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Running on Empty: The Risk of Continuing to Dither While the Empty Light is Flashing

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Director's Note

Welcome to the nineteenth issue of *Economic Issues*, a series published by the South Australian Centre for Economic Studies as part of its Corporate Membership Program. The scope of *Economic Issues* is intended to be broad, limited only to topical, applied economic issues of relevance to South Australia and Australia. Within this scope, the intention is to focus on key economic issues – public policy issues, economic trends, economic events – and present an authoritative, expert analysis which contributes to both public understanding and public debate. Papers will be published on a continuing basis, as topics present themselves and as resources allow.

Persistent drought conditions in most areas of the Murray-Darling Basin have led to record low inflows to the River Murray in 2006. This follows the emergence of water shortages over recent years. Given the dependence of South Australia on the River Murray as a source of water, a continuation of this trend will have significant environmental, social and economic consequences for the State. With this in mind, the Centre invited Professor Peter Cullen to speak to our Corporate Members about current water issues in his role as a leading member of the Wentworth Group of Concerned Scientists. A version of this article was subsequently presented to Corporate Members at the Centre's Economic Briefing Luncheon, held in Adelaide on 23rd November 2006.

Professor Peter Cullen has substantial experience and expertise in the areas of water reform, freshwater ecology, environmental flows and catchment management. He is a commissioner of the National Water Commission – an independent statutory body that provides advice to the Council of Australian Governments and the Australian Government on national water issues. He is also Chair of the Victorian Water Trust Advisory Council, and Chair of the Scientific Advisory Panel for the Lake Eyre Basin Ministerial Forum. He is a member of the National Heritage Trust Advisory Committee and the International Water Academy.

Professor Cullen was the founding Chief Executive of the CRC for Freshwater Ecology at the University of Canberra from 1993 to 2002. He is a graduate in Agricultural Science from the University of Melbourne and he currently holds the position of Emeritus Professor at the University of Canberra.

Michael O'Neil
Director
SA Centre for Economic Studies
January 2007

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Running on Empty: The Risk of Continuing to Dither While the Empty Light is Flashing

Overview

In this Issues Paper, Professor Peter Cullen argues that we need to take urgent action to address growing water shortages. A range of climatic data indicates that the Australian climate has been drying over the past decade. Rainfall over recent years in much of South Eastern Australia, Adelaide and Perth has been below average, while rainfall in large areas of south eastern Australia are currently at record lows. It appears that climatic change may be contributing to the drier trend. In fact, historical data suggests that the period from 1960 to the 1990's may have been unusually wet in South Eastern Australia. It therefore seems prudent to assume that less rainfall is something we will need to learn to live with.

An environment with less rainfall will require adjustment that may be painful and difficult, particularly for agriculture. Programs and strategies to support communities in transition may be required to facilitate adjustment. However, current drought strategies seem designed to slow necessary adjustment, which simply prolongs human misery and maximizes land degradation.

Addressing the challenges associated with national water shortages can sometimes seem overwhelming. However, there is an existing national blueprint for dealing with these challenges in the form of the National Water Initiative. The National Water Initiative (NWI), which was agreed by the Premiers and Prime Minister in 2004, includes a range of practical and sensible actions to improve water management and address the scarcity of water resources. These actions include:

- Buying water for the environment to return over-allocated rivers and groundwater systems to sustainable levels of extraction, thus ensuring the health of these systems.
- Regulating the extraction of water since activity associated with afforestation (e.g., timber plantations), farms dams, ground water extraction, inappropriate irrigation practices and theft all significantly reduce flows to water systems.
- Accurately measuring surface and groundwater resources so that so we know what are sustainable levels of extraction. Providing open and free access to this data would improve policy and investment decision making, and drive innovation in the water sector.
- Pricing water so that users pay the real costs of supplying water. For instance, urban communities should pay landholders for the catchment services they want, while rural users should pay an environmental levy to repair the damage they cause to waterways.

- Giving farmers a secure water entitlement separated from their land that can be traded and thus allow a market to develop that will let water move to its most valuable use – irrigation, urban or the environment.
- Undertaking comprehensive regional planning to identify future water needs and how these needs will be met. All options should be considered and various alternatives evaluated. In evaluating various options, externalities should be built into the costings so that the best choices are made from a whole-of-community perspective.
- Encourage best practice demand management as this is the most practical short term response to water scarcity. Given that communities have adopted a variety of demand management strategies that have resulted in different levels of success, there is a need to agree on and then enforce a set of best practice demand management approaches.

Unfortunately governments seem to have difficulties implementing these actions. There has already been some slippage in meeting agreed timelines due to various interest groups successfully resisting the necessary changes required. Where groups are seriously disadvantaged, then adjustment programs are warranted. However, failure to implement the above actions will only exacerbate the problem of water scarcity.

1. Introduction

... cycle of below average rainfall.

Australia seems to have been drying over the last decade. Rainfall in much of South Eastern Australia is very low, and large areas are now at the lowest on record (see Figures 1 and 2). Adelaide and its hills catchments are also very much below average rainfall. The Murray River is at unprecedented low flows (refer Figure 3). The average long term inflow has been about 11,000 GL, but this was last seen in 2000-01 and now we have had six years well below this.

The Wimmera Region in Victoria has over the last ten years been running at 18 per cent of the 50 year average flow, and many other Victorian rivers are at 40 per cent of their long term flow (see Figure A.1 in Appendix A). In parts of Victoria this is now a 1 in 400 year event.

Is this climate change or just another drought?

- Perth has experienced a series of drops in rainfall and hence runoff since the 1970's. Not a smooth drop but a series of steps down (see Figures A.2 and A.3).
- The period 1900 to 1950 was much drier in South Eastern Australia compared to the perhaps unusually wet period of 1960 to 1990's when so many of our expectations on water have developed.
- This dry spell is now outside anything we have known in our period of settlement, although there is evidence from pollen records that over the last 1,000 years, Southern Australia has experienced at least three such dry periods of at least 50 years duration.
- There is now no doubt that human activity has led to an increase in atmospheric carbon dioxide, and this is leading to global warming.

It does look as if our climate is drying:

... likelihood of climate change ...

- We may have an El Nino and other cyclic change on top of climate trend.
- Climate shift may not be a smooth curve but a series of sharp drops (as experienced in Perth).
- Denying the likelihood of climate change seems to be a high risk strategy.
- It may be prudent for us to assume that less rainfall is something we must learn to live with.

2. Adjusting to Less Rainfall

When the fuel light in your car starts flashing it is a bold strategy to just keep driving and hope a service station will appear. With regard to water we now seem to be running on empty and we need to take urgent action.

Agriculture is going to have to adjust to changing realities, and this will be painful and difficult. Current drought strategies seem designed to slow the necessary readjustment, not facilitate it — and they prop up land

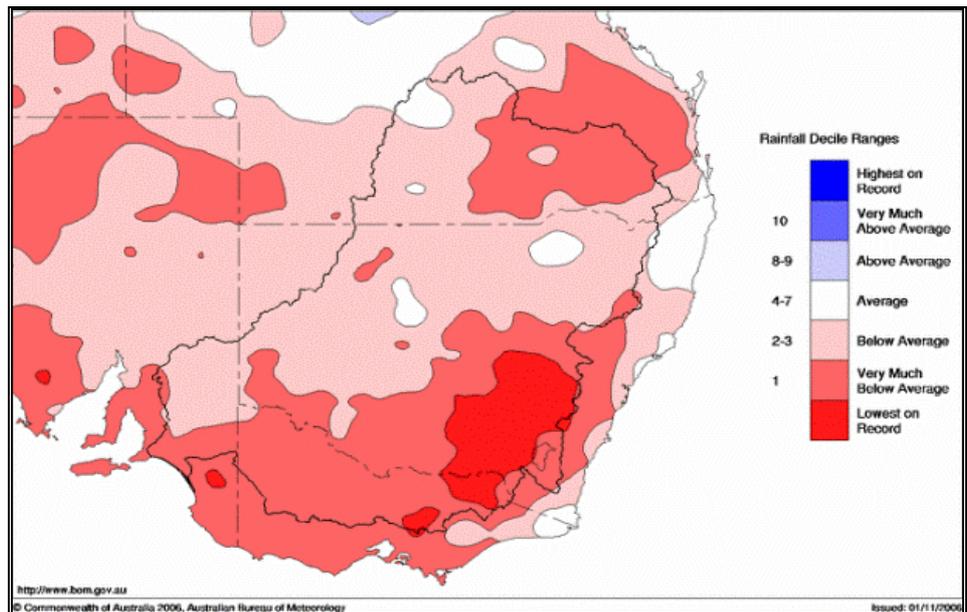
prices, prolong human misery and maximise land degradation. Farmers need help to envision alternative futures, and may need help to get there. We should look for ways to support communities in transition, not encourage them to deny it.

*... sustainable population
need to be supported by
estimates of per capita
water usage ...*

Communities need to get serious about water planning, and accept that water may be a limiting resource. Careful estimates of future populations and estimates of per capita water use in households, industry and for open space purposes need to be made. All alternative ways of meeting these needs must be explored in a serious way to assure security of supplies for our cities and rural towns as well as for agriculture.

Within hydraulic and environmental constraints we should allow the market to let water to move between uses – urban, irrigation and the environment. We must demand efficient use of water. In over allocated systems the Government should stand in the market and purchase back the entitlements it has previously issued without understanding that the water didn't exist.

Figure 1
Murray Darling Rainfall Deciles, 1st February to 31 October 2006
Distribution Based on Gridded Data, Product of the National Climate Centre



Source: Australian Bureau of Meteorology.

Figure 2 – Less Rain Means Much Less Water!

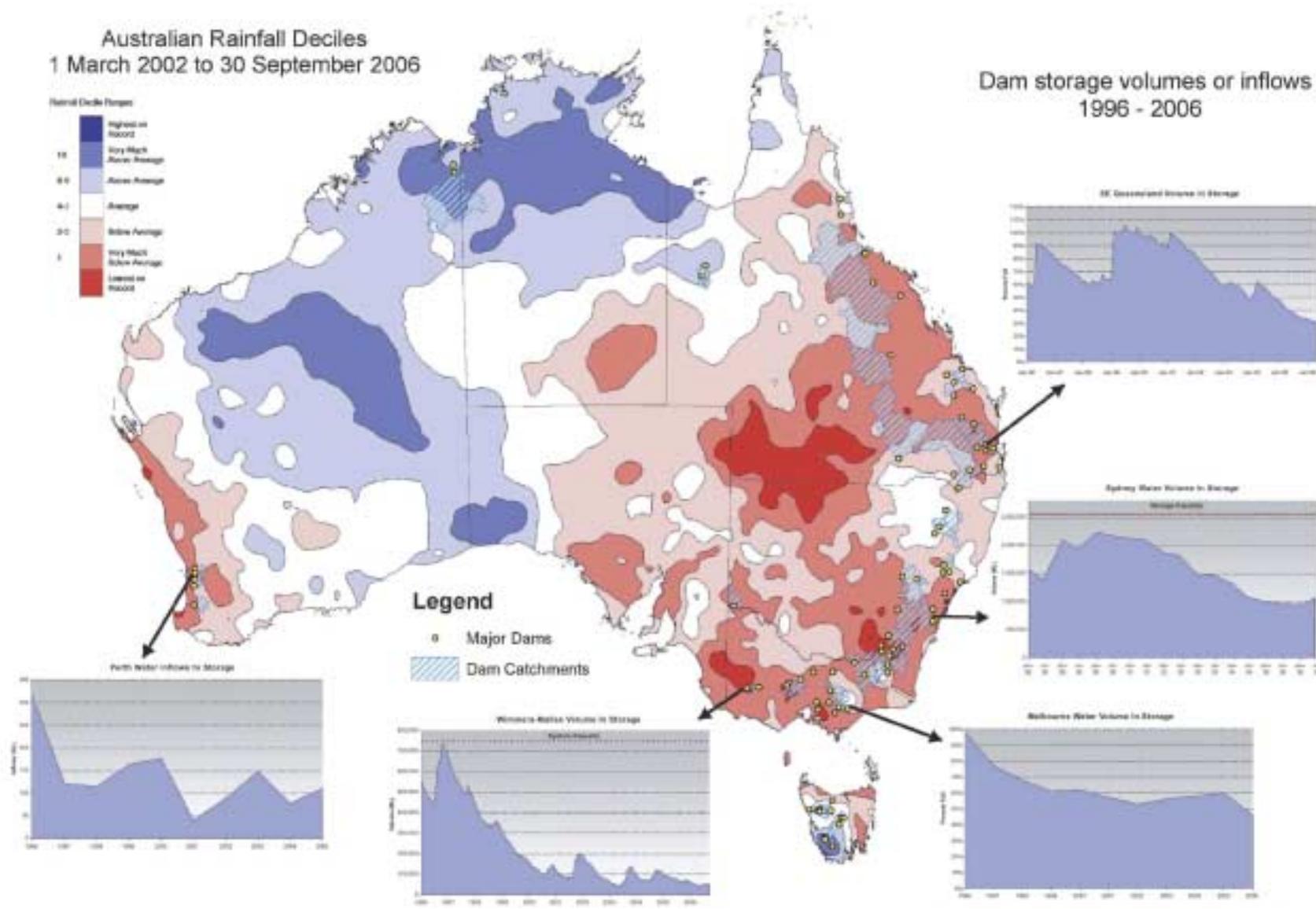
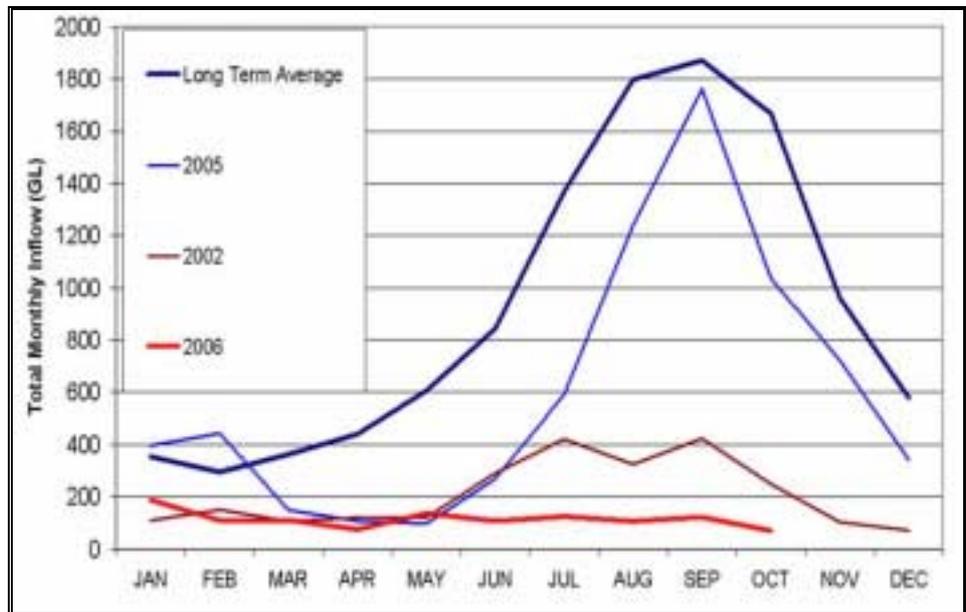


Figure 3
Inflows to the River Murray
Selected Years versus Long Term Average
Modelled Current Conditions to June 2000, Actual Data from July 2000



Source: ABS (2005b), ABS (2006) and SACES calculations.

3. So What Should We Do?

Fortunately we have a national blueprint: the National Water Initiative (NWI) was agreed by the Premiers and the Prime Minister in 2004 to address these challenges.

*... slow to implement
 National Water Initiative ...*

The NWI has some simple and obvious things to do, yet the evidence to date is they seem hard for Governments to implement the required actions, since the timelines have already slipped:

- Understand the resource. What are the sustainable levels of extraction of the surface and groundwater resource upon which we depend? How might they change with climate change? What is the consumptive pool available for us to extract?
- Return over allocated systems to sustainable levels. Our communities depend on healthy rivers. They are not an optional extra but the foundations upon which our communities depend.
- Give farmers secure entitlement that can be traded and allow a market to develop that will let water move to its most valuable use – irrigation, urban or the environment.
- Insist that we all use water as efficiently as we can. Proper pricing is part of this, but so are urban design and public education.
- Planning that identifies future demands and the full range of options for meeting the needs of our communities. Nothing should be excluded on doctrinaire grounds, but all must be subject to serious and open analysis – will they work, what is the cost, what is

the environmental cost, what is the greenhouse gas contribution and what are the social impacts?

We are a community living in the driest inhabited continent, with the greatest variability of rainfall – a land of droughts and flooding rains - and yet we don't seem to have the capacity or the will to get serious and implement this simple strategy.

4. So How Will We Sabotage Ourselves?

Blame Others as an Excuse for Inaction

Blame is such a simple approach when we haven't a clue what to do.

*... accept the reality of
scarcity ...*

We have come through the denial stage, and most Australians are now concerned about water. Ask a taxi driver about the dam levels in any city. But we seem to be locked in the blame stage. Blaming other levels of Government, blaming rice growers, blaming Cubbie station. Blaming anyone other than ourselves. We need to accept the reality of water scarcity and get on with the task.

Lack of Capacity to Address Difficult Technical Issues

*... government have
outsourced critical
thinking.*

Agencies have cut back on technical expertise and there is a real shortage of skilled professionals to do the detailed analysis we need in this situation. Commonly our professionals are trained and operate in narrow silos. We have examples of water sharing plans being developed which have not understood the need for floods to recharge groundwater. We have examples of permits for bores being given right next to rivers as though they were different buckets of water. Governments have now outsourced so much expertise they seem to have outsourced critical thinking.

Waste Money and Time on Ill-considered Infrastructure Projects

Politicians like to respond to community concerns, and each recent election has seen proposals for significant water infrastructure projects that have not been seriously designed, planned or assessed. Political focus groups are not a substitute for detailed technical assessment.

*... long lived investment in
infrastructure ...*

Had the channel from the Kimberley got up at the last election in Western Australia, it would have doubled the water bill for each Perth household and provided water at about 6 times the cost of desalination. Each election now sees a new dam, new desalination plant or an expensive channel being proposed with no analysis or understanding. Yet these are 100 year infrastructure investments decided by a few political focus groups. We have entered a dangerous phase with serious water planning now commonly being overtaken by iconic water projects dreamt up by journalists or focus groups at election times.

Flying Blind

Disconnecting the fuel gauge might be one way to stop worrying about how much fuel might be left, but it's a pretty stupid strategy. Yet over the last 20 years we have wound back our streamflow gauging network and not developed an appropriate groundwater assessment program.

*... require free and open
access to data ...*

Where we do collect data, we often keep it inaccessible from those who could benefit from it. At least this stops the punters realizing Governments have been dishing out entitlements for water that doesn't exist – devaluing every license they print. The National Water Commission (NWC) has been calling for free and open access to all of this water data. This would allow individuals to make better investment decisions, it would stimulate innovation by allowing people to model and interpret the data in different ways and it would allow Governments to prepare water accounts so they know just where they are.

But our Governments can't even agree on this. Perhaps they realize how embarrassing it will be if the world can see the results of flying blind.

5. Actions to Address the Challenge of Water Scarcity

Action 1: Buy Water for the Environment

Buy water for the environment to return over-allocated rivers and groundwater systems to sustainable levels of extraction. We must secure the health of these systems. We should buy water from anyone willing to sell.

*... greater reliance on the
market mechanism ...*

Irrigators will have to get used to having less water. Buying water now at the top of the market is a readjustment mechanism that lets people get out of unviable farms with cash and dignity. Those with excess water needs can capitalize their asset. Most farmers seem to want to be allowed to reap these profits. The NWI encourages it. Yet the Minister for Agriculture steadfastly objects to using market mechanisms to drive this readjustment and recover water for the environment or urban communities.

The NSW Riverbank scheme, where the Government provided \$100 million to buy water in over-allocated systems has been a roaring success. Plenty of water has been made available and it hasn't driven the price up.

Action 2: Regulate Extraction of Water

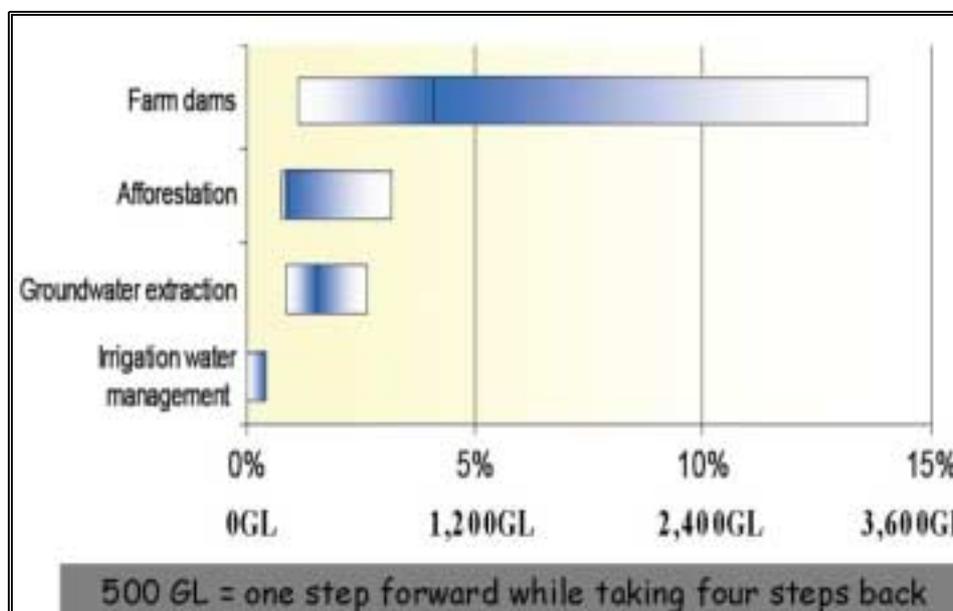
Issuing farmers with legal entitlements to water, and allowing them to trade is fundamental to the NWI. But if Governments don't control other activities which are taking water, then the entitlements are worthless. Such activities include:

- Timber plantations – which have rapidly dried up the groundwater in the South East of South Australia, leading to the drying of wetlands like Bool Lagoon.

- Farm dams which capture water that would have gone into streams where it has already been allocated. Hobby farms around our cities seem to be capturing 50 to 60 per cent of the runoff, often just to have aesthetic ponds where the water just evaporates.
- Groundwater use is poorly regulated or measured, and yet excessive extraction is affecting the flow in streams. There is often a time lag, depending on how far the bore is from the river, but it's all the same water.
- Water use efficiency is being encouraged in agriculture, often with public funding support. Yet in some places the water now being captured was a significant contribution to the environmental flows. In this situation, entitlements should be reduced.
- Theft. It is hard to estimate the illegal extraction of water, but some estimates suggest it might be up to 20 per cent. Governments need to address compliance issues.
- Cancel Sleeper licenses (surface and groundwater) – these are licenses not yet used but are activated as soon as the market develops.

Figure 4 shows the estimated flow reduction in the Murray-Darling Basin associated with farm dams, afforestation, groundwater extraction and poor irrigation water management.

Figure 4
Flow Reduction in the Murray-Darling Basin



Action 3: Measuring our Water Resources

Australia has the opportunity to lay out a real time water measurement system using 21st century technology that will give us all real time access to data and the interpretive models needed to make sense of it. CSIRO has been developing a Water Resources Observation Network and a \$200

million investment would give us a core national set of gauging stations that could provide real time data to all interested parties.

Governments should commit to free and open access to all of the water data to allow better decisions and to drive innovation in the water sector. Flying blind hasn't worked and we must know how much water we have, where it is and how it is being used. We need to know the health of our waterways.

As surface waters decrease, there is increasing pressure on groundwater, and our knowledge of the groundwater resource and capacity to understand it is seriously limited. Investment is needed to drill bores and obtain information on the groundwater resource, and to model and interpret the findings. Access to such funding should be contingent on meeting all NWI commitments with regard to licensing and metering and charging for groundwater.

Action 4: Pricing

Everyone using water should pay the real costs of that water. Urban communities should pay landholders for the catchment services they want, for the collection, treatment and delivery, and the full costs of cleaning up their waste so it can be recycled or returned to the environment without harm.

*... pricing the true cost of
water ...*

Rural users should provide a return on the infrastructure that taxpayers provide, and should pay the measurement and management costs of their activities. They should also pay an environmental levy to repair the damage they cause to waterways.

Getting the price right is important for encouraging private sector investment in water infrastructure. There are, however, difficult equity issues and it is inappropriate to see water pricing as a de facto social welfare policy. We don't do that for electricity, telephones or petrol.

Action 5: Comprehensive Regional Water Planning

... planning for the future ...

Regions need to develop comprehensive plans that identify water needs over the coming 50 years and identify where the water will come from. Nothing should be excluded from consideration on doctrinaire grounds. New dams, pipelines from elsewhere, recycling, storm water, groundwater, desalination, urban-rural trade and pricing should all be in the mix.

In considering the array of supply options, the analysis should consider the technical merits of the option – will it work and what will it cost? It should consider the reliability, the environmental impacts (including greenhouse gas emissions), the health risks and the social acceptability. We must try and build the externalities into the costing so we make better choices. In assessing various augmentation options, let us consider 3 or 4 alternatives and compare them across the range of criteria. Community

pressure groups can mount noisy campaigns against any option they feel disadvantages them. Toowoomba is an example where a community rejected recycling without understanding their alternatives. Water planning is the cornerstone of the NWI but as yet I doubt we have any plan that is NWI compliant.

Action 6: Best Practice Demand Management

This is the most immediate short term response to scarcity. Some communities have put in more effort and got better results than others. We need to agree on a set of best practice demand management approaches, and not give communities access to additional Government funding until they have met this standard.

6. Summary and Conclusions

Australia seems to be entering a drier period, and we may well not have access to the water we have become accustomed to over the last 50 years.

*... leadership from
government will be
required ...*

We have an agreed blueprint to address these challenges and ensure reasonable security of essential water for all.

However, governments are finding it hard to implement the agreed measures because various interest groups are resisting the necessary changes. If groups are seriously disadvantaged, then adjustment programs are warranted, but it is just not fair to stall these reforms so a small group can continue to use water in the wasteful ways of the last century.

References

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Appendix A
Data for Victoria and Western Australia

Figure A.1
Annual Streamflow at Wimmera River, Victoria (megalitres)

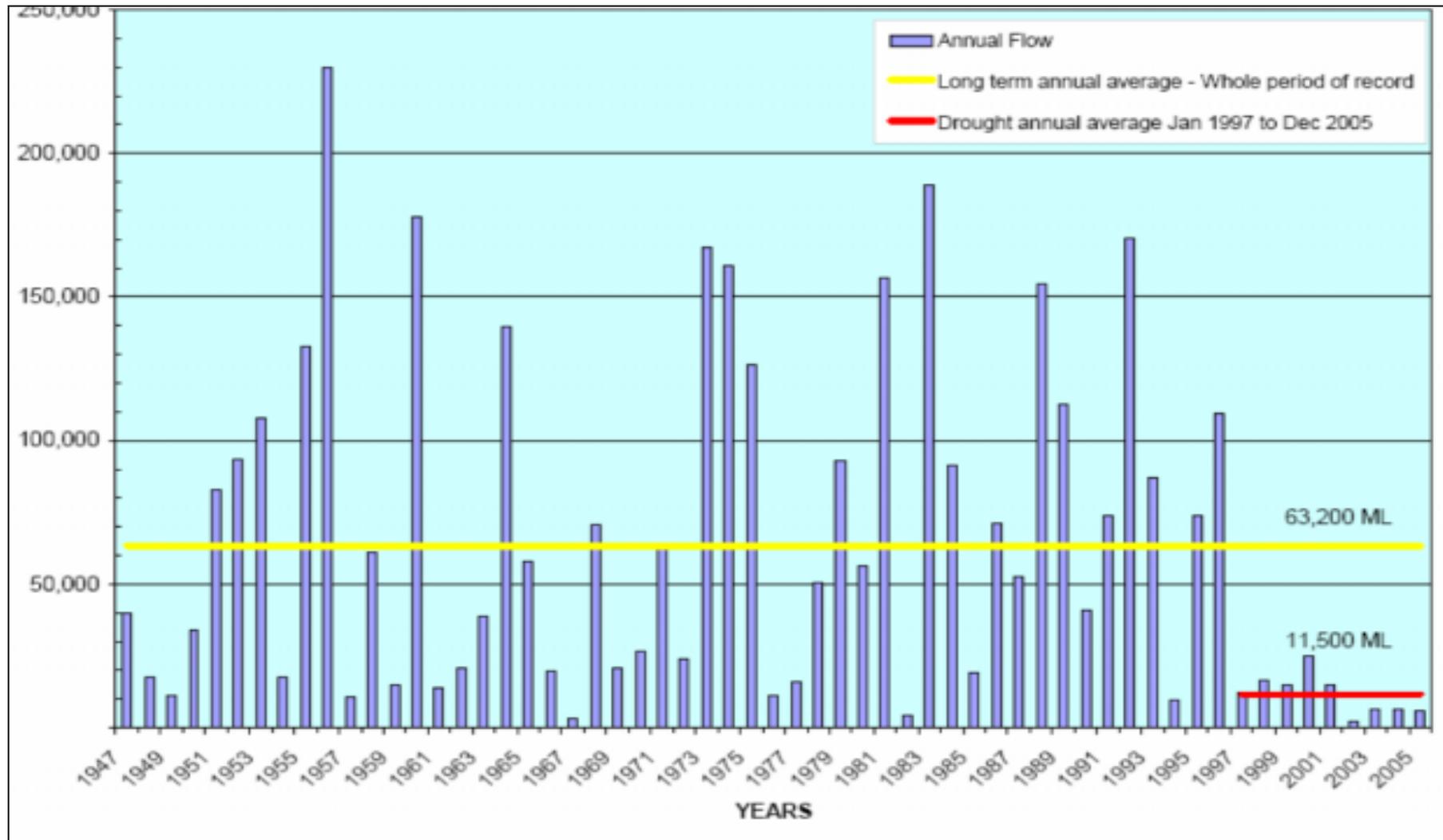
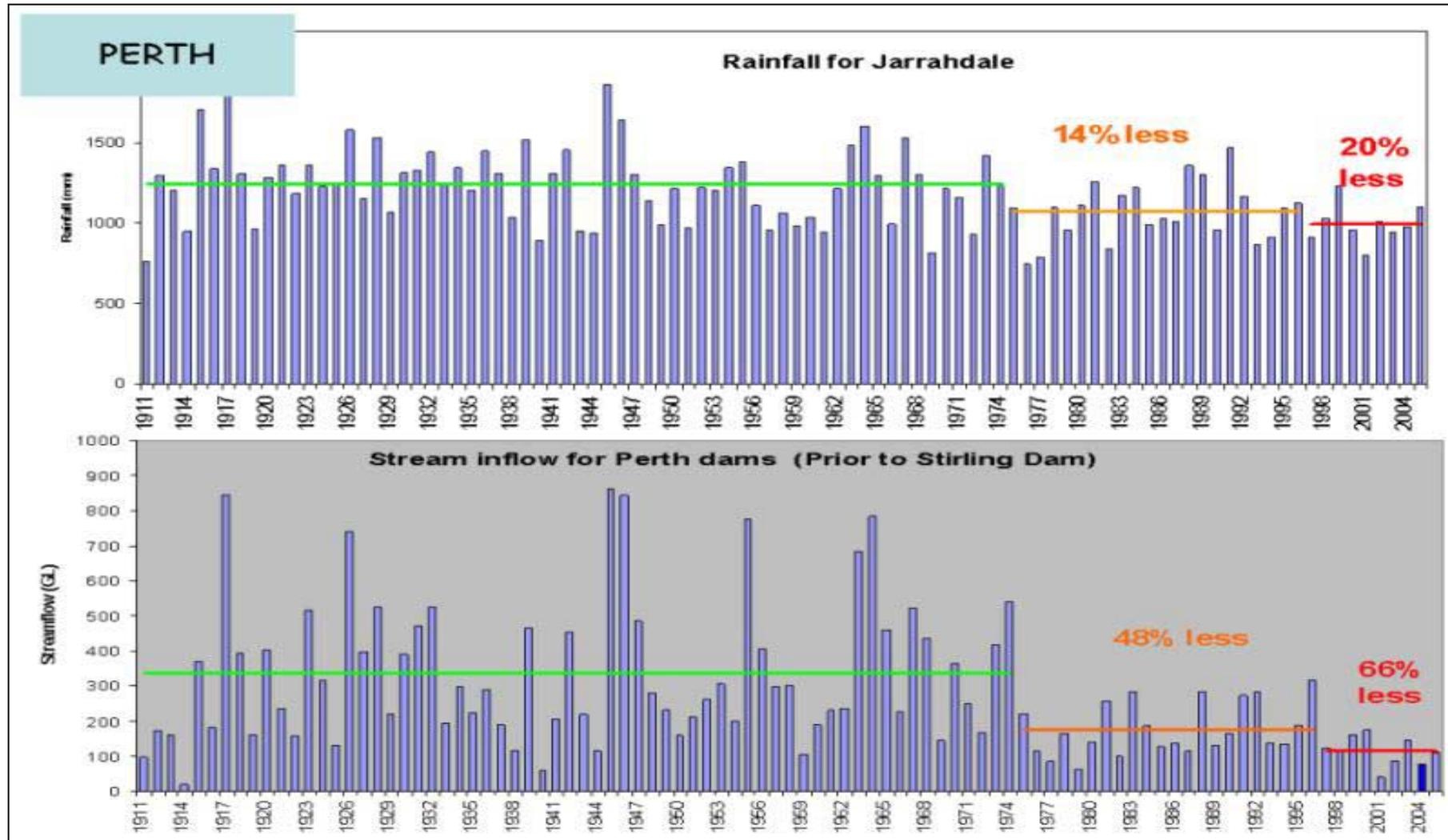


Figure A.2
Perth: Rainfall for Jarrahdale and Stream Inflow for Perth Dams



Note: Stream flow is from May of labelled year to the following April.

Figure A.3
Warragamba and Three Nepean Dams: Inflows and Annual Rainfall

