



Australian Dairy Industry Council Inc.

Australian Dairy Industry Council

submission in response to the
Murray Darling Basin Authority's
proposed Basin Plan

Tuesday 10 April 2012

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Australian Dairy Industry Council

The Australian Dairy Industry Council (ADIC) is the national peak policy body for the Australian dairy industry and represents all sectors of industry on issues of national and international importance.

Our member organisations – the Australian Dairy Farmers Limited and the Australian Dairy Products Federation - represent the interests of dairy farmers, manufacturers, processors and traders across Australia.

The ADIC's role is to bring together these members to establish a unified dairy position on issues that affect the industry's future across the entire value chain.

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Executive Summary

The draft Basin Plan does not pass the test of being achievable, practical and cost-effective, and optimising social, economic and environmental outcomes. The Government's Water Recovery Program will not deliver the draft Basin Plan's proposed management outcome of communities that are better adapted to reduced water availability.

ADIC makes the following points:

- The proposed 2750GL water recovery target is not supported by MDBA modelling comparing scenarios if 2400GL, 2800GL or 3200GL is recovered in the form of entitlements. The models indicate little difference in key outcomes such as maintaining the lower lakes above sea level, diluting Coorong salinity, the extent of area watered, flows over the barrages and keeping the Murray mouth open.
- The MDBA recognises similar or better environmental outcomes could be achieved with less water if more sophisticated modelling was undertaken to account for other options. Such options include environmental works and measures, improved river operations, and infrastructure works such as upgrading the barrages, and increasing natural drainage into the Coorong.
- More sophisticated, real-world modelling based on allocations, rather than a crude proportion of diversions in current models, is critical before the Basin Plan is finalised. This would provide a more accurate picture of environmental water availability in a given year or sequence of years such as during a drought, and therefore the likelihood and duration of dry periods between watering.
- Chapter 6 requires 2750GL to be recovered in the form of 'held' water entitlements or converted water access rights. This will drive continued investment into buyback as the priority over environmental works and other measures that may achieve similar or better environmental outcomes with less water.
- While the draft Basin Plan intimates the 2015 review could lead to the water recovery volume being reduced in recognition of environmental works and other measures, the process to change the Basin Plan itself would likely take another two years.
- In the meantime, the legal obligation would remain on the Federal Government to meet the water recovery targets in the Basin Plan at it was approved in 2012 – that is, it must invest in the measures that will deliver 2750GL in the form of 'held' entitlement or converted water access rights.
- Biophysical obstacles such as headwork and channel capacities and legal constraints against flooding private properties mean that even if 2750GL is recovered, river managers may not be able to deliver the water to achieve the environmental outcomes envisaged in the draft Basin Plan.
- These constraints cannot be simply wished away, or ignored as a problem for the States to fix and presumably fund sometime. Solutions such as buying and extending flood easements on private property are expensive, controversial and problematic, not to mention the compensation if a watering goes wrong.

Recommendations

Recommendation 1

The environmental water holders must demonstrate they can use the water already recovered effectively, efficiently and without unacceptable third-party impacts or negative environmental outcomes, before more water is removed from productive use.

This exercise would provide a solid foundation for determining whether more water is required for downstream needs, or these can be met in other ways.

Recommendation 2

Chapter 6 must be revised to set the water recovery target at the level required to meet catchment SDLs (1636GL);

- a. 247GL in northern system
- b. 1318GL in southern connected system
- c. 71GL in southern disconnected valleys.

Chapter 6 must seek to achieve downstream objectives using the available environmental allocations in conjunction with improved river operations, environmental works and other efficiency measures.

Chapter 6 must actively direct Government investment into environmental works and measures, and improved river operations as a priority.

Recommendation 3

The remaining buyback and infrastructure funding must be pooled, and the Government must commit to investing in a package of environmental works, improved river operations and other measures as the priority.

Recommendation 4

The 2015 review should assess progress in achieving downstream objectives in light of the investment in a package of environmental works, improved river operations, and other efficiency measures.

Recommendation 5

Chapter 8 and Schedule 9 must be amended to recognise the Basin Salinity Management Strategy 2001-2015 as meeting the requirements of the Water Act 2007 to develop a water quality and salinity management plan.

Recommendation 6

Groundwater SDLs in Victoria must be set as the Permissible Consumptive Volume (PCV) in State groundwater management plans, as reviewed and revised from time to time.

Where no PCV is in force, the SDL will be the Baseline Diversion Limit in the draft Basin Plan. The Government must compensate water companies for foregone groundwater management fees if groundwater entitlements are purchased and then extinguished.

Recommendation 7

The costs for the Basin Plan's management, monitoring, evaluation and reporting regimes must be shared among all Australians – not just passed on to those who live and work in the Basin itself via higher water bills.

Recommendation 8

Chapter 11 must be revised to more clearly delineate the respective regulatory and other roles played by different agencies, and to avoid duplication with agencies more expert in water trade matters than the MDBA.

Recommendation 9

Schedule 1 must be revised to include more recent, positive environmental data reflecting the environmental response since the drought ended. It must provide appropriate context so that the reader gets the full picture, not just part of the picture.

Australian Dairy Industry Council position

The draft Basin Plan and the Federal water recovery program have not effectively balanced environmental needs with those of the community and the economy.

1. Water recovery target should be set at the level required to meet catchment SDLs (1636GL)
 - a. 247GL in northern system
 - b. 1318GL in southern connected system
 - c. 71GL in southern disconnected valleys.
2. 2015 review should assess environmental works and measures, improved river operations and new knowledge to achieve downstream environmental outcomes.
3. No further general buyback tenders in the southern system. Buyback limited to strategic purchases linked to community-led efficiency projects.
4. Remaining buyback and infrastructure funding (~\$2 billion in Water for the Future Fund + \$1.4 billion committed for further buyback 2015-2019) pooled and reprioritised for investment in:
 - a. \$400 million to extend On-Farm Irrigation Efficiency Program to 2017, and deliver at least 100GL in farm water savings to the environment.
 - b. Additional funding for Private Irrigation Infrastructure Operators Program (PIIOP) in the NSW Murray and Murrumbidgee.
 - c. \$200 million to decommission Lowbidgee Irrigation District and buy back its supplementary licences to free up an annual average 100GL for environment.
 - d. \$30 million to rehabilitate Murray Swamps in SA, to save an average 63GL/yr in evaporation, and control acidity and a rising saline water table affecting lower lakes.
 - e. Upgrading and automating barrages in lower lakes to better control and improve flows to Coorong and Murray mouth.
 - f. Works to redirect south-east drainage system into Coorong south lagoon, to resolve salinity problems by boosting inflows from 10.9GL/yr to 26GL/yr.
 - g. Environmental works for greater water efficiency and improved flows through key indicator sites across the Basin. For example, \$105 million to water key sites, red gum forests and wetlands in Victoria using 550GL less than otherwise required.
 - h. Improved river operations, including a comprehensive real-time monitoring network to guide the timing and volume of environmental releases. A 10% improvement could deliver watering events that would otherwise need another 800GL in environmental entitlements.
 - i. Remove causeway and remains of bund restricting flows through Narrung Narrows, and dredge Narrows to improve freshwater exchange between Lakes Alexandrina and Albert.
 - j. Study on feasibility and environmental cost/benefits of pipeline connecting Lake Albert and Coorong, to improve salinity in both waterbodies.
5. Groundwater SDLs in Victoria set as the Permitted Consumptive Volume (PCV) in State groundwater management plans. Where no PCV is in force, the SDL is the Baseline Diversion Limit.
6. Stock and domestic water must be permanently exempted from any reductions to meet the Basin Plan's sustainable diversion limits for ground or surface water.
7. Access to a reliable and affordable water source for farms around Lake Albert.
8. The Murray River operated to maintain a minimum 0.5m AHD past Murray Bridge, to ensure water access for farms on the Murray Swamps and integrity of levee banks and hydrologic balance.
9. Salinity levels no greater than 1000EC at Wellington (600mg/L) and 1500EC (900mg/L) in the lakes.

Dairy in the Murray Darling Basin¹

Dairy is the largest irrigation-based livestock industry in the Murray Darling Basin. More than 12,000 people in the Basin rely on dairy for their livelihoods – not just farmers and their families, but farm and factory workers, tanker drivers, dairy machinery technicians, financial services, vets, feed brokers and suppliers, farm equipment suppliers, agronomists and farm advisers.

This critical mass of population supports businesses in nearby towns, keeps schools open, and justifies decent regional medical services. Without them, there is no doctor, no nurse, no footy club, no netball team, no supermarket, no mechanic, no pharmacy -- maybe not even a service station and a pub.

Dairy farmers across the Basin have proved flexible users of water, steadily adapting their practices to produce more milk with less water over the last 20 years, particularly in the irrigation districts in northern Victoria and southern NSW. They have also actively participated in programs returning more than 2000 GL/yr (four Sydney Harbours) to the environment in the southern connected system over the last 20 years.

However, record low irrigation allocations during the drought forced dairy farmers into high-cost, temporary coping strategies that drove up debts. Reduced milk production during the drought put pressure on milk companies to rationalise processing capacity, with the Leitchville factory in northern Victoria closing in early 2010 and the Rochester plant scaling back production in March 2012.

In 2011/12, with the recovery in water storages, good export demand growth and improved milk prices, dairy farmers in northern Victoria and southern NSW are now rebuilding herds, reducing farm production costs and debt, and increasing milk production.

How well the dairy industry recovers depends on how the Basin Plan affects future water availability and affordability.

Dairy in the Basin – a 2011 snapshot	
Dairy farms:	1956 (98% family-owned)
Milk production:	2266 billion litres
Milk factories:	16
Jobs (on and off farm):	+12,000
Farmgate value of milk:	\$969 million
Processed value-add:	\$2449 million
% national milk production:	25%

Victoria

The Basin dairy industry is concentrated in Victoria's north-east (Kiewa and upper Murray valleys) and the Goulburn Murray Irrigation District (GMID). The GMID alone accounts for nearly 70% of all milk produced in the Basin. More than 1550 dairy farms in northern Victoria produced 1630 million litres of milk in 2011, with a farmgate value of around \$684 million and a processed value-add of \$1710 million.

Dairy farms in northern Victoria support nine major processing facilities in towns where the milk factory is often the major employer (Rochester, Cobram, Kiewa, Stanhope, Echuca, Tatura, Bendigo, Tongala, Strathmerton). Dairy employs more than 8000 people on farm and in processing – around five for every farm – and many more in service industries. More than half the milk produced is exported as manufactured product.

¹ Sources for dairy farm numbers, production, value, jobs etc, from Dairy Australia, ABARES, ABS, Dairy Food Safety Victoria, NSW Food Authority, South Australian Dairy Authority, Safefood Production Queensland, Queensland Dairyfarmers' Organisation and dairy processing companies..

The combination of relatively cheap land and a reliable water supply enabled the development of low-cost, low-risk farming systems in the GMID, and attracted strong investment in expanding milk production and processing.

New South Wales

More than 160 dairy farms are located across most NSW Basin catchments (Namoi 17; Macquarie 6; Lachlan 14; Murrumbidgee 14; NSW Murray 110). Collectively, NSW Basin dairy farms produced around 285 million litres of milk in 2011, with a farmgate value of around \$137 million and a processed value-add of \$344 million.

While some milk is processed at the factory in Wagga Wagga, most milk is transported outside the NSW Basin for processing, mostly to factories in northern Victoria. The NSW Basin dairy farms support around 1800 jobs on farms, in processing and in service industries.

The NSW Basin dairy industry is concentrated in the Murray Irrigation District in the southern Riverina (NSW Murray catchment) around Finley and Deniliquin. Each farm employs an average of 5.5 people (including the owners), and dairy farmers here spend two-thirds of their income in the nearby local towns.

Queensland

Dairy is concentrated in the North and South Darling Downs, corresponding with the upper Condamine-Balonne and Border Rivers catchments in the draft Basin Plan. Here 168 farms – 30% of all Queensland dairy farms – supply regional drinking milk and fresh product to various markets, including Brisbane and the Gold Coast.

In 2011, the Queensland Basin dairy farms produced 168 million litres of milk, with a farmgate value of \$89 million, and a processed value-add of \$222.5 million. The farms supported 1250 jobs on-farm, in processing and service industries.

All these farms rely to some extent on irrigation to maintain production. Groundwater is the major water source, with some supplementary supply from rivers and creeks. Even farms using little irrigation still rely on the Basin's water for stock and domestic purposes (cows drink between 120 and 150 litres of water a day – and up to 80% more on hot days) or indirectly via the feed purchased for their dairies.

South Australia

Dairy in the South Australian Basin is concentrated on the Murray Swamps near Murray Bridge and Mannum, the Eastern Mount Lofty Ranges and around the lower lakes.

In 2011, SA's 76 Basin dairy farms produced 183 million litres of milk, with a farmgate value of \$69.5 million and a processed value-add of \$173.7 million. The farms support six local factories (Jervois, Murray Bridge, BD Farms, Alexandrina Cheese, Udder Delights, and Woodside Cheese Wright) and 1000 jobs on farm, in processing and service industries.

All these farms rely on water for irrigation, sourced from the Murray River for the Murray Swamps, waterways and groundwater in the Eastern Mount Lofty Ranges, and from the lower lakes before the drought caused prolonged water quality problems; lower lakes farms that survived the drought have been connected to alternate, piped water supplies, but struggling to pay charges set at town water levels.

1. Draft Basin Plan impacts on the dairy industry

Water availability and affordability are dairy's key issues. The draft Basin Plan will result in a 30% reduction in water diversions for agriculture². Shrinking the collective pool for irrigation, trade and carryover will drive up prices for allocation trade, particularly in droughts when allocations are low.

Less water delivered through shared irrigation districts will put water companies under intense pressure to increase charges to cover the costs of maintaining and operating the system.

The Basin dairy industry will struggle to sustain its current size, much less grow and prosper in future, in the face of these cost pressures. In turn, fewer farmers will be left in the NSW Murray and Victorian irrigation districts to share the higher costs of modernised systems.

The problem lies in the draft Basin Plan's requirement to recover 2750GL in the form of 'held' entitlements (that is, irrigator entitlements) or 'planned' environmental water (defined as a converted water access right; infrastructure savings may fall into this category)³.

The Plan does not allow for less water to be recovered if environmental objectives can also be met through environmental works, improved river operations and infrastructure measures such as upgrading and automating the barrages on the lower lakes.

Instead, accounting for these options will be deferred until the proposed 2015 review. Any recommendations to change the water recovery volumes accordingly in the Plan are then subject to further consultation with communities and Basin State Governments, and ultimately federal ministerial and parliamentary approval; all this could take until 2017 to resolve.

In the meantime, between 2012 and 2017, water buybacks will likely continue to be the Government's investment priority as the cheapest means of recovering water in the form required by the Basin Plan.

Draft Basin Plan implications for dairy in northern Victoria and NSW southern Riverina:

Analysis⁴ commissioned by Dairy Australia shows that recovering 2750GL primarily by purchasing irrigation entitlements has profound implications for milk production and processing in the Goulburn Murray Irrigation District (GMID) and NSW southern Riverina.

These areas, along with north-east Victoria, form the Murray Dairy region, which produces more than 80% of all milk in the Basin. Most milk produced is exported as manufactured product, which means production costs must be kept at globally competitive levels.

The analysis focuses on the GMID, as it represents the largest milk production area and is considered to be more exposed to the draft Basin plan's implications. The southern Riverina will also be exposed, but it is considered that most of the water required for the environment in the NSW Murray catchment will come from rice production; rice farms own about 90% of general security water entitlements in this catchment.

The results indicate that, even if no further water was recovered from irrigators for the environment, the dairy industry in the GMID faces a significant challenge to restore milk production to pre-drought levels.

² 'Social and economic assessment of the draft Basin Plan', MDBA presentation to regional financial institutions, 27 February to 1 March 2012.

³ Proposed Basin Plan – a draft for consultation, November 2011', MDBA, Chapter 6, para 6.05.

⁴ 'Draft Basin Plan – Water availability and the implications for the dairy industry in the Murray Dairy region', Final Report, January 2012, RMCG, www.dairyaustralia.com.au

Draft Basin Plan*: implications for feed, dairy farm numbers and milk production in the GMID⁵

Pre-drought

- 2.5m tonnes total home-grown feed
- 1543 dairy farms
- 2.3 billion litres of milk

Scenario 1: water recovered to meet catchment targets

- 1.9m tonnes total home-grown feed
- 1201 dairy farms
- 1.8 billion litres of milk

Scenario 2: Scenario 1 + Vic pro-rata share of additional 971GL 'downstream'

- 1.7m tonnes total home-grown feed
- 1044 dairy farms
- 1.6 billion litres of milk

*Modelling by RMCG, using a base case linking milk production to a typical feed budget, and water availability determining the amount of feed that can be grown on-farm.⁶

Scenario 1: Water recovered to date in Victoria, including buyback and NVIRP stage 2 water savings commitment (671+ GL).

Scenario 2: Water recovered to date in Victoria, plus Victoria's contribution to the 971 GL 'downstream' target in southern system if apportioned pro-rata (~1047 GL).

The 500ML difference in milk production between pre-drought levels and scenario 1 has a farmgate value of \$210 million, based on the typical 42c/litre⁷ paid by milk factories in Victoria in 2010/11. Closing this 500ML gap with less water available for home-grown feed will require continued investment in on-farm efficiency gains – an outcome hampered by the high debt levels many farmers accrued in the recent drought⁸.

Further significant reductions in the total pool of water available for irrigation, trade and carryover to meet the shared 971GL downstream target will further limit industry output, particularly during drought, posing a major and potentially insurmountable adjustment challenge.

Reduced milk production in the GMID will increase pressure on local processors to rationalise operations, with far-reaching effects on local jobs, businesses, families and towns.

Socio-economic modelling for the MDBA predicts reduced dairy production under the draft Basin Plan will affect processing plants in Rochester and Cobram, Stanhope and Echuca and Tatura, and drive a 12.9% (\$88.2 million a year) fall in the gross value of production in the Goulburn-Broken valley in the long term. This is one of the highest percentage changes of all the Basin Plan regions.⁹

The NSW Basin is also an important source of affordable supplementary feed, such as lucerne hay, for dairy farms on the NSW coast. If water scarcity means less fodder is grown in the NSW Basin, dairy families as far away as Bega could suffer the flow-on cost and production implications.

Reducing the total pool of water available for irrigation, trade and carryover to meet the 971GL shared target will affect the availability and affordability of water for dairy and other commodities in the Murray Irrigation District, particularly in drought years. Reduced cereal, rice and dairy production will undermine the viability and affordability of the MIL irrigation distribution system for all users.

Draft Basin Plan implications for dairy in Queensland

As it stands, a substantial increase in milk supply is required in the medium term to meet expected market demand growth in Queensland, with at least a 50% increase in the size of existing farms.

⁵ *IBID.*

⁶ The only change between scenarios is the irrigation water available to dairy – all other variables such as proportion of bought-in feed, irrigation efficiency and average rainfall remain unchanged. Home-grown feed is generally cheaper than bought-in feed, and the model's 36:64 ratio of bought:home-grown feed is typical for Murray Dairy farms to remain globally cost competitive.

⁷ 'Australian Dairy Industry in Focus 2011', Dairy Australia.

⁸ ABARES farm survey data indicates average dairy farm debt in northern Victoria rose 41% during drought to \$575,900 in 2010/11; average debt per cow rose 72% during the same period. The biggest driver was the increased requirement for working capital, which increased by 200% from \$84,000 to \$255,000 between 1999-00 and 2007-08.

⁹ 'Socioeconomic analysis and the draft Basin Plan', Part A, Overview and Analysis, p105-106, MDBA, November 2011, <http://www.mdba.gov.au/draft-basin-plan/supporting-documents/socioeconomic-analysis>

The Condamine-Balonne valley, where most Queensland Basin dairy farms are located, has the largest gap (95GL) among the northern Basin catchments to meet its proposed surface water recovery target. Additional water may also be recovered in this valley to meet the northern Basin's 143GL shared downstream target.

Dairy farms are expected to be relatively unaffected because they are concentrated in the upper Condamine; the Commonwealth is more likely to concentrate its surface water recovery effort downstream around St George and Dirranbandi, as these areas are closer to the Narran Lakes and other sites identified for environmental watering.

However, the proposed cut in groundwater extraction of around 43% poses a serious risk for the industry, as groundwater is the major water source for dairy farms, with some supplementary supply from rivers and creeks. ***A groundwater cut of this magnitude poses a large risk for current production capacity and will constrain future development in one of Queensland's more important milk producing regions.***

Queensland dairy farmers already contend with higher-cost, daily fresh milk production systems than other States, and have been directly and progressively affected by the ongoing supermarket milk price war.

Draft Basin Plan implications for dairy in South Australia

A reliable and affordable water supply of suitable quality is essential for dairy farms in the lower Murray River, Eastern Mount Lofty Ranges and the lower lakes.

Additional water for the environment combined with improved river operations and works to use environment water efficiently and effectively, will help to sustain a healthy dairy industry.

In particular, funding is needed to repair the Murray Swamps levee banks, and drought-damaged farm land. If the levees fail, the swamps will revert to backwaters evaporating an average 63GL a year; this will undermine efforts to increase environmental flows into the lakes.

The swamps would also be a source of salinity and acidification polluting the Murray River and the lakes, if they are no longer irrigated and managed to control acid sulphate soil formation and saline water table.

Dairy farms around Lake Albert are also struggling to recover from the drought as the lake remains highly saline. This is because freshwater exchange between Lakes Albert and Alexandrina is limited by the Narrung Narrows silting up, in part due to the recent disintegration of an earthen bund built as a drought measure. The lake's poor water quality has left farmers dependent on expensive town water supplies.

SA dairy farmers, like those upstream in Victoria and NSW, will also be vulnerable to rising costs if the Basin Plan leads to large reductions in the total consumptive pool available for irrigation, trade and carryover in drought years.

2. MDBA models do not make the case for 2750GL

2400GL vs 2800GL vs 3200GL

Two MDBA reports¹⁰ have concluded that recovering 2400GL, 2800GL or 3200GL in the form of entitlements makes little difference to key outcomes such as maintaining the lower lakes above sea level, diluting Coorong salinity, the extent of area watered in key sites, flows over the barrages and keeping the Murray mouth open (Box 1).

¹⁰ *The proposed 'environmentally sustainable level of take' for surface water of the Murray-Darling Basin: Methods and outcomes*, November 2011, pp90-101; *Hydrologic modelling to inform the proposed Basin Plan: Methods and results*, February 2012, pp208-241.

The 2800GL scenario is equivalent to the draft Basin Plan's proposed 2750GL water recovery target in terms of the southern connected system; the 50GL difference is in the Condamine catchment target in Queensland, and has no material bearing on flows affecting key Murray downstream indicators and sites.

The main difference between the three modelled scenarios is the potential maximum number of dry years between watering wetlands and river red gums at key downstream sites such as Chowilla (Box 2).

To this end, the 2750GL water recovery target reflects a judgement call on ecosystem resilience. For example, a maximum 11 years between drinks for river red gums in Chowilla under the 2400GL scenario increases the risk of trees dying, compared with a maximum dry period of eight years under the 2800GL scenario. Further, owning entitlement is no guarantee that enough water will actually be available to prevent prolonged dry periods in a repeat of extreme drought conditions.

It is worth noting that large areas of river red gum went up to 14 years without a drink in the drought; while many trees died, many also survived and have bounced back very strongly under the recent big wet.

Notably the reports acknowledge that time between bird breeding at a particular site is not a reliable indicator, given that birds are highly mobile and will fly to wherever conditions are right in the Murray Darling and Lake Eyre Basins.

Box 1 - Downstream indicators

Coorong salinity

- 2800GL means max. Salinity target in Coorong north lagoon would be exceeded 2 out of 114 years;
- 2400GL means target exceeded 3 out of 114 years
- 2800GL meets the south lagoon target in all years
- 2400GL meets the south lagoon target in all but 1 of 114 years

MDBA reports state that these exceedances are not considered significant for the health of the system, given the uncertainty in the modelling and the salinity thresholds for *Ruppia megacarpa* (an aquatic grass).

Annual average salt export through Murray mouth

- Without development: 3.83mt (million tonnes)
- 2009 baseline conditions: 1.66mt
- 2400GL 1.91mt
- 2800GL 1.96mt
- 3200GL 2mt

Flows over the barrages

Three year rolling average of 2000GL/yr is met in 95% of years under all three scenarios. The 1000GL/yr indicator is met in 99% of years, failing only in the extreme drought conditions in 2006-08.

Murray mouth

All three scenarios achieve significant improvements in the depth of the Murray mouth, compared with the baseline.

The most significant difference is the mouth remained open (albeit at a shallow depth) for longer under the 3200GL scenario during the worst of the drought in 2007-09, compared with the 2400GL and 2800GL scenarios.

Acidity risks

All three scenarios prevent lake levels dropping below sea level, avoiding acidification risks.

Box 2 - Maximum potential dry period between watering

Chowilla

- wetlands: 10 years (2400GL) vs 8 years (2800GL)
- red gum forests and bird breeding: 11 years (2400GL) vs 8 years (2800GL)

Hattah Lakes

- wetlands: 12 years (2400GL) vs 8 years (2800GL)
- red gum forests and bird breeding: 21 years (2400GL) vs 21 years (2800GL)

Goulburn floodplain

- wetlands and red gum forests: 12 years (2400GL) vs 12 years (2800GL)
- red gum forests and bird breeding: 13 years (2400GL) vs 12 years (2800GL)

Murrumbidgee floodplain

- wetlands: 2 years (2400GL) vs 2 years (2400GL)
- red gum and bird breeding: 8 years (2400GL) vs 7 years (2800GL)

Modelling shortcomings

The MDBA acknowledges the scenario modelling is coarse, and designed only to compare the frequency and duration of watering events, and select outcomes such as salinity in the Coorong.

The modelling is not linked to expected ecological outcomes, so it provides no useful indication of whether actual ecological responses and resilience will be materially different under the different water recovery scenarios, or indeed under different watering regimes within those scenarios.

For example, what is the material difference in ecological response between 50GL/day for 60 days and 70GL/day for 42 days in the Hattah Lakes. The model tells us only that the difference in maximum potential dry years between these two event depending on whether 2400GL, 2800GL or 3200GL is recovered.

Significantly, the models assume no change in current river operations, the barrages, or the south-east drainage systems reducing inflows to the Coorong south lagoon. Nor do they factor in the potential for environmental works and measures to enable sites to be watered more often and with less water.

Environmental works typically involve installation of pipelines, regulators, weirs, pumps and channels to move water around and hold pools at the right height for the right period of time to support key ecological functions and events such as bird-breeding.

The MDBA models do not appear to factor in environmental works already underway to save water at sites such as Hattah Lakes. The Hattah project specifically involves installing permanent structures to replace temporary levee banks and portable pumps used to water Hattah during the drought.

The temporary works enabled a total of 48.4GL to be pumped into the lakes over six years from 2004-05; without the works, an additional 1400GL would have been needed to achieve the same outcomes.

Another oft-quoted example is Lindsay-Walpolla Island, a Living Murray Icon site where proposed works will enable ~5000 ha of floodplain to be watered using 90GL per event rather than 1200GL if the same event was achieved through overbank flooding. The proposed works would cost ~\$46 million.¹¹

¹¹ Victorian Department of Sustainability and Environment, 'Priority works to increase the effectiveness and efficiency of environmental water delivery in northern Victoria', Information for the Murray-Darling Basin Authority, July 2010.

Similarly, reconfiguring drainage in south-east South Australia could increase average annual inflows into the Coorong south lagoon from 10.9GL/yr to 26GL/yr¹², and potentially negate the one-year difference in exceeding the salinity targets between the 2400GL and 2800GL scenarios.

Upgrading and automating the barrages could improve flows into the Coorong and through the Murray mouth and therefore the volumes needed from upstream to keep watering flowing over the barrages under the modelled scenarios.

The freshwater exchange between Lakes Alexandrina and Albert would be improved by removing the causeway and remains of the earthen bund built as a drought measure, and dredging the Narrung Narrows.

Finally, the modelling assumes all water is recovered only in the form of irrigation entitlements purchased pro rata across all entitlement types¹³. The models then assess the utility of those entitlements as a crude proportion of total diversions.

More sophisticated modelling of water availability based on allocations would more accurately indicate flow responses depending on different types of entitlement and their location in catchments. Such modelling would provide a more accurate picture of environmental water availability in a given year or sequence of years such as during drought, and therefore the likelihood and duration of dry periods between watering.

Real world modelling required

The MDBA recognises that essentially the same or better environmental outcomes could be achieved in other ways, but these were not modelled. Recognised variations¹⁴ include:

- The mix of water recovery through buyback versus infrastructure programs.
- Where water is recovered from along a river system.
- The characteristics of recovered water (ie, high reliability and general security versus unregulated flows), including allocation and accounting provisions such as carryover.
- Changes in river operations¹⁵.

Modelling these variations could result in less than even 2400GL in entitlements needing to be recovered, while still achieving the draft Basin Plan's environmental targets and objectives, including the salinity and other indicators for the lower lakes and Coorong.

It appears this more sophisticated modelling was not undertaken simply because the MDBA ran out of time, given the politically mandated deadline to approve a final Basin Plan by the end of 2012. Presumably this more sophisticated modelling and analysis will be undertaken to inform the 2015 review.

Ultimately, however sophisticated the modelling, no model can predict how ecosystems will respond to different flow regimes and efficiency measures. Nor can they accurately measure legal and other constraints on flow regimes. Trial and error through an adaptive management regime is the only reliable way to learn what can and can't be done in practice.

3. Constraints prevent high flow events in 2750GL scenario

"Modelling indicates that the environmental objectives that would otherwise apply at particular locations cannot be fully met due to constraints. As a result not all of the environmental outcomes targeted by the draft

¹² Pers. Comm: Email from MDBA to Dairy Australia 1 March 2012.

¹³ *The proposed 'environmentally sustainable level of take' for surface water of the Murray-Darling Basin: Methods and outcomes*, November 2011, p160.

¹⁴ *Ibid.* p161; *Hydrologic modelling to inform the proposed Basin Plan: Methods and results*, February 2012, p9.

¹⁵ It should be noted that water resources in the Northern Basin are mainly unregulated (75%) and hence options to achieve better environmental outcomes with less water are limited. It means that very little can be achieved through adjustments of the kind described in dot points 3&4, and that the focus therefore will be more on buyback and water-saving on-farm infrastructure.

Basin Plan can be fully realised under the SDLs currently proposed, and may not be fully realised even with higher volumes of environmental water.¹⁶

In other words, physical obstacles such as headwork, channel capacities and legal constraints against flooding private properties mean that even if 2750GL is recovered, river managers may not be able to deliver the water to achieve the environmental outcomes envisaged in the draft Basin Plan.

These biophysical constraints cannot be simply wished away, or ignored as a problem for the States to fix and presumably fund sometime. Solutions such as buying and extending flood easements on private property, are expensive, controversial and problematic, not to mention the compensation if a watering goes wrong.

Further, the MDBA has recognised that some overbank flow events envisaged in its modelling for 2750GL will require careful integration and coordination. In lay language, this means timing releases from Burrinjuck, Hume and Eildon down the Murrumbidgee, Murray and Goulburn rivers, so that high flows converge downstream in a critical mass large enough and for long enough to water, say, Chowilla.

This plan will cost money because a comprehensive system for real-time flow monitoring is required to take the guesswork out of such an exercise. The alternative is a high risk of third-party impacts if river managers underestimate, for example, unregulated flows or misjudge timing of releases so that water backs up and floods because the Murray River cannot cope with the volumes converging from major tributaries.

All this assumes that such coordinated releases are possible when competing for channel capacity with irrigation orders. In some cases, the constraints may be simply insuperable, given the highly modified nature of the Basin landscape, particularly in the southern system, and the highly regulated nature of the rivers.

It is unacceptable for the draft Basin Plan to propose to recover 971GL in the southern connected system for downstream needs when constraints prevent the water being delivered for high-flow events – and similar outcomes may be achieved with less water by investing in other options such as environmental works and measures.

Conversely, in the northern Basin's largely highly unregulated systems, it will be inefficient and ineffective for environmental water holders to try to manage their releases. The focus there needs to be on a flow management approach and not on stored environmental water management.

It is unacceptable to defer proper consideration of these issues until the 2015 review. By then, the Federal Government may well have bought more water than can be realistically and cost-effectively delivered, and the socio-economic damage will have been done.

Recommendation 1

The environmental water holders must demonstrate they can use the water already recovered effectively, efficiently and without unacceptable third-party impacts or negative environmental outcomes, before more water is removed from productive use.

This exercise would provide a solid foundation for determining whether more water is required for downstream needs, or these can be met in other ways.

¹⁶ *River management – challenges and opportunities 25 November 2011, MDBA, p5.*

4. Draft Basin Plan chapter 6: Water recovery plan prioritises buyback

Chapter 6 in the draft Basin Plan specifies that the downstream water recovery targets (971GL and 143GL in the southern connected and northern Basin respectively) must be achieved in the form of 'held' water or 'planned environmental water, defined as a converted access right'¹⁷.

Presumably an example for the latter would be rights to extract unregulated water, such as Victoria's section 51 Take and Use licences or NSW Supplementary Licences. Either definition could be applied to savings from infrastructure works to reduce losses in irrigation systems, depending on the nature of the losses.

The draft Plan is silent on whether this also applies to the volume needed to meet the in-catchment SDLs, but the context implies this is the case.

Requiring the water to be recovered in these forms is intended to achieve the environmental flow regimes identified in MDBA modelling, which are based solely on buying irrigation entitlements.

The water recovery program designed and funded by the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) reflects the Chapter 6 requirement. The Department expects 600GL will be recovered through infrastructure savings such as irrigation modernisation, and the balance, 2150GL, through continued buyback¹⁸.

As noted earlier, the MDBA recognises similar or better environmental outcomes could be achieved with fewer entitlements if more sophisticated modelling was undertaken to account for other options. Such options include environmental works and measures, improved river operations and upgrading the barrages.

The draft Basin Plan suggests the more sophisticated modelling and analysis will be undertaken to inform the 2015 review, with the prospect that the SDL could be adjusted, and therefore the volume of water recovered could be reduced.

However, changing the Basin Plan to adopt such a recommendation requires a repeat of the current, lengthy process of consultation, ministerial council consideration, ministerial approval and parliamentary endorsement. The draft Plan envisages that the review process and any resulting changes to the Basin Plan would not be finalised before 2017.

In the meantime, the legal obligation remains on the Federal Government to meet the water recovery targets in the Basin Plan as it was approved in 2012 – that is, it must invest in the measures that will deliver 2750GL in the form of 'held' entitlement or converted water access rights.

This obligation remains until such time as it is superceded by changes approved by the minister and parliament – ie, till 2017, at the least. This in turn discourages the redirection of the remaining unspent federal funds into environmental works and measures etc. between 2012 and 2017, given the uncertainty as to whether the 2015 will or will not lead to the SDLs being adjusted to recover less water.

¹⁷ **Legal references:**

1. Water Act 2007, Part 1, Section 4: definition of 'held' environmental water as a water access right, water delivery right or irrigation right, for purposes of achieving environmental outcomes.
2. Water Act 2007, Part 1, Section 6: definition of 'planned' environmental water, being water committed by the Basin Plan or States that cannot be used for other purposes.
3. Draft Basin Plan, November 2011, Chapter 6, Part 2, 6.05 (4)(b): describes the downstream 'shared' water recovery targets (143GL and 971GL in northern and southern basin respectively) being met with 'held' environmental water, or water available under a water access right that has been converted into planned environmental water.
4. Draft Basin Plan, November 2011, Chapter 6, Part 2, 6.06: enables the MDBA to express its view on the extent to which changes arising from matters such as works and measures, river management etc. are likely to result in a need to adjust the SDL, and requires the MDBA to publish its view on its website.

¹⁸ SEWPaC presentation to ABARES Outlook 2012 conference, http://www.daff.gov.au/__data/assets/pdf_file/0010/2135395/Mary-Harwood.pdf

So, by 2017, it could well be academic whether the SDLs have been changed to requires less water to be recovered. By then, SEWPaC may have already bought most of the 2150GL, and will have little budget left to invest in these other options.

It needs to be kept in mind that while the current buyback budget, with \$1.2 billion remaining, runs out to 2015, the Government has already committed \$340m a year for buyback for another five years after that.

It is important to stress that Paragraph 6.06 in Chapter 6 does not in any way mitigate SEWPaC's obligation to recover the water in the specified forms. This paragraph only enables the MDBA to express a view on whether environmental works and so forth are likely to result in a need to adjust the SDL, and requires the MDBA to publish its view and the reasons on its website.

That is NOT the same thing as the Basin Plan actually and explicitly allowing these other options to reduce the mandated 2750GL water recovery target now, before the 2015 review. Neither is MDBA's professed support for other options somehow the same thing as SEWPaC actually investing in them.

The MDBA chair Craig Knowles has confirmed that neither the Basin Plan nor its schedules setting out SDLs and Baseline Diversion Levels (BDLs) can be changed without Parliamentary approval¹⁹, regardless of whether new knowledge or modelling before the 2015 review shows less water than 2750GL is needed.

This restriction was apparently deliberately included in the Water Act, to prevent SDLs being easily altered on the whim of future ministers for political expediency; as such, the provision does help to ensure certainty between the 10-year mandated reviews of the Basin Plan under the Act.

No one can predict what a future government might do. But given the significant uncertainty about system constraints, the potential for achieving the same environmental outcomes using less than 2750GL, and the socio-economic impacts of what is proposed, a more cautious approach is warranted in the Basin Plan approved in 2012.

The water recovery volumes in the form specified in Chapter 6 should therefore be set at the level required to meet the catchment SDL, and downstream objectives achieved by using the available environment allocations in conjunction with environmental works and other measures.

Recommendation 2

Chapter 6 must be revised to set the water recovery target at the level required to meet catchment SDLs (1636GL);

- a. 247GL in northern system
- b. 1318GL in southern connected system
- c. 71GL in southern disconnected valleys.

Chapter 6 must seek to achieve downstream objectives using the available environmental allocations in conjunction with improved river operations, environmental works and other efficiency measures.

Chapter 6 must actively direct Government investment into environmental works and measures, and improved river operations as a priority.

Recommendation 3

The remaining buyback and infrastructure funding must be pooled, and the Government must commit to investing in a package of environmental works, improved river operations and other measures as the priority

Recommendation 4

The 2015 review should assess progress in achieving downstream objectives in light of the investment in the package of works and measures.

¹⁹ MDBA stakeholder roundtable, Echuca, 16 March 2012.

5. Draft Basin Plan chapter 8: Water quality and salinity targets unnecessary and costly

The Basin's current salinity target is set out in the Basin Salinity Management Strategy 2001-2015. The target is to keep salinity at Morgan in South Australia at less than 800EC for 95% of the time over 15 years. To this end, the States have set end-of-valley targets for each catchment upstream²⁰, with the intent of reducing the salt volumes exported from tributaries into the Murray River.

The draft Basin Plan is consistent with this strategy in setting a target of 500mg/L salt (~800EC) at Morgan 95% of the time (Chapter 8, Part 4, Division 6, 8.18). All Basin States have agreed that meeting this target is cost-effective, achievable and practical, and the strategy has been a success in controlling salt export into the rivers and concentrations in the water itself.

The draft Plan, however, goes further by effectively setting new and additional standards to apply across the Basin for raw water for human consumption, irrigation water and recreational water. Unlike the Basin Salinity Management Strategy's end-of-valley targets, the new standards apply wherever water is drawn throughout a catchment for treatment for human consumption or to supply irrigation districts.

Three new salinity monitoring points and targets are also proposed, downstream from Morgan. It means instead of one monitoring and compliance point at Morgan under the Basin Salinity Management Strategy 2001-2015, States may need to fund and maintain dozens of additional points across the Basin without any clear rationale why the additional targets are necessary or whether they are even achievable.

For example, the Basin Plan's raw water for human consumption target is set at 500mg/L total dissolved solids (salinity), to achieve a 'palatability' (taste) rating of 'good'. This is more stringent than the Australian Drinking Water Standard 2011, which allows up to 600mg/L. Similarly, the draft Basin Plan is more stringent in requiring its target to apply to raw water, whereas the drinking water standard applies to *treated* water.

The irrigation water quality target in the draft Plan for the northern Basin is then set at 670mg/L; this is inconsistent with the raw water for human consumption target above. The irrigation quality target for the southern Basin is set at 500mg/L, the same as for raw water for treatment for human consumption.

The MDBA has advised that Section 25 of the Water Act requires the Authority and the Minister to have regard for the National Water Quality Management Strategy (NWQMS) in setting water quality and salinity objectives and targets, and that the draft Basin Plan reflects this advice²¹.

As the MDBA notes in its advice, the NWQMS provides guideline values²² for a wide range of water quality characteristics. These values reflect the wide range of plant tolerances for salinity concentrations above and below the fixed 500mg/L target proposed in the draft Basin Plan.

Setting the target as a range rather than a fixed number would therefore seem more consistent with the NWQMS approach, but the MDBA has instead made a judgement call to set the target on the basis of the most salt-sensitive crop currently contributing 10% of the gross value of irrigated product in each region. This is despite recognising that crop tolerance is a function of diverse variables beyond simple salinity concentration, such as soil properties, rainfall, irrigation and management practices²³.

²⁰ Murray Darling Basin Agreement, Schedule B, Appendix 1, End-of-Valley Targets (Water Act 2007, Schedule 1).

²¹ MDBA response to questions submitted by National Farmers Federation.

²² Water Quality Targets Online, <http://www.environment.gov.au/water/publications/quality/targets-online/map.php>.

²³ 'Salinity Targets Review: a process for developing objectives and targets', Report 3 (of 4), prepared for the MDBA by Sinclair Knight Mertz, pp26-35.

Setting a fixed target is therefore impractical and unnecessary. It also equates to setting a new standard, given the NWQMS only provides a range. The Basin Plan should do no more than recognise the range of crop salinity tolerances, and stipulate that irrigation water quality should be fit-for-purpose.

The MDBA apparently has also proposed these new standards without first determining, in proper consultation with the States, whether the standards are cost-effective, achievable and practical – and despite the Water Act requiring efficient and cost-effective management of Basin water resources²⁴.

Some naturally highly salty catchments, such as the Loddon, will never be able to comply with proposed new standards. Similarly, the Basin Plan sets standards for three new monitoring points below Morgan without agreement with the States on whether the standards at these locations are practical, cost-effective and achievable given naturally, highly saline nature of the catchment in the lower Murray.

The dairy industry acknowledges the MDBA's assurance that failure to meet a target does not mean a person has acted inconsistently with the Plan, and that the target places no legal obligation for a dilution flow.

Nonetheless, the salinity and water quality targets, along with the Sustainable Diversion Limits (SDL), are the only easily measurable, hard and fast targets in the draft Basin Plan. The dairy industry is concerned the new standards could be used as proxy benchmarks to measure progress towards environmental targets.

Failure to meet the salinity and water quality targets could then be used as grounds to support campaigns for more environmental water. This concern is not allayed when the draft Basin Plan fails to note the NWQMS guidelines for environmental health in lowland rivers set a very wide range of 125-2200mg/L²⁵.

The Water Act 2007 Part 2, Division 1, Section 25 requires a water quality and salinity management plan, including objectives and targets. This requirement is satisfied by existing management arrangements as agreed by all parties in the Basin Salinity Management Strategy 2001-2015.

The MDBA has arguably gone beyond the Water Act in proposing a suite of new and more stringent water quality and salinity targets that do not pass the test as being achievable, practical and cost-effective.

Recommendation 5

Chapter 8 and Schedule 9 must be amended to recognise the Basin Salinity Management Strategy 2001-2015 as meeting the requirements of the Water Act 2007 to develop a water quality and salinity management plan.

6. Groundwater

The MDBA chair Craig Knowles has repeatedly assured stakeholders in meetings over the last eight months or so that groundwater Sustainable Diversion Limits (SDL) would be consistent with extraction levels permitted under existing or proposed state groundwater management plans.

The draft Basin Plan determines the Baseline Diversion Limit (BDL) in each groundwater resource unit as being the extraction limit or current level of entitlement under existing or proposed state and territory water resource management plan. Where no management plan exists, the BDL is entitlement (plus stock and domestic rights), along with the effect of any rules managing extraction²⁶.

²⁴ For example, see Water Act 2007, Part 1, Section 3, Objects.

²⁵ *Salinity Targets Review: a process for developing objectives and targets*, Report 3 (of 4), prepared for the MDBA by Sinclair Knight Mertz, pp23.

²⁶ *Plain English summary of the proposed Basin Plan – including explanatory notes*, MDBA, November 2011, p87.

On this basis, SDLs have been set at or above the BDLs in all but three of the 94 groundwater resource units, being the upper Condamine alluvium central and tributaries, and Victorian Riverine Sedimentary Plain.

In these three units, cuts below the BDL range from 43% (35GL) in the upper Condamine alluvium central; 27% (48GL) in the Victorian Riverine Sedimentary Plain; and, 11% (5GL) in the upper Condamine alluvium tributaries. The Basin dairy industry is concentrated in the area underlain by the five aquifers making up the Victorian Riverine Sedimentary Plain.

In the Riverine unit, the MDBA says the 175GL Baseline Diversion Limit (BDL) reflects the Authority's policy of adopting the current state groundwater plan limits and rules used to manage extraction²⁷; this BDL already incorporates a 70% cap on use on the Katunga Deep Lead imposed by the State in consultation with groundwater users under the provisions of the current management plan.

However, the proposed 127GL SDL is derived from MDBA modelling using and updating the CSIRO model used for its Sustainable Yields project in 2007/08²⁸, rather than relying on the extractions allowed under the Victorian Government's groundwater management plans.

The MDBA says the SDL reflects a high risk posed by the BDL to key environmental assets within the Riverine groundwater resource unit, such as the Lower Goulburn River Floodplain, Barmah-Millewa Forest and Gunbower Forest. It also reflects a risk to a key ecosystem function, being rivers and streams in the southern part of the resource unit that depend on base flow derived from groundwater²⁹.

However the Riverine unit is made up of five different aquifers. The MDBA groundwater methods³⁰ report does not distinguish the extent to which extraction from this or that aquifer might contribute to materialising the risks identified above. Without this information, entitlements may be disproportionately bought back from aquifers where extraction is not, in fact, posing a significant environmental risk.

The MDBA argues that the proposed SDL of 127 GL/year is higher than the recorded maximum use from the aquifers of 105GL/year in 2006-07, and higher than the average annual metered use of 97GL/year from 2003-04 to 2007-08. The logic seems to be that the 48GL cut is therefore only a cut on paper, and the SDL will still allow for some further growth in extraction to support economic development.

The difficulty again is that the proposed cuts are not apportioned across the five aquifers. Katunga is already operating with a 70% cap on extractions; further cuts here will be real and constrain the potential for future economic growth. Further, existing use is irrelevant as a benchmark or a justification for cuts; the SDL should be based on the extractions allowed under existing state groundwater management plans.

The Victorian plans already manage groundwater conservatively, and provide the flexibility to respond to changing aquifer levels by setting Permissible Consumptive Volumes (PCVs) during the life of the management plan. PCVs are caps imposed to prevent the resource being depleted or adverse impacts such as declining groundwater levels, reduced base flows in rivers and streams, or changes to water quality.

The Victorian groundwater management plans stood the test during the drought, when levels in the five aquifers stabilised or even rose; it seems unnecessary to go further by imposing a permanent 48GL cut when the plans allow for managing any potential impacts arising if usage rises to meet the BDL.

²⁷ 'The proposed groundwater baseline and sustainable diversion limits: Methods Report', MDBA, 2012, p26.
<http://download.mdba.gov.au/proposed/Proposed-BP-GW-BDL-SDL.pdf>

²⁸ Peter Hyde, Director, Groundwater Planning, Policy & Planning Division, MDBA. Phone hook-up with Moira Shire, Murray Goulburn Cooperative, GMW and Dairy Australia, 26 March 2012.

²⁹ 'The proposed groundwater baseline and sustainable diversion limits: Methods Report', MDBA, 2012, p26.
<http://download.mdba.gov.au/proposed/Proposed-BP-GW-BDL-SDL.pdf>

³⁰ *IBID.*

It is also unclear whether groundwater entitlements bought by the Government will be extinguished, a move that would lead to remaining entitlement holder paying more to cover Goulburn Murray Water (GMW) groundwater management costs. This issue must be resolved as a matter of urgency.

Recommendation 6

Groundwater SDLs in Victoria set as the Permissible Consumptive Volume (PCV) in State groundwater management plans, as reviewed and revised from time to time.

Where no PCV is in force, the SDL will be the Baseline Diversion Limit in the draft Basin Plan.

The Government must compensate water companies for foregone groundwater management fees if groundwater entitlements are purchased and then extinguished.

7. Policy mismatch in draft Basin plan intent and Federal water recovery program

Government water recovery program is making a bad socio-economic outcome even worse.

The draft Basin Plan reflects the Water Act's requirement that the Basin's water resources be used and managed in a way that optimises economic, social and environmental outcomes³¹. The Federal Government has pointed to this clause as proof that the Basin Plan can deliver a triple-bottom line outcome, rather than prioritising the environment's needs as per the legal advice to the MDBA in preparing the Guide in 2010.

To this end, the Plan's management objective in the Water Act's Chapter 5, 5.02 is a healthy working Basin, including a healthy working environment, strong communities and a productive economy, through the integrated and cost-effective management of Basin resources.

It goes on to identify the management outcomes. These include the use of Basin Water resources in a way that improves water security for all users of Basin water, and that water recovery measures should result in communities that are better adapted to reduced water availability.

The problem is that the water recovery program designed and funded by the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) is actively undermining the capacity for adaptation.

For example, SEWPaC intends to buyback 2150GL of the 2750GL water recovery target³². This approach will reduce the collective pool of water available for irrigation, carryover and trade in the southern connected system by around 30% in average years³³. It means scarcity and therefore insecurity of adequate supply and affordability could be acute in a repeat of the recent drought conditions with prolonged low allocations.

The proposed 2750GL water recovery target is expected to reduce milk production across northern Victoria to below drought levels. A comprehensive socio-economic impacts report commissioned by the MDBA³⁴, warns this could lead to the number of major factories dropping from six to three.

The report says staff wages from these six factories inject \$146 million a year into local economies, and another \$64 million for repairs and maintenance at the plants.

³¹ Water Act 2007, Part 2, subdivision B, para 20 (d).

³² SEWPaC presentation to ABARES Outlook 2012 conference, http://www.daff.gov.au/__data/assets/pdf_file/0010/2135395/Mary-Harwood.pdf

³³ 'Social and economic assessment of the draft Basin Plan', MDBA presentation to regional financial institutions, 27 February to 1 March 2012.

³⁴ "Community impacts of the Guide to the proposed Murray-Darling Basin Plan", May 2011. Volume 3. While this modelling is based on the Guide, it remains relevant because the proposed southern system recovery volumes are virtually the same in the Guide (2274GL) and the draft Basin Plan (2289GL).

Rochester and Stanhope are identified as the most vulnerable towns in terms of socio-economic impacts if their dairy factories close. The report highlights that towns in the north west of Victoria, such as Kerang, will feel the brunt of the SDLs given their high reliance on irrigated agriculture³⁵.

Significantly, the report goes on to warn that a bias towards purchasing higher-reliability entitlements will disproportionately affect higher-value industries like dairy and horticulture, with even more serious flow-on socio-economic effects.

The MDBA socio-economic report says water for the environment can be obtained from a range of sources at lower socio-economic cost than buyback. And that “increasing infrastructure spending and reduced buyback could potentially help reduce the socio economic cost of the Basin Plan without reducing the environmental benefits.”³⁶

The Commonwealth’s purchasing history, however, has been strongly weighted towards higher reliability water shares; the higher the reliability weighting, the more entitlement in that class the Commonwealth owns as a percentage of the whole³⁷ (Table 1).

Table 1: Proportion of total ‘regulated’ irrigation entitlement held by Commonwealth in southern connected system, as of 31 October 2011

River Basin	Entitlement type	Total entitlement (ML)	Reliability *	Volume (ML) held by environment	% total entitlement held by environment
Murrumbidgee	High security	298,021	96%	103	<0.1
	General security	2,043,432	64%	147,230	7.2%
	Supplementary	220,000	14%	20,821	<0.1
NSW Murray	General security**	1,668,000	81%	215,810	12.9
	MIL general security	1,190,763		186,932	16%
	NSW High security	198,011	95%	2,636	1.3%
Campaspe	High reliability	36,911	95%	6,256	16.9%
	Low reliability	18,660	49%	395	2.1%
Goulburn-Broken	High reliability	993,396	95%	174,503	17.5%
	Low reliability	438,601	35%	10,286	2.3%
Loddon	High reliability	21,393	95%	2432	11.5%
	Low reliability	8095	27%	644	7.9%
Vic Murray	High reliability	1,181,640	95%	199,026	16.8%
	Low reliability	300,846	24%	11,168	3.7%
SA Murray	SA High security	544,018	90%	84,848	15.5%
Total		7,751,024		855,337	11%

* SEWPac conversion - average allocation /yr as % of entitlement

**Total entitlements changed from 1,983,508 ML in previous tables to 1,668,000 ML, on advice from Murray Irrigation Limit that NSW Office of Water figures erroneously include 300,000ML conveyance water.

³⁵ This is consistent with later, regionally focused socio-economic impact analysis of the draft Basin Plan, prepared for the MDBA during 2011, such as the Arche Consulting report.

³⁶ “Community impacts of the Guide to the proposed Murray-Darling Basin Plan”, May 2011. Volume 3, pp3-4.

³⁷ The exception is high reliability entitlement in the Murrumbidgee and NSW Murray; it is not clear whether these entitlement holders have simply chosen not to sell or whether SEWPac has avoided purchasing these entitlements in NSW when they are more plentiful in Victoria.

SEWPaC has not sought to purchase water access rights to unregulated flows, such as Victoria's Section 51 Take and Use licences, and has purchased almost no supplementary licences in NSW. The justification seems to be that these entitlement types are not 'held' water that can be stored in a dam for controlled releases, and therefore they have zero value in terms of long-term cap equivalents.

This ignores the fact that buying back these licences will increase unregulated environmental flows that respond to natural conditions in the catchment – the best kind of environmental flows.

The dairy industry understands that irrigators in the Lowbidgee are willing to sell their supplementary licences and decommission the irrigation district. Their licences yield an annual average of around 100GL, albeit with large annual fluctuations depending on the level of river flow.

This water would be invaluable for meeting the needs of wetlands and river red gums on the lower Murrumbidgee Floodplain, and contributing to downstream watering events.

It is an opportunity going begging, but SEWPaC's latest round of buybacks, announced on 23 February 2012, continues the past pattern. The criteria specify, like the previous tenders, that SEWPaC is only seeking High Reliability water in Victoria, and General Security and High Security in the NSW Murray and Murrumbidgee.

In short, SEWPaC water recovery program will make a bad socio-economic situation even worse. It is directly opposed to the draft Basin Plan's professed intent that water recovery should result in communities that are better adapted to reduced water availability.

Less water means fewer farmers to share increased costs to maintain shared irrigation systems.

The Government's commitment to buyback entitlements rather than impose cuts on all diverters does preserve the reliability of the individual entitlements that farmers retain. However, the total pool of water available for irrigation, trade and carryover in any given year will be about 30% smaller.

As noted earlier, this will put upward pressure on market prices in years when allocations are low, water is scarce and competition is hot among high-value enterprises such as dairy and horticulture that need to buy extra water to top up their low allocations or for carryover. Put simply, there may not be enough water at the time dairy farmers need it at a price they can afford.

The amount of water being delivered through shared irrigation systems will also be lower, which means reduced revenue for operators to cover the system's operating and maintenance costs. Inevitably, this will put upward pressure on water charges to cover the revenue shortfall.

Initial modelling by Goulburn Murray Water (GMW)³⁸, for example, indicates that if the 971GL for downstream needs is shared pro-rata among States and primarily achieved through buyback, the typical water bill for a medium-sized Goulburn Murray Irrigation District (GMID) customer will increase by 15-21% by 2019.

This is because GMW's share of the 971GL translates to a 20% reduction in the 1096GL of HRWS now held in the GMID. How much the price rises depends on the extent to which approved and potential water-saving infrastructure offsets the amount recovered through buyback. But the bottom line is GMW would be forced to increase prices to cover the revenue shortfall due to less water being delivered to its customers.

It needs to be noted that the 20% reduction in HRWS now held in the GMID would be on top of the ~19% reduction already imposed by the Commonwealth purchasing an estimated 300GL from GMW's customer

³⁸ Initial modelling by GMW, for consultation with stakeholders. Email from GMW to Dairy Australia, 4 April 2012.

base over the last three years. So water companies are already feeling the revenue impacts of the buyback program, before more is bought to meet 971GL downstream target.

It also needs to be remembered that the price impacts are in addition to any price rises needed to maintain and operate the modernised system (although it should be noted that the modernised system will cost less to operate and maintain in the long term than if the old, inefficient channel system was retained).

More generally, it is essential that all costs associated with storing and delivering water, whether for irrigation, environment or lifestyle block, is shared fairly among all users. This includes environmental water holders paying casual use rates when using irrigation channels to deliver water to environmental sites – even during the non-irrigation season when it is not competing with irrigators for access.

Funding works and measures to achieve environmental outcomes with less water

The MDBA is supportive of investment in environmental works and measures and other projects that it believes will help to deliver the draft Basin Plan's environmental outcomes using less than 2750GL. The Federal Government has duly given the State \$10 million for feasibility studies for 16 potential projects detailed in a communiqué from a Basin ministerial meeting on 4 November 2011.³⁹

However, the question is how these projects might be funded if they are proved feasible. Indeed, the same question applies to other potential projects such as the Coorong drainage works, upgrading and automating the barrages, dredging the Narrung Narrows into Lake Albert, and extending the On-Farm Irrigation Efficiency Program to 2017 to yield at least another 100GL for the environment in Victoria.

The Federal Government has committed a total of \$9 billion to buybacks in the Murray Darling Basin (\$3.1 billion Restoring the Balance program) and regional infrastructure and efficiency projects (\$5.8 billion Sustainable Rural Water Use and Infrastructure Program, or SRWUIP).

The infrastructure program funds projects in all regional areas, but includes \$3.2 billion for State Priority Projects in the Basin, \$370 million to decommission Menindee Lakes, and \$300 million on the On-Farm Irrigation Efficiency Program in the southern Basin (Appendix 1).

However, of this \$9 billion, the dairy industry understands only up to \$2 billion remains unspent or uncommitted (\$1.2 billion in the buyback budget to 2015, and \$500-900 million in the infrastructure budget, depending on whether the Menindee Lakes project gets up as originally intended or in a more modest form).

The Government has committed an additional \$340 million a year for five years after 2015 (\$1.4 billion total) for buybacks to close any remaining gap to meet the SDL when the SDL comes into effect in 2019. This takes the total commitment to buybacks to \$4.6 billion over the 12 years to 2018-19⁴⁰.

On the basis of the funding available, SEWPaC expects to recover 600GL in infrastructure savings and 2150GL through buyback. The latter is feasible, given the buyback budget and average prices paid to date.

The 600GL in infrastructure savings is less certain as NSW does not support SEWPaC's original proposal to decommission the Menindee Lakes and save 200GL. This proposal would undermine the critical role Menindee plays in shoring up security of supply for NSW, Victoria and SA, and NSW accordingly has proposed a more modest project delivering an estimated 70-100GL.

The bottom line is that the lion's share of unspent funding is earmarked for buyback, not infrastructure works, and buyback is expected to deliver the bulk of the water to meet the 2750GL target.

³⁹ Communiqué from Murray Darling Basin ministerial meeting, 4 November 2011, http://www.mdba.gov.au/media_centre/legislative-and-governance-forum/legislative-and-Governance-Forum1

⁴⁰ Email from SEWPaC to Dairy Australia, 11 October 2011.

This is despite socio-economic reports pointing out that “increasing infrastructure spending and reduced buyback could potentially help reduce the socio economic cost of the Basin Plan without reducing the environmental benefits.”⁴¹

If the Government is serious about a Basin Plan that optimises triple bottom line outcomes, it will pool the remaining buyback and infrastructure funding, and commit to investing in a package of environmental works and measures as the priority.

8. Socio-economic modelling issues

The dairy industry acknowledges the MDBA’s recognition that some regions and communities will bear the brunt of adjustment to less water under the Basin Plan⁴². It is no surprise that the five most vulnerable regions with the least capacity to adapt are also the five regions most dependent on irrigation.

The Basin’s dairy industry is concentrated in two of these regions; the Victorian Goulburn-Broken/Murray and the NSW Murray, which together account for around 80% of Basin milk production and more than 20% of national milk production. The industry’s broader socio-economic significance in supporting employment and services in these regions is detailed earlier.

While the MDBA has commissioned studies to identify the Plan’s regional socio-economic effects, the dairy industry remains concerned that these studies underplay the true impacts on irrigation communities.

This is, to some extent, inevitable given the limitations and theoretical assumptions built into conventional economic models – but underestimating impacts gives false comfort to politicians and bureaucrats. It can also lead to underestimating the degree and nature of structural adjustment required.

This in turn leads to poorly designed programs that fail to address core issues, and misdirected funding that fails to the structural adjustment required for communities to adapt and prosper with less water available for productive use.

The general buyback tenders are a case in point, as they remove water independent of infrastructure programs to modernise and rationalise the irrigation footprint, and improve on-farm efficiency. Buyback also undermines the overall viability of irrigation districts, as less water being delivered means higher prices to cover operating and maintenance costs, and a greater risk of stranded assets.

An exhaustive critique of the shortcomings of the socio-economic modelling to date would be a hefty submission in its own right, but the dairy industry would like to highlight a few examples here.

The Arche Consulting report

To begin, the MDBA summaries of socio-economic reports (and most people and media will read no further) include a table of expected job and economic losses in vulnerable local government areas (LGAs)⁴³.

The table presented only includes impacts arising from closing the remaining gap to 2750GL by 2019, as if there is no pain of adjustment involved in the water already removed from production since 2009.

⁴¹ “Community impacts of the Guide to the proposed Murray-Darling Basin Plan”, May 2011. Volume 3, pp3-4.

⁴² ‘Socioeconomic analysis and the draft Basin Plan’, Parts A and B, MDBA, November 2011, <http://www.mdba.gov.au/draft-basin-plan/supporting-documents/socioeconomic-analysis>

⁴³ ‘Socioeconomic analysis and the draft Basin Plan’, Part A, Overview and Analysis, p108, MDBA, November 2011, <http://www.mdba.gov.au/draft-basin-plan/supporting-documents/socioeconomic-analysis>

The impacts expected taking in account both the water already recovered since 2009 and closing the gap to 2019 are included in the full report by Arche Consulting⁴⁴, and summarised in the box below.

The modelling does not examine the number of irrigators affected by the change or any significant alteration in overhead costs – the latter a particularly pertinent point for dairy farmers trying to adjust to less water. In assuming that dairy farms will convert to dryland grazing, it does not account for the costs of consolidating irrigated dairy properties and converting them, or changes in property values affecting debt:equity ratios. The modelling also does not capture the downstream effect on the viability of associated processing activities.

Conversely, the report says it presents only a short-term analysis and does not cover the transition occurring now and in the future due a range of other factors including exchange rates, ageing population and increasing farm size. Nor does it factor in the assumed offsetting stimulus of the Government buyback and infrastructure spending till 2019.

By way of comparison, ABARES predicted that reduced dairy production would drive a 12.9% (\$88.2 million a year) fall in the gross value of production in the Goulburn-Broken valley in the long term. This is one of the highest percentage changes of all the Basin Plan regions.⁴⁵

Arche Consulting report: estimated local community impacts from past and future water recovery to meet draft Basin Plan catchment (1318GL) and downstream (971GL) targets in southern system.

Deniliquin/Murray LGA: 26% drop in water use = irrigated production falling \$18.2m (23.9%), offset by \$2.9m increase in dryland grazing.
- 35 farm jobs and 72 flow-on jobs lost.

Shepparton LGA: 31.2% drop in water use = irrigated dairy and cereal production falling by \$45.8m (15.3%), offset by \$6.5m rise in dryland grazing.
- 94 farm jobs and 155 flow-on jobs lost.

Gannawarra LGA: 24.7% drop in water use = irrigated dairy and cereal production falling by \$39.6m (25.9%), offset by \$5.1m rise in dryland grazing.
- 65 farm jobs and 102 flow-on jobs lost.

Murray Bridge LGA: 23.9% drop in water use = irrigated dairy production to fall by \$4.8m (21.2%), offset by a \$0.5m increase in dryland grazing.
- 12 farm jobs and 23 flow-on jobs lost.

MDBA socio-economic presentation

An MDBA slide show on its socio-economic assessment to regional banks⁴⁶ in the last week of February presents at best a confusing picture to an uninformed audience; at worst the slides are misleading.

For example, two early slides show the *value* of milk production did not fall much from 2001-2008, even though water usage did. It is to be hoped this rosy scenario is verbally balanced by pointing out the *volume* of milk produced in the southern Basin fell 33% during the same period. And at the same time, average debt rose more than 40% as dairy farmers struggled with higher feed and other costs to keep herds going.

⁴⁴ 'Assessing the local economic impacts of the draft Basin Plan', Outcomes Report, Arche Consulting, November 2011, p8, <http://www.mdba.gov.au/files/bp-kid/1720-AssessingTheLocalEconomicImpactsOfDraftBasinPlan-OutcomesReport.pdf>

⁴⁵ 'Socioeconomic analysis and the draft Basin Plan', Part A, Overview and Analysis, p105-106, MDBA, November 2011, <http://www.mdba.gov.au/draft-basin-plan/supporting-documents/socioeconomic-analysis>

⁴⁶ 'Social and economic assessment of the draft Basin Plan', MDBA presentation to regional financial institutions, 27 February to 1 March 2012.

The slideshow also neglects to balance the big jump in farm gate milk prices from 2005/06 to 2007/08 that helped buffer farm income as the drought drove down milk production, with more recent data showing how the price crashed mid-way through the 2008/09 season along with water allocations and milk production.

Elsewhere the slide show assumes that the Basin Plan's economic impacts on irrigated agriculture can be offset by less efficient water users selling first, and a switch to dry land farming.

The assumption that less efficient water users will sell first is dubious – much like the assumption that water will move to its highest economic value. This idea is premised on different types of water entitlements being interchangeable, ie. that water used for rice will move to dairy and horticulture instead.

As explained earlier in this submission, dairy and horticulture are unlikely to substitute high reliability entitlements with the less reliable general security entitlements favoured by cotton and rice. This is because the uncertainty of supply is too much of a business risk for dairy and horticulture, particularly in dry years when general security licences may have negligible and even zero allocations.

For dairy, less water means less home-grown feed, and that means higher overhead costs to substitute the loss with bought-in feed, or reduced income if herd size is reduced.

The MDBA also seems to assume that irrigated dairy farms will be converted to dryland, without any analysis of whether dry land farming is profitable for dairy in terms of the ratio of feed to milk price or the impacts on land value and equity balances.

MDBA slideshow – playing down the effects

The slide show says diversions will only fall by 19%, compared with the 70% reduction in water use in the drought. The ADIC and ADF dispute these facts.

Fact 1: The 2750GL water recovery target equates to a 21% reduction in total diversions across the Basin, if water used by timber plantations and stored in farm dams is included in the baseline.

But as no one is suggesting pulling out plantations or farm dams, 2750GL equates to a 25% reduction on diversions for all other uses – ie, agriculture, mining, town supply and manufacturing.

Fact 2: The 70% fall in water use was in only one drought year (2008/09), whereas the proposed 25% reduction under the Basin Plan is permanent and ongoing. A more accurate comparison is the annual average 39% drop in water allocations across the southern system in the last five drought years (2005-2009) against the slide show's implied permanent 30% reduction in water for irrigated agriculture.

In short, the water available for agriculture every year under the Basin Plan will be only marginally more than the amount available during the drought's worst five years.

Socio-economic impacts need to be examined as part of the preparation of water recovery programs for local and regional areas. If done properly, these investigations should prioritise and guide water recovery programs.

9. Other issues

Increased costs: monitoring, evaluation and reporting framework

The draft Basin Plan details a stringent monitoring and evaluation regime in Chapter 12. It is not clear how the costs for this regime might be shared among the Commonwealth, State governments, and irrigation and environmental water management agencies.

The dairy industry is concerned that the costs may be recouped on a user-pays basis – that is, passed on to water entitlement holders alongside fees to cover water resource management costs, such as groundwater plans, storage and delivery fees, and town water supply.

It will be important in preparing to implement the Basin Plan by 2019 that all programs show budgets and performance against budgets. Planning and management programs involving significant expenditure need to be subject to cost benefit

If the Basin Plan is about delivering a public good with a healthy river system, then the costs of planning, management, monitoring, evaluation and reporting that should be shared among all Australians – not just those who live and work in the Basin itself.

Recommendation 7

The costs of the Basin plan's management, monitoring, evaluation and reporting requirements must be shared among all Australians – not just passed on those living and working in the Basin, via higher water bills.

Chapter 11: Water trading rules

This chapter creates some confusion as to whether the Murray Darling Basin Authority is merely codifying the legal principles that already govern water trade within and between States, or creating a new role for itself as the regulatory, compliance and enforcement agency presiding over an altogether new system.

As such it is not clear where other agencies with rules around water trade, such as the Australian Competition and Consumer Council and the States, stand in relation to the regime proposed in the draft Basin Plan.

Similarly, the draft Basin Plan implies the Murray Darling Basin Authority will duplicate the data collection role already undertaken by others such as the Bureau of Meteorology.

The Murray Darling Basin Authority does not have the internal resources or expertise to regulate the water market, or to oversee and enforce compliance.

Recommendation 8

Chapter 11 must be revised to more clearly delineate the respective regulatory and other roles played by different agencies, and to avoid duplication with agencies more expert than the MDBA.

Schedule 1 – Basin water resources and the context for their use

This schedule is intended to provide a snapshot of the Basin's environmental condition, what its water is used for, and the Basin's socio-economic profile. It relies heavily on studies undertaken during the drought when the system was under extreme duress. As such it paints an unrelentingly negative picture, and creates the impression that this is a permanent state of affairs brought about solely by diversions for human use.

An example is paragraph 22 on p125, which describes how modified flow regimes have changed the ecological character of the lower lakes since their Ramsar listing in 1985. It goes on to state that flows at the Murray mouth has been particularly low over the past decade, and this has resulted in the siltation of the Murray mouth channel and extreme hypersalinisation of the Coorong's South Lagoon.

The decade in question is not identified, making it sound as if this situation is still current, nor is the decade identified as a drought of unprecedented severity and duration. Without this all-important context, the uninformed reader is left with the mistaken impression that modified flow regimes and diversions alone were

responsible for the low flows, as if drought played no role. Neither is there any attempt to consider the role played by the barrages in altering flows and contributing to siltation around the mouth.

The schedule needs to acknowledge that some recent degradation in whole or part can be attributed to the natural cycle of extreme drought. Many wetlands that dried out would have done so even if there were no diversions for human use at all. Similarly, the Murray River itself would have stopped flowing altogether for prolonged periods if not for the regulated flows released from the dams.

The schedule needs to be balanced with more recent, positive studies, such as the Eastern Australia Waterbird Survey 2011⁴⁷, which show ecosystems bouncing back strongly since the drought ended in 2010.

Recommendation 9

Schedule 1 must be revised to include more recent, positive environmental data reflecting the environmental response since the drought ended. It must provide appropriate context so that the reader gets the full picture, not just part of the picture.

⁴⁷ Eastern Australia Waterbird Survey, Australian Wetlands and Rivers Centre,
http://www.wetrivers.unsw.edu.au/2011/12/eastern_australian_waterbird_survey/

Appendix 1

APPENDIX 1: \$5.8b Sustainable Rural Water Use and Infrastructure Program⁴⁸ commitments

Infrastructure projects, including analysis, assessment and planning support (Administered Funding) Feb 2011

	Maximum government commitment (\$m)
State Priority Projects	3,236.0
Orange City Pipeline	20.0
Menindee Lakes project	370.0
Warren Nyngan Pipeline project	12.0
Lithgow-Clarence Colliery Water Transfer project	4.0
Wimmera-Mallee pipeline project	99.0
Supporting more efficient irrigation in Tasmania	140.0
Harvey Pipeline Project	49.0
Gascoyne Pipeline project	6.6
On Farm Irrigation Efficiency Project	300.0
On Farm pilot projects	5.6
Strengthening Basin Communities Program	200.0
Hotspots Assessment Program	24.3
Irrigation Modernisation Planning Assistance Program	7.2
Small Block Irrigators Exit Grants	102.5
Hume Dam Remedial Works	10.0
Meter Test Facilities	6.9
Due Diligence and Conveyancing Costs	35.0
Subtotal	4,628.1
<i>Environmental works feasibility study[^]</i>	<i>10</i>
Subtotal[^]	4,638.1

Improved water use and knowledge, market reform and water skills development (Administered Funding)

	Maximum government Commitment (\$m)
Compliance and Enforcement *	60.0
National Water Market System *	56.0
Basin Plan Activities	59.0
Snowy – Repayment of Mowamba Borrow [*]	13.7
National Water Commission – Assessment of Reforms *	1.0
CEWH – Management of Water Holdings	195.8
E-Water CRC Hydrological Modelling *	5.7
Water for Rivers *	6.3
Great Artesian Basin Shared Water Resource Assessment *	3.1
WA Sustainable Yields Study *	5.2
Water for the Future Communication	8.5
Subtotal	414.3

Total **5052.4**

** Initiatives agreed between the Commonwealth and one or more States/Territories, eg. through COAG or other fora.*

[^]Agreed since this table presented to Senate Estimates in February 2011.

⁴⁸ Senate Estimates

http://www.aph.gov.au/Parliamentary_Business/Committees/Senate_Committees?url=ec_ctte/estimates/add_1011/s ewpac/index.htm

Appendix 2

Environmental works and measures summary

Environmental works typically involve installation of pipelines, regulators, weirs, pumps and channels to move water across sites without overbank flooding, and hold pools at the right height for the right period to support events such as bird-breeding.

Environmental works are effective

Hattah Lakes, north-west Victoria: Temporary levee banks and portable pumps installed during the drought enabled a total of 48.4GL to be pumped into the lakes over six years from 2004-05; without the works, an additional 1400GL would have been needed to achieve the same outcomes.

The temporary measures are now being replaced with permanent structures for efficient watering.

Other projects

Lindsay-Walpolla Island is a Living Murray Icon site where proposed works will enable ~5000 ha of floodplain to be watered using 90GL per event rather than 1200GL if the same event was achieved through overbank flooding. The proposed works would cost ~\$46 million.

Victorian river red gum national and state parks and reserves⁴⁹: works to water the new Nyah-Vinifera Park and sites in three priority reaches: Bridge Creek to Murrumbidgee junction, Echuca to Torrumbarry and Robinvale to Mildura. Without works, more than 300GL a year may be needed to water these sites, compared to around 35GL with the works. The works would also avoid flooding private land. Approx. cost: \$32 million to water around 3,000 ha.

Reconfiguring drainage in south-east South Australia could increase average annual inflows into the Coorong south lagoon from 10.9GL/yr to 26GL/yr, and potentially negate the one-year difference in exceeding the salinity targets between the 2400GL and 2800GL scenarios.

Upgrading and automating the barrages could improve flows through the Murray mouth. This would reduce the volumes needed upstream to keep watering flowing over the barrages.

Dredging the Narrung Narrows and removing the earthen bund built as a drought measure would improve freshwater flows from Lake Alexandrina to Lake Albert, and ease persistent hyper-salinity.

Feasibility studies underway

The Federal Government has given the States \$10 million for feasibility studies for 16 potential projects detailed in a communiqué from a Basin ministerial meeting on 4 November 2011⁵⁰.

Victoria

a) Watering the Lindsay Island floodplain sub-project (\$1.1 million) to revise concept designs for weirs and regulators to better inundate over 5000 hectares including River Red Gum floodplain.

b) Watering the Walpolla Island floodplain sub-project (\$0.1 million) to review concept designs for a channel and regulating structures to better inundate around 1,000 hectares of floodplain.

50: 'Priority works to increase the effectiveness and efficiency of environmental water delivery in northern Victoria', Information for the Murray-Darling Basin Authority, July 2010'.

⁵⁰ Agreed at Basin Ministerial meeting in Canberra, 4 November 2011, with \$10 million in Federal funding to undertake the feasibility studies. http://www.mdba.gov.au/media_centre/legislative-and-governance-forum/legislative-and-Governance-Forum1

- c) Watering River Red Gum sites along the Murray sub-project (\$0.2 million) to scope structural works to deliver environmental water to various river red gum reserves from Echuca to SA border.
- d) Watering black box wetlands in Gunbower forest sub-project (\$0.45 million) for concept design to deliver water and remove man made barriers to inundate 8000 ha of forest and wetlands.
- e) Watering the Hattah Lakes - Chalka Creek North sub-project (\$0.15 million) for feasibility studies and designs to better deliver water.

New South Wales

- (a) Euston Lake restoration and improved water efficiency sub-project (\$0.4 million), to save water with more natural wetting and drying regime.
- (b) Upper Murrumbidgee environmental flow enhancement sub-project (\$0.5 million) to raise the operational flow limit at Gundagai to save water and improve health of mid-catchment wetlands.
- (c) Nimmie-Caira System Enhanced Environmental Water Delivery Sub-project (\$0.2 million) to save water and improve environmental water delivery lower Murrumbidgee floodplain.
- (d) Piping Irrigation Demands sub-project (\$0.15 million).
- (e) Burrendong Dam sub-project (\$0.2 million) to increase Burrendong dam outlet for higher pulse flows for fish spawning and more efficient water delivery, including Macquarie Marshes.
- (f) Southern Macquarie Marshes sub-project (\$0.2 million) for more efficient inundation of the South Macquarie Marsh.
- (g) Investigation into efficient delivery of high priority stock and domestic supplies sub-project (\$0.15 million) in the Macquarie, Murray, Murrumbidgee river systems.
- (h) Modify Weirs enhance floodplain inundation sub-project (\$0.2 million) to assess optimal weir pool height for more efficient delivery of environmental water onto floodplains.

Queensland

- (a) Queensland Murray Darling Basin Environmental Works and Measures project (\$1.0 million)

South Australia

- (a) Katfish Reach and Pike Implementation (Stage 3) sub-project (\$0.65 million) to assess new environmental regulators to enable broad floodplain inundation with less environmental water.
- (b) Eastern Mount Lofty Ranges Low Flow Bypasses sub-project (\$0.18 million) to assess feasibility of fitting devices to improve stream flows below farm dams.

Appendix 3

Summary of dairy-supported priority projects and programs

Remaining buyback and infrastructure funding (~\$2 billion in Water for the Future Fund + \$1.4 billion committed for further buyback 2015-2019) pooled and reprioritised for investment in:

- a. \$400 million to extend On-Farm Irrigation Efficiency Program to 2017, and deliver at least 100GL in farm water savings to the environment.
- b. Additional funding for Private Irrigation Infrastructure Operators Program (PIIOP) in the NSW Murray and Murrumbidgee.
- c. \$200 million to decommission Lowbidgee Irrigation District and buy back its supplementary licences to free up an annual average 100GL for environment.
- d. \$30 million to rehabilitate Murray Swamps in SA, to save an average 63GL/yr in evaporation, and control acidity and a rising saline water table affecting lower lakes.
- e. Upgrading and automating barrages in lower lakes to better control and improve flows to Coorong and Murray mouth.
- f. Works to redirect south-east drainage system into Coorong south lagoon, to resolve salinity problems by boosting inflows from 10.9GL/yr to 26GL/yr.
- g. Environmental works for greater water efficiency and improved flows through key indicator sites across the Basin. For example, \$105 million to water key sites, red gum forests and wetlands in Victoria using 550GL less than otherwise required.
- h. Improved river operations, including a comprehensive real-time monitoring network to guide the timing and volume of environmental releases. A 10% improvement could deliver watering events that would otherwise need another 800GL in environmental entitlements.
- i. Remove causeway and remains of bund restricting flows through Narrung Narrows, and dredge Narrows to improve freshwater exchange between Lakes Alexandrina and Albert.
- j. Study on feasibility and environmental cost/benefits of pipeline connecting Lake Albert and Coorong, to improve salinity in both waterbodies.