The Murray-Darling Basin Agreement
A framework for managing severe drought

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Outline

- Geography – Murray-Darling Basin introduction
- History – Development of the Agreement
- The Ultimate Test – Prolonged Drought
- Strengths/Weaknesses - How has the Agreement performed?
Drought Planning

Figure 1  The hydro-illogical cycle (from DPTF 1990, after Wilhite)

We are here

From Climate extremes in Australia: the role of risk management (2002), after Don Wilhite. Dingle Smith, Centre for Resource and Environmental Studies, Australian National University
Geography

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

Economic:
- 40% of Australian agriculture - approx $14 billion
- 70% of irrigated agriculture - approx $7 billion

Environment:
- Alpine rainforest to arid rangelands
- World heritage convention listings
- At least 35 endangered birds - At least 16 endangered mammals

River Murray system Runoff, Diversions and Storage
- 9,100 GL median annual runoff
- 4,300 GL average diversions
- 9,500 GL MDBC major storage
Irrigation

• The biggest user of diverted fresh water

• Produces more than half the profit in Australian Agriculture & Horticulture, from 0.5% of land (NLWRA 2002)
The Murray – an “exotic river”

Less than 5% of the Basin yields > 50% flow
Large in scale but less flow in an average year than the Amazon in a day

Highly variable – heavily exploited water resources
Highly developed but thus high vulnerability
Future health influenced by climate change, landuse, bush fires, forestry and water resources policy reform
Government Jurisdictions

- Victoria
- New South Wales
- South Australia
- Queensland
- Australian Capital Territory
- Australian Government
Murray-Darling Basin Agreement

• An agreement between governments – Commonwealth, NSW, Victoria, South Australia and Queensland ratified by each of the Parliaments, (ACT participates by MOU) to

“promote & coordinate effective planning and management for the equitable efficient & sustainable use of the water land & environmental resources of the Murray-Darling Basin”
Part X - Distribution of Water

- rules for sharing River Murray system waters & defining water under control of Commission
- Commission empowered and required to direct operation of works to ensure
  - South Australia’s entitlements are met
  - reserves of water held
  - NSW & Victoria can exercise rights to use of River Murray water
- Commission may also have regard for improving water quality or other environmental objectives
- rules for special accounting during dry periods
Water Sharing

Inflows to Menindee Lakes Shared 50:50

NSW tributary inflows downstream of Albury 100% NSW water (Murrumbidgee & Billabong)

Inflows to Dartmouth, Hume and from the Kiewa River Shared 50:50

SA supplied equally by NSW and Vic

Vic tributary inflows downstream of Albury 100% Vic water (Ovens, Goulburn, Broken, Campaspe, Loddon)
Australian water era

- 1890’s – 1980’s Development era – “drought, royal commission => new dam”
- 1992 Industry Commission – TWE
- 1994 COAG reforms – environmental flows, unbundling water and land “titles”; corporatisation and cost recovery
- 1995 – MDB “Cap” on diversions
- 2001 - The Living Murray “First Step” – 500 GL Eflows
- National Water Initiative 2004 – reaffirms reform agenda and markets’ role in reallocating water
- Tony will cover more recent developments…..
1915 – 1979: Dam construction
1915 – 1987: Irrigation development

Many entitlements are issued, particularly in wet periods
The Agreement’s Toughest Test

1. Unprecedented Drought

2006/07 inflows
900 GL (45%) less than 1914/15
Droughts and Flooding Rains:
This long drought is the worst

River Murray system inflows

Long-term Average Inflow = 8,900 GL

Average Inflows during Drought

Lowest inflows for all sequences up to 10 years
2. Pressure on Precious Resources

Surface Water Over-Allocation

Growth in Water Use in Murray-Darling Basin

Total Basin Government Storage Capacity (GL)
Total Basin Diversions
Median Total Yield

Total MDB major storage - 30,076 GL
Median Total Yield ~23,400 GL/annum
(River Murray ~9,000 GL/annum)

Full Development of ExistingLicences

'93/94 CAP

Total Basin Government Storage Capacity (GL)
Total Basin Diversions
Median Total Yield

Annual Diversion (GL/Year)

Year

3. MDB’s Recent Climate is Hotter and Drier

1 °C temperature increase = 4% evaporation increase

Global average temperature

Murray-Darling average temperature

Satellite estimate of soil moisture
So is this Climate Change?
River Murray inflows - Typical CC Prediction

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

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

Models consistently predict lower rainfall and hence streamflows for the River Murray system
How has the Agreement Performed?

- **By what measure?**
  - Cooperation between Governments?
    - Has provided an effective negotiating framework
    - After Transition framework will be amended but fundamentals are similar
  - Water security?
    - This drought has exposed flaws in urban water supply security, but the Agreement has provided a framework for adaptation
  - Underlying basis of water allocation systems?
    - Water allocation systems have continued with relatively minor changes
    - Irrigation industry has respected allocation systems
    - An effective water market has developed
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  - Environmental Condition?
    - This is the area of the greatest challenge
    - Basin Plan – adjust Caps to Sustainable Diversion Limits

*But is the Agreement to blame?*
But the Agreement must be wrong!!?

• What does the Agreement do?
  – Define the State’s shares of water.
    • States manage own water allocations
      *Allocations are too high.*
  – The Agreement has been used to begin to address over-allocation:
    – Cap on Diversions
    – The Living Murray “First Step” 500 GL
      *the slow pace of reform has been exposed by this drought.*

• An amended Agreement is incorporated in new Water Act
  – Water sharing aspects will continue
  – But the Act aims for *Sustainable Diversion Limits.*
To Conclude - Drought Lessons

• Extremely low inflows can threaten urban water supply security in the River Murray
  – Repeated 2006/07 inflows are insufficient if storages are empty
  – *A more robust Minimum Reserve policy is needed*

A “Safety Net”
Governments have determined that *critical human needs are first in water allocation hierarchy*
Drought Lessons

• Contingency measures are addictive
  – Wetland disconnection - implemented for critical human needs: remain in place to augment irrigation.

  – If next season is dry, contingency measures will be less effective (or environmental cost higher)
Drought Lessons – there are some positives!

• **Water trade works**
  – Water market ensures highest value production when resources are constrained
  – 40% of water used was traded in 2007/08
  – Merit in individual carryover for irrigators

Record prices up to $1,000/ML…..but…..

*economic impact of drought reduced by 50%*