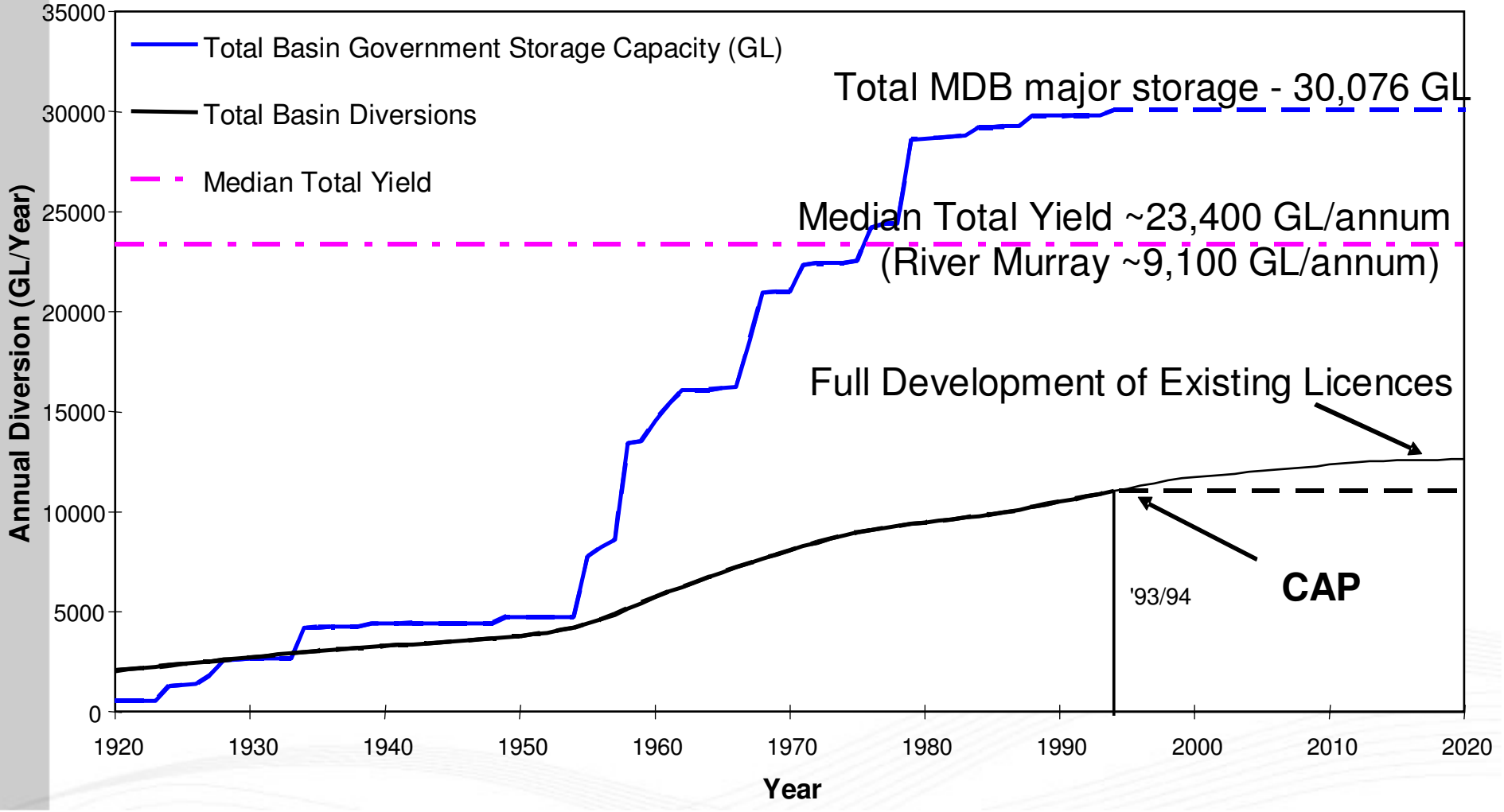
Dry Catchment Impact on Runoff:
The Ovens River



4. Surface Water Over-Allocation

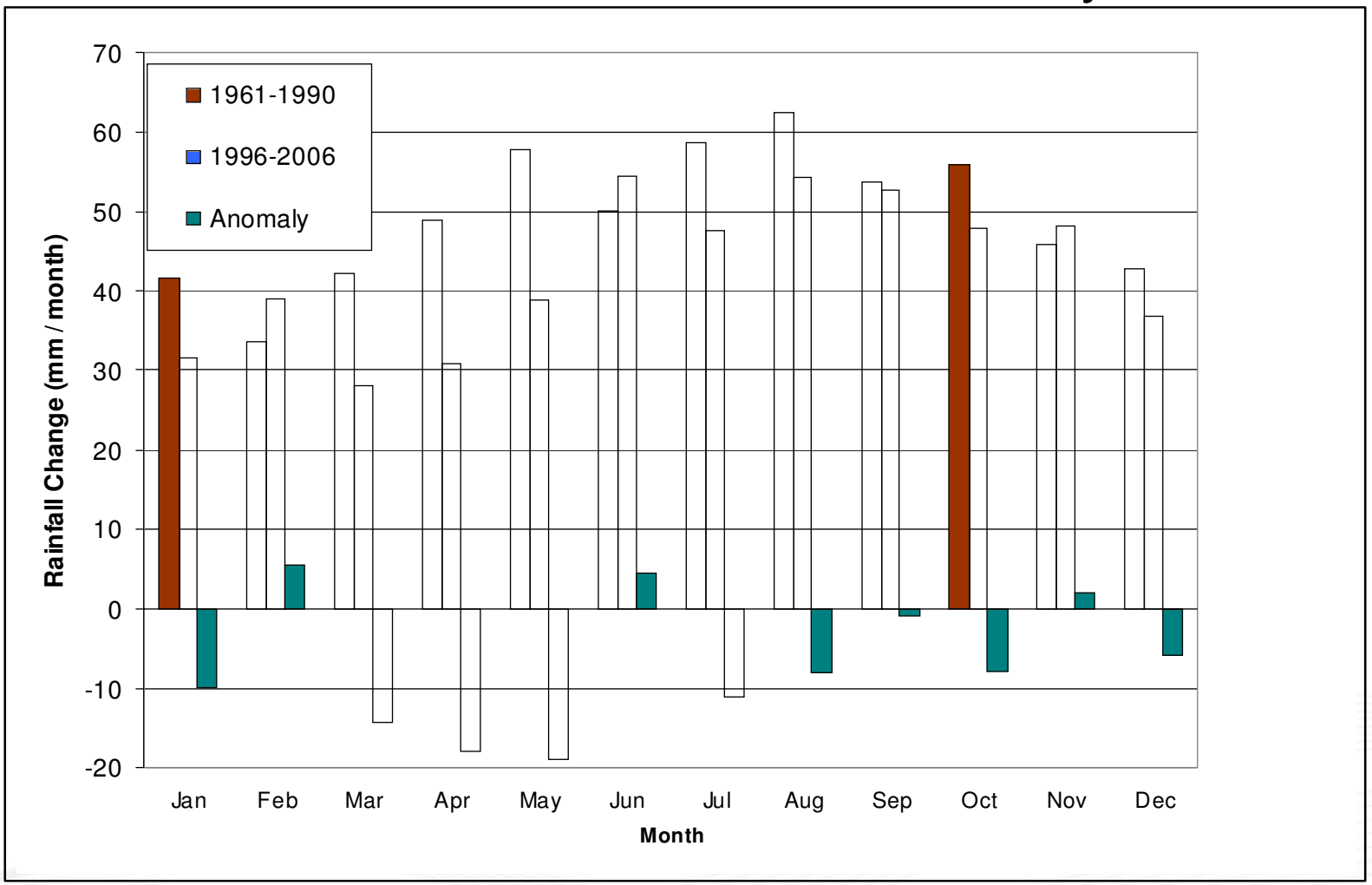
Growth in Water Use in Murray-Darling Basin

Unsustainable, Over-Allocated Surface Water Diversions

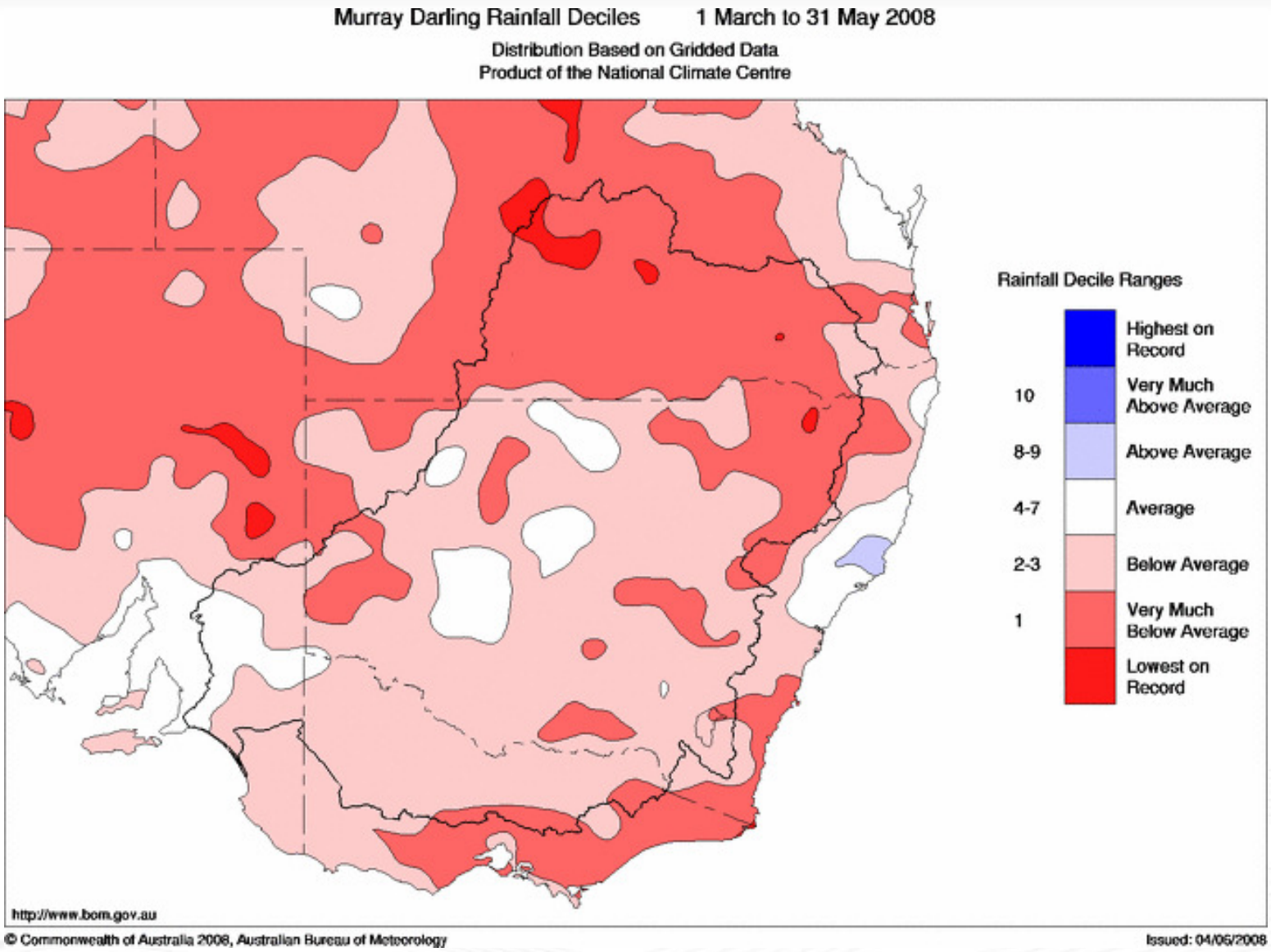


5. Drier Autumns

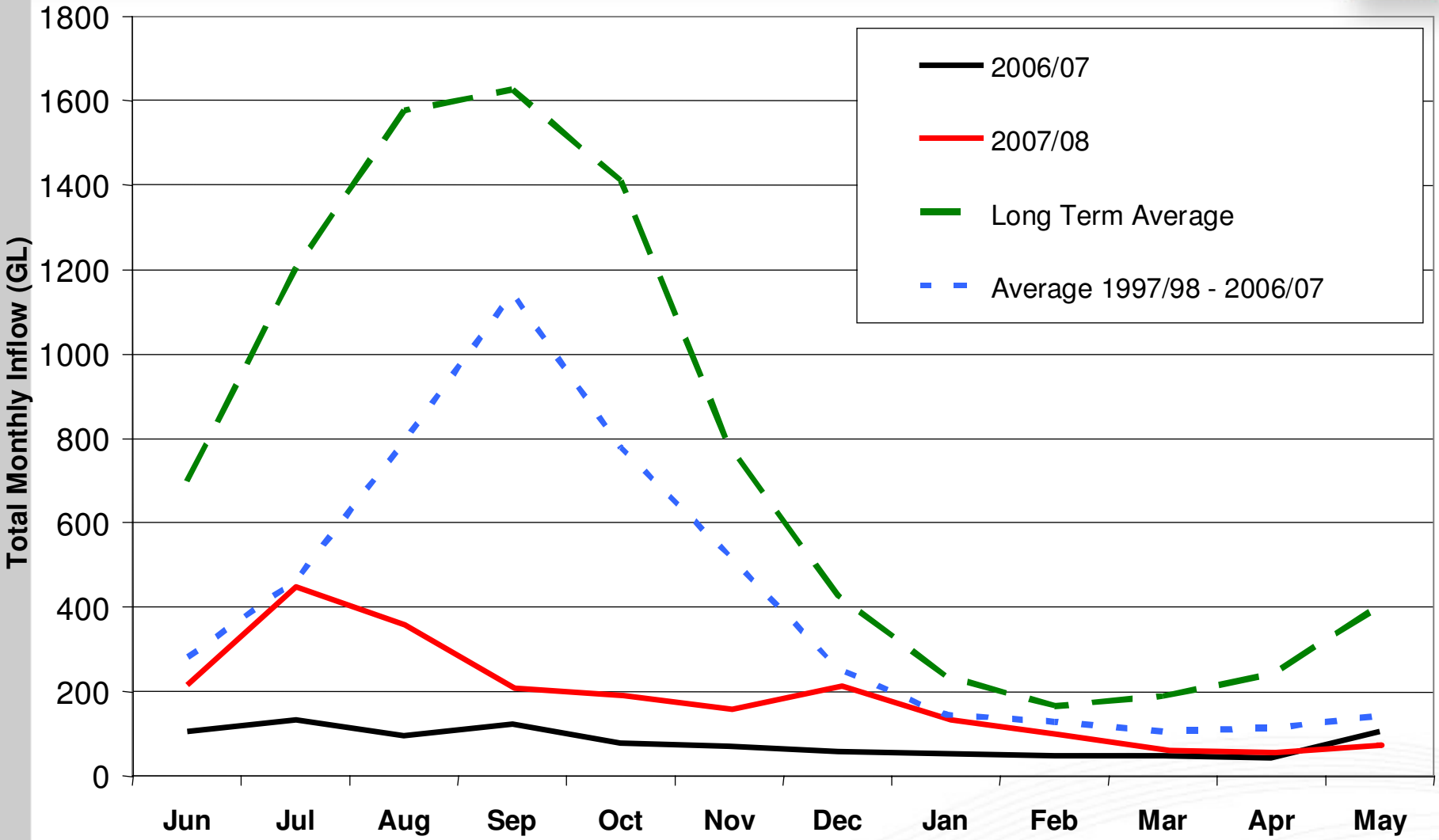
Monthly mean south eastern Australia rainfall, 1961-1990, 1996-2006 and anomaly



Rainfall Autumn 2008:
March, April and May



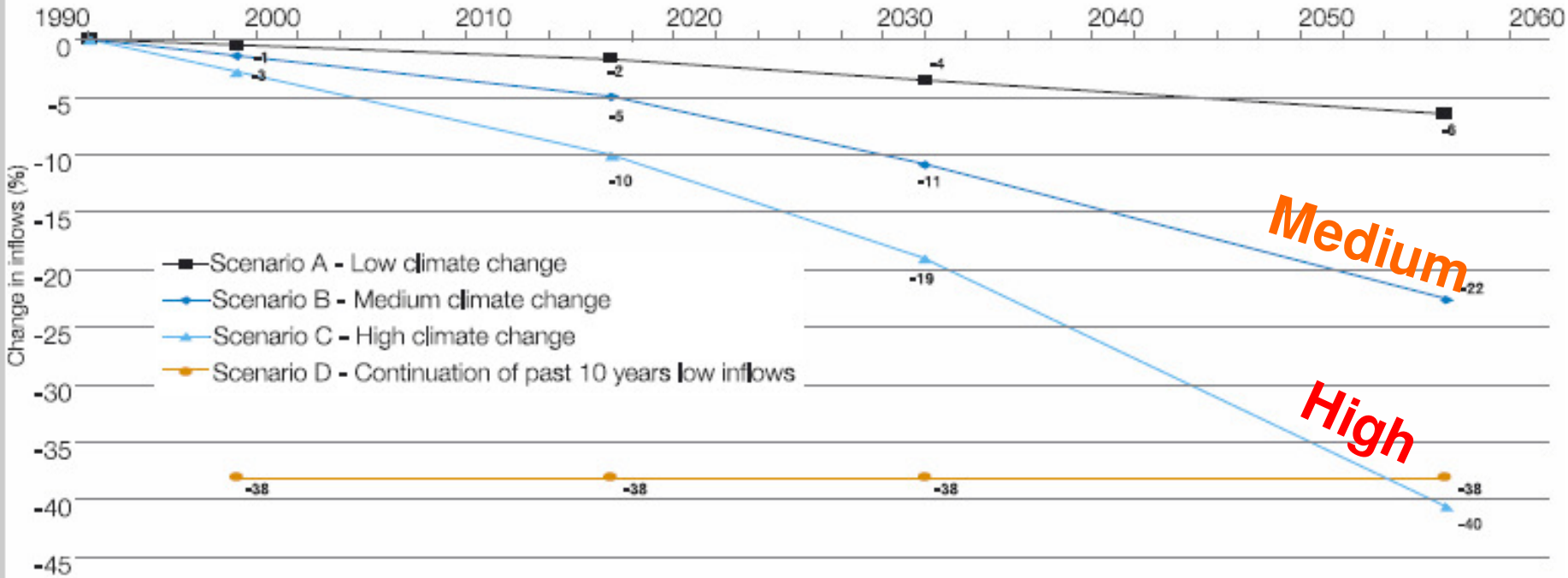
River Murray Inflows:
Inflows exclude Menindee and Snowy



Murray-Darling Basin Commission May 2008

River Murray & Climate Change:
A Typical Prediction

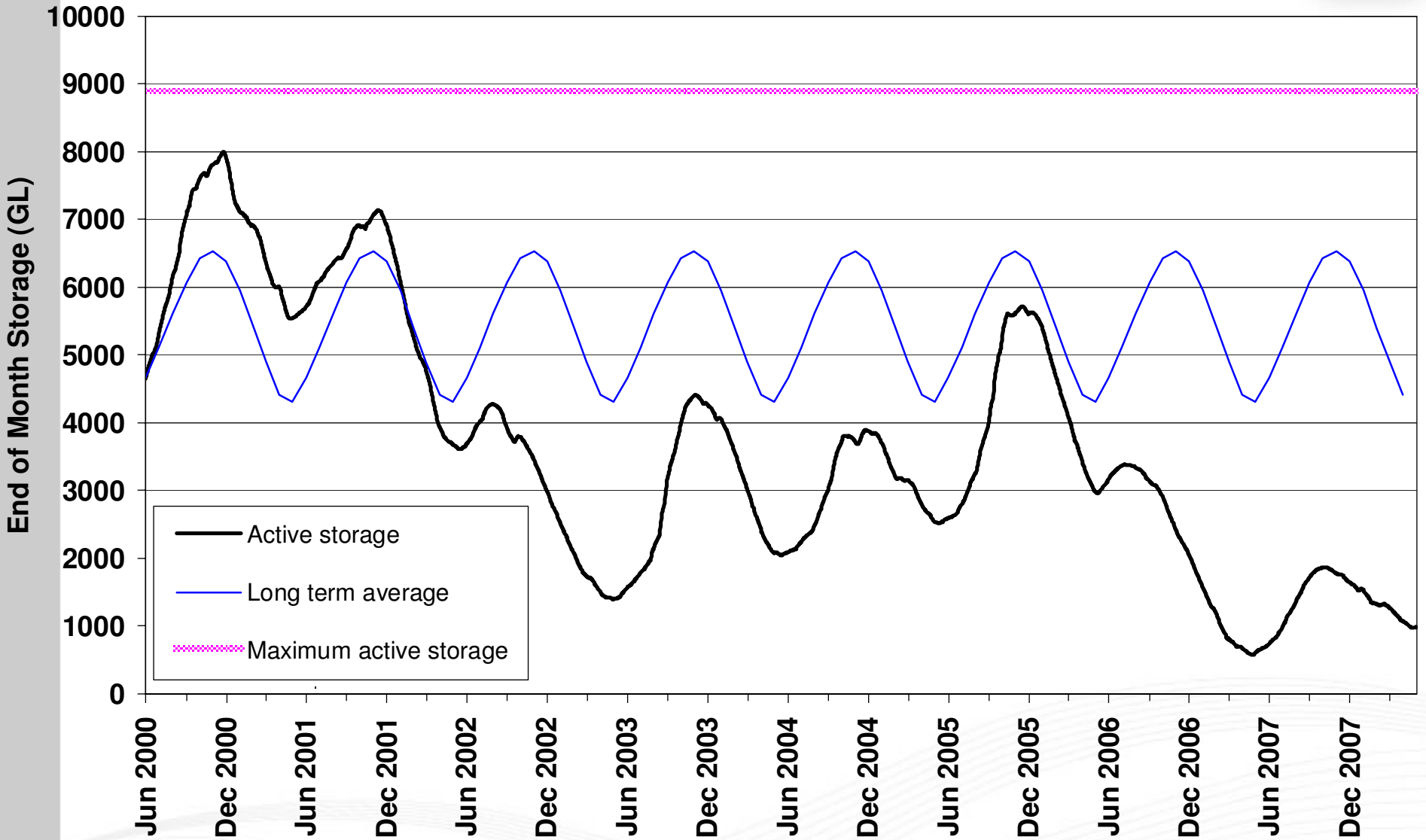
Figure E.2 Potential reduction in total inflows for the Murray system over 50 years (compared with the long-term average)[1]



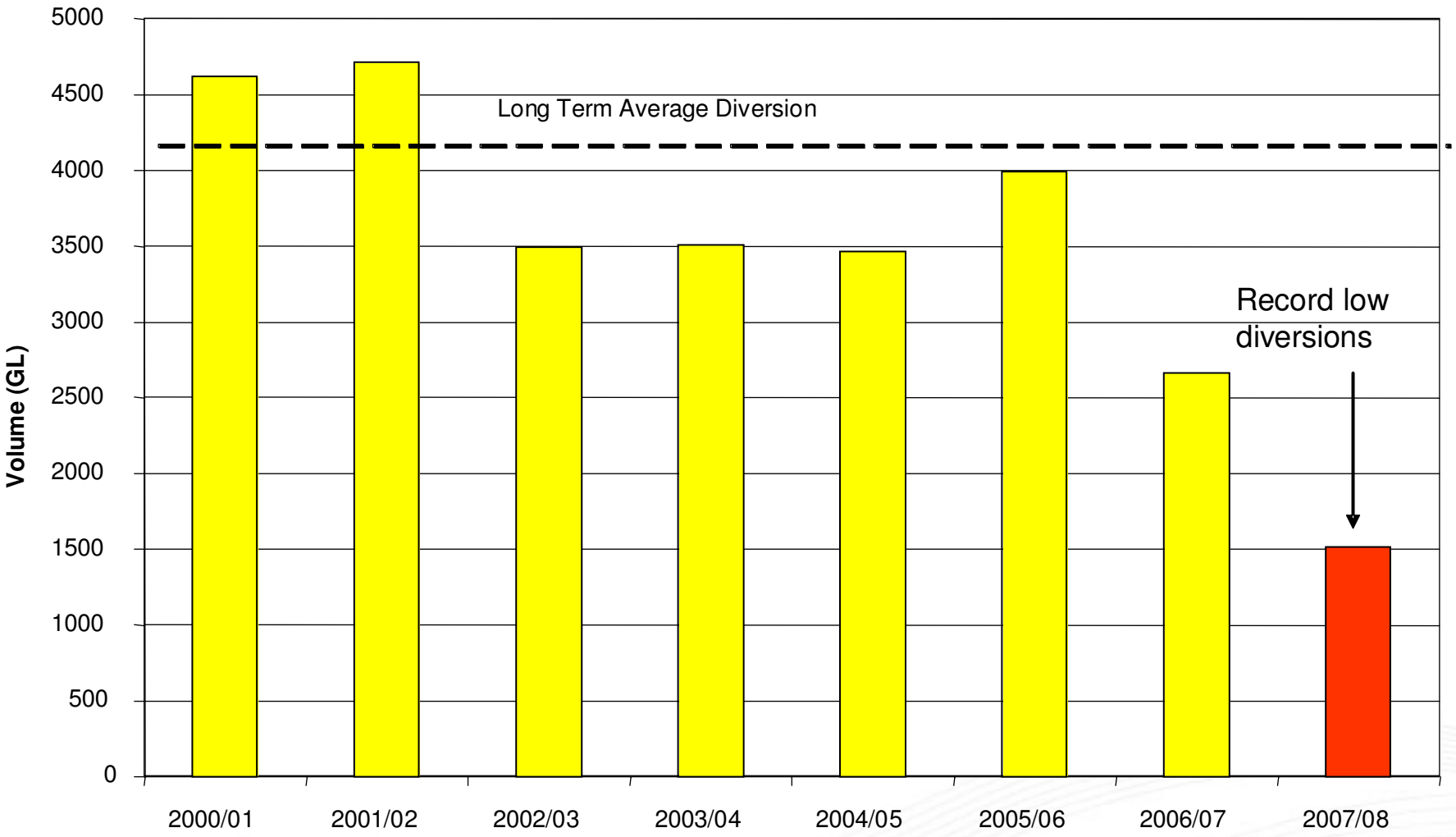
Source: Department of Sustainability and Environment Victoria – Northern Region Sustainable Water Strategy discussion paper 2008

Models consistently predict lower rainfall and streamflows

Active Storage:
Storages are close to record low levels



Irrigation Impacts:
2007/08 Record Low Diversions

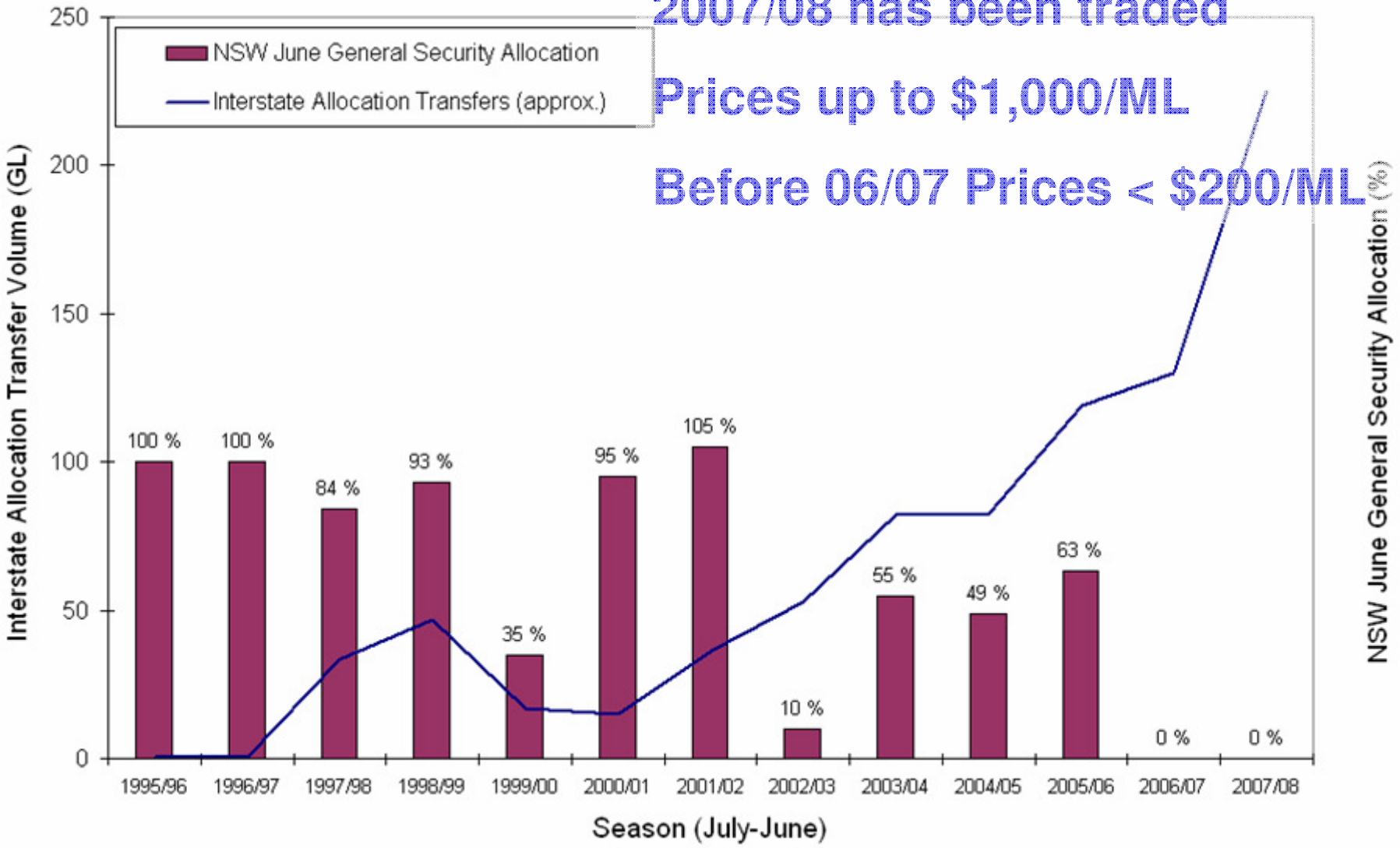


Inter-State Water Trade:
Reducing the Economic Impact of Drought

≈ 30% of the water used in 2007/08 has been traded

Prices up to $1,000/ML

Before 06/07 Prices < $200/ML



Irrigation Impacts:
Response from the Irrigation Industry

"Triage" of permanent plantings

- Unprofitable value varieties abandoned
- Mid-value varieties – survival, minimise impact on next year
- High value varieties – cropped but with lower yield

Modification of business practices

Significant increase in water trade

- ≈ 30% of water used has been traded
- Record prices over $1,000/ML

Wetland Disconnection

Acid Sulphate Soils

Lower Lakes Deteriorating

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Risk Management:
Short-term contingency responses

Aim to reduce evaporation and losses and maximise flexibility:

- Retain water in headwater storages
- Lake Mulwala drawdown capture Ovens River peak flows
- Lower weir-pool levels reduce evaporation
- Reduced flows in the Murray, especially over Lock 1
- Early pumping to Adelaide storages
- Disconnecting artificially inundated wetlands
- Lower pumps at off-takes

Risk Management:
Medium-term contingency responses

Aim to maximise water manager and irrigator flexibility:

- Critical water carry-over in all states
- Allocation water carry-over available for all irrigators
- Relaxed water trade restrictions
- Some contingency measures are continuing
- Communicating ongoing drought issues to irrigators and the public

GOOLWA

- Rebalancing consumptive and environmental water shares
- Planning for new minimum flows
  - Impacts on irrigation and the environment
- More extreme events
- Technological advancements
- Social adjustment


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