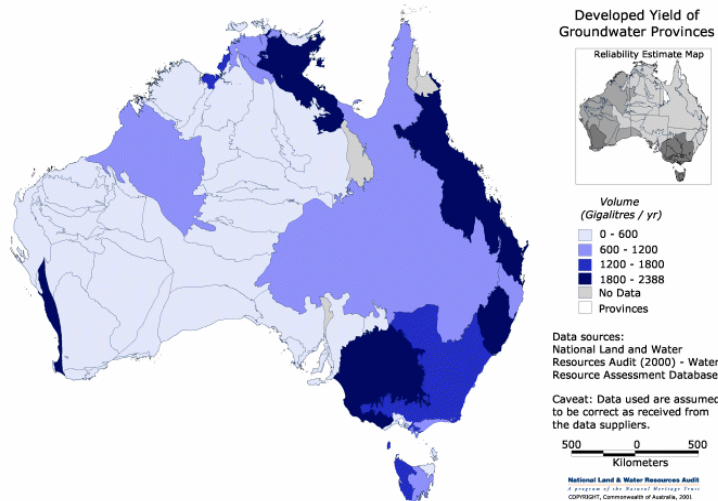
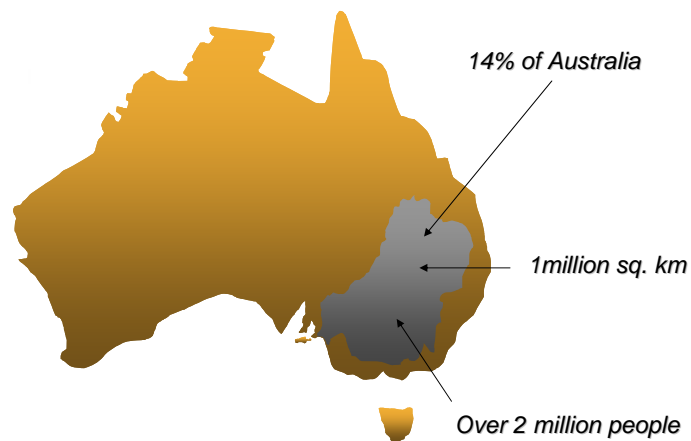


Distribution of Australia's groundwater



The Murray-Darling Basin



Snapshot of the MDB

• Major river systems

- Murray River
2530 km
- Darling River
2740 km



The MDB Agreement



- all jurisdictions
- ongoing
- water sharing
- cost sharing
- construction
- management
- consultation



The Charter

“to promote and coordinate effective planning and management for equitable, efficient and sustainable use of land, water and other environmental resources”



**Community
Advisory
Committee**

SIX GOVERNMENTS

C'wealth NSW Vic SA Qld ACT

MURRAY-DARLING BASIN MINISTERIAL COUNCIL

Up to 3 Ministers from each Government
representing land, water and environment

MURRAY-DARLING BASIN COMMISSION

1 Independent President
2 Commissioners from each Government

Commission Office

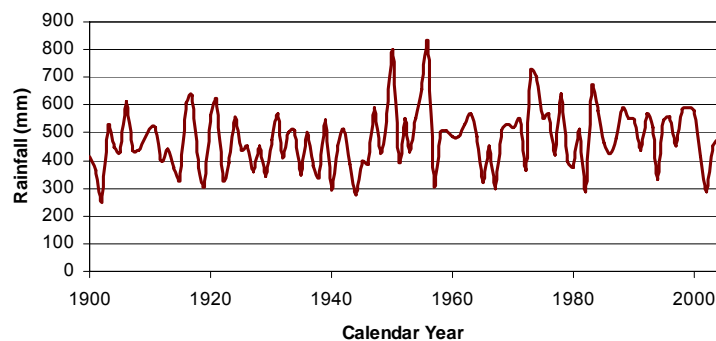
Technical and administrative secretariat



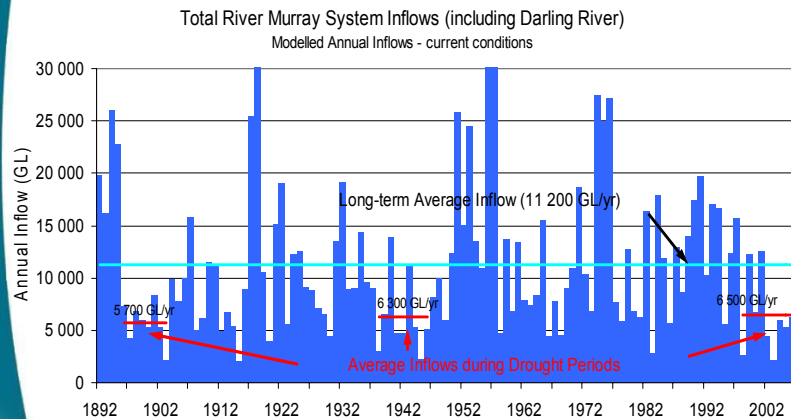
Minimum/maximum flows of world rivers

COUNTRY	RIVER	RATIO BETWEEN THE MAXIMUM and the MINIMUM ANNUAL FLOWS
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	15.5
AUSTRALIA	HUNTER	54.3
AUSTRALIA	DARLING	4705.2

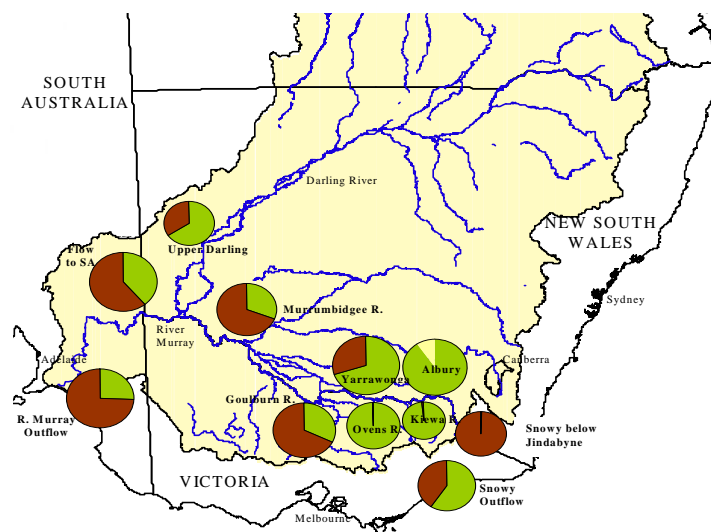
Rainfall averages



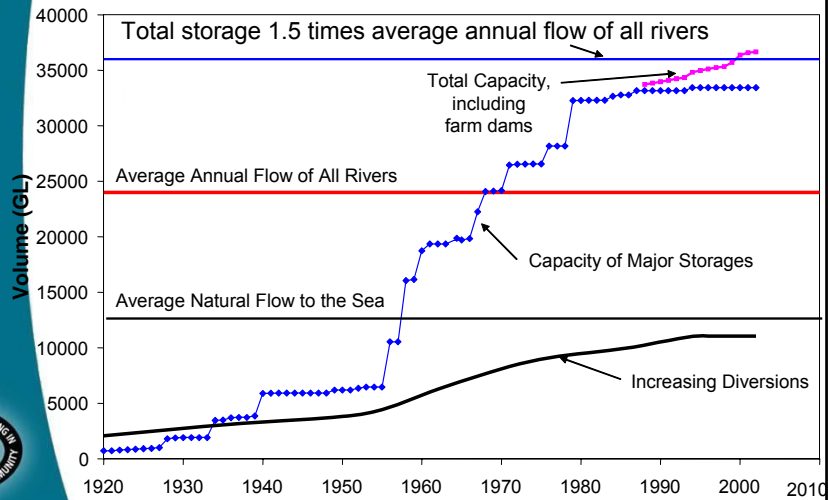
River Murray Inflows – incl. Darling River



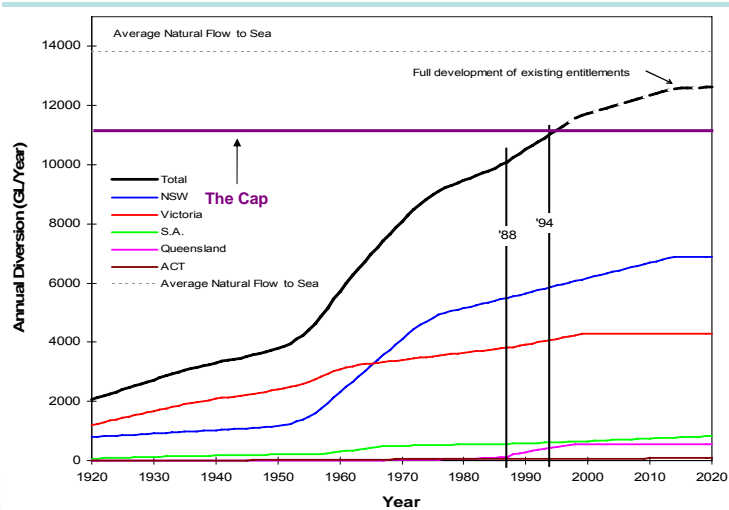
Murray-Darling Basin flows



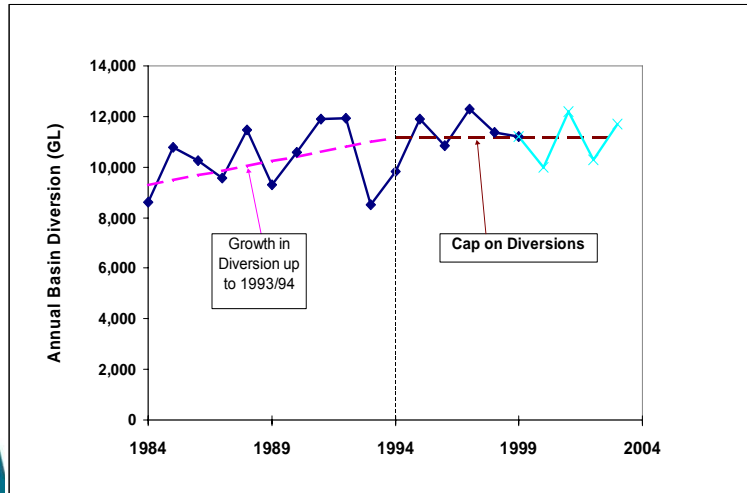
Storage capacity and diversions in the MDB



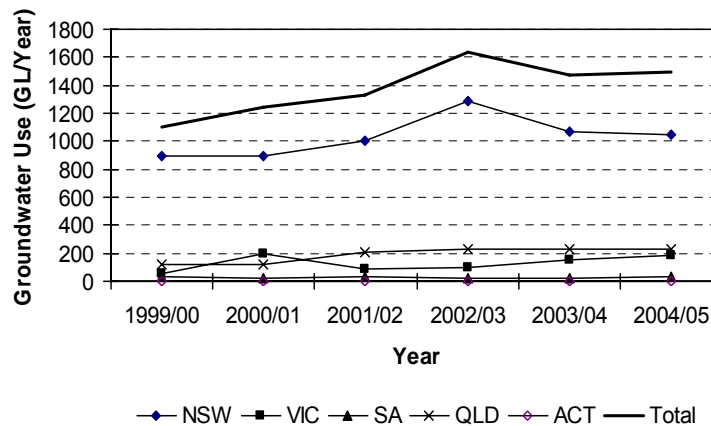
The Cap



Operation of the Cap on diversions

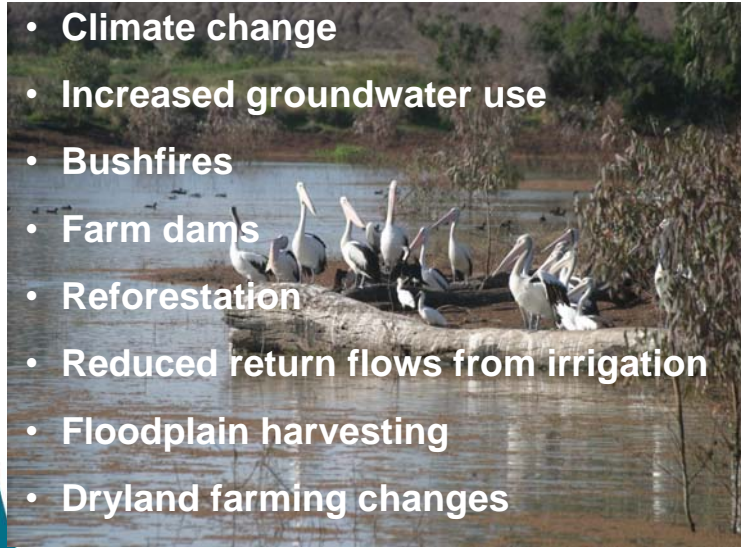


Groundwater use in the Basin



Risks to shared water resources

- Climate change
- Increased groundwater use
- Bushfires
- Farm dams
- Reforestation
- Reduced return flows from irrigation
- Floodplain harvesting
- Dryland farming changes



Risks to shared water resources

Commission program objective:

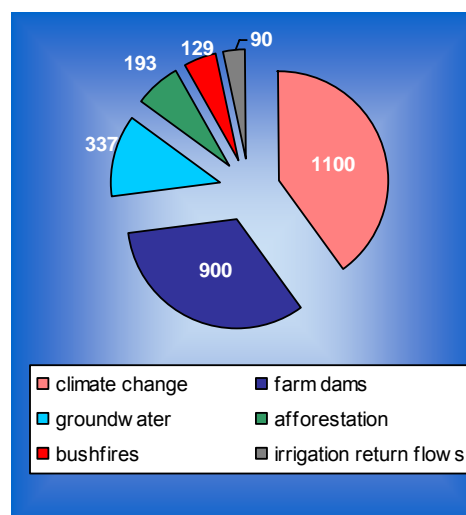
To protect both the integrity of the water access entitlements system and the achievement of environmental objectives as they relate to the shared water resources of the Murray-Darling Basin

Risks to shared water resources

Agreed program framework:

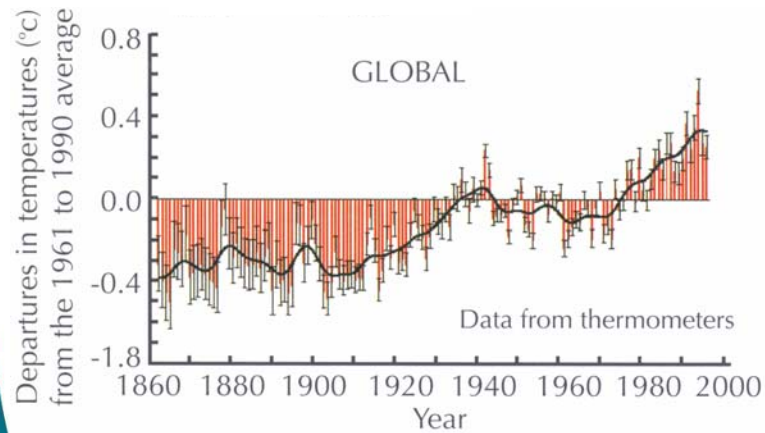
- Risk assessment
- Modelling the inter-relationship & cumulative impact of risks
- Policy response
 - Assigning risk to water sharing agreements
 - Reducing impact
- Monitoring, evaluation and reporting

Our shared water resource at risk (estimates)



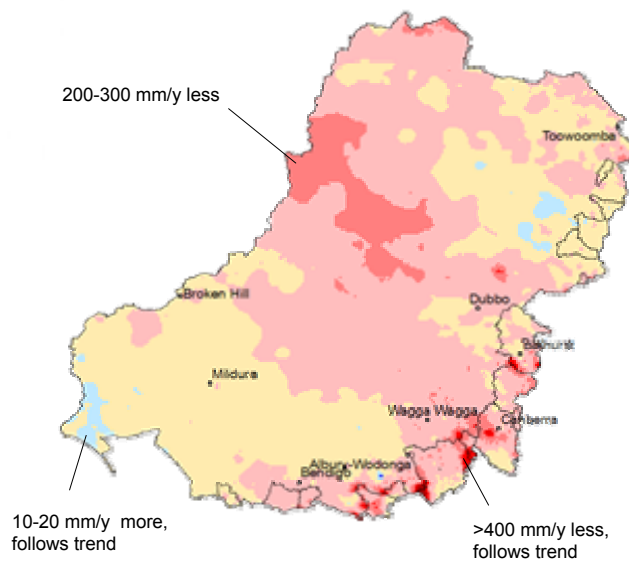
Source: CSIRO

Global temperature increase since 1860



Climate change and variability

Difference last 5 years vs 20 foregoing years





Climate change – possible impacts

- Possible impacts in MDB include:
- ↓ annual average rainfall
- ↑ average temperatures
- ↑ frequency/severity of extreme events (floods and droughts)
- ↓ stream flow (all water resources?)
- ↓ water quality
- ↔ ecological, economic, social ↔



Risk and vulnerability – climate change

- Murray-Darling Basin
 - Estimated stream flow variation (CSIRO)
 - 2030: 0 to - 20%
 - 2070: + 5 to - 45%



Potential effect of climate change on flow (GL/pa)*

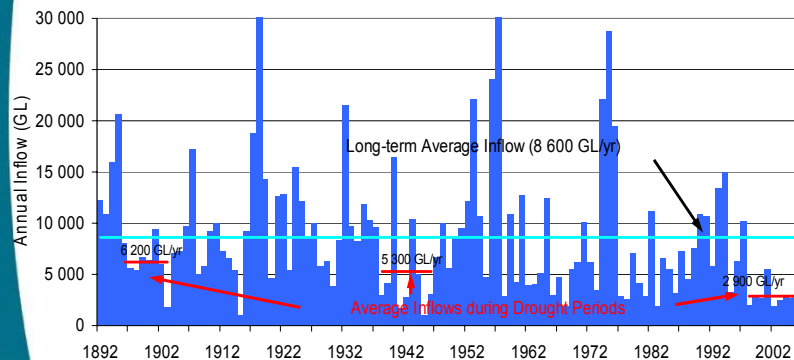
Murray	Natural	Current	2030 – 20%	2070 –45%
Average flow to sea (pa)	12 896	5071	10 317	7093
Median flow to sea (pa)	11 318	3092	9054	6225
Average flow to SA (pa)	13 871	6702	11 097	7629
Median flow to SA (pa)	12 835	4827	10 268	7059

* Reduction in 'flow' (CSIRO 2006)



Flows at Euston

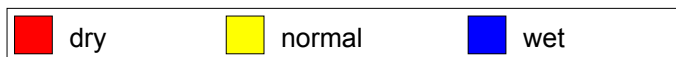
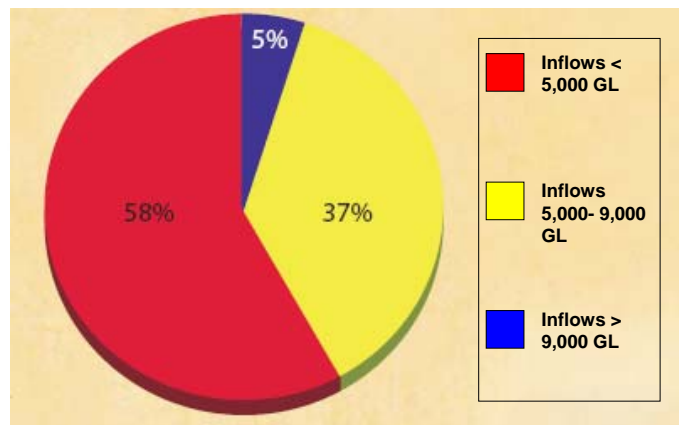
Actual Flows in the River Murray at Euston



Impacts of drought on average irrigation allocation

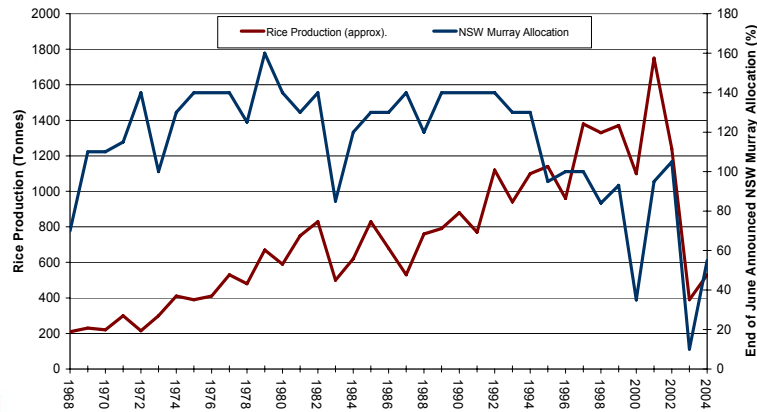
Entitlement	2001-2006 drought	Long term
NSW GS	55%	85%
Vic WR	100%	100%
Vic SALES	33%	76%
SA	Approx. 99%	>99%

Outlook for 2006-07 inflows




Water allocation vs rice production

End of June Murray Allocation -v- Annual Australian Rice Production (approx.)



Climate change – what do we need?

- Improved understanding of climate change impact
- Need to plan for the future (supply constraints)
 - Modelling potential supply change scenarios
 - Analysis of consequences of changed flows on
 - TLM
 - River health
 - State shares
 - Salinity
- More reliable forecasting methods





South Eastern Australian Climate Initiative

Collaborative venture - \$7 million investment over three years

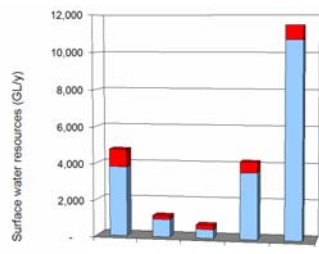
Around 40 projects across three research themes:

- Characterisation and attribution of current climate
- High resolution climate projections and impacts
- Seasonal forecasting

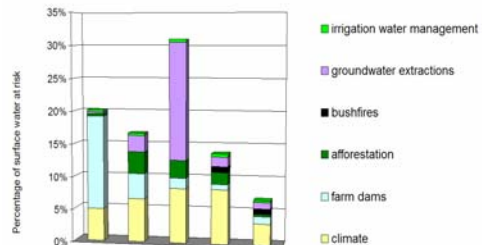





When is a systems view needed?



INDICATIVE ESTIMATES ONLY



Source: CSIRO



Major challenges

- Localised information
- Flexible responses
- Impact on other risks
- Time frame

