

Chapter 4

Basin-wide issues

Introduction

4.1 This chapter examines two broad basin-wide issues identified in hearings and by submitters. Each section concludes with a number of relevant recommendations. The chapter is divided by the following overarching subjects:

- value of water and its ownership; and
- use, quality and management of water.

The value of water and its ownership

The costs and benefits of taking action

4.2 The committee is of the view that the Plan has imposed costs on governments, primary producers and communities. It is a \$13 billion investment by taxpayers in water efficiency and environmental outcomes which will have profound implications for decades to come. However, the committee considers that it has been introduced without a thorough understanding of the economic costs or value of environmental benefits. As such, the Commonwealth has failed to undertake a cost-benefit analysis of the Plan's implementation.

4.3 The committee heard from Professor Sinclair Davidson, Senior Fellow, Institute of Public Affairs (IPA) that:

The MDBA talks about a triple bottom line, which basically looks at people, planet and profit...but they have not actually looked at the people and the profit. I think that is where the problem is. There has not actually been explicit, consistent and comprehensive analysis done of people and profit in this particular analysis.¹

4.4 Mr Chris Berg, Senior Fellow, IPA stated:

A cost-benefit analysis that assesses alternative policy settlements, such as estuary restoration, would also clarify the opportunity costs of policy choices forgone.²

Recommendation 19

4.5 The committee recommends that the Commonwealth Government request the Productivity Commission to undertake a full cost-benefit analysis of the Murray Darling Basin Plan.

1 Professor Sinclair Davidson, Senior Fellow at the Institute of Public Affairs, *Committee Hansard*, 5 February 2016, p. 16.

2 Mr Chris Berg, Senior Fellow, Senior Fellow at the Institute of Public Affairs, *Committee Hansard*, 5 February 2016, p. 16.

Water recovery

4.6 As highlighted throughout the report, water recovery under the Plan is undertaken through purchases of water and investment in infrastructure. The MDBA's submission stated that 70 per cent of the water recovery target has been achieved and noted that since 2012–13, 'investment in infrastructure has greatly exceeded that for water purchases.'³

4.7 The MDBA's submission also noted the 1500GL cap on Commonwealth purchases on the water market and indicated that most of the remaining recovery amounts are planned to come through infrastructure projects.⁴

4.8 The submission from the Department of the Environment stated these parameters and stated that the Water Act and the Plan 'do not allow for any compulsory acquisition.'⁵ The submission further stated that:

All water entitlements recovered for Commonwealth-run programmes are acquired for value as the result of individual irrigators or individual irrigation infrastructure operators choosing to participate in Commonwealth programmes.⁶

Buyback scheme

4.9 The committee heard many times throughout the inquiry about the purchase of water from 'unwilling sellers', with witnesses arguing that they felt compelled to sell their water rights.

4.10 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, stated that water was only purchased from willing sellers, however sellers' financial situations may have influenced their decisions to sell their water:

What I am aware of is that during the drought period some farmers possibly sold water because of their financial circumstances. The water was quite valuable, so it was very important for maintaining their bottom line, and they may well feel that drought conditions required them to sell water—for a very good price, as the price was quite high in many places at the time.⁷

4.11 The committee heard that a number of those who had agreed to sell permanent water rights did so in the expectation that they would be able to purchase water on the temporary market at reasonable prices. It heard many complaints about the price of water and its impact on farm viability.

3 MDBA, *Submission 243*, p. 11.

4 MDBA, *Submission 243*, p. 11.

5 Department of the Environment, *Submission 50*, p. 6.

6 Department of the Environment, *Submission 50*, p. 6.

7 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 24.

4.12 The committee also received submissions from Northern Victorian submitters who felt that some farmers were ‘forced’ to sell entitlements due to the reconfiguration of irrigation schemes that left them with very high infrastructure costs due either to cost recovery or because there were few other irrigators remaining on the system. Some also claimed they were unable to receive their water entitlement even though it had not been sold.

Impact of buybacks

4.13 The committee heard evidence across the basin on the impact that sale of water had on communities and secondary industries, such as agricultural suppliers. In general, witnesses stated that buybacks reduced the size and scale of irrigation and farming, which meant there was less money in communities.

4.14 The committee heard about the enormous impact of the sale of water in the Condamine-Balonne catchment had on communities and farm suppliers. This was discussed in Chapter Three.

4.15 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, stated that negative impacts are associated with the movement of water:

The negative impacts are associated with where water moves from one region to another and you end up with stranded assets or supply lines that have different costs. The trade will go to those who can pay the most, and it generates adjustment in the region, which always has local economic and social consequences.⁸

4.16 Witnesses also spoke of declining populations in areas where buybacks occurred and particularly noted the 'Swiss cheese' effect of buybacks. The Department of Agriculture stated that this meant that some irrigation systems became unviable once a large proportion of the water in the system has been sold. Mr Thompson acknowledged that this has sometimes included pressure to sell water:

I am aware that changes in delivery arrangements meant that some farmers may have come under pressure to sell water or access to water as the price or the arrangements have changed.⁹

4.17 Former Victorian Water Minister, the Hon. Peter Walsh MLA stated in evidence that:

A lot of farmers have significant water bills because of that purchase of permanent water from the Commonwealth. They now face those water bills but do not have water to make an income and cannot afford to buy temporary water to do that. So that buying of water by the Commonwealth

8 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 26.

9 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 24.

has effectively undermined the viability of Goulburn Murray Water [the largest water distribution company in Australia] in the longer term.¹⁰

SDL adjustment mechanism

4.18 The Sustainable Diversion Limit (SDL) adjustment mechanism was included in the Plan at the request of state governments. The Plan provides for an SDL Adjustment Mechanism of 650GL (i.e. to reduce the amount recovered from consumptive use to 2100GL). The MDBA's submission states that the adjustment mechanism provides an opportunity to increase water extraction limits if environmental outcomes could be achieved with less water:

...there would be an opportunity to increase the water extraction limits in the Basin Plan if states could develop projects that can achieve equivalent environmental outcomes to the Basin Plan with less water ... This would mean less water would need to be recovered and would benefit irrigation industries and basin communities.¹¹

4.19 The Department of the Environment's submission stated that adjustments to the SDLs can be achieved through two methods: supply measures and efficiency measures. Supply measures may include environmental works, changes to river operations and evaporative savings.¹²

4.20 Various witnesses and both the NSW and Victorian governments emphasised that achievement of the full 650GL under the SDL Adjustment Mechanism is a vital part of the implementation of the Plan.

4.21 Currently the amount by which the SDL can be reduced (SDL Adjustment Mechanism) stands at 508GL, leaving a shortfall of 142GL if the 650GL target is to be achieved.

Recommendation 20

4.22 **The committee recommends that state governments make every effort to promote SDL Adjustment Mechanism projects in their jurisdiction to achieve the 650GL target.**

Recovery of additional 450GL

4.23 The committee heard from the Department of Environment who stated that:

Efficiency measures enable the recovery of an additional 450 GL of water for the environment. Both supply and efficiency measures are the responsibility of the basin state governments. Efficiency measures may include water recovery 'through works to infrastructure and better irrigation water use efficiency on farms'.¹³

10 The Hon. Peter Walsh MLA, Member for Murray Plains, Victoria, Committee Hansard, 5 November 2015, p. 66.

11 MDBA, *Submission 243*, p. 14.

12 Department of the Environment, *Submission 50*, p. 6.

13 Department of the Environment, *Submission 50*, pp 6–7.

4.24 Given current community concerns about the existing water recovery targets, some witnesses called for the recovery of the additional 450GL to be delayed until economic and social impacts of current water recovery, and the potential impacts of this additional recovery, have been assessed.

4.25 Mr Anderson, representing the Victorian Farmers Federation, stated that delay in recovering the additional 450GL is required to ensure a triple bottom line outcome is reached:

We have made it very clear that that needs putting off for a bit of time, because we have not really seen the full effect of the environmental outcomes from the water that we have already got and that has already been recovered.¹⁴

4.26 However, Mr David Parker, Deputy Secretary, Department of Agriculture and Water Resources, emphasised that the 450GL would primarily be aimed at 'infrastructure investment rather than buyback'.¹⁵

Committee view

4.27 The committee acknowledges that the aim of the Plan is to deliver economic, social and environmental outcomes in the basin. The committee does not dispute that the environment required more water in order to protect environmental values. The committee supports the principles of the Plan.

4.28 However, the committee notes the Plan was prepared during a severe drought and that many environmental indicators have improved since the drought broke. The committee considers that the economic, social and environmental impacts of the recovery volume already achieved should be assessed before any further recovery amount is determined or recovered.

4.29 In the same vein, the committee is of the view that the impacts of the SDL adjustment mechanism and the recovery of the additional 450GL should be assessed prior to any decisions being taken on whether these should proceed. The committee also considers that the apportionment of any further recovery, should it occur, should be equitably distributed between the basin states, taking into account contributions already made.

4.30 The committee also notes that some witnesses have stated that the modelled delivery of 2750GL to the environment within existing constraints is at odds with historical knowledge of river capacity. The committee urges MDBA to consult with local landholders when assessing river capacity to ensure that modelling matches historical knowledge.

14 Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, *Committee Hansard*, 6 November 2015, p. 23.

15 Mr David Parker, Deputy Secretary, Department of Agriculture and Water Resources, *Committee Hansard*, 5 February 2016, p. 31.

4.31 The committee is encouraged by the focus on engineering solutions to achieve better environmental outcomes with less water, and supports the recovery of water through infrastructure investment.

4.32 Accordingly, the committee urges further water recovery to come from infrastructure investment. Should recovery come from buybacks, the committee expects an assessment of the possible economic, social and environmental implications of such purchases should take place prior to the purchase occurring. In the event that negative outcomes would occur from water purchases, the committee expects that they would not proceed without further investigation, mitigation or compensation.

4.33 With regard to buybacks, as noted in the previous chapter, the committee unequivocally supports the rights of farmers to sell their water. However, the committee acknowledges the difficulty of balancing this right and the examples of the disproportionate social and economic impacts that uneven reductions in water availability have had on some communities.

4.34 The committee also would like to see a full investigation into involuntary loss of water to irrigators and supports measures that would return this water to irrigators.

Recommendation 21

4.35 The committee recommends that no further buybacks of water occur and that action to recover the additional 450GL of water through efficiency measures is delayed until the SDL Adjustment Mechanism target is met and the socio-economic impacts of water recovery to date are known.

Water trading market

4.36 At present, water trading in Australia occurs across several separate water markets, which are differentiated by water systems or administrative boundaries. Despite common perceptions of 'the water trading market' as a single entity, in reality there are a number of water trading platforms. Water can only be traded between connected systems; trade cannot occur between non-connected areas.

4.37 The Bureau of Meteorology's (BoM) website states that water rights and water trading fall into the jurisdiction of states, so each state has its own legislative and administrative arrangements for water rights and water trading.¹⁶

4.38 The BoM states that an efficient water market depends on clear water rights, the ability to undertake transactions, and access to relevant market information. The website states that this is a responsibility of state and territory governments:

Each State and Territory government has a water register for recording water access entitlements, including ownership details and transactions. Water trading relies on an efficient water register system in the same way that the property market relies on an efficient land titles register and the Australian Stock Exchange relies on an accurate share register. Efficient,

16 Bureau of Meteorology, <http://www.nationalwatermarket.gov.au/about/index.html> (accessed 1 March 2016).

accurate and comprehensive water registers are critical to a flourishing water market.¹⁷

4.39 The MDBA's submission to the inquiry noted that new water trading rules commenced in 2014 and were designed 'to improve the operation and transparency of the water market by removing barriers to trade and giving traders better access to market information, regardless of which state they operate in.'¹⁸

4.40 The submission also stated that there is an ongoing upward trend of participation in the water market, indicating that irrigators are adapting their behaviour to suit the system:

There is a continuing trend of an increasing number of people participating in the water market. This suggests more irrigators are adapting to the changing volumes of water in the market, rethinking planting decisions and being able to take a more informed approach to managing their business risks.¹⁹

4.41 Mr David Parker, Deputy Secretary, Department of Agriculture and Water Resources, stated that Australia's water market is 'very highly developed' by international standards and is one of the largest water markets in the world:

That is providing significant elements of investment strategy in the Australian water market and related agricultural markets. It has seen the expansion of some elements of agriculture in the basin because of that.²⁰

4.42 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture stated that Australia's water trading market is world-leading:

...internationally water trading is perceived as something that is an opportunity and an advantage and something that Australia has done very well. The security of rights that underpins water trading is important for investment security. In water security and water trading frameworks, Australia in many senses leads the world. We have had Californian irrigators out here recently trying to learn from Australia about how we allocate water.²¹

4.43 Mr Thompson stated that water trading gives irrigators flexibility throughout the year:

17 Bureau of Meteorology, <http://www.nationalwatermarket.gov.au/about/index.html> (accessed 1 March 2016).

18 MDBA, *Submission 243*, p. 13.

19 MDBA, *Submission 243*, p. 13.

20 Mr David Parker, Deputy Secretary, Department of Agriculture and Water Resources, *Committee Hansard*, 5 February 2016, p. 31.

21 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, pp 23–24.

Water trading is something that irrigators do voluntarily, and they can take advantage of temporary trades to access water when they need it without having to spend capital money. They can also use it to trade water when they perhaps will not have enough and the price is high and they can use it to do other things.²²

4.44 Mr Peter Gooday, Assistant Secretary, Farm Analysis and Biosecurity Branch, Australian Bureau of Agricultural and Resource Economics and Science, Department of Agriculture, added that water trading had enabled irrigators and other landholders to manage the basin's variable inflows:

The water trading system that we have has allowed irrigators to maintain the value of production surprisingly well during the ups and downs, through water being able to be traded towards higher-value uses. In terms of being able to respond to climate variability, the water trading system has been particularly important.²³

4.45 Mr Gooday added that a freer trading system was better than one with significant constraints:

Probably the main advance that we have had has been to free up water markets and I am sure that all irrigators would say that it is much better to have a system of entitlements and allocations that are freely tradeable that maximises their value than one that has all sorts of constraints.²⁴

4.46 As mentioned in Chapter Two, the Water Act legislated for the ACCC to develop and enforce water charge and water market rules.

4.47 On 24 November 2015, the ACCC released draft advice on amendments to the Commonwealth water charge rules to increase transparency, promote efficiency and reduce regulatory burden. These rules regulate the charges imposed on rural water users in the basin and have been in place for five years. The government asked the ACCC to conduct a review of these rules in December 2014, following a recommendation of the 2014 Independent Review of the Water Act.²⁵

4.48 Two primary concerns were raised by witnesses with regard to water trading. The first was that water trading in the basin is not clear and transparent. The second is that market volatility is detrimental to irrigators and primary producers. The

22 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, pp 23–24.

23 Mr Peter Gooday, Assistant Secretary, Farm Analysis and Biosecurity Branch, Australian Bureau of Agricultural and Resource Economics and Science, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 24.

24 Mr Peter Gooday, Assistant Secretary, Farm Analysis and Biosecurity Branch, Australian Bureau of Agricultural and Resource Economics and Science, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 24.

25 ACCC, <http://www.accc.gov.au/media-release/accc%E2%80%99s-draft-advice-on-water-charge-rules-to-increase-transparency-promote-efficiency-and-reduce-regulatory-burden> (accessed 1 March 2016).

committee heard evidence on both these points, particularly in Griffith and Echuca, near significant irrigation communities.

Transparency of water trading market

4.49 With regard to a lack of clear and transparent information surrounding the water market, the committee heard that it is difficult to find information on who is trading what volume of water. In Griffith, Mrs Helen Dalton, President, New South Wales Farmers Griffith District Council and Branch, stated that a lack of a national water register meant that she was unsure who was purchasing water:

We do not actually know who is buying what, because there is no national water register, and that needs to be addressed straight off.²⁶

4.50 In Echuca, Cr Leigh Wilson, Mayor, Campaspe Shire Council, stated that there was inadequate information for his organisation to make an informed decision on current water trading practices and how it might be improved:

We would have liked to have been able to discuss speculative trading in some depth, but unfortunately there is no information available to be able to make an informed decision.²⁷

4.51 Mr Stuart Brown, Milk Supply Manager, Tatura Milk Industries, also stated that there are also some trade restrictions in the southern connected basin which impede free trade of water, and called for fairer trading rules:

There are a number of trade restrictions, including the Murrumbidgee restrictions and the Barmah Choke restrictions, that have resulted in the majority of temporary trade coming out of the Goulburn system. These trading rules must be unimpeded, fair and equitable.²⁸

Volatility of the market

4.52 The volatility of the market was a key point of concern for many witnesses. Cr John Dal Broi, Mayor, Griffith City Council, stated that the price of water has increased significantly from when trading was first introduced:

...when trading was first introduced, you could purchase water for \$10 a megalitre—insignificant. We have seen it rise exponentially to this year anything from \$200 to \$350; it depends which valley you are in.²⁹

4.53 Cr Dal Broi noted that once water reaches such high levels, farmers must make decisions about what crops to plant, or whether to plant a crop at all:

26 Mrs Helen Dalton, President, New South Wales Farmers Griffith District Council and Branch, *Committee Hansard*, 27 October 2015, p. 50.

27 Cr Leigh Wilson, Mayor, Campaspe Shire Council, *Committee Hansard*, 5 November 2015, p. 1.

28 Mr Stuart Brown, Milk Supply Manager, Tatura Milk Industries, *Committee Hansard*, 6 November 2016, p. 21.

29 Cr John Dal Broi, Mayor, Griffith City Council, *Committee Hansard*, 27 October 2015, p. 10.

At \$40 to \$50 a megalitre, irrigators can live with it. A lot of the issues are whether you can afford to purchase water, trade water and grow a whole crop. ...With the way the water is, you would be working for nothing; you would not start your tractor. I have growers who are coming to me and saying: 'I have 300 megalitres left on my account, what will I do? Turn around and buy another 300 megalitres to grow a crop? Or do I sell 300 megalitres, get \$200/\$250 a megalitre for it, sit on my hands, not grow a crop, not start a tractor, not burn diesel and not wear tyres out?'³⁰

4.54 Similarly, Mr John Bradford, Delegate, Southern Riverina Irrigators, argued that volatility on the water trading market was 'wrecking families', and that external influence in the market would make this worse:

Well you have families, you are wrecking families. The thing is we have come from community farming, the issues that we see—

...We are individual landholders. We are not corporate farmers, we never have been. We are getting to the stage that we are getting bigger. The understanding that you are saying, is that it is a true market—³¹

4.55 Mr David Parker, Department of Agriculture and Water Resources, stated that there was an element of risk in selling permanent water entitlements and planning to purchase water from the temporary water market. Mr Parker noted that in some instances this would be beneficial to the irrigators, however in others it would be detrimental:

In terms of irrigators who sold earlier entitlements, it could be observed that those irrigators who did that would have done very well during the period when water was abundant, in the last several years before the recent dry period, when allocations were in the tens of dollars per megalitre.³²

4.56 Mr Parker acknowledged that the main factor driving water prices in recent times has been the availability (i.e. supply) of water. Mr Parker noted that one would expect the CEWH to have some effect on the market in principle, but other price fluctuations reflect seasonal patterns:

Notwithstanding that, the moves in water market prices are not out of line with shifts in water prices that we have seen. As you, I think, implicitly mentioned, water prices have declined since November also. That is a fairly typical seasonal pattern. You reach a peak earlier in the year, particularly around planting time, and we have seen that. The prices are also not out of line with prices that we have seen in earlier dry periods.³³

30 Cr John Dal Broi, Mayor, Griffith City Council, *Committee Hansard*, 27 October 2015, p. 10.

31 Mr John Bradford, Delegate, Southern Riverina Irrigators, *Committee Hansard*, 5 November 2015, p. 41.

32 Mr David Parker, Deputy Secretary, Department of Agriculture and Water Resources, *Committee Hansard*, 5 February 2016, p. 31.

33 Mr David Parker, Deputy Secretary, Department of Agriculture and Water Resources, *Committee Hansard*, 5 February 2016, p. 31.

Suggested changes to water trading

4.57 Witnesses offered various suggestions for improving water trading in the basin, particularly with regard to simplifying the water market and improving transparency and accountability.

4.58 In Echuca, Mr John Bradford, Delegate, Southern Riverina Irrigators, outlined one option whereby water could only be traded a limited number of times, to reduce speculation on price and limit purchases by non-water users:

One suggestion could be that you tag that water and that it can only be traded two or three times. Each time it gets traded it gets a dot. Some of that water comes out looking like measles because it gets bought back and forth. You have people in Melbourne who have the ability to get an account with Murray irrigation and trade water and speculate. Anyone can have an account.³⁴

4.59 In Shepparton, Mr Jeff Odgers, Director, Bega Cheese, suggested an even playing field was required between different irrigation regions:

I think the first thing that we would do would be to make it an even playing field between irrigation regions and states. What is really hurting the Goulburn district in particular is that the water can be traded freely downstream. So our high-reliability water has been raided to a large extent by other interests.³⁵

4.60 Witnesses also noted that there are different water registers in each state. The committee notes that basin states do have separate water registers, which provide public access to information about water licencing and trading. Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, compared this to a land titles register:

The water register holds the details of their entitlements and who they are held by. It is no different to a land titles register in terms of who owns the entitlement. Any temporary or permanent movements in trade go through that register. Unbundling, which has been mentioned, has basically made water a property right in perpetuity. You deal in water shares the same as you deal with land and other commodities.³⁶

4.61 Mr Anderson noted that all the states and territories' registers need to be compatible.³⁷

4.62 Given the complexity of the current system, witnesses consistently advocated the consolidation of water trading platforms into a single national platform. Mr

34 Mr John Bradford, Delegate, Southern Riverina Irrigators, *Committee Hansard*, 5 November 2015, p. 41.

35 Mr Jeff Odgers, Director, Bega Cheese, *Committee Hansard*, 6 November 2015, p. 28.

36 Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, *Committee Hansard*, 6 November 2015, pp 28–29.

37 Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, *Committee Hansard*, 6 November 2015, p. 28.

Anderson suggested that a national platform for water trading would ensure transparency and accountability:

Our position has always been that there should be a national trading platform. All brokers are brokers to the exchange.³⁸

4.63 Mr John Brady, CEO, Kagome Australia, also called for the creation of a single national market:

We are looking for one market: transparent, ASX regulated, an ACCC set-up—whatever you guys come up with, but we need something that people can rely on and can trust.³⁹

4.64 Mr Brady stated that this would enable visibility of the amount of water for sale, and what is being traded, and argued that this would have an impact on price:

...a centralised system that would at least make it more transparent to see what is available, potentially, for trade and what is being traded, I believe, simply because of the fact that it is centralised, would actually relieve the system—so much so that prices would come down.⁴⁰

4.65 Mr Brady noted that this would also provide more clarity on who was trading significant volumes of water:

...you see directors' sales and purchases; you would see, also, who the megatraders are and who has actually taken megatrades off the market and put them on the market. That would help, I think. It would help give a lot more transparency around who the larger players are and stop a lot of the peripheral noise around this issue.⁴¹

4.66 The National Farmers Federation advocated improving transparency in the water market, improving people's understanding of the market and providing up-to-date information about the market. Ms Jacqueline Knowles, Natural Resources Management Manager, NFF, stated that developing the skills and capabilities of farmers would enable them to better use the water market:

...there is an opportunity to develop the skills and sophistication of many farmers in the basin so that they can develop the capacity and the capability to best utilise the water market for their own situation. That is a costly and expensive process that, to date, has largely fallen on industry associations—like it has on the members of NFF. There is a skills and capability gap that can mean that people can better understand and appreciate the benefits that the market emerging can bring.⁴²

38 Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, *Committee Hansard*, 6 November 2015, p. 28.

39 Mr John Brady, CEO, Kagome Australia, *Committee Hansard*, 5 November 2015, p. 22.

40 Mr John Brady, CEO, Kagome Australia, *Committee Hansard*, 5 November 2015, p. 22.

41 Mr John Brady, CEO, Kagome Australia, *Committee Hansard*, 5 November 2015, pp 27–28.

42 Ms Jacqueline Knowles, Natural Resources Management Manager, National Farmers' Federation, *Committee Hansard*, 5 February 2016, pp. 27–28.

4.67 Further, Ms Knowles urged caution with 'over-engineering' the market into a national trading platform:

What we have seen in the market—this summer in particular—is that a fall of rain or a voice of confidence or no confidence in the local press has seen, for example, the market spike at an hourly or daily rate. What we need to be cautious of is over-engineering an ASX-like stock exchange. The total value of the water market and the total likely value of the water market is never going to be anything like the ASX, so we need to be cautious about how we proceed with that.⁴³

Speculation

4.68 The committee heard comments at hearings across the basin about speculative traders and water prices being influenced by entities that held and traded water but did not use it.

4.69 At its final hearing, the committee heard from Waterfind, a water trading company, which stated that there are no 'water barons' holding water or influencing prices.

4.70 Mr Thomas Rooney, President of Waterfind Pty Ltd, agreed that there are speculators in the market and stated that these speculators had a positive influence on the market by stabilising pricing:

There are speculators in the market. It is growing. The speculation in the market is growing. There is an increased quantity of people who are buying water rights as a pure investment instrument, and it is actually servicing the market. It is actually stabilising the pricing in the market.⁴⁴

4.71 With regard to evidence heard about speculators in the market, Mr Alister Walsh, Chief Executive Officer, Waterfind stated that the largest speculators are actually irrigators, who buy, hold and sell water for productive use:

We would say that the largest speculators in the market are irrigators themselves. By far the largest volumes are still held by irrigators for productive outcomes. They are using the market as and when it suits to engage and sell and buy water for their engagement. The other factor is that the underlying capacity for an irrigator to pay for water is based on the commodity and their output.⁴⁵

4.72 Mr Walsh stated that the Commonwealth is the only entity that can really impact the market overall as it uses, holds and trades a much more significant volume of water compared to other traders:

43 Ms Jacqueline Knowles, Natural Resources Management Manager, National Farmers' Federation, *Committee Hansard*, 5 February 2016, pp. 27–28.

44 Mr Thomas Rooney, President, Waterfind Pty Ltd, *Committee Hansard*, 5 February 2016, p. 7.

45 Mr Alister Walsh, Chief Executive Officer, Waterfind Pty Ltd, *Committee Hansard*, 5 February 2016, p. 7.

Regardless of who owns the water, there is not a capability, apart from the Commonwealth, for somebody to have the sort of volume that impacts on the market, because it is quite spread and diverse—⁴⁶

Foreign ownership of water

4.73 With regard to foreign ownership of water and foreign influences in the water trading market, the committee heard concerns from witnesses regarding the potential for foreign ownership of water and the implications this may have for the water market.

4.74 Although there was no definitive evidence on the level of foreign ownership or trade in water, this concern was expressed throughout the basin. For example, Mr Paul Pierotti, President, Griffith Business Chamber, stated that it is assumed that there are foreign interests involved in the water market:

We can assume that that is the case because we have major investment portfolios that are playing into the market. Those major investment portfolios are international portfolios so we can assume that there is. I do not think that it is on a grand scale at this point in time but the fear is that with the limited resource that we have, and the value of that resource, someone could ultimately buy the entire amount.⁴⁷

4.75 Mr Pierotti stated that although this is not a significant issue now, it has the potential to become a major national issue:

There is no restriction on that so there is a huge risk to the nation because for us that is a lot of money but for a number of other countries it is not a drop in the ocean. And if you could control a resource like that you could control that nation.⁴⁸

4.76 A representative of the Department of Agriculture stated at the committee's first public hearing in September 2015 that the government did not have a register of foreign-owned water.⁴⁹

4.77 On 22 February, the Minister for Agriculture and Water Resources, the Hon Barnaby Joyce, issued a media release announcing the release of a consultation paper as a preliminary step to establishing a register of foreign ownership of water access entitlements.⁵⁰

46 Mr Alister Walsh, Chief Executive Officer, Waterfind Pty Ltd, *Committee Hansard*, 5 February 2016, p. 7.

47 Mr Paul Pierotti, President, Griffith Business Chamber, *Committee Hansard*, 27 October 2015, p. 13.

48 Mr Paul Pierotti, President, Griffith Business Chamber, *Committee Hansard*, 27 October 2015, p. 13.

49 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 26.

50 The Hon. Barnaby Joyce MP, Deputy Prime Minister and Minister for Agriculture and Water Resources, <http://minister.agriculture.gov.au/joyce/Pages/Media-Releases/foreign-ownership-of-water-entitlements.aspx> (accessed 26 February 2016).

4.78 The media release stated that the register would 'give greater oversight of the ownership of Australian water assets' and legislation to enact the register would be introduced by 1 December 2016.⁵¹

Committee view

4.79 The committee notes the complexity of the present multiple water markets and the concerns that witnesses have about the transparency and accountability of these markets. The committee also notes that states and territories provide water registers and detail on water trading, although it appears that some in the community are unaware of the information available in these formats.

4.80 The committee notes the historic and logical reasons for state and local water markets. However the committee is of the view that a single consolidated water market, with appropriate constraints on trade between non-connected areas, would provide a simpler and fairer trading system as it would enable buyers and sellers to view a transparent, live market and gain their information from a central system. Given this, the committee is of the view that consideration be given to a basin-wide or national water trading platform, comparable to the ASX.

Recommendation 22

4.81 The committee recommends that the government investigate the costs and benefits of a real-time national water trading register, and whether private platforms provide or can complement such arrangements.

4.82 Regardless, although the committee understands the frustrations of farmers with regard to non-water users trading water, the committee is of the view that restrictions on who can purchase and sell water would undermine Australia's fair trading policies. The committee unequivocally supports an unrestricted market.

4.83 The committee is heartened by evidence that water speculation is not a significant issue, but remains concerned about the potential for market manipulation and speculative trading. The committee would support the promotion of measures that increase market transparency.

4.84 The committee considers that further work should be done on possible measures to increase market transparency. This work could include assessing the following possibilities:

- licencing traders/brokers;
- preventing traders/brokers from receiving commissions from both buyers and sellers in the same transaction; and
- ensuring market speculators and water users pay the same charge (for instance, storage, infrastructure, delivery and other costs are paid by both

51 The Hon. Barnaby Joyce MP, Deputy Prime Minister and Minister for Agriculture and Water Resources, <http://minister.agriculture.gov.au/joyce/Pages/Media-Releases/foreign-ownership-of-water-entitlements.aspx> (accessed 26 February 2016).

irrigators and speculators regardless of whether or how the water is to be used).

4.85 The committee does not share witnesses' concerns about the foreign ownership of water but does not necessarily reject the government's moves to establish a register of foreign ownership of water access entitlements.

Carryover

4.86 Carryover refers to a provision that enables water holders to carry over their allocations from one year to the next. Water allocations are a state responsibility; similarly, carryover provisions are also determined by states.

4.87 The MDBA's submission reiterated that water entitlements and allocations are set by the states and that some types of entitlement permit the carryover of water from one year to the next:

Each allocation announcement tells water entitlement holders how much of their entitlement they're allowed to take from the system over the course of the year. Where such a provision is available, irrigators can choose to carryover their allocations, as can state and Commonwealth environmental water holders.⁵²

4.88 Carryover rules change over time, and can and do differ between and within states. In Victoria, for example, carryover rules vary according to the water system, with the smaller water systems such as the Broken, Loddon, Bullarook and Werribee systems being subject to different rules from the larger, regulated systems such as the Murray, Goulburn and Campaspe systems.⁵³

4.89 During the inquiry, carryover was particularly discussed in the Southern Basin. In Echuca, witnesses compared the Victorian and NSW carryover systems.

4.90 Mr Guy Duncan, speaking in a private capacity, explained the Victorian system for water allocations and carryover provisions:

You can carry over up to 100 per cent of your allocation, and once you are allocated it, next year it falls out the other side unless you have low-reliability water, which is something that has been paid for in tariff for the last 15 years and has never been allocated. That low reliability is effectively airspace in the dam for that megalitre, so you are paying a storage tariff on that, and that is where it goes into.⁵⁴

4.91 However, Mr Duncan noted that as Victoria's allocations were historically highly reliable, carryover was less of an issue in the past.

4.92 On the other hand, Mr Eagle told the committee that the carryover system in NSW on the Murray system was initially trialled on a 10 per cent carryover basis, with

52 MDBA, *Submission 243*, p. 20.

53 Victorian Water Register, <http://waterregister.vic.gov.au/water-entitlements/carryover/carryover-rules> (accessed 1 March 2016).

54 Mr Guy Duncan, private capacity, *Committee Hansard*, 5 November 2015, p. 63.

the condition that carryover water 'was the first water lost when Hume pre-released or spilt.' Mr Eagle stated that this meant that carryover water did not take up dam space:

After a year or two, the irrigators realised that it did not take up dam space, provided it was the first water lost. Then it really does not matter a stuff whether it is 100 per cent carryover that is enabled or 10 per cent or 15 per cent or 30 per cent— provided, if the dam pre-releases or spills, it is the first water lost.⁵⁵

4.93 Mr Eagle noted that there are current discussions about a cap as some water holders now do not want carryover to be the first water lost in the event of spillage.⁵⁶

Impact of carryover for agriculture, irrigation and the environment

4.94 Witnesses had various views on carryover. Mr Duncan noted that carryover enabled farmers to have more flexibility in the way they managed their water:

...a lot of it comes back to the individual farmer's financial position, their level of equity, the level of risk they are exposed to and how much they are prepared to gamble on what they are going to hold in and hold out, or whether they buy to carry over at the end of the season.⁵⁷

4.95 However, Mr Duncan acknowledged that there was a wide variety of opinions and was of the view that generally, Victorian irrigators do not like carryover nor do they want the carryover system.⁵⁸

4.96 Mr Rob Rendell, private capacity, stated that carryover has helped people in some instances in Victoria:

It is interesting to see that in Victoria the introduction of carryover has helped individuals, but during the four years of the drought we actually saw about 800 gigalitres taken out by individuals to be collectively used.⁵⁹

4.97 However, Mr Rendell noted that in wet periods, carryover from earlier dry periods was spilled:

Unfortunately, for carryover people, in 2011-12 and 2012-13 we got a wet period where the water that was accumulated in the drought actually spilt and the environment got the benefit of it. So carryover is helping individuals, but, as a result of carryover, we actually have more spills. Carryover means we keep the dams fuller most of the time, which increases the spills.⁶⁰

4.98 In Victoria, Mr Rendell noted that in Victoria this has led to more water for the environment from spills:

55 Mr Neil Eagle, private capacity, *Committee Hansard*, 5 November 2015, p. 59.

56 Mr Neil Eagle, private capacity, *Committee Hansard*, 5 November 2015, p. 59.

57 Mr Guy Duncan, private capacity, *Committee Hansard*, 5 November 2015, p. 63.

58 Mr Guy Duncan, private capacity, *Committee Hansard*, 5 November 2015, p. 63.

59 Mr Robert Rendell, private capacity, *Committee Hansard*, 5 February 2016, p. 10.

60 Mr Robert Rendell, private capacity, *Committee Hansard*, 5 February 2016, p. 10.

One of the things in Victoria is that, as a result of carryover, which is great and it is an important tool, the environment has had more water from spills, which has not been recognised.⁶¹

4.99 The committee heard further evidence that carryover was a system that meant more water was tied up in storage instead of being used for productive or environmental purposes. Mr John Bradford, Delegate, Southern Riverina Irrigators, stated that this meant that water could not be used for productive use. Mr Bradford outlined a possible compromise whereby environmental water could have been borrowed for productive use then returned later:

Earlier this year, the Hume Dam was at 44 per cent and Dartmouth was at 68 per cent. A lot of that was carryover environmental water. We had magnificent crops; we have had the best year in 40 years. If we could have had some access negotiated and had a bit of ability to trade with the environmental water holder, we could have borrowed that water, watered the crop, made a lot of money for the community with what would have flowed through, and then paid it back later. But our hands are tied, and they do not understand that.⁶²

4.100 Mr John Brady, CEO, Kagome Australia, stated that the carryover system was unfair and required reform as the carryover proportion is not standard across all entitlement holders:

...we need a review of the whole carryover process. Some people have 100 per cent, some people have 10 per cent. It is not fair. It was not designed that way originally. The carryover process was to stop people wasting water, but it is not working that way.⁶³

4.101 Furthermore, Mr Duncan and Mr Eagle were of the opinion that the first water that spilled out of a dam should be environmental water and not water that impacted on entitlements for irrigation or urban supply. Mr Duncan argued that the current situation was inequitable:

...as far as banking against what the value is going to be in the use of the carryover for speculation and the holding up of valuable airspace in the dam—if you are going to do that, well, the first water that spills over the dam when the spill happens should be environmental water, because it is only going one place, and that is down the river. It should not be taken off irrigator or urban entitlements. It is a ridiculous proposition. If the water spills into the river, it is in the river. The river is the environment. That is its first allocation—whatever spills over that dam wall.⁶⁴

4.102 Mr Eagle agreed, stating that the CEWH holds a significant volume of water that is protected against spillage:

61 Mr Robert Rendell, private capacity, *Committee Hansard*, 5 February 2016, p. 10.

62 Mr John Bradford, Delegate, Southern Riverina Irrigators, *Committee Hansard*, 5 November 2015, p. 50.

63 Mr John Brady, CEO, Kagome Australia, *Committee Hansard*, 5 November 2015, p. 22.

64 Mr Guy Duncan, private capacity, *Committee Hansard*, 5 November 2015, p. 59.

...they are the biggest water holder. If they are sitting on a large amount of water and the dam pre-releases and spills, that water has not been lost. So it is taking up dam space now. It has become a very real issue as far as restricting the possibility of increases in allocation in any given year is concerned.⁶⁵

4.103 However, the Victorian Farmers Federation (VFF) provided responses to questions on notice that stated that the Victorian system of carryover was appropriate for the system:

The northern Victorian carryover model is based on the capacity in northern Victorian storages and the volume of entitlements issued. This methodology supports our strong water security and reliability regime. In Victoria high security water has enabled permanent plantings and high return dairying to be established.⁶⁶

4.104 Given this, the VFF was of the view that the Victorian carryover system did not require amendment:

The VFF does not believe that the Victorian carryover system needs to be changed.⁶⁷

4.105 The VFF noted that NSW carryover rules differed due to the different circumstances in that state:

NSW carryover rules are different because they have different storage capacity and have over-allocated volume of entitlements. In NSW general security water supports annual opportunistic crops like rice and cotton.⁶⁸

Carryover by the CEWH

4.106 As evidenced above, carryover of environmental water was a matter of some discontent among witnesses. At the committee's final hearing, Mr Papps reported that the CEWH is subject to the same 'carryover rules and regulations that apply to various entitlements across the basin', that is, Commonwealth water entitlements are treated exactly the same as water entitlements held by others.⁶⁹

4.107 The CEWH's submission stated that the volume of Commonwealth environmental water was a small percentage of the water stored in the basin:

65 Mr Neil Eagle, private capacity, *Committee Hansard*, 5 November 2015, p. 59.

66 Victorian Farmers Federation, responses to questions on notice, received 11 December 2015, p. 2.

67 Victorian Farmers Federation, responses to questions on notice, received 11 December 2015, p. 3.

68 Victorian Farmers Federation, responses to questions on notice, received 11 December 2015, p. 3.

69 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 35.

The volume of Commonwealth environmental water carried over into 2015–16 was the equivalent of approximately 2 percent of public storage capacity in the Basin.⁷⁰

4.108 Further, Mr Papps stated that changing the carryover entitlements for the CEWH would be 'demonstrably a very bad idea'.⁷¹ Mr Papps stated that even though carryover provisions were originally developed for irrigators, he considered they were of great benefit to the CEWH. Mr Papps explained that they were a mechanism for enabling the best use of environmental water:

They are a very important mechanism that enables us to manipulate the use of environmental water to get the most effective and efficient use of that water. Irrigators say to me very often, quite properly, that in the same way they are driven constantly to look for more effective and efficient ways to produce their crops, I should also be driven to find more effective and efficient ways to utilise environmental water, and I am. We are constantly exploring those mechanisms.⁷²

4.109 Mr Papps explained that carryover enabled the CEWH to produce greater environmental outcomes by providing flexibility in the timing and volume of water delivered for environmental events:

Carryover is one of those. It gives us an opportunity to do things that we would not otherwise be able to do that produce significant ecological results. ...[in one example] we were able to utilise carryover water to provide early season watering—that is, to replicate winter flows—as an enormous ecological benefit. It is a great way to make effective use of environmental water.⁷³

Committee view

4.110 The committee acknowledges that carryover is a complex area and one that falls within the jurisdiction of the basin state governments. Indeed, there was some confusion among witnesses about the specific rules that governed carryover, and the ability of the CEWH to carry over water. As such, the committee is of the view that a discussion about carryover would clarify the current situation in each state and pave the way for potential future streamlining of carryover throughout the basin.

4.111 The committee considers that such discussions might include the following items:

- the impact that carryover has on allocation for the following year;

70 CEWH, *Submission 45*, p. 2.

71 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 35.

72 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 35.

73 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 35.

- the implications of only allowing water users (environmental water holders and irrigators) to have the ability to carry over water, and a possible limit on their carryover amount as a percentage of their allocation; and
- the rules regarding spillage from dams and storages and the classification of this water as environmental water.

Recommendation 23

4.112 The committee recommends that the government coordinate with the basin state governments to undertake a comprehensive assessment of carryover rules and regulations and investigate the potential for amendment of the rules.

Value of water

4.113 Water is valued in different ways by different people. In addition to the value of water across the basin for agriculture, irrigation and food processing, the committee also heard evidence about water's value for recreation, tourism, ecology and the environment. Most of this evidence noted the necessity of meeting multiple outcomes from water use, demonstrating that water is valued for a variety of uses, often concurrently. This section shares some of the different viewpoints heard throughout the inquiry on the value of water.

4.114 In Echuca, Mr Roger Knight, Farmer/Managing Farmer, Nyton Park Agriculture spoke of the value of water to the environment:

On water relocation impacts, the Basin Plan, as you are well aware, aims to increase additional water flows for the connection of rivers and the flood plain, which will help native vegetation, water bird breeding and native fish numbers.⁷⁴

4.115 However, Mr Knight noted that positive activities may also have unintentional 'negative environmental impacts when water is removed from the agricultural landscape.'⁷⁵ Mr Knight spoke of a balancing act required to enable complementary benefits for industry and the environment:

However, these aims need to be balanced against negative environmental impacts when water is removed from the agricultural landscape. It is not going to be all positives; they need to be balanced—no need robbing Peter to pay Paul, so to speak, especially when there are opportunities for complementary benefits for improving both productive and environmental outcomes, a win-win for nature and production.⁷⁶

74 Mr Roger Knight, Farmer/Managing Farmer, Nyton Park Agriculture, *Committee Hansard*, 5 November 2015, p. 24.

75 Mr Roger Knight, Farmer/Managing Farmer, Nyton Park Agriculture, *Committee Hansard*, 5 November 2015, p. 24.

76 Mr Roger Knight, Farmer/Managing Farmer, Nyton Park Agriculture, *Committee Hansard*, 5 November 2015, p.24.

4.116 In Broken Hill, witnesses spoke of the importance of the Darling River and the Menindee Lakes for multiple needs. Mr Christopher Rawlins, private capacity, emphasised the importance of the lakes as a water source and for other uses:

The importance to the region of the Darling River and the lakes system is of immense tourism value and environmental importance and as a recreational venue. There are thousands of years of history and connection between the Aboriginal community and the rivers and lakes.⁷⁷

4.117 In Griffith, Cr Mark Hall, Councillor, Lachlan Shire Council, stated that Lake Cargelligo, which is a wetlands and lakes system near the Lachlan River, is also valued for multiple reasons:

...it was the most significant water fowl and bird wildlife refuge habitat during the millennium drought. ...It has been used for thousands of years by our local brothers and sisters, the Wiradjuri tribe. We want to have that system there. We want to have it as a healthy wetlands system for the environment. We need it for tourism. We need the water assurance for our towns.⁷⁸

4.118 Cr Hall was strongly critical of the absence from the Plan of a watering plan for Lake Cargelligo and a commitment to maintain its various uses.

4.119 The rivers of the basin and the Murray River in particular, also have significant tourism value. In South Australia, Mrs Sharon Starick, Presiding Member, South Australian Murray-Darling Basin Natural Resources Management Board, spoke of the \$7.3m houseboat industry directly tied to the river, and the \$200m tourism industry, supported in part by the river.⁷⁹

4.120 Ms Anne Hartnett, Chairman of both the River Lakes and Coorong Action Group and the Point Sturt and Districts Landcare Group, outlined the importance of a healthy river to ensure tourism:

Potentially, the river has a huge opportunity for tourism but, in its degraded state, it is not going to capitalise on that. If more could be put into making sure that the river banks were more amenable to tourism, then a lot of these dying towns along the river would be much better off...⁸⁰

4.121 Councillor Kevin Myers, Spokesperson, Murray Mallee Local Government Association, referred in particular to the town of Morgan, stating that a healthy river improved people's spirits as well as increasing tourism:

77 Mr Christopher Rawlins, private capacity, *Committee Hansard*, 26 October 2015, p. 23.

78 Cr Mark Hall, Councillor, E Ward, Lachlan Shire Council, *Committee Hansard*, 27 October 2015, p. 5.

79 Mrs Sharon Starick, Presiding Member, South Australian Murray-Darling Basin Natural Resources Management Board, *Committee Hansard*, 9 December 2015, p. 31.

80 Ms Anne Hartnett, Chairman, River Lakes and Coorong Action Group, and Chairman, Point Sturt and Districts Landcare Group Inc., *Committee Hansard*, 8 December 2015, p. 36.

Yes, and I think it goes a little bit further than that, because 10 kilometres away from me is a town called Morgan, which, in the summertime, relies heavily on tourism. Without a clean river, there is no tourism.⁸¹

4.122 Furthermore, in Goolwa, Ms Margaret Gambling argued that water is worth 'everything'. Ms Gambling stated that the water that has returned to Lake Albert has multiple environmental, ecological and human value, and that it is impossible to give this a dollar value:

The water is back in the lake. What is it worth? It is not worth so many billion dollars. It is worth frogs, fish, birds, waves, a reflection of a sunset—it is worth everything. You cannot put a price on water. You cannot put a price on this environment. It is ever changing. We are the driest state and the driest continent on Earth.⁸²

Committee view

4.123 The committee is of the view that the value of water should be assessed in a more scientific and economic manner, and that priority should be given to the user who values it most or the sequence of uses which gains the most value from the water overall. However, the committee is cognisant that it would be difficult for all basin water users to agree on who values water most and what the most efficient and effective water uses are.

4.124 Despite the difficulty in determining the most valuable uses for water, the committee is of the view that it would be useful for water management purposes to calculate the value of water in various situations, including water in storage, evaporated, used for irrigation or agriculture, and used for the environment. This information would enable more informed decision-making about how water can be best used.

Recommendation 24

4.125 The committee recommends the government assess, objectively value and publish data on the various uses of water in the Murray-Darling Basin.

Optimising economic, social and environmental outcomes equally

4.126 One of the objects of the Water Act states that the use and management of basin water resources should occur in a way that 'optimises economic, social and environmental outcomes'.⁸³ The Act underpinned the development of the Plan and the management of the basin's water resources.

4.127 During the first public hearing, Dr Rhondda Dickson, then Chief Executive of MDBA, clearly stated that the objectives of the Plan equally focus on economic, social and environmental outcomes:

81 Cr Kevin Myers, Spokesperson, Murray Mallee Local Government Association, *Committee Hansard*, 9 December 2015, p. 3.

82 Ms Margaret Gambling, private capacity, *Committee Hansard*, 8 December 2015, p. 31.

83 Section 3(c), Water Act 2007.

The objectives in the Basin Plan, which should set out fairly clearly for you that it is a triple-bottom line, are about productive and resilient communities, about productive industries and about a restored and more functioning environment. So it genuinely is a triple-bottom-line plan.⁸⁴

4.128 Officials from the then Department of Agriculture stated at the committee's first hearing that the Plan is a major part of the federal government's water reform agenda. Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, stated that the Plan is focused on economic, social and environmental outcomes:

...it is aimed at economically efficient water use and sustainable resource management to maximise the triple bottom line for economics, social outcomes and the environment.⁸⁵

4.129 Mr Thompson agreed that the economic and social aspects of water recovery and the Plan are important, and should be considered equally with the environmental aspects:

The department believes that the socioeconomic aspects of water recovery are important and that it is essential that the implementation of the plan continues to adopt a triple bottom line approach for irrigators, basin communities, other affected stakeholders and the environment.⁸⁶

4.130 However, Mr Thompson acknowledged that some stakeholders remain concerned about the impacts of water recovery and the future of irrigation:

...farmer stakeholders remain concerned about the economic and social impacts of water recovery to date and in the future for irrigators and irrigation dependent communities throughout the basin. In this context it is very important that future water recovery continues to seek to optimise social and economic outcomes and demonstrate the environmental improvements that they are aimed at.⁸⁷

Economic and social impacts of the Plan

4.131 Indeed, many submissions and witnesses argued that environmental outcomes were being prioritised above social and economic impacts, and particularly gave personal perspectives on negative economic and/or social impacts as a result of the Plan.

4.132 Mr John Lolicato, Chairman, Murray Valley Private Diverters, stated that the Plan has a triple bottom line aim though the primary focus is on the environment:

84 Dr Rhondda Dickson, Chief Executive, MDBA, *Committee Hansard*, 18 September 2015, p. 7.

85 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 23.

86 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 23.

87 Mr Ian Thompson, First Assistant Secretary, Sustainable Agriculture and Fisheries Division, Department of Agriculture, *Committee Hansard*, 18 September 2015, p. 23.

While there has always been ambiguity and debates surrounding a balanced triple bottom line, the evidence is stark: the environment has primacy over social and economic considerations. This is confirmed by the fact that with the huge amount of taxpayers' dollars being spent on the majority of the valuation and monitoring of the various projects under the Basin Plan, the reporting focuses on the benefits to the environment and the negatives and the benefit-cost ratios are virtually ignored.⁸⁸

4.133 Cr Terry Hogan, Chairman, Riverina and Murray Regional Organisation of Councils (RAMROC) stated that the MDBA had been slow to assess economic and social impacts of the Plan, noting:

...the lack of meaningful intent or progress that has been made by the Murray-Darling Basin Authority in assessing the social and economic impacts of the Basin Plan on communities, businesses and residents throughout the basin region...⁸⁹

4.134 Mr Tom Chesson, Chief Executive Officer, National Irrigators Council, stated that he did not believe the current implementation of the Plan would achieve a balanced triple bottom line:

I do not think it ever could. I think this is part of the myth, that somehow you can remove 30 per cent of a resource and not have an economic triple bottom line impact.⁹⁰

4.135 Mr Chesson stated that the cumulative water reforms also impacted on industry and communities and these were not being assessed by the MDBA:

One of the key problems that we have is that the Basin Plan, particularly around the social and economic issue, is looked at in isolation to the previous historic reforms that we have such as the cap and the Living Murray, which took a lot of water out of the basin as well. So we are not looking at the cumulative impact of those prior reforms on communities.⁹¹

4.136 Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, acknowledged that it takes time to gather socioeconomic data, which inevitably leads to long lag times before the economic and social impacts are assessed:

I would just add to the studies that have been done on the triple bottom line and the socioeconomic stuff that is being done by the MDBA. A lot of emphasis has been put on census information. Unfortunately, we only get it every seven years. So you are not going to see much of a result until you

88 Mr John Lolicato, Chairman, Murray Valley Private Diverters, *Committee Hansard*, 5 November 20015, p. 39.

89 Cr Terry Hogan, Chairman, Riverina and Murray Regional Organisation of Councils (RAMROC), *Committee Hansard*, 27 October 2015, p. 1.

90 Mr Tom Chesson, Chief Executive Officer, National Irrigators Council, *Committee Hansard*, 9 December 2015, p. 10.

91 Mr Tom Chesson, Chief Executive Officer, National Irrigators Council, *Committee Hansard*, 9 December 2015, p. 10.

have a number of those census periods being covered. That is a real flaw in some of the socioeconomic work that is being done.⁹²

Balancing economic, social and environmental outcomes

4.137 Due to these concerns, some witnesses called for the Water Act to be amended to better reflect a balance between economic, social and environmental outcomes. Cr Hogan, representing RAMROC, argued for:

...the need for the Commonwealth Act to be appropriately amended to fully enshrine the essential triple-bottom-line balance between the environment, social and economic criteria, and outcomes...⁹³

4.138 Mr Mark McKenzie, Chief Executive, New South Wales Irrigators' Council, stated in Griffith that the Act needed to be amended for clarity:

[the Act] needs to be amended to make it absolutely and blatantly clear that this plan was based on the triple bottom line approach—in other words, the environment was one factor but it could not be enhanced to the detriment of either the social impact on basin communities or the economic impact on irrigators, other users of water or those communities as well.⁹⁴

4.139 This view was supported by Mr Neil Eagle, private capacity, who stated in Echuca that the Act in its existing form did not give equal weighting to these three outcomes, and argued that it should be amended or redrafted:

...to give a triple bottom line of equal weighting to economic, social and environmental needs. The current act contravenes this basic principle which was laid down by COAG under the National Water Initiative.⁹⁵

4.140 A number of submitters quoted the late Professor John Briscoe, who was an invited member of the MDBA High-Level External Review Panel. Professor Briscoe made a submission to the Senate Legal and Constitutional Affairs References Committee's 2011 inquiry into the provisions of the Water Act 2007.⁹⁶

4.141 In that submission, Professor Briscoe stated that the Productivity Commission's interpretation of the Water Act prioritised environmental needs over economic and social needs:

92 Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, *Committee Hansard*, 6 November 2015, p. 23.

93 Cr Terry Hogan, Chairman, Riverina and Murray Regional Organisation of Councils (RAMROC), *Committee Hansard*, 27 October 2015, p. 1.

94 Mr Mark McKenzie, Chief Executive, New South Wales Irrigators' Council, *Committee Hansard*, 27 October 2015, p. 46.

95 Mr Neil Eagle, private capacity, *Committee Hansard*, 5 November 2015, p. 54.

96 Submissions to the inquiry can be found on the Legal and Constitutional Affairs Committee's website:
http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Legal_and_Constitutional_Affairs/Completed_inquiries/2010-13/provisionswateract2007/submissions
 (accessed 3 March 2016).

The National Productivity Commission's interpretation of the Water Act (2007) is that "it requires the Murray-Darling basin Authority to determine environmental water needs based on scientific information, but precludes consideration of economic and social costs in deciding the extent to which these needs should be met".⁹⁷

4.142 Professor Briscoe also noted that he was part of a review of the Plan which found that the Plan prioritises environmental needs over economic and social needs:

Similarly, the High-Level Review Panel for the Murray Darling Basin Plan (of which I was a member) stated that "The driving value of the Act is that a triple-bottom-line approach (environment, economic, social) is replaced by one in which environment becomes the overriding objective, with the social and economic spheres required to "do the best they can" with whatever is left once environmental needs are addressed."⁹⁸

Adjustment of SDLs based on economic or social factors

4.143 In addition to community concern about the Plan as a whole, the committee heard concerns about whether the significant economic and social impacts of the Plan would have any influence on SDLs.

4.144 In St George, Queensland, Mr Frank Deshon, Chair, Smartrivers, stated that although the triple bottom line is frequently discussed, it was unclear whether a significant negative economic or social impact would alter an SDL, or if there were environmental requirements that must be satisfied first. Mr Deshon stated:

...the key issue is—as you quite rightly identified—that it is a triple bottom line but nobody has got their heads around whether it in fact shows that there is significant socioeconomic impact and what that is going to mean to an SDL. I do not know the answer to that is and I have not heard anyone else articulate it.⁹⁹

4.145 Given community concern during the inquiry about the prioritisation of environmental outcomes, the committee sought clarification on whether economic or social factors alone might allow a change in the SDLs.

4.146 In responses to questions on notice following the committee's final public hearing, MDBA stated that this was possible, providing the change was consistent with the Act:

The SDLs in the Basin Plan are based on a judgment by the Authority informed by a triple bottom line analysis of information available to the MDBA in 2012. This includes, economic, social and environmental factors. Any new information on any of these factors could inform a proposed

97 Professor Briscoe, Submission 2 to that inquiry, p. 4.

98 Professor Briscoe, Submission 2 to that inquiry, p. 4.

99 Mr Malcolm Peters, Chair, Northern Basin Advisory Committee, MDBA, *Committee Hansard*, 29 September 2015, p. 42.

change to the SDLs, provided the proposed change was still consistent with the relevant provisions of the Water Act 2007.¹⁰⁰

Committee view

4.147 The committee agrees that the purpose of the Plan should be the optimisation of economic, social and environmental outcomes. The committee notes that these three outcomes are equally weighted in the objects of the Act. However, the committee is of the view that overwhelming emphasis in implementation of the Plan is placed on environmental outcomes, to the detriment of social and economic needs and outcomes.

4.148 The committee heard significant evidence that in practice, environmental outcomes have been prioritised over economic and social outcomes. The committee shares these sentiments and is concerned that future implementation of the Plan may also follow this pattern. The committee does not agree that environmental needs and outcomes should be met at the expense of economic and social outcomes.

4.149 The committee is of the opinion that in order to correctly balance economic and social needs and outcomes with environmental needs and outcomes, the Act should be amended to reflect the equal standing of these three needs and reflect the triple bottom line approach.

Recommendation 25

4.150 The committee recommends that the government amend the *Water Act 2007* to make clear the equal standing of economic, social and environmental needs and outcomes.

4.151 Further, the committee strongly emphasises the equal standing of economic, social and environmental needs and outcomes and expects that any assessments that indicate negative economic or social impacts should result in an adjustment to SDLs for the affected area.

Use, quality and management of water

4.152 Water is managed by various actors for various uses, and both the management and use of water can impact on the quality of water in the Murray-Darling Basin. The aim of the Plan is to recover and manage water for the purposes of restoring the basin environment to a more balanced state, thus enabling the basin to continue to support productive industry and communities into the future.

4.153 This section deals with the role of the Commonwealth Environmental Water Holder (CEWH), environmental watering, fish populations, and salinity in the basin.

Role of the Commonwealth Environmental Water Holder (CEWH)

4.154 The Commonwealth Environmental Water Holder (CEWH) is a statutory position established under the *Water Act* responsible for managing the Commonwealth's environmental water holdings. The current CEWH is Mr David

100 MDBA, responses to questions on notice, received 23 February 2016, p. 5.

Papps. The CEWH is supported by the Commonwealth Environmental Water Office, which sits within the Department of the Environment.¹⁰¹

4.155 The CEWH's submission to the inquiry stated that Commonwealth environmental water must be managed to protect and restore the rivers, wetlands and floodplains (and the native animals and plants they support) of the Murray-Darling Basin.¹⁰² Commonwealth environmental water holdings are water entitlements, acquired by the Commonwealth from basin state governments, in two ways: through investments in infrastructure, and through purchases on the water market.¹⁰³

4.156 The CEWH holds a mix of entitlements across 19 of the basin's catchments, and its entitlements are subject to 'the same fees, allocations, allocations, carryover and other rules as equivalent entitlements held by other water users.'¹⁰⁴ Amendments to the *Water Act* in 2015 introduced a cap of 1500GL on water that may be purchased by the CEWH under water purchase contracts, to partially limit the volume of water held by the CEWH.¹⁰⁵

4.157 As outlined in its submission, the CEWH has three options for managing Commonwealth environmental water:

- delivering water to a river or wetland to meet an identified environmental demand;
- leaving water in storage and carrying it over for use in the next water year (referred to as 'carryover'); and
- trading water, that is, selling water and using the proceeds to buy water in another catchment or in a future year.¹⁰⁶

4.158 The CEWH monitors each environmental watering action and publishes information on watering or trading decisions and outcomes, monitoring and outcome reports, monthly volumes of water available and delivered by the CEWH, quarterly trading intentions and annual reports on the management of environmental water.¹⁰⁷

Calls for flexibility for the role of the CEWH

4.159 The CEWH's role is limited to water purchase, storage and release. Although this gives the CEWH a clearly defined role and confines its actions purely to

101 Note that this has *not* changed with the movement of water management from the Department of the Environment to the Department of Agriculture and Water Resources in late 2015. The CEWH and CEWO still remain within the Department of the Environment.

102 Commonwealth Environmental Water Holder, *Submission 45*, p. 1.

103 Commonwealth Environmental Water Holder, *Submission 45*, p. 1.

104 Commonwealth Environmental Water Holder, *Submission 45*, p. 1.

105 *Water Amendment Act 2015*, <https://www.comlaw.gov.au/Details/C2015A00133> (accessed 17 February 2016).

106 Commonwealth Environmental Water Holder, *Submission 45*, p. 1. For more detail, see p. 2 of the submission.

107 Commonwealth Environmental Water Holder, *Submission 45*, pp 2–3.

environmental water management, it does limit the CEWH's ability to contribute to the construction, upkeep and management of water infrastructure where Commonwealth environmental water may be stored. It also prohibits the CEWH from undertaking works and measures to deliver environmental outcomes.

4.160 The committee heard evidence that the CEWH's current powers are limited, as funds from the sale of water can only be used to buy more water. Mr Michael Murray, General Manager, Cotton Australia, stated that this constrained the CEWH's ability to deliver environmental outcomes:

At the moment, effectively he has to say that he has absolutely used all the water he possibly can on environmental outcomes at the present time, he has no foreseeable use for it, and any proceeds of the trade can only be used to buy water again. In my opinion, he is Australia's largest irrigator, if you like. He or she should pretty well be given freedom to trade, with the only stipulation being that, at the end of his day, he has to be able to justify that he is getting maximum environmental outcome.¹⁰⁸

4.161 Mr Murray suggested that the CEWH could use profits generated through the sale of water to improve infrastructure and enact other water efficiency measures to deliver environmental outcomes. For example, Mr Murray suggested that feral animal control might deliver better outcomes than the release of water that would have a neutral or negative environmental outcome:

...it may be much more sensible for the CEWH to trade 10,000 megs of water, get \$20 million or whatever, and spend it on pig control across the basin than to go down to another catchment and buy \$20 million worth of water to release cold out of a dam and not breed any fish. It would just make it a lot more flexible.¹⁰⁹

4.162 Mr Murray stated that this approach would allow the CEWH to approach situations with more flexibility and to 'devote the proceeds to whatever he believes is best for the environment.'¹¹⁰

4.163 On the other hand, other witnesses expressed concern that giving the CEWH the ability to use water sale funds for works and measures may have unintended consequences. Dr Arlene Harriss-Buchan, Healthy Rivers Campaigner, Australian Conservation Foundation, stated that while the idea is sensible in theory, it may lead to other entities withdrawing from their responsibilities to implement works and measures:

We are worried in terms of that thin edge of the wedge—a one-off example, 'Well, you know, the local CMA does not have any cash, we'll just do it in

108 Mr Michael Murray, General Manager, Cotton Australia, *Committee Hansard*, 29 September 2015, p. 34.

109 Mr Michael Murray, General Manager, Cotton Australia, *Committee Hansard*, 29 September 2015, p. 34.

110 Mr Michael Murray, General Manager, Cotton Australia, *Committee Hansard*, 29 September 2015, p. 34.

this case and we'll put in the fish ladder.' That would be fine, but it happens once and it ends up setting a precedent and the next thing you know state governments and others withdraw all their funding from existing programs that are intended to fund those works and measures and it falls on the CEWH.¹¹¹

4.164 Some witnesses expressed concern that the CEWH was not contributing towards the cost of water storage and delivery. Mr Stuart Brown, Milk Supply Manager, Tatura Milk Industries, stated that he was under the impression that the CEWH was not contributing in a proportional manner to infrastructure used to transport environmental water. Mr Brown argued that this cost should be divided equitably among users:

As productive water leaves the prescribed districts, the cost for our remaining irrigators increases. We believe that the CEWH and disassociated users—that is, water holders who do not have land—should contribute proportionately towards the irrigation infrastructure, either in delivery shares or some other form. We believe that is not currently being done.¹¹²

4.165 At the committee's final hearing, the CEWH affirmed that it does pay the same costs as other entitlement holders:

...the Commonwealth Environmental Water Holder has the same storage and infrastructure costs as equivalent entitlement holders and always has. If an irrigator is paying a certain fee to store his or her water, and then to distribute it through the private infrastructure or public infrastructure, we pay the same fees.¹¹³

4.166 Mr Papps explained that even though delivery of water is done in partnership with state agencies, the CEWH pays for the cost of water delivery:

...we do not hold delivery rights in states. They are held by the relevant state agency. There are charges associated with those. We provide funding to the state agencies in proportion to the amount of water they are delivering on our behalf. That is a long-winded way of saying that our activities are not subsidised.¹¹⁴

Water Amendment (Review Implementation and Other Measures) Bill 2015

4.167 As mentioned in Chapter 2, a bill to amend the Water Act is currently before the federal parliament. Among a suite of amendments arising from review of the

111 Dr Arlene Harriss-Buchan, Healthy Rivers Campaigner, Australian Conservation Foundation, *Committee Hansard*, 6 November 2015, p. 13.

112 Mr Stuart Brown, Milk Supply Manager, Tatura Milk Industries, *Committee Hansard*, 6 November 2015, pp 20–21.

113 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 29.

114 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, pp 29–30.

Water Act, the bill proposes to amend the abilities of the CEWH so it can sell water allocations and 'use the revenue to invest in environmental activities, and/or purchase water' where this is likely to achieve greater environmental objectives than retaining the water.¹¹⁵

4.168 This would enable the CEWH to invest in works and measures to complement environmental watering. The Explanatory Memorandum for the bill specifies 'environmental activities' as a range of investments that could include infrastructure such as 'fish-ways or carp exclusion screens that support the delivery of water to off-river wetlands.'¹¹⁶ The Explanatory Memorandum states that such investments could improve environmental watering and outcomes over the long term:

By selling a small volume of allocations in one year to fund the construction of such works, it could improve the effectiveness of larger volumes of environmental water delivered over several years, thereby improving environmental outcomes.¹¹⁷

4.169 Further, the bill does not define what would constitute environmental activities, so as to enable the CEWH to have the flexibility to invest in whichever environmental activities 'provide the best environmental outcomes possible based on conditions at the time.'¹¹⁸

Committee view

4.170 The committee heard significant evidence regarding the role and responsibility of the CEWH, including different perspectives on the impact of the CEWH's role on the basin environment and communities.

4.171 The committee acknowledges the calls for greater flexibility for the role of the CEWH, including the ability of the CEWH to undertake works and measures to

115 Water Amendment (Review Implementation and Other Measures) Bill 2015, Explanatory Memorandum, p. 16
http://parlinfo.aph.gov.au/parlInfo/download/legislation/ems/r5595_ems_6f238abc-acd0-4842-bb7a-8ff9bef80594/upload_pdf/504425.pdf;fileType=application%2Fpdf
(accessed 18 February 2016).

116 Water Amendment (Review Implementation and Other Measures) Bill 2015, Explanatory Memorandum, p. 17
http://parlinfo.aph.gov.au/parlInfo/download/legislation/ems/r5595_ems_6f238abc-acd0-4842-bb7a-8ff9bef80594/upload_pdf/504425.pdf;fileType=application%2Fpdf
(accessed 18 February 2016).

117 Water Amendment (Review Implementation and Other Measures) Bill 2015, Explanatory Memorandum, p. 17
http://parlinfo.aph.gov.au/parlInfo/download/legislation/ems/r5595_ems_6f238abc-acd0-4842-bb7a-8ff9bef80594/upload_pdf/504425.pdf;fileType=application%2Fpdf
(accessed 18 February 2016).

118 Water Amendment (Review Implementation and Other Measures) Bill 2015, Explanatory Memorandum, p. 17
http://parlinfo.aph.gov.au/parlInfo/download/legislation/ems/r5595_ems_6f238abc-acd0-4842-bb7a-8ff9bef80594/upload_pdf/504425.pdf;fileType=application%2Fpdf
(accessed 18 February 2016)

deliver environmental outcomes. Accordingly, the committee supports this proposal in the Water Amendment (Review Implementation and Other Measures) Bill 2015.

Environmental watering

4.172 Environmental watering aims to return water to rivers, wetlands and floodplains in order to restore the environmental health of the basin. Environmental watering activities are undertaken by the CEWH in accordance with the environmental watering strategy and environmental watering priorities for the basin.

4.173 The MDBA is responsible for preparing a basin-wide environmental watering strategy in accordance with the environmental watering plan, which is detailed in chapter 8 of the Basin Plan. The MDBA is also responsible for publishing annual environmental watering priorities, facilitating coordination of environmental watering activities and monitoring and evaluating environmental outcomes at a basin scale.¹¹⁹

4.174 The MDBA produced the first basin-wide Environmental Watering Strategy in November 2014. This strategy identifies four key components of the basin's water-dependent ecosystems and approaches to managing them to achieve environmental objectives. The four components are river flows and connectivity, native vegetation, waterbirds and native fish.¹²⁰

4.175 Mr Colin Mues, Executive Director, Environmental Management Division, MDBA, outlined the development of the Plan and emphasised that the outcomes were feasible within the constraints that existed at that time:

Once the Basin Plan was finalised, we developed the Basin-wide environmental watering strategy, which went to quantifying the environmental outcomes that would be achieved under the plan, within the existing constraints as they stood at the time.¹²¹

4.176 The MDBA's submission stated that 'long-term commitment is required to deliver improved environmental outcomes' through environmental watering.¹²² The submission also stated that although environmental watering so far has had a positive environmental effect, it is likely that the full benefits will not be revealed in the monitoring for some years.¹²³

119 MDBA, *Submission 243*, p. 13.

120 MDBA website <http://www.mdba.gov.au/publications/mdba-reports/basin-wide-environmental-watering-strategy-2014> (accessed 22 February 2016).

121 Mr Colin Mues, Executive Director, Environmental Management Division, MDBA, *Committee Hansard*, 5 February 2016, p. 50.

122 MDBA, *Submission 243*, p. 27.

123 MDBA, *Submission 243*, p. 27.

4.177 The MDBA is also responsible for developing annual watering priorities which 'build on local, regional and state priorities'. Four of the 2015-16 priorities support the four key components of the environmental watering strategy.¹²⁴

4.178 The MDBA's submission stated that the best results from environmental watering come from listening to local communities, mimicking natural patterns, working to ensure watering events are coordinated to deliver maximum impact, and taking a holistic approach to use water for multiple benefits (such as both irrigation and environmental uses) wherever possible.¹²⁵

4.179 The CEWH emphasised that the same volumes of environmental water can be used to deliver multiple ecological outcomes. The CEWH gave a recent example of a water release from the Hume Dam that had multiple benefits as it flowed through the basin:

...the so-called winter watering that we did out of Hume delivered outcomes in the Barmah-Millewa, it delivered outcomes in the northern Victorian rivers, it delivered outcomes in the main stem of the Murray River, and it delivered a range of environmental outcomes in all of those areas before it got to the Lower Lakes. Then it did its ecological job in the Lower Lakes, the Coorong and the Murray Mouth.¹²⁶

4.180 The committee heard evidence of successful watering activities and concerns regarding environmental watering and unsuccessful watering activities. These are explored in more detail in the following sections.

4.181 At the committee's first hearing, the CEWH stated that although environmental watering has primarily environmental outcomes, environmental water can deliver social and economic benefits. For example, Mr Papps stated:

...we all appreciate that a healthy environment underpins a healthy economy. There are specific social and economic benefits, for example. The water that we put into environmental assets supports a burgeoning tourism and recreational use industry in the basin. Those of you who have been in the basin a lot will understand, for example, the widespread popularity of recreational fishing. Environmental watering is a major supporter of recreational fishing, therefore tourism, therefore the economy.¹²⁷

124 <http://www.mdba.gov.au/publications/mdba-reports/basin-annual-environmental-watering-priorities-2015-16> (accessed 22 February 2016).

125 MDBA, *Submission 243*, p. 30.

126 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 37.

127 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 18 September 2015, p. 12.

4.182 Furthermore, Mr Papps noted that environmental water also reduces salinity, which is a 'direct cost saving for state agencies, who do not otherwise have to manage salinity.'¹²⁸

Monitoring and evaluation of environmental watering

4.183 The MDBA's submission states that the basin-wide environmental watering strategy details the quantified environmental outcomes expected from the full implementation of the Plan, and notes that monitoring and evaluation of environmental watering activities is 'directly connected' to these outcomes.¹²⁹

4.184 Environmental reporting, monitoring and evaluation activities are carried out by the MDBA, CEWH and basin states. The MDBA focuses on the basin-scale, the states focus on catchment and wetland sites, and the CEWH focuses on the impacts of its watering activities.¹³⁰

4.185 Additionally, the CEWH undertakes operational monitoring for each watering action. This includes the collection and analysis of 'on-ground data about the environmental water delivery action such as volumes, timing, duration, location, flow rates and river heights.'¹³¹

4.186 The CEWH also undertakes intervention monitoring, which investigates the environmental response to a watering action. The CEWH's submission stated that it has invested \$30 million in the Long Term Intervention Monitoring Project. The submission explains the focus of the project:

Under this Project, consortium teams, led by Australian research institutions and involving locally based land and water managers, have been engaged to develop and implement detailed 5-year monitoring and evaluation plans for seven selected areas within the Basin. The seven areas are: Junction of the Warrego and Darling rivers; Gwydir river system; Lower Lachlan river system; Murrumbidgee river system; Edward-Wakool river system; Goulburn River; and Lower Murray River.¹³²

4.187 At the committee's final hearing, Mr Papps stated that the first year's results of the project were soon to be released. Mr Papps indicated that this project included both a record of the environmental outcomes achieved from environmental watering activities and an assessment of these outcomes against the expected outcomes:

...it is also an evaluation—in other words, an assessment of what we said we expected to emerge from that watering, what actually happened and then

128 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 18 September 2015, p. 13.

129 MDBA, *Submission 243*, p. 28.

130 CEWH, responses to questions on notice, received 2 February 2016, p. 2.

131 CEWH, *Submission 45*, p. 2.

132 CEWH, *Submission 45*, p. 3.

what we are going to do in subsequent waterings on the basis of that knowledge. It is adaptive management.¹³³

4.188 The results of the project are published on the CEWH's website.¹³⁴ Mr Papps reported that the scientific reports for each of the seven areas demonstrated that environmental watering is having a positive impact on the basin:

...the results from the latest monitoring demonstrated that the right volume of environmental water at the right time, and in the right place, is having a positive effect on the rivers, floodplains and wetlands of the Murray-Darling Basin.¹³⁵

4.189 Further, Mr Papps stated that the reports state that environmental watering during 2014-15 has contributed to positive outcomes for native fish, birds and frogs.

Successful environmental watering activities

4.190 The committee heard evidence regarding the success of environmental watering activities and ways to increase the benefit of these activities. Ms Juliet Le Feuvre, Healthy Rivers Campaign Manager, Environment Victoria, stated that environmental watering in the Goulburn River had improved fish stocks:

Recent watering here in the Goulburn has been timed to encourage Murray cod and yellow-belly to spawn and breed, and fishing is better than it has been in years.¹³⁶

4.191 Ms Le Feuvre also elaborated on the broader environmental benefits of the recent watering in the Goulburn River:

Environmental water flowing out of the Goulburn travels downstream and can be used to water red gums at Gunbower...fill the lakes at Hattah and keep salinity levels in check in the Coorong.¹³⁷

4.192 Other witnesses noted the possibility for investing in infrastructure to improve environmental outcomes. At the committee's public hearing in Renmark, Councillor Kevin Myers, Spokesperson, Murray Mallee Local Government Association, stated that infrastructure can be beneficial to managing environmental watering:

...we are virtually imitating what would have been a natural cycle. So, with the use of these environmental flows, they can open up a regulator, fill a wetland and then shut it. Therefore, even if the natural event only lasted a couple of days, we can actually make it last a lot longer.

...we can imitate a natural cycle with these engineering things.¹³⁸

133 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 32.

134 CEWH, <http://www.environment.gov.au/node/40825> (accessed 22 February 2016).

135 CEWH, <http://www.environment.gov.au/node/40825> (accessed 22 February 2016).

136 Ms Juliet Le Feuvre, Healthy Rivers Campaign Manager, Environment Victoria, *Committee Hansard*, 6 November 2015, p. 12.

137 Ms Juliet Le Feuvre, Healthy Rivers Campaign Manager, Environment Victoria, *Committee Hansard*, 6 November 2015, p. 12.

4.193 Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, stated in Shepparton that works and measures such as pumps at the Hattah Lakes can improve environmental outcomes. Mr Anderson stated that in recent dry years, this infrastructure has been beneficial:

That has been a platform; we have always had that platform in terms of works and measures. It is in these dry years, and we have already seen examples of it this year, when we have not had those high rainfall events and there is not a lot of water available that we see the benefits of those works and measures. The Hattah Lakes pumps are a really good example of what can be done.¹³⁹

4.194 Further, Mr Gavin McMahon, Chief Executive Officer, Central Irrigation Trust, stated at Renmark that there are various examples of infrastructure in SA that improve environmental outcomes, including at Chowilla and Katarapko. Mr McMahon stated that there are a variety of ways to deliver environmental outcomes, and these should be investigated further:

If you look laterally and work harder to find an outcome to the solution there are a number of solutions around that can give you the outcomes that you want. To replace those small floods, that is where you are looking for river red gum regeneration, black box regeneration, lignin regeneration on the flats. If you cannot get it—and that is still a question be answered—if you cannot do it with natural flows, then let's work out a way we can get it.¹⁴⁰

Criticisms of environmental watering activities

4.195 The committee also heard evidence critical of environmental watering activities, including the need to address the risk of blackwater events and the potential that environmental watering is changing the ecological makeup of some areas.

4.196 Mr Roger Knight, Farmer/Managing Farmer, Nyton Park Agriculture, raised the risk of blackwater events, which deplete fish populations. Such events can have significant impacts on native fish. Mr Knight noted that such events in his local area mostly occurred during flooding, not during environmental watering, in 2010-11. However, he stated that these risks need to be addressed to ensure watering events do not 'wipe out' native fish populations.¹⁴¹ Mr Knight stated:

Blackwater risk, which I have been raising, is identified as one of the key environmental risks of environmental water delivery. There is no use

138 Cr Kevin Myers, Spokesperson, Murray Mallee Local Government Association, *Committee Hansard*, 9 December 2015, p. 4.

139 Mr Richard Anderson, Chair, Water Council, Victorian Farmers Federation, *Committee Hansard*, 6 November 2015, p. 23.

140 Mr Gavin McMahon, Chief Executive Officer, Central Irrigation Trust, *Committee Hansard*, 9 December 2015, p. 40.

141 Mr Roger Knight, Farmer/Managing Farmer, Nyton Park Agriculture, *Committee Hansard*, 5 November 2015, p. 25.

breeding up fish and then wiping them out. It is a waste of water. It puts great stress on our communities. I have submitted information about that. It has been a frustrating process to get risks acknowledged and have input into that process.¹⁴²

4.197 Another Echuca witness, Mr John Lolicato, Chairman, Murray Valley Private Diverters, stated that one risk of environmental watering activities is that the ecological makeup of the site may be changed. Mr Lolicato stated that the Hattah Lakes are an example of this:

The amount of water that is being poured into that place—what it is doing is turning a black box-lignum community into something that it is not: a red gum community.¹⁴³

4.198 The CEWH stated that comments from individuals or landholders about environmental watering activities are taken seriously and investigated:

We are learning from that; we will continue to learn from that. I do hear comments publicly quite a bit along the lines of, 'You've done it at the wrong time of year in the wrong place,' and so on. We take those comments seriously. We are always keen to investigate that, particularly if there is some strong local knowledge involved, and, where there is good evidence from local knowledge, we will deploy it.¹⁴⁴

4.199 The CEWH noted that it was aware that some commenters state that watering is occurring at the wrong time of year. Mr Papps stated that often in this situation, people are observing consumptive water and not environmental water flowing through the system:

In many cases the observations are made not about environmental watering, but about movement of consumptive water through the system which is assumed to be environmental water. So of course it is at the wrong time.¹⁴⁵

4.200 Mr Papps also stated that given the focus on fish breeding and spawning, people sometimes observe environmental flows and express concern that the environmental watering is occurring at the wrong time of year as the fish are not breeding or spawning at that time. However, Mr Papps stated that fish populations also require suitable conditions prior to breeding and that some water releases are for this purpose:

...when we put water into the system, for example, to support golden perch breeding, there is an assumption that it is the wrong time because they are

142 Mr Roger Knight, Farmer/Managing Farmer, Nyton Park Agriculture, *Committee Hansard*, 5 November 2015, p. 24.

143 Mr John Lolicato, Chairman, Murray Valley Private Diverters, *Committee Hansard*, 5 November 2015, p. 50.

144 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 32.

145 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 32.

not breeding or spawning now. No, they are not. As I said before, we will try to create the antecedent conditions to promote breeding, so sometimes those flows are for that purpose. So we can see and we concede a challenge to continue to inform the communities on what we are doing.¹⁴⁶

4.201 Mr Papps noted that community awareness and comprehension of the scope and timing of environmental watering was an ongoing challenge.

Environmental watering at the Barmah-Millewa Forest

4.202 One example of environmental watering is at the Barmah Millewa Forest. In response to a question from the committee, the Department of the Environment provided detail from the MDBA stating that the forest required medium to large floods and the frequency, size and duration of these events have reduced as a result of river regulation and water extraction from the Murray River.¹⁴⁷

4.203 The response stated that environmental watering has occurred at this site since 2009-10, with varying volumes of water each year depending on natural flows. Ecological monitoring of the forest in 2013-14 stated that 94 per cent of the river red gum forests and woodlands were in 'Good or Moderate' condition, increased from 89.5 per cent 'prior to significant natural flooding in 2010.'¹⁴⁸

4.204 This flooding event caused a blackwater event; the response stated that monitoring of native fish has shown increasing spawning, although pest species still dominate the population.

4.205 Further, while Moira grass has been regrowing, it still represents less than five per cent of the area mapped in the 1940s and growth 'has been from existing plants, rather than new plants germinating from seed'. The response stated that 'this vegetation community is still under considerable threat.'¹⁴⁹

4.206 However, the response also noted that two significant waterbird breeding events have occurred at the forest, with a variety of nesting birds present.¹⁵⁰

Committee view

4.207 The committee heard mixed evidence on environmental watering, with some witnesses stating that it was delivering significant ecological benefits, and others concerned that it was negatively impacting on the environment and in some cases the broader community or economy.

146 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 32.

147 Department of the Environment, responses to questions on notice, received 2 October 2015, p. 6.

148 Department of the Environment, responses to questions on notice, received 2 October 2015, p. 6.

149 Department of the Environment, responses to questions on notice, received 2 October 2015, p. 6.

150 Department of the Environment, responses to questions on notice, received 2 October 2015, p. 6.

4.208 The committee is of the view that environmental watering activities must be carefully measured and objectively monitored to ensure adequate environmental water management occurs. This would also provide clear scientific information on the short, medium and long-term benefits of environmental watering activities.

4.209 The committee notes that the MDBA, CEWH and basin states all take a role in monitoring and evaluation, and encourages closer collaboration to enable clearer reporting of the aims, plans and outcomes of environmental watering. The committee also encourages consistent measurements of the social, economic and environmental impacts of environmental watering activities. Together, these components should be clearly communicated to basin communities to provide greater awareness and understanding of the objectives and outcomes of environmental watering.

Recommendation 26

4.210 The committee recommends that the MDBA, Commonwealth Environment Water Holder and basin states conduct greater monitoring, objective evaluation and communication of environmental watering activities, and that the MDBA collate and publicly report this information.

4.211 Further, the committee encourages greater long-term monitoring, evaluation and communication to the public of ecological sites, for example through the CEWH's Long Term Intervention Monitoring Project. The committee urges an expansion of this project to provide greater certainty in environmental watering aims, practices and outcomes.

Recommendation 27

4.212 The committee recommends that the government fund the expansion of the Commonwealth Environmental Water Holder's existing Long Term Intervention Monitoring Project to include more sites around the basin and provide greater monitoring and evaluation of basin environmental watering activities.

4.213 With particular regard to the Barmah-Millewa Forest, the committee notes the restoration of some aspects of the forest due to environmental watering and natural flooding, as well as the negative impacts of the natural flooding and the likely slower than anticipated regrowth of native grass.

4.214 The committee acknowledges that environmental watering outcomes are complex and that environmental watering and natural weather events can have varying impacts on ecological systems. However, the committee is of the view that a minimum standard for improvement should be investigated and implemented, and environmental watering activities that are therefore not producing results should be reconsidered.

Native fish strategy

4.215 One of the aims of environmental watering is the rehabilitation of native fish populations in the basin. One witness, Dr Arlene Harriss-Buchan, Healthy Rivers Campaigner, Australian Conservation Foundation, stated that native fish and their

habitats were in rapid decline by 2007. Dr Harriss-Buchan stated that this situation required a different approach:

By that time, very large swathes of the basin were hurtling towards ecological collapse. Ninety per cent of the wetlands were gone. Ninety per cent of the native fish were gone, with fish biologists concerned that, if things did not change, that would be 95 per cent gone.¹⁵¹

4.216 The Murray-Darling Basin Commission (MDBA's predecessor) developed the Native Fish Strategy for the Murray-Darling Basin 2003-2013, which was endorsed by the Murray-Darling Basin Ministerial Council in 2003. The goal of this strategy was to bring native fish numbers 'back to 60 per cent of their estimated pre-European settlement levels after 50 years of implementation.'¹⁵²

4.217 In response to questions on notice, the Department of Agriculture and Water Resources advised that \$92 million had been spent on development and implementation of the Native Fish Strategy.

4.218 The strategy stated that key threats to native fish populations included flow regulation, habitat degradation, lowered water quality, man-made barriers, non-native species, fisheries exploitation, the spread of diseases and the translocation and stocking of fish. The strategy also noted that fish populations had declined since European settlement and, at the time the strategy was prepared, populations were at about 10 per cent of their pre-European settlement levels.¹⁵³

4.219 The strategy had 13 key objectives, which included repairing and rehabilitating habitats, improving water quality, modifying flow regulation practices, enabling passage of native fish between waterways, protecting and managing native fish populations and controlling alien fish populations. These objectives were to be met by rehabilitating and protecting fish habitat, managing riverine structures, controlling alien fish species, protecting threatened native fish species and managing fish translocation and stocking.¹⁵⁴

4.220 The strategy was to be reviewed after five and ten years, and a 2013-2023 strategy was to be developed.¹⁵⁵ However, funding for the strategy ceased in 2013 and

151 Dr Arlene Harriss-Buchan, Healthy Rivers Campaigner, Australian Conservation Foundation, *Committee Hansard*, 6 November 2015, p. 11.

152 Native Fish Strategy 2003-2013, via MDBA website, p. 1, <http://www.mdba.gov.au/publications/mdba-reports/native-fish-strategy-murray-darling-basin-2003-2013> (accessed 19 February 2016).

153 Native Fish Strategy 2003-2013, via MDBA website, p. 1, <http://www.mdba.gov.au/sites/default/files/pubs/NFS-for-MDB-2003-2013.pdf> (accessed 19 February 2016).

154 Native Fish Strategy 2003-2013, via MDBA website, p. 1, <http://www.mdba.gov.au/sites/default/files/pubs/NFS-for-MDB-2003-2013.pdf> (accessed 19 February 2016).

155 Native Fish Strategy 2003-2013, via MDBA website, p. 2, <http://www.mdba.gov.au/sites/default/files/pubs/NFS-for-MDB-2003-2013.pdf> (accessed 19 February 2016).

native fish management is now one of the four key components of the MDBA's basin-wide environmental watering strategy.¹⁵⁶

Native fish population recovery

4.221 Some witnesses noted that environmental flows have increased native fish and other aquatic populations. Cr Leigh Wilson, Mayor, Campaspe Shire Council, stated that this had been the case in the Campaspe River:

I have noticed an increase in turtle and platypus activity and, in conjunction with our very active angling clubs in the area, some restocking. There is certainly an increase in native fishes along the Campaspe River.¹⁵⁷

4.222 The CEWH reiterated that native fish breeding is one of the four key elements of the environmental watering strategy, and that creating conditions conducive to spawning was an important part of restoring native fish populations:

Fish are a target of that monitoring because they are one of the four areas of focus in the environmental watering strategy, which sets quite specific targets for me. We are very interested in the spawning of fish since we want to grow the populations, particularly of endangered fish, so we pay particular attention to that.¹⁵⁸

4.223 However, the CEWH outlined that fish spawning is only one aspect of restoring native fish populations. Mr Papps stated that environmental watering activities also focused on creating conditions required prior to spawning, and creating an environment for fish to grow to adulthood:

Spawning is only the start of the journey for the recovery of fish populations. Our environmental watering also takes into account the conditions that you need before spawning. Fat, happy fish breed better, and so we try to create the conditions before breeding time to ensure that breeding is maximised, and then after breeding you of course have to create the conditions in the wetlands, rivers and flood plains to give those fish the best chance to grow into adults to breed, and so you grow the population.¹⁵⁹

Impact of cold water releases on native fish

4.224 The committee heard evidence that releases of cold water for environmental flows could have severe impacts on native fish, including preventing them from breeding. The MDBA stated that cold water pollution can be an issue where water is

156 A technical report assessing the key outcomes of the strategy was prepared for the MDBA by the Institute for Applied Ecology at the University of Canberra, <http://www.finterest.com.au/wp-content/uploads/2014/06/NFS-Technical-Report-FINAL-April-2014.pdf> (accessed 22 February 2016).

157 Cr Leigh Wilson, Mayor, Campaspe Shire Council, *Committee Hansard*, 5 November 2016, p. 2.

158 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 32.

159 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, p. 32.

discharged from the bottom of dams or water storages. The MDBA advised the committee that the operation of dams is the responsibility of basin states and as such cold water pollution is a responsibility of basin state governments.¹⁶⁰

4.225 Mr Michael Murray, General Manager, Cotton Australia, stated that this had occurred in the Gwydir Valley, with cold water being released from Copeton Dam:

In the Gwydir Valley, where there is an interest in trying to enhance fish breeding, they go to release water out of Copeton Dam for fish breeding, but there is no multi-level off-take on Copeton Dam, so they are releasing cold water into the Gwydir River and it is too cold to breed anyhow.¹⁶¹

4.226 Mr Murray argued that this was a waste of environmental flows, as the water was not delivering the expected outcome of fish breeding:

So they are using water and getting nothing. In that valley, the Commonwealth have spent something in the order of a quarter of a billion dollars on buying water but nothing on environmental works.¹⁶²

4.227 This view was also put forward by Dr Jennifer Marohasy, Spokesperson, Myth and the Murray group, who stated that cold water pollution was a major problem in the Murrumbidgee and Murray rivers, and impacted on the recovery of native species such as the Murray cod.¹⁶³

4.228 The CEWH responded to the committee's concerns about cold water pollution, agreeing that 'it is a legitimate issue under certain circumstances, and there are engineering responses available'.¹⁶⁴ Mr Papps assured the committee that there are ways to deliver environmental water without causing cold water pollution:

...there are some mechanisms or strategies available to us in the application of environmental water to avoid the impacts of cold water pollution, which we exercise. In the assessment of all our environmental watering activities we look at the risk of cold water pollution and then ensure that we mitigate it to the extent possible. Some of those strategies are pretty self-evident and common sense—for example, using environmental water where we are going to get a good environmental outcome but at the time of the year when

160 MDBA, responses to questions on notice, received 3 February 2016, p. 3.

161 Mr Michael Murray, General Manager, Cotton Australia, *Committee Hansard*, 29 September 2015, p. 34.

162 Mr Michael Murray, General Manager, Cotton Australia, *Committee Hansard*, 29 September 2015, p. 34.

163 Dr Jennifer Marohasy, Spokesperson, Myth and the Murray, *Committee Hansard*, 8 December 2015, p. 10.

164 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, pp 31–32.

there is less stratification in the dam and therefore less impact from cold water.¹⁶⁵

4.229 The CEWH gave further detail on its watering activities in responses to questions on notice, outlining the best times of year to deliver environmental water:

The main step the Commonwealth Environmental Water Holder can take to manage cold water pollution is through the timing of a watering action. The risk of cold water pollution is much lower at cooler times of year (winter and early spring) when dam water temperatures are not stratified. Environmental watering typically targets this time of year (particularly in the southern Basin), to align with natural cues including those for native fish spawning. Other options include timing releases with downstream tributary flows, which will dilute the cold water, and releasing water at a rate and/or volume unlikely to cause a significant risk in receiving water temperatures.¹⁶⁶

4.230 The CEWH says it supports and participates in action to address cold water pollution in collaboration with state governments and water authorities.¹⁶⁷

4.231 The MDB Ministerial Council Native Fish Strategy lists cold water pollution as a threatening process. Yet despite funding of \$92 million committed to the Strategy, only one water storage facility, Burrendong dam, has been modified to mitigate cold water pollution.

Cold water releases from the Hume Dam

4.232 Dr Marohasy also raised the issue of cold water releases from the Hume Dam, stating that this led to cold water pollution in the Murray River. Dr Marohasy argued that the Native Fish Strategy for the basin from 2003 to 2013 gave a solution to cold water pollution in the Murray:

...the most cost-effective, tangible, achievable, easiest thing to do right away...was retrofitting of the Hume Dam with multilevel outlets and also including artificial de-stratification of the water in the dam.¹⁶⁸

4.233 The CEWH provided information from the MDBA stating that adapting the Hume Dam would be difficult due to local weather conditions:

Hume Dam is extremely exposed to prevailing south easterly winds and as such wave action immediately upstream of the dam can be significant. This

165 Mr David Papps, Commonwealth Environmental Water Holder, Commonwealth Environmental Water Office, Department of the Environment, *Committee Hansard*, 5 February 2016, pp 31–32.

166 CEWH, responses to questions on notice, received 2 February 2016, p. 1.

167 CEWH, responses to questions on notice, received 2 February 2016, p. 1.

168 Dr Jennifer Marohasy, Spokesperson, Myth and the Murray, *Committee Hansard*, 8 December 2015, p. 10.

means that suspended curtains to limit outflow to surface layer or floating turbines to mix water would be extremely difficult to moor.¹⁶⁹

4.234 Furthermore, this information stated that the 'only likely viable option' would cost approximately \$40 million:

The only likely viable option to eliminate any temperature differential at Hume Dam would be a substantial concrete structure upstream of the power station inlets and probably also covering the irrigation intakes.¹⁷⁰

4.235 Furthermore, Dr Marohasy stated that the construction of the barrages had led to a decline in saltwater fish, such as mulloway, in the South Australian Lower Lakes. Dr Marohasy said that the mulloway fishery declined after the barrages were sealed:

Of course the mulloway fishery was decimated, totally decimated when the barrages were sealed in 1940.¹⁷¹

4.236 Dr Marohasy stated that following the implementation of the barrages, the saltwater fish have been replaced by freshwater fish, predominately European carp:

In fact, there is a Charlie Carp industry that has built up around the harvesting of this pest species in the Lower Lakes.¹⁷²

4.237 Further, Dr Marohasy argued that if the barrages were removed and the Lower Lakes became an estuarine environment, saltwater fish such as the mulloway would return. Dr Marohasy stated that this would improve the fishing industry in the region:

If the lakes became estuarine, unfortunately [the carp] industry would go out of business but, hey, we would have a return of higher value fish and better fishing fish and native fish including the mulloway, for example. We would be rid, simply by letting the sea water in, of the carp in the Lower Lakes and we would have a return of the mulloway.¹⁷³

4.238 This view was also held by Mr Neil Eagle, a witness at Echuca, who stated that an estuarine environment would lead to a productive fishing industry:

The productivity and health of the Lower Lakes could be restored with re-establishment of the Mulloway fishing industry, which was a big industry before the barrages were constructed. The productivity of the Basin in South Australia and the upper states could be secured in the national interest.¹⁷⁴

169 CEWH, responses to questions on notice, received 2 February 2016, p. 1.

170 CEWH, responses to questions on notice, received 2 February 2016, p. 1.

171 Dr Jennifer Marohasy, Spokesperson, Myth and the Murray, *Committee Hansard*, 8 December 2015, p. 10.

172 Dr Jennifer Marohasy, Spokesperson, Myth and the Murray, *Committee Hansard*, 8 December 2015, p. 10.

173 Dr Jennifer Marohasy, Spokesperson, Myth and the Murray, *Committee Hansard*, 8 December 2015, p. 10.

174 Mr Neil Eagle, private capacity, *Committee Hansard*, 5 November 2015, p. 54.

Impact of European carp

4.239 Native fish have to compete with introduced or alien species in the basin's rivers. The most populous introduced fish in the basin is European carp. The committee heard that European carp were a big problem in rivers in the basin. Witnesses spoke of the damage that carp are causing to rivers and riverbanks and how carp cause turbidity in rivers, which affects water quality. Cr Peter Laird, Mayor, Carrathool Shire Council, stated that carp are doing incredible amounts of damage to the Lachlan River:

The damage that carp are doing to the Lachlan is unbelievable. They are burrowing under the banks and I am told by people who swim in it that they can hang onto the edge and swing their legs right back up in under. That is how the fish burrow on the banks. The red gums are falling in and it has become an absolute disaster—the amount of timber.¹⁷⁵

4.240 Cr Laird also argued that the effect that carp have on waterways stymies the positive impact of environmental flows, and stated that the removal of carp can lead to positive environmental outcomes. Cr Laird recounted a story of Willandra Creek, which was filled with carp from 1975 to 2011. However, once the carp disappeared, plants originally displaced by the carp reappeared:

The minute the carp moved in in 1975, it absolutely ruined the creek. In 2011 we had a downpour of rain and the opportunity of fresh water. Within one month the ribbon weed was back. Nature, amazingly, takes care. It had not been there for 37 years and all of a sudden the ribbon weed was back. This is the effect that carp has on the waterways. It does not matter how much water you pour down that Lachlan River for the environment; the carp are just ruining it.¹⁷⁶

4.241 Mr Anthony Wass, Committee Person, Macquarie Marshes Environmental Trust, also indicated that carp were damaging rivers in his region, although not to the extent that Cr Laird had experienced:

The carp damage in the river is very, very significant. That riverine weed comment is illustrative. There is a lot of damage caused by carp.¹⁷⁷

4.242 Given the destructive effects of carp, witnesses such as Mr Mike Dalmau, in a private capacity at Shepparton, called for the eradication of carp, and argued that this was imperative to the success of the Plan:

The other thing that needs to be put on the agenda is that you can talk all you want about the environmental water coming down the river, but the greatest percentage of it will be wasted unless you eradicate carp. The carp

175 Cr Peter Laird, Mayor, Carrathool Shire Council, *Committee Hansard*, 27 October 2015, p. 17.

176 Cr Peter Laird, Mayor, Carrathool Shire Council, *Committee Hansard*, 27 October 2015, p. 17.

177 Mr Anthony Wass, Committee Person, Macquarie Marshes Environmental Trust, *Committee Hansard*, 27 October 2015, p. 30.

attack the basic microsystems of whole environment of the system. Until you get rid of carp all the other benefits can never be achieved.¹⁷⁸

European carp control measures

4.243 Witnesses supported measures to reduce, control and potentially eradicate the European carp population. In particular, witnesses noted that CSIRO is currently developing a carp herpes virus to manage carp numbers.

4.244 Mr Anthony Wass, Committee Person, Macquarie Marshes Environmental Trust, stated that the prospect of a disease to prevent carp breeding was positive:

I have heard of a program called the daughterless carp program, which was designed to put some sort of disease within the carp population which was benign to other fish species so that you would have a breeding program so that they bred themselves out of existence.¹⁷⁹

4.245 Mr Michael Murray, General Manager, Cotton Australia, concurred that a release of the carp herpes virus would reduce the number of carp in the river and improve the health of the river system.¹⁸⁰

4.246 Mr Colin Mues, Acting Executive Director, Environmental Management Division, MDBA noted the complexity of eradicating carp, and stated that present management of environmental water took into account the risks associated with carp and tried to undertake measures that were advantageous to native fish where possible:

...carp is one of those feral pests that are in our system and are going to be extremely hard to eradicate, if at all. Environmental water managers are acutely aware of the risks that carp pose to our environment, and they manage that water as diligently as they can while managing the risk. There are some mechanisms they have got to advantage native fish over carp but they are somewhat limited...

4.247 However, Mr Mues noted that the carp herpes virus would make a considerable difference in controlling the carp population but that a possible release of the virus is still two to three years away:

...that is why there is such considerable attention being focused on the carp herpes virus and the potential it presents for a large-scale control mechanism. As I understand it, the herpes virus is going through the last stages of testing—I think the New South Wales Department of Primary Industries is leading the work necessary to get those last trials done—but that is I think two to three years off maybe from release.¹⁸¹

178 Mr Mike Dalmau, private capacity, *Committee Hansard*, 6 November 2015, p. 45.

179 Mr Anthony Wass, Committee Person, Macquarie Marshes Environmental Trust, *Committee Hansard*, 27 October 2015, p. 30.

180 Mr Michael Murray, General Manager, Cotton Australia, *Committee Hansard*, 29 September 2015, p. 28.

181 Mr Colin Mues, Executive Director, Environmental Management Division, MDBA, *Committee Hansard*, 5 February 2016, p. 58.

4.248 Scientists from CSIRO are testing a virus called *cyprinid herpesvirus-3* (CyHV-3) or *koi herpesvirus* (KHV) to determine the 'safety and suitability of the virus for controlling carp'.¹⁸² The CSIRO reported that research has shown that the virus does kill carp and does not develop in any other native or introduced fish. However, CSIRO will continue testing before a release of the virus is considered:

Over the next few years we'll continue to test the susceptibility of other fish and amphibian species to CyHV-3 and address questions regarding the safety of possible widespread distribution of the virus, both for people and other animal species. This work is supported by the Invasive Animals Cooperative Research Centre and the release program is led by the New South Wales Department of Primary Industries.¹⁸³

4.249 The SA government, in response to questions from the committee, stated that in considering whether or not the carp herpes virus should be released, significant analysis of the costs, risks and benefits would be required:

A full analysis of all risks and benefits would be required before any decision is made to release the virus into waterways to ensure there would be no unintended adverse consequences. For example, it will be very important to ensure there is no risk of infecting other fish and animal species. It will also be necessary to understand the effects on the aquatic food web of quickly removing large numbers of carp which provide an important food source for other species.¹⁸⁴

4.250 Furthermore, Mr Russell James, Executive Director, Policy and Planning Division, MDBA, stated that the release of the virus would need to be accompanied by a strategy to ensure ongoing removal of dead carp from waterways:

I might just say it is one thing to get the virus to the right safety level, if you like, that it is not going to impact on other species, but the strategy you need to have in place to release it is quite massive because you think of dead carp up and down the river system, you need to have systems in place to deal with that and that is going to be a massive effort.¹⁸⁵

Committee view

4.251 The committee heard evidence pointing out the importance of native fish to the basin's ecosystems. Witnesses stated that native fish populations were in decline, and noted the work done under the native fish strategy to rehabilitate these populations. Again, the committee heard mixed evidence on the regeneration of native fish populations and the impact of environmental watering activities.

182 CSIRO, <http://www.csiro.au/en/Research/BF/Areas/Managing-the-impacts-of-invasive-species/Biological-control/Biocontrol-of-carp> (accessed 18 February 2016).

183 CSIRO, <http://www.csiro.au/en/Research/BF/Areas/Managing-the-impacts-of-invasive-species/Biological-control/Biocontrol-of-carp> (accessed 18 February 2016).

184 SA Government, responses to questions on notice, received 17 February 2016, p. 16.

185 Mr Russell James, Executive Director, Policy and Planning Division, MDBA, *Committee Hansard*, 5 February 2016, p. 58.

4.252 The committee notes the positive impact of environmental watering activities, including the promotion of spawning, breeding, and growth of native fish. The committee also notes the instances and negative impacts of cold water releases on native fish. The committee encourages MDBA to review these incidents and implement risk assessments and mitigation strategies to ensure they are not repeated.

Recommendation 28

4.253 The committee recommends the Victorian and NSW governments, as operators of the relevant storages, implement measures to mitigate cold water pollution that is undermining recovery efforts of native fish.

Recommendation 29

4.254 The committee recommends the MDBA conduct a review of the impact of cold water releases on native fish and develop risk assessments and mitigation strategies to ensure that cold water releases do not impact on native fish.

4.255 The committee also noted the decline of saltwater fish in the Lower Lakes and the associated decline of the fishing industry and considers that this matter would be resolved if the management of the Lower Lakes is altered.

4.256 Further, the committee notes the damaging impact of European carp on rivers and the development of a control measure in the form of carp herpes virus. The committee supports the ongoing testing of this virus. Should this testing determine that the virus has no unintended adverse consequences, the committee would support its release.

4.257 Overall, the committee is cognisant of the fact that native fish health is one of the four key indicators of basin health, and expects native fish monitoring and evaluation to continue throughout the implementation of the Plan.

Salinity levels

4.258 Salinity is the concentration of dissolved salts in water or soil. Salt is a natural feature of the basin, however human alteration of the basin landscape for irrigation and land clearing can increase the mobilisation of salt, which can lead to salt concentration in some areas of the basin landscape. Salinity is an issue throughout the basin, not just in the Lower Lakes and Coorong.

4.259 The origin of the salt in the basin is multifaceted. There is the underlying salt that resides in the basin sediments as a result of sea incursions thousands of years ago and there is considerable evidence of aeolian (wind-blown) salt deposits together with salts from the gradual erosion and dispersion of bedrock minerals.

In the south-eastern uplands of the Murray-Darling Basin, a common conception has been that salt is sourced from the whole landscape, being present in the overall geology or groundwater systems. This includes connate salts coincident with deposition (as in marine sediments) or salts derived from subsequent weathering processes. More recently, it has become accepted that salts have been introduced to the landscape rather than being derived in situ from bedrock. This can be by rainfall accessions with evapotranspiration causing accumulation of oceanic cyclic salts in the

soil profile. Salts can also be associated with silty clay deposits derived from wind-blown sources...[these are] significant for the south-eastern margins of the Murray-Darling basin. Such surficial deposits can be the dominant source of salt in these catchments and when saturated or mobilised become a driver for dryland salinity¹⁸⁶

4.260 Coupled with these sources is the constant deposition of salt laden ground water that resides in aquifers alongside the river systems. In some regions of the Pliocene Sands aquifer north of Renmark SA the groundwater is hypersaline:

Towards the end of the south-west directed groundwater flow path, [south across the basin toward Renmark] the watertable is relatively shallow (< 30 m) and the Pliocene Sands represent the shallow watertable aquifer. Groundwater salinities commonly exceed sea water concentrations (35,000 mg/L) and may become hypersaline (>100,000 mg/L) under salt lakes. The groundwater in the aquifer can also be highly stratified.¹⁸⁷

4.261 This salt is slowly released into the river system due to a variety of reasons – soil degradation, removal of vegetation, raising water tables, seeps along the edges of aquifers etc. This salt must eventually be flushed out of the basin down the Murray River and out through the Murray Mouth to the sea.

4.262 The MDBA's website states that if salinity is not managed appropriately, it 'has serious implications for water quality, plant growth, biodiversity, land productivity and the supply of water for critical human needs.'¹⁸⁸

4.263 Mr David Dreverman, Executive Director, River Management Division, MDBA stated that a large proportion of the salt in the system comes from the landscape in South Australia:

Typically the salinity will double—the salt load will double—between the South Australian border and Morgan, which is the reference point we use in South Australia, so probably about half.¹⁸⁹

4.264 However, a fair proportion of the salt coming over the border originated in the Mallee region of Victoria due to its levels of salt:

But, of the salt that enters the Murray in South Australia, a fair part comes from groundwater systems that are primed from country in the Mallee in Victoria. That is really ancient salt that has been moving through that

186 P.N. Bierwirth and R.S. Brodie, Bureau of Rural Sciences, *Developing a salt source model for the Murray-Darling Basin from natural soil-radioactivity and geological data*, 2004, pp.4–5.

187 Geoscience Australia, *Assessment of groundwater resources in the Broken Hill region*, Professional opinion 2008/05, prepared for the Australian Government Department of the Environment, Water, Heritage and the Arts, September 2008, p. 51.

188 MDBA, <http://www.mdba.gov.au/managing-water/salinity> (accessed 17 February 2016).

189 Mr David Dreverman, Executive Director, River Management Division, MDBA, *Committee Hansard*, 5 February 2016, p. 45.

landscape for thousands of years, because the travel in a year is maybe less than 10 metres.¹⁹⁰

4.265 Salinity levels have been one of the key factors in securing additional water for the rivers in the basin, and strategies to manage salinity and water quality have been in effect from the 1980s.¹⁹¹

4.266 The MDBA's submission stated that coordinated, cross-jurisdictional salinity management has improved salinity in the southern river reaches of the basin:

The important improvements in salinity and water quality already observed in the southern river reaches are a further demonstration of the success that comes from years of coordinated management by multiple governments. Salinity has been gradually reduced through cooperation between governments, land management and smart engineering, such as salt interception schemes.¹⁹²

4.267 Further, the MDBA explained that various measures including salt interception schemes and improving farming practices had dramatically improved salinity in the lower reaches of the basin:

Yes, it is one of the really good news stories of joint action by governments over the last 30 years, not only salt interception schemes but also all the things that people have done in improving irrigation and irrigation districts and improving drainage. There is also the combination with the drought. The salinities for the last year and a half have been about 300 EC at Morgan [SA]. Back in the 1980s there were times when it was consistently over 1,200 EC.¹⁹³

4.268 However, salinity requires ongoing management. In response to questions from the committee, the SA government stated that the basin salinity management program:

...continues to successfully manage the salinity threat across the Murray-Darling Basin to protect the environment, irrigated agriculture, industry and critical human water supplies from adverse effects of high salinities.¹⁹⁴

4.269 The SA government noted the General Review of Salinity Management in the Murray-Darling Basin undertaken in 2014, which 'showed that salinity remains an ongoing risk requiring a continued joint government management response.'¹⁹⁵

190 Mr David Dreverman, Executive Director, River Management Division, MDBA, *Committee Hansard*, 5 February 2016, p. 45.

191 MDBA, *Submission 243*, p. 4.

192 MDBA, *Submission 243*, p. 32.

193 Mr David Dreverman, Executive Director, River Management Division, MDBA, *Committee Hansard*, 5 February 2016, p. 45.

194 SA government, responses to questions on notice, received 17 February 2016, p. 7.

195 SA government, responses to questions on notice, received 17 February 2016, p. 7.

4.270 This review recommended the development of the now active Basin Salinity Management 2030 (BSM2030) strategy, which was released in November 2015.¹⁹⁶ This strategy builds on previous salinity management practices to manage salinity as the Plan is implemented and includes the continuation of salt interception schemes.

4.271 The strategy also builds on the findings of the Report of the Independent Audit Group for Salinity 2013-14, also released in 2015.¹⁹⁷ This report concluded that salinity management was a key issue that required continuing management through various water management mechanisms including environmental watering and salt interception schemes.¹⁹⁸

Salt interception schemes

4.272 In addition to ensuring water flows through the system, the MDBA coordinates salt interception schemes to keep salinity at agreed levels.¹⁹⁹ Mr Dreverman stated that it was imperative to continue running salt interception schemes and ensure the management of the basin kept salinity levels in check:

All of our recent studies indicate that it is only that good because of not only all the things that we have done in those 30 years and the investments made but also the fact that we continue to operate all those salt schemes.²⁰⁰

4.273 Furthermore, the Independent Audit Group for Salinity report recommended that when developing the BSM2030 strategy, consideration be given to a risk-based, responsive approach to the management of such schemes, while still aiming to meet salt reduction targets.²⁰¹

4.274 This included:

- the efficiency of schemes and the consequences of closing systems down for periods of time
- the costs of running the scheme versus its effectiveness in reducing salinity impacts
- the costs and timeliness of restarting systems versus the potential impacts over time of not operating the system
- the practicality of running [the schemes] in a responsive way.²⁰²

196 Basin Salinity Management 2030 (BSM2030), p. vii, via MDBA website: <http://www.mdba.gov.au/publications/mdba-reports/basin-salinity-management-2030> (accessed 17 February 2016).

197 Independent Report, via MDBA website, <http://www.mdba.gov.au/sites/default/files/pubs/IAG-Salinity-report-2013-14.pdf> (accessed 18 February 2016).

198 Basin Salinity Management 2030 (BSM2030), pp 7–10.

199 MDBA, *Submission 243*, p. 4.

200 Mr David Dreverman, Executive Director, River Management Division, MDBA, *Committee Hansard*, 5 February 2016, p. 45.

201 Basin Salinity Management 2030 (BSM2030), p. 8.

202 Basin Salinity Management 2030 (BSM2030), p. 8.

4.275 The BSM2030 strategy also noted that even with current successes and the additional benefit of environmental water as a result of the Plan, salt interception schemes will still be required. However, the strategy states that the management of salt interception schemes can be modified to respond to forecast river salinity:

Nonetheless, the modelling suggests that it may be possible to vary the operation of salt interception schemes in response to forecast river salinity. This would involve running the salt interception schemes at full capacity only in periods of high salinity risk or when salinity is forecast to be a problem.²⁰³

Committee view

4.276 The committee recognises that salinity levels are an issue throughout the basin, not just in the Lower Lakes and Coorong. The committee is aware that salinity levels were one of the key drivers in securing additional water for rivers in the basin.

4.277 The committee notes the improved salinity levels and supports ongoing management of salinity in the basin.

4.278 The committee is not persuaded that the best means of dealing with salinity in the south-east of South Australia is to drain saline water into the river system and then dilute it through increased flow of fresh water. In addition, it considers there are options to increase surface flows from the south-east of South Australia directly into the lower Coorong (a 'Coorong Surface Inflows Restoration Project') which could avoid at least some of these effects.

Recommendation 30

4.279 The committee recommends that the MDBA work with basin state governments to investigate the efficiency and effectiveness of salt interception schemes and combine their use and other complementary measures to manage salinity in the basin.

Recommendation 31

4.280 The committee recommends the Commonwealth fund and facilitate accelerated work on the restoration of surface flows from the south-east of South Australia into the lower Coorong, and undertake a feasibility study into the potential for redirecting all existing drainage discharges from the South East into the Coorong.

203 Basin Salinity Management 2030 (BSM2030), p. 6.

Senator David Leyonhjelm
Chair