The Senate

Rural and Regional Affairs and Transport References Committee

The management of the Murray-Darling Basin

March 2013

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Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABC	Australian Broadcasting Corporation
ABS	Australian Bureau of Statistics
ACF	Australian Conservation Foundation
ANAO	Australian National Audit Office
Basin Plan	Murray-Darling Basin Authority's Proposed Basin Plan
BDL	Baseline Diversion Limit
CEO	Chief Executive Officer
CMA	Catchment Management Authority
CRC	Cooperative Research Centres
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry
ESLT	Environmentally Sustainable Level of Take
EWP	Environmental Watering Plan
GL/y	gigalitres per year
The Guide	Murray-Darling Basin Authority's Guide to the proposed Basin Plan
LTCE	Long-Term Cap Equivalent
MDBA	Murray-Darling Basin Authority
ML	megalitres
NFF	National Farmers' Federation
NVIRP	Northern Victoria Irrigation Project
NWC	National Water Commission
NWI	National Water Initiative

PEL	Preliminary Extraction Limit
R&D	Research and Development
RAMROC	Riverina and Murray Regional Organisation of Councils
RRAM	Recharge Risk Assessment Method
SDL	Sustainable Diversion Limit
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SRWUIP	Sustainable Rural Water Use and Infrastructure program
WALs	Water Access Licences
Water Act	*Water Act 2007*
WAVES	Water Vegetation Energy and Solute
Wentworth Group	The Wentworth Group of Concerned Scientists
Windsor Report	House of Representatives Standing Committee on Regional Australia, *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan*, May 2011

LIST OF RECOMMENDATIONS

Recommendation 1

2.39 The committee recommends that the Murray-Darling Basin Authority develop a concise and non-technical explanation of the hydrological modelling and assumptions used to develop the 2750 GL/y return of surface water to the environment, to be made publicly available.

Recommendation 2

2.58 The committee recommends that the MDBA specifically include the predicted range of impacts of climate change on water runoff when implementing the relevant risk management strategies under chapter 4 of the Basin Plan.

Recommendation 3

2.59 Consistent with Recommendation 20, the committee recommends that the government develop a clear research strategy on the future impacts of climate change on water runoff in the Basin. The strategy should also include a process for integrating the results of the research into the adaptive management process under the Basin Plan.

Recommendation 4

2.70 The committee recommends that the MDBA model a range of possible future intercept scenarios and publish the results so that each state can better plan for the impacts of the interception on its overall consumptive water allocation.

Recommendation 5

2.71 The committee recommends that, in undertaking its adaptive management approach to the Basin Plan, the Murray Darling Basin Authority clearly considers, assesses and incorporates all elements that could impact environmental watering requirements. This includes climate change, interception activities, coal seam gas mining, surface-groundwater connectivity and possible negative effects such as over watering caused by increased river flows. This information should be clearly set out in non-technical language and be made publicly available in a timely manner.

Recommendation 6

3.48 The committee recommends that before 2016 the MDBA undertake a thorough review of the groundwater aspects of the Basin Plan including:

- **the methodology and the assumptions underpinning the groundwater BDLs and SDLs; and**
- **the connectivity of all groundwater and surface water resources to ensure that the modelling used in the Basin Plan is scientifically sound.**

Recommendation 7

3.49 The committee also recommends that in conducting this review the MDBA should consult with a range of scientific experts. To ensure reliability, the final review findings should be peer reviewed by the CSIRO. To ensure transparency, the results of the review should be published by the MDBA.

Recommendation 8

4.21 The committee recommends the MDBA conduct further research into how effective the works and measures programs are for delivering environmental outcomes and the cost effectiveness of such projects in comparison to other forms of water recovery. This research should also include the socio-economic impacts to irrigation communities of increased levels of 'buyback'.

Recommendation 9

4.22 The committee recommends that the MDBA and SEWPaC provide ongoing public updates to Basin stakeholders on progress in securing water savings from environmental works and measures.

Recommendation 10

4.47 The committee recommends that greater detail on the socio-economic costs and benefits of any proposed constraints removal be presented to affected communities and the public in general. Such information should be publicly updated in a timely manner when changes occur or new information is obtained by the MDBA and SEWPaC.

Recommendation 11

4.48 The committee recommends that further consultation regarding constraints management and the additional 450 GL/y should remain a high priority for the MDBA and SEWPaC. To ensure consultation is adequately undertaken, the committee recommends that the MDBA and SEWPaC develop and publish a strategy that identifies and provides solutions for previous shortcomings (see chapter seven) in the government's consultation process for developing the Basin Plan.

Recommendation 12

5.28 The committee recommends that the government develop a water trading information and support program aimed at helping possible "distressed sellers" understand their financial options and risks relating to water trading.

Recommendation 13

5.40 The committee recommends that the government undertakes explicit auditing and reporting of the extent and impact of sleeper and dozer licences on the Basin Plan.

Recommendation 14

5.41 The committee recommends this audit be publicly released and that updated audit information is incorporated into the MDBA's reporting on the Basin Plan at regular intervals.

Recommendation 15

6.26 The committee recommends that the MDBA commission an independent review of the possible effects of using a range of assumptions of water entitlements types (e.g. high and low reliability) in the hydrological and socio-economic modelling of the Basin Plan. In the case where the results for certain water entitlement assumptions show that the objectives of the plan will be compromised, the MDBA should develop a policy which will ensure that this arrangement of water entitlements will not be realised.

Recommendation 16

6.49 The committee recommends that the Australian National Audit Office (ANAO) review the Nimmie-Caira proposal. To the extent possible and in collaboration with the NSW Audit Office if necessary, the review should amongst other things examine the process undertaken by relevant parties for determining the value of all aspects of the Nimmie-Caira proposal. The review should also examine any factors that may impact on the value for money for the government and the tax-payer of the proposal should it proceed. The ANAO should report on this review prior to the approval of the Nimmie-Caira proposal by the Department of Sustainability, Environment, Water, Population and Communities.

Recommendation 17

7.40 The committee recommends that the MDBA update the socio-economic modelling of the local impacts of the Basin Plan. There should be a strong focus on the communities likely to be most affected by the Basin Plan and strategies should be developed to address the impacts. All such information should be publicly released and presented in a form that is accessible to stakeholders, local

community members, and parliamentarians. This modelling should also include tabular or graphical data depicting the location and volumes of buyback on an irrigation district basis.

Recommendation 18

7.54 The committee recommends that the government develop a formal process for long-term and integrated engagement with key stakeholders on the implementation of the final Basin Plan.

Recommendation 19

7.69 The committee recommends that the MDBA provide a clear explanation of how 'localism' is to be implemented under the Basin Plan.

Recommendation 20

8.8 The committee recommends that the government develop and publish a detailed policy for agricultural productivity, environmental and water resource R&D in the Murray-Darling Basin. This policy should reflect a greater priority in this area and incorporate the specific research areas identified in recommendations throughout this report.

Recommendation 21

8.18 That the Government commission the Australian Bureau of Agricultural and Resource Economics and Sciences to undertake a cost-benefit analysis of potential water-efficient crops (including non-paddy rice) in the Murray-Darling Basin.

Recommendation 22

8.40 The committee recommends that the government commission research into innovative agricultural soil use and farming practices that will improve agricultural productivity and water efficiency in the Murray-Darling Basin.

Recommendation 23

8.49 The committee recommends that the government prioritise R&D into water infrastructure to meet the needs of farming communities, agricultural production, and the environmental health of the Murray-Darling Basin.

Executive Summary

The Murray-Darling Basin is without doubt one of the most important river systems in Australia. It contains 11 per cent of Australia's population and generates agricultural production worth $15 billion per annum (in gross value terms). This represents 40 per cent of Australia's total agricultural production and 65 per cent of Australia's irrigated farms.[1]

The Basin is also home to many of Australia's key riverine environmental sites. The ongoing health of the river system is essential for sustaining these important water-dependent ecosystems and the ecosystem services they provide; the long-term agricultural productivity of the Basin; as well as the regional and rural communities which depend on a healthy river for their livelihoods.

Over several decades the health of the Basin system has deteriorated through a combination of increased water extraction (especially in the 1970s, 1980s and early 1990s) and the many years of drought until 2010 (the millennium drought).

The increased rainfall of recent years has given some reprieve to the potentially devastating environmental, agricultural and social consequences of the millennium drought. However the inevitability of future droughts (which may be even more severe) requires the implementation of a Basin Plan which effectively manages the social, economic and environmental risks facing the Basin system to ensure a sustainable and productive future for the Basin. It is with this in mind that the committee welcomes the tabling of the Basin Plan in Parliament late last year. The committee commends the work of the Australian government, the Basin states and the MDBA for one of the most significant water reforms in Australia's history.

Because of the need to balance a range of competing interests, the Basin Plan strikes a necessary yet imperfect compromise. Over the course of the committee's inquiry, much of the evidence received highlighted concerns with the various iterations of Basin Plan. The committee's second interim report of October 2012 discussed many of these issues prior to the presentation of the final Basin Plan to Parliament in November 2012. However, some issues with the final Basin Plan remain. While the committee is mindful that this report will not change the substance of the Basin Plan, it considers that the evidence received and recommendations made in this report and previous reports make a significant contribution to the ongoing public debate about the management of the Murray-Darling Basin. It also urges the government to consider the report's recommendations as part of the adaptive management framework that will be used to implement the Basin Plan.

The key findings of this report are as follows:

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1 ABS, *Completing the Picture - Environmental Accounting in Practice*, 4628.0.55.001, May 2012, p. 66.

Surface water

The committee remains concerned about how the 2750 GL/y reduction in the environmentally sustainable level of take (ESLT) was determined by the Murray-Darling Basin Authority (MDBA). While the committee acknowledges the additional modelling of reduction scenarios that occurred just prior to the release of the final Basin Plan, this modelling could have been produced in a more timely manner and covered additional reduction scenarios.

Furthermore, the committee considers that future pressures on water resources due to the projected range of climate change impacts and run-off interceptions predictions should have been more thoroughly considered in the modelling and that more research in these areas is needed. In addition, despite the volumes of information released about surface water, the MDBA needs to improve how key information is presented to stakeholders and the Australian public. The committee expects that these issues will be the subject of further government-funded research and will also be key considerations for the MDBA in its adaptive management processes.

Groundwater

The committee remains concerned with how the proposed extraction limits on groundwater have increased significantly since the Guide and subsequently changed across various iterations of the Basin Plan. The committee is of the view that the reasons for such changes have not been adequately explained. Furthermore, the committee is concerned with the limitations in knowledge about groundwater and surface water connectivity and that the Basin Plan does not apply a more precautionary approach where these knowledge gaps exist. While the committee acknowledges the steps taken by the MDBA to update information about groundwater in the Basin, it considers that further research in surface water and groundwater connectivity should be a high priority.

Infrastructure investment, environmental works and measures and constraints management

The committee welcomes the use of environmental works and measures and other water infrastructure projects to improve water efficiency in the Basin. It also supports the target that environmental works and measures to contribute as much as 650 GL/y of the 2750 GL/y reduction in take through the application of the adjustment mechanism. The committee urges the government to assist Basin states in reaching this target and to keep Basin stakeholders informed of the progress, as the committee is concerned of the uncertainty created of any shortfall in the 650 GL/y being made up by water entitlement buybacks.

The committee welcomes the consideration of constraints removal in the Basin system to return an additional 450 GL/y to the environment. However, the committee is concerned about the potential consequences that this may have on landholders and communities in certain parts of the Basin. The committee acknowledges the requirement of the MDBA for consultation when proposing constraints removal and it encourages the MDBA to do so in a manner that is comprehensive, timely and that fully addresses stakeholder feedback.

Water trading

The committee considers that the over-allocation of water entitlements in the Basin in previous decades is a major source of the current water scarcity problems faced in the Basin. The committee recognises that the development of diversion limits under the Basin Plan addresses this issue.

The committee remains concerned that there is limited information about the extent of sleeper and dozer water licences in the Basin and how their activation and trade may impact on the management of water resources in the Murray-Darling Basin.

The committee also remains concerned about the conduct of the government buyback program of water entitlements. In particular, its inquiry found that a number of stakeholders and rural communities had felt increased cost pressures resulting from the 'Swiss cheese' effect caused by non-strategic buybacks creating gaps in water delivery and that many sellers of water entitlements sold entitlements under financial distress. Although the majority of water buybacks have been completed, the committee urges the government to address these two issues when conducting the remaining buybacks.

Types of water entitlements

The committee was concerned about how the different types of water entitlements were addressed in the modelling used to develop the Basin Plan. While it was acknowledged by relevant government officials that the use of different types of water entitlements (or reliability types) could have a significant impact on the water resources outcomes achieved in the Basin, the committee was not provided with convincing evidence that this issue was adequately addressed. The committee also heard evidence that raised concerns about the value for money of the buyback scheme due to different water entitlement types. In this regard the committee took evidence about the Twynam water purchase and the proposed Nimmie-Caira irrigation area buyback.

Socio-economic impacts and stakeholder engagement

The committee heard evidence about the limitations of the socio-economic modelling of the Basin Plan. It also took evidence from rural communities and stakeholders that stated that social and economic consequences of the Basin Plan would be serious for many rural communities. In addition, the committee heard of some significant gaps in the conduct of the government's consultation process over the Basin Plan despite the high number of consultation meetings that were conducted. The committee also heard that while the MDBA has embraced the concept of 'localism' in its future work on the Basin Plan there was confusion among stakeholders about how this concept would apply in practice.

Future research

Finally, the committee found that research and development (R&D) was essential to the ongoing implementation of the Basin Plan and solving many of the issues facing the Basin system. In particular, the committee considers that R&D should be improved in five key areas:

- possibilities for improved water efficiency through crop use such as non-paddy rice;
- future changes in water interception due to changing farm practices;
- surface water and groundwater connectivity;
- soil use and management; and
- improved water efficiency from infrastructure projects.

The committee considers that R&D should be fully and explicitly integrated into the MDBA's adaptive management approach to the Basin Plan.

Chapter 1

Introduction

1.1 This is the final report of the Senate Rural and Regional Affairs and Transport References Committee's (the committee) inquiry into the management of the Murray-Darling Basin (the inquiry). The Basin Plan is one of the most significant and strongly debated water reforms in Australian history. This report examines the development of the Basin Plan and the likely consequences that it and related government policies will have on the Murray-Darling Basin in the coming years and decades. Although the Basin Plan is now in place, the committee considers that the evidence and recommendations in this report can provide valuable input into the ongoing adaptive management process that is central to the implementation of the Basin Plan.

Information about the inquiry

1.2 The Senate referred the inquiry to the committee on 28 October 2010. The committee is required to deliver this final report on 13 March 2013. The inquiry's terms of reference specifically require the committee to investigate the 'the development and implementation of the Basin Plan.'[1] The full terms of reference are included in Appendix 1.

1.3 The inquiry has received 381 submissions (including many in relation to the coal seam gas interim report tabled on 30 November 2011). The committee held a total of 14 public hearings in Canberra and interstate. A list of submissions and witnesses can be found in appendices 2 and 3 respectively.

1.4 Due to the extensive changes between the Guide and the final Basin Plan, this final report focuses on evidence received since the tabling of the interim report on coal seam gas in November 2011. In particular, the evidence presented draws extensively on the committee's hearings between April and November 2012 as these relate most directly to the final Basin Plan tabled in Parliament in November 2012. Where appropriate, the final report also covers issues that were discussed in the committee's second substantive interim report tabled on 3 October 2012.

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1 Note: for the purposes of the report, the Guide to the Proposed Basin Plan will be referred to as 'the Guide' and the various iterations of the Proposed Basin Plan and the final Basin Plan, will be referred to as 'the Basin Plan'. Where it is necessary to refer to the specific iterations of the Basin Plan (except the final version) the versions will be identified by the month of release i.e. the Basin Plan (November 2011), the Basin Plan (May 2012), the Basin Plan (August 2012), and the final Basin Plan. Please note that where direct quotes are used the original nomenclature remains.

Acknowledgements

1.5 The committee would like to thank all those organisations and individuals that have made submissions to the inquiry and appeared as witnesses at public hearings. The committee is mindful that because of the length of the inquiry and the significant changes to the Basin Plan since the release of the Guide, a large number of early submissions to the inquiry are not referenced in the interim or final reports. This is essentially because the detail contained in those submissions has become outdated due to the significant changes that have occurred during the development of the Basin Plan. However, the committee considers that the early submissions referring to the Guide were essential in shaping the committee's thinking throughout the inquiry and contributing to the public debate about the development of the Basin Plan.

Note on references

1.6 References to committee Hansard are to the proof versions. Page numbers may vary between the proof and official version of the Hansard. Evidence referred to in the final report draws primarily on the committee Hansards. However, due to the wide ranging issues relevant to the development and implementation of the Basin Plan, where appropriate, the committee has drawn on additional information from various government and parliamentary reports and research papers.

Structure of the report

1.7 The report is divided into eight chapters as follows:

- Chapter 1 outlines the conduct of the inquiry (including the two interim reports), the structure of the report, and background to the development of the Basin Plan and associated policies and legislation.
- Chapter 2 discusses the management of surface water under the Basin Plan including the modelling for the sustainable diversion limits (SDLs), the baseline diversion limits (BDLs), the 2750 GL/y reduction in the environmentally sustainable level of take (ESLT) and the relaxed constraints 3200 GL/y reduction in ESLT scenario.[2]
- Chapter 3 discusses the treatment of groundwater SDLs, BDLs, and the increased groundwater extraction under the Basin Plan including the issue of surface water and groundwater connectivity.
- Chapter 4 reviews the use of infrastructure investments, environmental works and measures and the constraint management strategy under the Basin Plan.

2 For the purposes of this report the terms "environmentally sustainable level of take", "ESLT", "reduction in take" and "return of additional water to environment" are used interchangeably especially in regards to the 2750 GL/y figure.

- Chapter 5 details the trade in water across the Basin and notes the issues of sleeper licences, distressed sellers and the 'Swiss cheese' effect.
- Chapter 6 outlines the different types of water entitlements in the Basin and the impact these have on the development and implementation of the Basin Plan.
- Chapter 7 discusses the socio-economic impacts of the Basin Plan and the process and criticism of stakeholder and industry engagement by the Murray-Darling Basin Authority (MBDA) and the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC).
- Chapter 8 notes future areas of research and development that the committee identified would assist in developing a more environmentally, social and economically productive and sustainable Basin system.

Interim reports

Coal Seam Gas – Murray-Darling Basin interim report

1.8 Over the course of this inquiry, the committee received evidence about the impact of coal seam gas (CSG) mining on the Murray-Darling Basin. This evidence is set out in more detail in the committee's interim report, *Management of the Murray-Darling Basin Interim Report: the impact of mining coal seam gas on the management of the Murray-Darling Basin*.[3] The report had additional terms of reference, took submissions (submission numbers from about 200 to 370 relate to CSG mining), and reported with 24 recommendations on 30 November 2011.

1.9 The report examined the economic, social and environmental impacts of CSG mining on matters including: the sustainability of water aquifers; water licensing arrangements; landholder's property rights and values; prime agricultural land; the food task; and regional towns and communities. North-west New South Wales and south-west Queensland were the main regions of focus due to the rapid expansion of the industry in these areas.

Second interim report: the Basin Plan

1.10 The purpose of the second interim report was to detail the committee's concerns with the MDBA's Basin Plan as at October 2012. The committee's concerns arose from criticisms about the Basin Plan and its development identified by a wide variety of stakeholders including farmers, rural communities, scientists, and environmentalists. Because the Basin Plan is a legislative instrument, the Parliament

3 Senate Rural and Regional Affairs and Transport References Committee, *Management of the Murray-Darling Basin Interim Report: the impact of coal seam gas on the management of the Murray-Darling Basin*, November 2011.

had no ability to debate amendments to improve the Basin Plan. The Basin Plan was either to be agreed to as presented or disallowed in its entirety.

1.11 The report made eight recommendations covering the topics of surface water, groundwater, environmental outcomes and socio-economic impacts of the Basin Plan.

1.12 At the time of the interim report (3 October 2012), the Minister for Sustainability, Environment, Water, Population and Communities, the Hon Tony Burke MP, had stated his intention to present the Basin Plan to Parliament before the end of 2012. As noted below, the final Basin Pan was tabled in Parliament 26 November 2012 and commenced the following day.[4]

Background to water regulation and the Basin Plan[5]

1.13 This background section briefly outlines key historic water regulations relating to the Murray-Darling Basin. The 1995 Cap on diversions, National Water Initiative (NWI), the *Water Act 2007* (Water Act), and the background to the development of the Basin Plan including the Guide will be discussed in turn.

Basin-wide cap

1.14 Due to concerns about the increase in water extraction in the Murray-Darling Basin in the 1980s and 1990s, the Murray-Darling Basin Ministerial Council (ministerial council)[6] published an audit of the use of water resources in the Basin. The audit found that from 1988 to 1994, there was a 7.9 per cent increase in the overall water consumption in the Basin to 10 780 GL/y. The audit also found 'that average diversions could increase by a further 14.5 per cent if expansion under 1993/94 management rules was unrestricted'.[7]

1.15 Due to the results of the audit, the ministerial council decided in June 1995 to introduce an interim cap on diversions from the Basin – this was later made permanent and effective from 1 July 1997. The cap is subject to some state variations, and in

4 As noted below, the Basin Plan effectively passed the Parliament after defeated disallowance motions in the House of Representatives on 29 November 2012 and the Senate on 28 November 2012. However, its commencement is the day following registration with an exception is made for chapter 12 which commences on 1 July 2014, see *Basin Plan*, section 1.04.

5 Note: paragraphs 1.19 to 1.33 are largely reproduced from the committee's second interim report.

6 The ministerial council consists of ministers responsible for environment, land and water resources from the Commonwealth, Australian Capital Territory, New South Wales, Queensland, South Australian and Victorian governments.

7 Murray-Darling Basin Commission, *The Cap: Providing security for water users and sustainable rivers*, www2.mdbc.gov.au/__data/page/86/cap_brochure.pdf, p. 2 (accessed 1 March 2013).

New South Wales and Victoria it defined as 'the volume of water that would have been diverted under 1993/94 levels of development'.[8] The other Basin states and territory (Queensland, South Australia and the Australian Capital Territory) 'have agreed to different levels of development as their Cap.'[9] States are responsible for their own compliance with the cap, however, annual audits are undertaken and where a breach of the cap occurs, it needs to be explained and actions and timeframes for compliance have to be reported to the ministerial council.[10] The cap is now governed by the *Water Act 2007* and in 2019 it will be replaced by the Basin Plan's sustainable diversion limits.[11]

National Water Initiative

1.16 In 2004, the Council of Australian Governments (COAG) agreed to establish a 'national blueprint of water reform' called the NWI. The NWI – implemented through the Water for the Future program – aims to improve Australia's water efficiency with COAG governments agreeing to:

- prepare comprehensive water plans;
- achieve sustainable water use in over-allocated or stressed water systems;
- introduce registers of water rights and standards for water accounting;
- expand trade in water rights;
- improve pricing for water storage and delivery; and
- better manage urban water demands.[12]

1.17 The National Water Commission (NWC) conducts biennial reports into the implementation of the NWI and completed reports in 2007, 2009 and 2011.

Water Act 2007

1.18 The Water Act came into effect on 3 March 2008 and provides the framework for major reforms in the management of water resources in Australia. Prior to the Water Act, Australia's water resources were managed predominantly by individual states and territories. For the Murray-Darling Basin, the relevant states signed the River Murray Waters Agreement in 1914 (which later provided for the Murray-

8 Murray-Darling Basin Commission, *The Cap: Providing security for water users and sustainable rivers*, www2.mdbc.gov.au/__data/page/86/cap_brochure.pdf, p. 2 (accessed 1 March 2013).

9 MDBA, www.mdba.gov.au/programs/the-cap (accessed 1 March 2013).).

10 Murray-Darling Basin Commission, *The Cap: Providing security for water users and sustainable rivers*, www2.mdbc.gov.au/__data/page/86/cap_brochure.pdf, pp 4–5, (accessed 1 March 2013).

11 MDBA, www.mdba.gov.au/programs/the-cap (accessed 1 March 2013).

12 SEWPaC, National Water Initiative, www.environment.gov.au/water/australia/nwi/index.html (accessed 1 March 2013).

Darling Basin Commission) and water reforms required agreement in all states to proceed.[13] The Water Act was a departure from this and for the first time the states signed over some of their water responsibilities to the Commonwealth. In particular, the Water Act provides for the following:

- the establishment of the Murray-Darling Basin Authority (MDBA) with the functions and powers to ensure that Basin water resources are managed in an integrated and sustainable way;
- the requirement of the MDBA to develop the Basin Plan;
- the establishment of the Commonwealth Environmental Water Holder (CEWH) to manage the Commonwealth's environmental water portfolio, including restoring environmental assets of the Murray-Darling Basin;
- the Australian Competition and Consumer Commission (ACCC) being given a major role in developing and enforcing water charge and water market rules in line with the NWI; and
- the Bureau of Meteorology having additional water information functions.[14]

1.19 The objects of the Water Act were to provide clear parameters about the management of the Basin's water resources, including to:

- give effect to relevant international agreements relevant to the use and management of Basin water resources;
- promote the use and management of the Basin water resources 'in a way that optimises economic, social and environmental outcomes', which includes the return to environmentally sustainable levels of take;
- improve water security of the Basin water resources;
- ensure that the management of Basin water resources takes into account the broader management of natural resources in the Basin.[15]

1.20 The legislative objectives are discussed in further detail in the Senate Legal and Constitutional Affairs References Committee report, *A Balancing Act: provisions of the Water Act 2007*.[16]

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13 SEWPaC, www.environment.gov.au/water/australia/water-act/index.html (accessed 1 March 2013)

14 SEWPaC, the Water Act, www.environment.gov.au/water/australia/water-act/index.html (accessed 1 March 2013).

15 Section 3 of the *Water Act 2007*.

16 Senate Legal and Constitutional Affairs References Committee, *A Balancing Act: provisions of the Water Act 2007*, June 2011.

1.21 As noted above, a key part of the legislation was the development of a Basin Plan and the MDBA undertook a lengthy consultation and drafting process to develop this Basin Plan. The steps undertaken by the MDBA are outlined briefly below.

Guide to the Proposed Basin Plan, October 2010

1.22 In October 2010, the MDBA released the *Guide to the proposed Basin Plan* (the Guide) which outlined proposals for public consultation. In its release, the MDBA stated the Guide was the 'landmark first-stage document in the process of establishing a plan' for the long-term management of the Basin.[17] The MDBA stated that the Guide was for 'consultation purposes only' and that it was intended to facilitate discussion on proposals for further refinement.[18]

1.23 The Guide proposed that the additional surface water needed to achieve desired environmental outcomes was between 3000 and 7600 GL/y. However, the MDBA determined that reductions in take greater than 4000 GL/y would not meet certain requirements of the Water Act and, therefore, explored scenarios ranging from 3000 to 4000 GL/y.[19]

1.24 The Guide, and the subsequent consultation process, was subject to significant and vigorous public debate. This debate has been outlined in multiple public reports, including the House of Representatives committee inquiry into the impact of the Murray-Darling Basin Plan in Regional Australia report titled, *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan*.[20] The government (including MDBA and SEWPaC) responded to a number of issues raised in this report when developing the Basin Plan.

Proposed Basin Plan, November 2011

1.25 Based on stakeholder feedback, the MDBA continued to amend proposals (from the Guide) to manage the Basin system and on 28 November 2011 released the first version of the Basin Plan (November 2011). Again, this document was developed for the purposes of further consultation. Accompanying the Basin Plan (November 2011) was the *Plain English Summary of the proposed basin plan* which attempted to set out the key aspects of the proposals in easy to understand language.

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17 MDBA, *Basin Guide released for public consultation*, 8 October 2010, www.mdba.gov.au/media_centre/media_releases/basin-plan-guide-released-for-public-discussion, (accessed 17 September 2012).

18 MDBA, *Guide to the proposed Basin Plan*, Volume 1, Overview, 8 October 2010.

19 MDBA, *Guide to the proposed Basin Plan*, Volume 1, Overview, 8 October 2010, pp xxi and 125–128.

20 House Standing Committee on Regional Australia, *Of drought and flooding rain: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan*, May 2011, www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=ra/murraydarling/report.htm.

1.26 In Basin Plan (November 2011), the MDBA outlined the specific long-term ESLT including the target of a reduction in take of 2750 GL/y in surface water to achieve certain environmental outcomes. This plan also proposed increases to the levels of groundwater SDLs from 2095 GL/y in the Guide to 4340 GL/y (see chapter 3).[21] The Basin Plan (November 2011) was followed by a 20-week consultation period. It was intended that the results of this consultation period would 'inform the development of the Basin Plan.'[22]

Proposed Basin Plan – a revised draft, May 2012

1.27 Following this consultation period, the MDBA released a revised draft of the Basin Plan in May 2012.[23] This version incorporated changes which were raised during the consultation process and also reflected new information. Supporting Basin Plan (May 2012) was a summary of the changes and information received through the MDBA's public consultation process. The Basin wide return of surface water to the environment remained at 2750 GL/y; however, the total groundwater SDL figures had been reduced from 4340 GL/y to 3184 GL/y.[24]

1.28 The Basin Plan (May 2012) was provided to the Murray-Darling Basin ministerial council. The ministerial council had a six-week period to consider and comment on the Basin Plan (May 2012) and make suggested changes.[25]

Ministerial council comments on draft Proposed Plan

1.29 On 9 July 2012, the ministerial council provided the MDBA with its additional comments on Basin Plan (May 2012). The comments raised by the ministerial council as a whole included:

- a sustainable diversion limit (SDL) adjustment mechanism to be developed which recognises works and measures, investment in infrastructure and on-farm water efficiency to recover water;
- further modelling of a 3200 GL/y without constraints scenarios to be undertaken to determine what environmental outcomes may be achieved;
- equitable downstream apportionment and water recovery to be divided fairly between states;

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21 MDBA, *Proposed Basin Plan consultation report*, May 2012, p. 46.

22 MDBA, *Plain English summary of the proposed Basin Plan*, November 2011, p. vii.

23 MDBA, *Proposed Basin Plan – a revised draft*, May 2012, http://download.mdba.gov.au/revised-BP/PBP_reviseddraft.pdf.

24 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 2.

25 MDBA, *Changes to the draft Basin Plan released*, 28 May 2012, www.mdba.gov.au/media_centre/media_releases/changes-to-the-draft-basin-plan-released, (accessed 17 September 2012).

- removing the formal 2015 review in the Plan;
- SDLs to commence in 2019 and accredited water resource plans to stand for 10 years (i.e. until 2029);
- additional work to be undertaken regarding groundwater SDLs; and
- insertion of a clause making it clear that the obligation to 'bridge the gap' between current and future SDLs will not be passed from the Commonwealth to the states.[26]

1.30 In addition to the Council's feedback, each Basin state provided individual state-based comments to the MDBA for further consideration. These comments detailed state-specific concerns. This included the call from South Australia for more water to be recovered for environmental purposes, and the contrary arguments from Victoria and New South Wales for less water to be returned due to social and economic impacts on communities.[27]

Altered Proposed Basin Plan, August 2012

1.31 After receiving the ministerial council comments, the MDBA also sought further advice from 'the Basin Community Committee, national peak bodies, key scientists and technical experts, indigenous representatives and local government representatives from areas most likely to be affected by the Ministers' propositions.'[28]

1.32 On 28 August 2012, following this further consultation, the MDBA released the Basin Plan (August 2012). The MDBA indicated that it attempted to incorporate matters where there was a consensus position among basin states.[29] The main changes that were reflected in the Basin Plan (August 2012) included:

- apportionment of downstream shares among jurisdictions to be consistent, equitable and transparent. The options to achieve this were subject to further discussion within the ministerial council to reach a consensus position. As such no formal changes were made on this issue in the Basin Plan;
- inclusion of an SDL Adjustment Mechanism to take into account 'efficiencies and savings achieved through various initiatives in the

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26 Murray-Darling Basin Ministerial Council, *Attachment A – Council as a whole comments*, 9 July 2012, http://download.mdba.gov.au/revised-BP/AttachmentA_Main.pdf, (accessed 17 September 2012).

27 *Note*: see Ministerial Council state specific comments, 9 July 2012, Attachments D, F and G. www.mdba.gov.au/proposed-basin-plan.

28 www.mdba.gov.au/have-your-say/view-submission (accessed 25 September 2012).

29 The Hon. Craig Knowles, *Transmittal letter to the Hon. Tony Burke MP*, 6 August 2012, http://download.mdba.gov.au/altered-PBP/APBP-Transmission-letter-from-MDBA-Chair-to-Minister-Burke-06-August-2012.pdf, (accessed 17 August 2012).

Basin that could lead to adjustment of SDLs.'[30] The Basin Plan (August 2012) provides a framework and the MDBA indicated it would continue to work with jurisdictions to finalise detailed guidelines underpinning this mechanism; and

- further adjustment to groundwater SDLs based on additional information provided by Basin states regarding groundwater aquifers.[31]

1.33 The Basin Plan (August 2012) was also provided to the Commonwealth Minister, the Hon. Tony Burke MP on 28 August. Minister Burke later provided further feedback to the MDBA for consideration.

Final Basin Plan

1.34 The final Basin Plan was presented to Parliament on 26 November 2012. There were defeated disallowance motions in the House of Representatives on 29 November 2012 and the Senate on 28 November 2012. The Basin Plan commenced the day after its registration.[32]

1.35 A central feature of the final Basin Plan is the maintenance of 2750 GL/y as the reduction in the environmentally sustainable level of take. However, the Basin Plan also incorporated the following key changes since the Basin Plan (August 2012):

- further changes to the SDL adjustment mechanism including:
  - the clear separation of the adjustment mechanism from the establishment of SDLs;
  - provisions relating to a further 450 GL/y reduction of ESLT through infrastructure efficiency measures; and
  - the requirement for the MDBA to consult and seek submissions in addition to Ministerial approval before adjustments are tabled in parliament;
- agreement about how the 971 GL downstream component of the reduction in take is shared (apportioned) between Basin states;
- provisions requiring up-to-date climate change assessments in future reviews of the Basin Plan;

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30 The Hon. Craig Knowles, *Transmittal letter to the Hon. Tony Burke MP*, 6 August 2012, http://download.mdba.gov.au/altered-PBP/APBP-Transmission-letter-from-MDBA-Chair-to-Minister-Burke-06-August-2012.pdf, (accessed 17 August 2012).

31 The Hon. Craig Knowles, *Transmittal letter to the Hon. Tony Burke MP*, 6 August 2012, http://download.mdba.gov.au/altered-PBP/APBP-Transmission-letter-from-MDBA-Chair-to-Minister-Burke-06-August-2012.pdf, (accessed 17 August 2012), p. 2.

32 An exception is made for chapter 12 which commences on 1 July 2014, *Basin Plan*, section 1.04.

- some changes to groundwater limits (total Basin SDL set to 3334 GL/y) and the requirement for review, within two years of the Basin Plan, of the limit of take from three aquifers in NSW and Victoria; and
- the provision for some water trading rules not applying to trades for delivering held environmental water. The provision applies in limited conditions.[33]

33 MDBA, Changes to the Basin Plan, www.mdba.gov.au/basin-plan/changes-to-the-basin-plan, (accessed 3 March 2013).

Chapter 2
Surface Water

Introduction

2.1 The management of surface water resources in the Murray-Darling Basin is a key aspect of the Basin Plan. The central feature of surface water management was the development of the Basin's surface water and the associated quantities of sustainable diversion limits (SDLs) and baseline diversion limits (BDLs). The setting of the SDLs and BDLs will be discussed in turn.

2.2 The quantity of water set for the SDLs and BDLs has a major impact on the way in which water in the Basin will be managed under the Basin Plan. As a result, these items have been a major focus of the public debate regarding the Basin Plan. This chapter examines the modelling and key assumptions that informed the Murray-Darling Basin Authority's (MDBA) setting of the SDLs and BDLs for surface water in the Basin Plan. The chapter also identifies some key areas of concern regarding the MDBA's modelling including:

- the MDBA's lack of clarity in presenting information about the modelling to stakeholders and the public;
- the lack of information available about the alternative scenarios for a reduction in take other than the 2750 GL/y figure proposed by the MDBA;
- reliance on historical data for the modelling;
- inadequate treatment of predicted impacts of climate change in the modelling; and
- inadequate treatment of water interception in the modelling.

2.3 The SDLs and BDLs for groundwater resources and the issue of surface water and groundwater connectivity are discussed in the following chapter.

2.4 Although modelling of scenarios for 3200 GL/y return of take is discussed in this chapter, the additional return of 450 GL/y to the Murray River that was proposed by the Government in October 2012 is dealt with in chapter four.

Surface water resources

SDLs and BDLs

2.5 The MDBA established a baseline from which to measure diversion reductions, known as BDLs. In general, a specific BDL is:

> …a combination of limits established by state law (e.g. existing water resource plan limits), defined levels of take where there are no established

> limits, and in some cases, the limits established by the Murray–Darling Basin cap arrangements where these establish the lowest limit.[1]

2.6 Schedule 3 of the Basin Plan determines the BDL for the various individual resource units in the Basin. The MDBA determined the total, Basin-wide BDL to be 13 623 GL in the baseline year of 2009.[2]

2.7 The Basin Plan also establishes SDLs. The Basin Plan's explanatory statement notes that an SDL:

> …is defined in section 1.07 [of the Basin Plan] to mean the long-term average sustainable diversion limit. 'Long-term average sustainable diversion limit' means the maximum long-term annual average quantities of water that can be taken, on a sustainable basis, from the Basin water resources as a whole, and the water resources, or particular parts of the water resources of each water resource plan area (item 6 of subsection 22(1) of the Act [*Water Act 2007*]). Each long-term average sustainable diversion limit must reflect an environmentally sustainable level of take (subsection 23(1) of the Act). An environmentally sustainable level of take (ESLT) is the level of take at which water can from be taken from a water resource without compromising key environmental assets, key ecosystem functions, the productive base or key environmental outcomes for the water resource (subsection 4(1) of the Act).

2.8 The long-term average SDLs across all the Basin's catchments will come into effect in 2019.[3] This is currently estimated as 10 873 GL/y.[4]

2.9 The difference between the Basin wide BDL and the Basin wide SDL is 2750 GL/y. This is the total return of water to the Basin system for environmental purposes. The northern basin is to contribute 390 GL/y, the southern basin 2289 GL/y and the disconnected tributaries contribute the remaining 71 GL/y to the total 2750 GL/y.[5]

2.10 In addition, the final Basin Plan contains a mechanism to adjust the reduction amounts, therefore the 2750 GL/y figure becomes a range of total reduction of

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1 MDBA, www.mdba.gov.au/draft-basin-plan/draft-basin-plan-chapter-summary/glossary (accessed, 5 March 2013).

2 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 8.

3 Basin Plan, section 6.04 (1)

4 Basin Plan, section 6.04 (2)

5 The northern Basin consists of Paroo, Warrego, Gwydir, Nebine, Condamine-Balonne, intersecting streams (including NSW Warrego), Moonie, Namoi, Macquarie-Castlereagh, Queensland Border Rivers, NSW Border Rivers, and Barwon-Darling; the southern Basin consists of Ovens, Goulburn, Broken, Loddon, Campaspe, Murrumbidgee-NSW, Kiewa, Eastern Mount Lofty Ranges, NSW Murray, Victorian Murray, SA Murray, Lower Darling, Murrumbidgee – ACT, Marne Saunders; Disconnected Tributaries consist of Lachlan and Wimmera-Avoca. SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 22.

2750 GL/y plus or minus 5 per cent of the long-term Basin wide SDL.[6] This adjustment mechanism is discussed further below.

SDL adjustment mechanism

2.11 In November 2012, the *Water Act 2007* (Water Act) was amended to allow the final Basin Plan to include an adjustment mechanism to change SDLs 'based on new initiatives which achieve better environmental outcomes, or reduced social and economic impacts, relative to those considered in setting initial SDLs.'[7] Although the surface water recovery figure in the Basin Plan remains at 2750 GL/y, the SDL adjustment mechanism allows for changes to this figure of plus or minus 5 per cent of the Basin-wide SDL. As noted in the explanatory statement to the Basin Plan:

> SDL adjustments resulting from application of the SDL adjustment mechanism must operate in the net range of plus or minus 5% of the surface water SDL for the Basin. Adjustments resulting from supply and efficiency measures will be netted against one another to provide the total adjustment amount while maintaining the plus or minus 5% limit.[8]

2.12 As a result, with 'an initial surface water SDL of 10 873 GL this limits the net adjustment to 544 GL.'[9]

2.13 Importantly, the primary way of achieving changes from the 2750 GL/y figure are through either efficiency measures or supply measures. An efficiency measure is a measure that 'makes savings in the amount of water required for consumptive purposes. Examples include investment in more efficient irrigation infrastructure.'[10] A supply measure is:

> …a measure that increases the quantity of water available before consumptive take. The measure may do this either by making water available for environmental use without reducing the volume of water available for consumptive take (e.g. through reducing evaporation losses at suitable storages) or by allowing environmental managers to achieve the same environmental outcomes more efficiently, thus reducing the volume of water needing to be recovered for the environment. Supply measures allow equivalent environmental outcomes to be achieved without needing to reduce consumptive take as much as originally anticipated in the Basin Plan.[11]

2.14 The amendment to the Water Act that provided for the adjustment mechanism was inquired into by the Senate Environment and Communications Legislation

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6 Basin Plan Explanatory Statement, p. 32.

7 Basin Plan Explanatory Statement, p. 43.

8 Basin Plan Explanatory Statement, p. 32.

9 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 10.

10 Basin Plan Explanatory Statement, p. 43.

11 Basin Plan Explanatory Statement, p. 43.

Committee.[12] That committee's report stated that '[m]any submitters were generally supportive of an adjustment mechanism'.[13] However, the report also identified three concerns with the amendment as it was initially proposed in Parliament:

- lack of opportunity for public participation in and consultation on the adjustment mechanism;
- lack of ministerial discretion as to whether to adopt an adjustment amendment to the Basin Plan; and
- whether such an amendment to the Basin Plan is a disallowable instrument.[14]

2.15 On 30 October 2012, the House of Representatives made amendments to the bill and the Environment and Communications Committee was of the view that the amendments addressed the above concerns.[15] The bill with amendments was enacted on 21 November 2012.

2.16 As noted above, the Senate Environment and Communications Committee's report stated that many stakeholders supported the enabling legislation for the adjustment mechanism.[16] This is reflective of the views raised by witnesses in this committee's inquiry that the 2750 GL/y should be considered as a 'starting point' for reduction in take and that future flexibility was required.[17]

2.17 This was also the view of the MDBA at the time of Basin Plan (November 2011 and May 2012), that the 2750 GL/y figure should be viewed as a 'starting point for an adaptive process' and it could shift following future reviews, proposals to

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12 Senate Environment and Communications Legislation Committee, Report on *Water Amendment (Long Term Average Sustainable Diversion Limit Adjustment) Bill 2012 [Provisions]*, 19 November 2012.

13 Senate Environment and Communications Legislation Committee, Report on *Water Amendment (Long Term Average Sustainable Diversion Limit Adjustment) Bill 2012 [Provisions]*, 19 November 2012, p. 11.

14 Senate Environment and Communications Legislation Committee, Report on *Water Amendment (Long Term Average Sustainable Diversion Limit Adjustment) Bill 2012 [Provisions]*, 19 November 2012, p. 11.

15 Senate Environment and Communications Legislation Committee, Report on *Water Amendment (Long Term Average Sustainable Diversion Limit Adjustment) Bill 2012 [Provisions]*, 19 November 2012, pp 14–15. Another stakeholder expressed more caution to this committee, noting that '[w]e have not yet seen how the adjustment mechanism will work in practice.' Ms Perin Davey, Executive Officer, Murray Group of Concerned Communities, *Committee Hansard*, 23 November 2012, p. 12.

16 Senate Environment and Communications Legislation Committee, Report on *Water Amendment (Long Term Average Sustainable Diversion Limit Adjustment) Bill 2012 [Provisions]*, 19 November 2012, p. 11.

17 For 2750 GL/y as a good starting point and/or flexibility see: the Hon Dean Brown, Lower River Murray Reference Group, *Committee Hansard*, 3 April 2012, p. 53; Ms Cheryl Rix, General Manager, Western Murray Irrigation Ltd, *Committee Hansard*, 3 April 2012, p. 14; and Mr Laurie, President, National Farmers Federation, *Committee Hansard*, 23 April 2012, p. 34.

address constraints, efficiencies gained through environmental works and measures and as new science or other knowledge is gathered.[18]

2.18 More detail on the adjustment mechanism (specifically in terms of supply measures and efficiency measures) is included in chapter four.

Modelling of surface water sustainable division limits and the 2750 GL/y

2.19 To determine the Basin SDLs and as a consequence arrive at the 2750 GL/y reduction in take, the MDBA undertook significant modelling of surface water in the Basin. Initial work undertaken by the MDBA included assessing the water needs of species, communities and areas of diversity, in particular 'those recognised under international agreements such as the Ramsar Convention' and the *Environment Protection and Biodiversity Conservation Act 1999* throughout the Basin.[19]

2.20 However, the modelling techniques for surface water SDLs have also shifted over time. The modelling of surface water in the Guide involved an 'end-of-system flow model'. For the development of the various iterations of the Basin Plan, the MDBA moved to a 'hydrological indicator flow model' which 'targets a range of sites up and down the basin' to capture flow issues across the basin.[20]

2.21 The MDBA argued that the hydrological modelling approach for surface water SDLs was the best available approach to test a range of scenarios and variable factors:

> Hydrological models have been used to represent and test environmental water requirements and flow regimes. They are the best available tools for representation of long term flow regimes in the Basin under current water sharing arrangements (baseline conditions) and without development conditions.[21]

2.22 The MDBA further explained that the surface water resources of the Basin were represented by linking 24 individual river system models developed by the MDBA, CSIRO and Snowy Mountains Hydro into an Integrated River Systems Modelling Framework (IRSMF). The IRSMF allowed the MDBA to assess responses across the Basin, to changes in flow regime, over time and with different scenarios of water recovery.[22] The MDBA noted:

> The Basin Plan scenario modelling was carried out by simulating a reduction in consumptive water use, and making an equivalent volume of

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18 MDBA, answer to question on notice, 24 April 2012, (received 7 June 2012)

19 MDBA, *Plain English summary of the proposed Basin Plan – including explanatory notes, Appendix A – Outline of the Scientific Knowledge*, November 2011, p. 109.

20 Mr Knowles, Chair, Murray-Darling Basin Authority, *Committee Hansard*, 23 April 2012, p. 2.

21 MDBA, *Hydrologic modelling to inform the proposed Basin Plan: methods and results*, February 2012, p. iii.

22 MDBA, *Hydrologic modelling to inform the proposed Basin Plan: methods and results*, February 2012, p. 6.

> water available for environmental use within the water sharing and water management rules and constraints as prescribed under baseline conditions. The environmental water requirements were assessed at 122 hydrologic indicator sites across the Basin.[23]

2.23 The MDBA summarised the 'basic approach' to determining the SDLs in the following four step process:

> 1. Determining Basin-wide environmental objectives that reflect the requirements of the [Water] Act;
> 2. Determining environmental flows required to achieve these objectives, using a group of hydrological indicator sites at key locations across the Basin;
> 3. Modelling options for water recovery and environmental water use targeted at delivering these flow requirements; and
> 4. Address the model results to determine the effectiveness of the options in achieving objectives, and iterate as required until an option is found that achieves an appropriate balance in environmental, social and economic outcomes.[24]

2.24 Therefore, to determine the 2750 GL/y for surface water, the MDBA modelled key reduction scenarios ranging from 2400, 2800 and 3200 GL/y. Modelling documentation released by the MDBA explains the 2750 GL/y figure:

> Key scenarios modelled are 'without development' (a near-natural condition scenario); 'baseline' (reflecting water sharing arrangements and levels of infrastructure as per June 2009); and a reduction of 2800 GL across the Basin. Sensitivity analysis was carried out for the Southern Connected System (Murray, Murrumbidgee and Goulburn-Broken catchments), where two further diversion reduction scenarios were modelled to represent a Basin-wide reduction of 2400 GL, and 3200 GL to gauge the sensitivity of the proposed scale of change. Some initial sensitivity testing has also been undertaken for the Condamine-Balonne, exploring alternative water recovery volumes and strategies. The results of this sensitivity analysis led to a further increase of 50 GL in SDL for the Condamine-Balonne system and consequently a total proposed reduction of 2750 GL across the Basin has been proposed in the draft Basin Plan.[25]

2.25 The MDBA further explained the results of the modelling of 2400 GL/y and 3200 GL/y reduction scenarios and why this directed it towards the 2750 GL/y figure:

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23 MDBA, *Hydrologic modelling to inform the proposed Basin Plan: methods and results*, February 2012, p. v.

24 The Hon Craig Knowles, Chair, Murray-Darling Basin Authority, *Response to the Chair of Senate Regional and Rural Affairs and Transport References Committee*, 19 April 2012, www.aph.gov.au/Parliamentary_Business/Committees/Senate_Committees?url=rrat_ctte/mdb/submissions.htm (accessed 23 August 2012).

25 MDBA, *Hydrologic modelling to inform the proposed Basin Plan: methods and results*, February 2012, p. v.

> MDBA also conducted sensitivity testing of 2400GL and 3200GL reduction scenarios. The analysis showed a number of key ecological targets and objectives of the proposed Basin Plan might not be achievable with the 2400 GL/y scenario, whereas the 3200 GL/y achieved some marginal improvements over the 2800 GL/y scenario, but not sufficient to justify the potential additional socioeconomic impacts. In addition, flow delivery constraints such as roads, bridges, or rules to avoid flooding private property, limit the capacity to actively use extra environmental water available under the 3200 GL/y scenario.[26]

2.26 Despite criticisms about the MDBA's modelling discussed below, the MDBA defended the scientific basis for development of the Basin Plan. As Dr Rhondda Dickson, Chief Executive, MDBA stated:

> We challenge any assertion that the plan is not based on firm science. The modelling that we have done is far more detailed and more robust than any previous scientific work carried out, either by the authority or by any other independent groups.[27]

Additional modelling scenarios

2.27 In October 2012, the MDBA released the details of further modelling which considered the possibility of 'relaxing' a number of constraints in the southern part of the Basin system. In this modelling, eight river operating constraints were relaxed 'to increase the peak rate at which environmental flows can be delivered'. In addition, an 'altered environment watering strategy was adopted, necessitated by and taking advantage of the relaxation of constraints.'[28] Of the eight constraints relaxed:

> Seven of these represent an increase in the allowable discharge to pass key river reaches in the southern Basin. The eighth represents the inclusion of a new regulator on the Darling Anabranch to accommodate efficient delivery of Menindee releases made to contribute to environmental flows to the Murray.[29]

2.28 The new modelling predicted results for achieving environmental outcomes for scenarios of 2800 GL/y and 3200 GL/y reduction in take with relaxed constraints. The results for 2800 GL/y relaxed constraints were summarised as:

> Overall, the model results indicate that combining 2800 GL/y of recovered water with constraint relaxation would have a positive effect on the ability to deliver high-flow events; enabling greater areas of mid- to high-elevation parts of the River Murray floodplain to be inundated for longer periods and at a greater frequency. However, in order to detect changes using the flow indicators developed by MDBA to assess modelling scenarios, the

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26 MDBA, *Answer to Question taken on Notice*, 24 April 2012 (received 7 June 2012).

27 Dr Rhondda Dickson, Chief Executive, MDBA, *Committee Hansard*, 24 April 2012, p. 71.

28 MDBA, *Hydrological modelling of the relation of operational constraints in the southern connected system: methods and results*, October 2012, p. v.

29 MDBA, *Hydrological modelling of the relation of operational constraints in the southern connected system: methods and results*, October 2012, pp v–vi.

> improvements in flow have to meet specified flow rate and durations before environmental outcomes can be inferred. The BP-2800-RC [the Basin Plan 2800 GL/y relaxed constraints reduction in take] modelling showed that while, in general, the duration and peak of existing events could be extended (providing environmental benefits), the events were not enhanced sufficiently to achieve additional flow indicator targets for mid- to high-level floodplains.[30]

2.29 The results for the relaxed constraints model of 3200 GL/y return of take were noted as:

> The BP-3200-RC [the Basin Plan 3200 GL/y relaxed constraints reduction in take] scenario indicates that the combination of constraint relaxation and an additional average of 400 GL/y of available environmental water:
>
> - can substantially increase environmental benefits, with many more flow indicators being met for the River Murray… [and]
> - could provide the capacity to water mid- to high-level parts of the floodplain in the Lower Murray (with the potential to benefit large areas of natural wetlands and floodplains).[31]

2.30 In order to demonstrate the improved environmental outcomes, the MDBA produced the following table for key environmental targets for the Murray River. It shows 'achievement of 'actively managed' river channel and floodplain environmental flow indicators achieved on the River Murray for the baseline and Basin Plan scenarios.'[32]

Table 2.1—Environmental Outcomes (River Murray) for Modelled Scenarios of Reduction in ESLT[33]

Scenario	Baseline	BP-2800	BP-2800-RC	BP-3200	BP-3200-RC
Number of flow indicators achieved – River Murray	0/18 (0%)	11/18 (61%)	11/18 (61%)	13/18 (72%)	17/18 (94%)

30 MDBA, *Hydrological modelling of the relation of operational constraints in the southern connected system: methods and results*, October 2012, p. vii.

31 MDBA, *Hydrological modelling of the relation of operational constraints in the southern connected system: methods and results*, October 2012, p. ix.

32 MDBA, *Hydrological modelling of the relation of operational constraints in the southern connected system: methods and results*, October 2012, p. ix.

33 Information reproduced from: MDBA, *Hydrological modelling of the relation of operational constraints in the southern connected system: methods and results*, October 2012, p. ix.

Criticisms of the modelling for the Basin Plan

2.31 Many stakeholders criticised the modelling process undertaken by the MDBA, first for the iterations prior to the final Basin Plan and even after additional modelling for the 2800 GL/y and 3200 GL/y relaxed constraint scenarios was complete. At a general level, some of these criticisms questioned the fundamentals (or assumptions) of the MDBA's approach to the modelling and why other modelling scenarios (such as 4000 GL/y return of take) had not been undertaken. These general criticisms will be discussed in turn.

2.32 The concerns about the limited modelling of alternative scenarios were expressed to the committee. Conservations Councils across Australia called for further modelling and specified 4000 GL/y should be modelled to demonstrate that this would 'meet the ecological objectives set by the MDBA.'[34] The Wentworth Group supported this and advised the committee:

> The science seems to indicate that you need to be up around 4 000 gigalitres if you want to just achieve the minimum targets to have a functioning system. Obviously that is going to have social and economic impacts.[35]

2.33 The Commonwealth Science and Industrial Research Organisation (CSIRO), in its science review of the MDBA modelling, stated that the 2800 GL/y reduction scenario was 'not consistent with the stated environmental targets' and recommended that scenarios above this figure be modelled.[36] When questioned (regarding Basin Plan (November 2011)) about what scenarios greater than the 2750 GL/y figure the MDBA had modelled, CSIRO representatives explained:

> [The MDBA] have published, as you are probably aware, some limited information around a 3200 gigalitre scenario, and that shows some incremental improvements. I guess it comes back to whether people think those incremental improvements are worth the incremental costs and what the value proposition is for the different scenario. The modelling [the MDBA] have done for the 3200 gigalitre scenario, as I understand it, is only for the Murray system. [The MDBA] have not run the connected models for the entire basin in assessing that; [the MDBA] have just made some additional modifications and water recovery in the Murray system and looked at the consequences of those for the environmental outcomes at the bottom end of the system.[37]

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34 Ms Juliet Le Feuvre, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 25, see also Mr Tim Kelly, Chief Executive, Conservation Council of South Australia, *Committee Hansard*, 24 April 2012, p. 30.

35 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, p. 17.

36 CSIRO, *Science Review of the Estimation of an Environmentally Sustainable Level of Take for the Murray Darling Basin*, November 2011, p. 29.

37 Dr Bill Young, Director, Water for a Healthy Country Flagship, CSIRO, *Committee Hansard*, 23 April 2012, p. 65.

2.34 The Wentworth Group advised the committee that the MDBA could model other scenarios with the current tools available:

> **Dr Williams:** Scientifically and technically it is possible to do. I think the guide had set in place the range of requirements to give you levels of confidence in returning the river to sustainability. I think that is still a very valid means of saying it because the science can give you some indication. If you use this amount of [water], what level of confidence can you have as a taxpayer that you will get a sustainable functioning river? To do that with 4000 gigalitres, we did some preliminary work that suggests it is entirely feasible. I think the modelling capacity is there, from my background in CSIRO and also my background in the CRCs [Cooperative Research Centres].
>
> …
>
> **Mr Stubbs:** …The [MDBA] has the tools and has some very good people doing a very good job at the level of modelling. It would take them approximately two months to run the model for a different scenario. If we were not on this deadline of getting everything wrapped up by the end of [2012], we could do a range of scenarios and get a very full understanding of the different outcomes—environmental, social and economic—and also of the constraints in a relatively short time so that parliament could make a very well informed decision on the future of the basin.[38]

Concerns about the modelling assumptions

2.35 The committee heard evidence of a number of other concerns about the assumptions used in the MDBA's modelling. This included, general concerns about the lack of scientific justification for the final 2750 GL/y[39] or that the MDBA's approach would simply embed existing management practices in the Basin. As Ms Beverly Smiles, President, Inland Rivers Network, explained:

> The MDBA changed the hydrological-modelling approach adopted in the [Guide] to one that is more closely aligned with current river operations and management. This approach has effectively locked in the poor management and ecological outcomes currently entrenched in state water planning and implementation processes.[40]

2.36 More specifically, the committee identified several themes that emerged in evidence about the assumptions used in the MDBA's modelling which will be discussed in turn and included:

- modelling (and its assumptions) is reflected in complex and technical reports;
- modelling is based on historical data, and does not include recent wet years;

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38 Dr John Williams, Founding Member, and Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, p. 19.

39 Wentworth Group of Concerned Scientists, *Evaluation of Proposed Plan*, August 2012, p. 3.

40 Ms Beverley Smiles, President, Inland Rivers Network, *Committee Hansard*, 24 April 2012, p. 17.

- predicted impacts of climate change are not captured in the modelling; and
- interception activity has not been adequately reflected in the modelling.

Modelling reflected in highly complex and technical reports

2.37 The committee heard evidence that the technical nature of the material that supports the modelling remains unclear and difficult to understand, for both technical experts and the public alike. Mr Stubbs from the Wentworth Group reflected on the complexity of the modelling and explained that the science had not been clearly explained when it could have been:

> [W]e cannot understand the outcomes of the modelling run they [the MBDA] have done. It is very opaque. It does not clearly state what the outcomes are for Ramsar [wetlands] or for [other environmental] assets. It could have been clearly and easily stated [this information]. Even with just one scenario [2750 GL/y], we cannot understand the costs and the benefits of other scenarios, what we could actually achieve and why we are locked at this one scenario. So we really have a complete dearth of information not just for the scenario that has been looked at but even for other scenarios to understand what could be achieved.[41]

Committee view

2.38 Notwithstanding this Plain English Summary, the modelling and assumptions behind the plan have never been set out concisely, in an easy to understand format. Despite many calls by the committee to have the methodology clearly articulated, the MDBA have failed to do so. This remains a key concern for the committee. Although the following recommendation applies to the MDBA's modelling of surface water, they align with the concerns noted in chapter seven about the MDBA's consultation process and stakeholder engagement.

Recommendation 1

2.39 The committee recommends that the Murray-Darling Basin Authority develop a concise and non-technical explanation of the hydrological modelling and assumptions used to develop the 2750 GL/y return of surface water to the environment, to be made publicly available.

Modelling based on historical data

2.40 The modelling that informed the Basin Plan is based on 114 years of historical data, which the MDBA has argued captures climate variability over an extensive period. As the Chair of the Authority, Mr Knowles explained:

> For the Basin Plan, the proposed new arrangements have been applied to the historical climate period of July 1895 to June 2009, which covers periods of drought as well as floods.[42]

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41 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, p. 21.

42 MDBA, *Hydrologic modelling to inform the proposed Basin Plan: methods and results*, February 2012, p. v.

2.41 However, this historical data does not take capture the significant rainfall experienced in the years beyond 2009. This approach has been heavily criticised and some have argued that the long-term SDLs may have been different if the modelling captured the recent wet years:

> **Senator JOYCE:** But what your data set does not include is the La Nina substantial wet period that basically started in 2010—or 2009, to be precise. If you amended you data set you would get a substantial change in the assessment of the water profile, would you not? In fact, we have done it—about 500 gigs.
>
> **Dr Dickson:** I cannot comment on that. We have not done that assessment. I would just repeat that the amount of variability in the historic record is sufficient to be able to estimate the scale of change that we use for the Basin Plan modelling.[43]

2.42 The MDBA did subsequently review the impact of the recent flood years and maintains that including two additional years in this data would have no impact on the SDLs and that the 2009 baseline would not change:

> Estimating SDLs is not a simple averaging and subtraction exercise… If we changed the climate baseline to include 2010 and 2011 data, the relativities between the SDL scenarios would not change. The last two years have been very wet but no wetter than the very wet periods already included in the 114 year period we have used to test the scenarios.[44]

2.43 The MDBA reiterated that, although it has not used future projections in its modelling, it is confident that the historical record generates appropriate estimates for future management of the Basin. As Dr Rhondda Dickson from the MDBA explained:

> …what we have done in the plan is, as the chairman said, used as the starting point the best available information where we do have confidence, which is the historical record. Because it is a 10-year planning framework that gives us the opportunity to get a lot more certainty about some of those estimates.
>
> **CHAIR:** So is it fair to say you have not used the future at this point?
>
> **Dr Dickson:** We have not used the future as far as our modelling, given the range of uncertainty.[45]

Committee view

2.44 Due to the reliance on historical data in the MDBA hydrological modelling, the committee questions the claim by the MDBA that the Basin Plan was developed on the basis of the best available scientific knowledge. The committee considers that

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43 Environment and Communications Legislation Committee, *Additional Estimates Committee Hansard*, 14 February 2012, p. 41.

44 MDBA, *Myth busting website*, www.mdba.gov.au/draft-basin-plan/mythbusting#inflow-data, 2012, (accessed 20 August 2012).

45 Dr Rhondda Dickson, Chief Executive, Murray-Darling Basin Authority, *Committee Hansard*, 23 April 2012, p. 2.

the MDBA's claim is undermined by excluding recent flooding in the development of the Basin Plan and, as discussed in the remainder of the chapter, by not appropriately addressing the predicted impacts of climate change and water interception.

Climate change projections not captured in modelling

2.45 The treatment of the predicted impacts of climate change in developing the Basin Plan was another key concern identified in the inquiry. Previous reports have indicated that climate change will have a significant impact on water runoff in the Basin. For example, the CSIRO also conducted extensive analysis on this issue in 2008, including modelling rainfall run-off to the year 2030. According to the report, the likely impact would be significant:

> The best estimate or median indicates that the future mean annual runoff in the MDB in ~2030 relative to ~1990 will be lower, by 5 to 10 percent in the north-east and southern half [of the Basin], and by about 15 percent in the southernmost parts. Averaged across the entire MDB, the best estimate or median is a 9 percent decrease in mean annual runoff.[46]

2.46 In addition, the Garnaut Review on climate change stated that 'a decrease in rainfall can result in a two- to three-fold decrease in streamflow.'[47] Therefore, the impact for water run-off is far more significant than the change in rainfall due to a multiplier effect.

2.47 Prior to the release of the Basin Plan, climate change was identified by the MDBA as a significant issue and stated in the Guide that it was 'essential that the proposed Basin Plan appropriately addresses the impacts of climate change.'[48] Furthermore, the Guide details the predicted impact of climate change as follows:

> In light of the various issues associated with climate change, the Authority has determined that 3% is an appropriate allowance to account for the effect of climate change in the proposed Basin Plan. That is, the reduction being considered as necessary to achieve an environmentally sustainable level of take is inclusive of a 3% reduction in the current surface-water diversion limit in the Basin.[49]

2.48 Despite allowances being made in the Guide for projected climate change impacts, the MDBA advised the committee that projected climate change impacts are not in the modelling that informed the Basin Plan:

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46 Chiew FHS, Vaze J, Viney NR, Jordan PW, Perraud J-M, Zhang L, Teng J, Young WJ, Penaarancibia J, Morden RA, Freebairn A, Austin J, Hill PI, Wiesenfeld CR and Murphy R, *Rainfall-runoff modelling across the Murray-Darling Basin. A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project*. CSIRO, 2008, p. 13.

47 Professor Ross Garnaut, *The Garnaut Climate Change Review: Final Report*, Cambridge University Press, 2008, p. 109.

48 MDBA, *Guide to the proposed Basin Plan*, 2010, Canberra, p. 33.

49 MDBA, *Guide to the proposed Basin Plan*, 2010, Canberra, p. 34.

> [Future climate change] was never in the modelling. In the guide it was not in the modelling, and we have not included it in our modelling. We have modelled the historical sequence, as we have said before. The approach to climate change is one of adaptive management as well as putting various requirements in state water resource planning as part of the basin plan and investing in information that is going to improve our understanding of climate change in the future and how we might model those futures for climate change.[50]

2.49 However, the MDBA have also argued that under an adaptive management framework, the Basin Plan will account for future climate change as new information emerges. This approach is reflected in the MDBA's factsheet about managing climate change under the Basin Plan:

> The Basin Plan lays the foundation for future adaptation to climate change as we learn more about its impact on environmental water needs, other water requirements, water availability and communities.[51]

2.50 The future impact of climate change has also been acknowledged in the final Basin Plan by being identified as a risk to be managed. These risks are outlined in Chapter 4 of the Basin Plan and, as described in the Explanatory Statement, the MDBA must have regard to certain strategies when carrying out its functions. In the case of climate change, such strategies are to 'improve knowledge of water requirements within the Murray-Darling Basin, including…the impact of climate change on environmental water requirements' and also to 'improve knowledge of the impact on Basin water resources from…climate change'.[52]

2.51 The MDBA's general approach to climate change in the various iterations of the Basin Plan was criticised by some witnesses before the committee. For example, the Wentworth Group claimed the Basin Plan (November 2011) set SDLs on an 'assumption that there was no risk to river health from climate change'[53] and that it ignores climate change:

> We know that the CSIRO modelling suggests that climate change is likely to result in significant reductions in rainfall and runoff in south-eastern Australia over the next 20 years. Yet the draft plan ignores these effects even though it is intended to guide water use in the basin over much of the same time period.[54]

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50 Dr Rhondda Dickson, Chief Executive Officer, Murray-Darling Basin Authority, *Committee Hansard*, 23 April 2012, p. 10.

51 MDBA, *Climate Change and the Basin Plan*, 2011, p. 1, http://download.mdba.gov.au/proposed/FS_ClimateChange.pdf, (accessed 4 September 2012).

52 Basin Plan Explanatory Statement, pp 24–25.

53 Wentworth Group of Concerned Scientists, *Statement on the 2011 Draft Murray-Darling Basin Plan*, January 2012, p. 1.

54 Wentworth Group of Concerned Scientists, *Statement on the 2011 draft Murray-Darling Basin Plan*, November 2011, p. 19.

2.52 The committee also heard evidence that predicted climate change is likely to have significant impacts on the outcomes to be expected from returning water to the basin through setting the SDLs.[55] Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria also summarised the concerns about relying on historical climate conditions to the committee:

> The MDBA makes a risky assumption that future climate will fall within the range of past climate variability, flying in the face of the huge body of climate change research and projections for a dryer future, particularly in the southern basin and here in Victoria.[56]

2.53 The Wentworth Group has consistently criticised the lack of consideration of climate change projections in later versions of the Basin Plan and have stated that this position actually 'conflicts with Government Policy on climate change.'[57]

2.54 A similar criticism was noted following the modelling of the relaxed constraint scenarios just prior to the release of the final Basin Plan. The response from the Australian Conservation Foundation to a question about the improved environmental outcomes achieved through this modelling states:

> **Senator RUSTON:** ...What is the increase from that 57 per cent [of the MDBA's environmental targets achieved] once you add the 450 [GL/y additional reduction in take] onto it?
>
> **Mr La Nauze:** According to the authority's modelling, it goes up to 67 per cent [of the MDBA's environmental targets achieved]. But that excludes any undermining by excessive groundwater extraction or diminished inflows due to climate change. That is [the MDBA's] modelling based on historical climate data.[58]

2.55 The call, noted above, for incorporating predicted climate change impacts into the SDLs is not new. Following the release of the Guide, the House of Representatives Standing Committee on Regional Australia's report *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan* (Windsor Report) emphasised the importance of considering the forecast impacts of climate change in developing the SDLs for the Basin Plan:

> **Recommendation 2**: The Committee recommends that the Murray-Darling Basin Authority apply greater rigour to the assumptions made to develop

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55 See for example, Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 25; and Wentworth Group of Concerned Scientists, *Statement on the 2011 draft Murray-Darling Basin Plan*, November 2011, p. 19.

56 Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 25.

57 Wentworth Group of Concerned Scientists, *Evaluation of Proposed Basin Plan*, August 2012, p. 4.

58 Mr Jonathan La Nauze, Healthy rivers Campaigner, Australian Conservation Foundation, *Committee Hansard*, 23 November 2012 p. 22.

> the proposed sustainable diversion limits, including the forecast impact of climate change, taking into account regional variability.[59]

Committee view

2.56 The committee is of the view that the Windsor report's recommendation regarding the forecast impact of climate change has not been adequately addressed in the Basin Plan. This is consistent with the number of criticisms noted above that the Basin Plan does not appropriately address predicted impacts of climate change in its modelling of reduction of take scenarios.

2.57 The committee acknowledges that incorporating the predicted impacts of climate change into the relevant risk management strategies (as per chapter 4 of the Basin Plan) is the most realistic option for managing the predicted impacts of climate change given the Basin Plan has now come into effect. As a result, the committee urges that the MDBA specifically include the predicted impacts of climate change when implementing these strategies. The committee also considers that further research into the predicted impacts of climate change on water runoff in the Basin is necessary to properly implement the Basin Plan.

Recommendation 2

2.58 The committee recommends that the MDBA specifically include the predicted range of impacts of climate change on water runoff when implementing the relevant risk management strategies under chapter 4 of the Basin Plan.

Recommendation 3

2.59 Consistent with recommendation 20, the committee recommends that the government develop a clear research strategy on the future impacts of climate change on water runoff in the Basin. The strategy should also include a process for integrating the results of the research into the adaptive management process under the Basin Plan.

Interceptions have not been adequately reflected in modelling

2.60 Related to the issue of predicted climate change and the reliance on the historical data, the committee heard evidence that the treatment of water interception in the Basin Plan could be improved. Commenting on the Basin Plan (November 2011) Dr Rhondda Dickson, Chief Executive, stated:

> …the plan itself was based on...the best available estimate of interceptions that we have at the moment. We would be the first to acknowledge that the estimate of interceptions can be improved, and there are large areas of uncertainty about future interceptions, about the interplay of climate change and losses to the ground, between temperature as well as the interception changes. However, what we have done in the plan is…used as the starting

59 House of Representatives Standing Committee on Regional Australia, *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan*, May 2011, p. xvii.

> point the best available information where we do have confidence, which is the historical record.[60]

2.61 The MDBA noted further that interception activity has only been captured in the modelling in a 'point in time' approach. As Dr Dickson explained:

> There are a whole range of projections out there—what future irrigation use might be and future interceptions from farm dams and from a whole range of things. That is the future. All we have done is set a limit which is the best idea of what we have now and any future changes will need to be within that limit. If there is going to be a huge expansion of plantation forestry that is going to [increase] interceptions further that would have to be traded off against an irrigation entitlement in a water resource sharing plan.[61]

2.62 Despite this, the MDBA advised the committee that interception activity by commercial plantations and runoff dams have been 'taken into account' in the modelling through 'developing the baseline diversion limits for the proposed Basin plan.'[62]

2.63 The *Plain English Summary of the proposed Basin Plan* also outlined that interception activity needs to be captured in the water resource plans which will be managed by Basin states:

> The water resource plan must list the classes of interception activity that have been identified. When deciding whether an activity needs to be listed, consideration must be given to the location of the activity, its likely impact and likely growth over time. If there is interception by a runoff dam, a commercial plantation, mining activity (including coal seam gas mining) or floodplain harvesting, in the water resource plan area, those activities must be included on the list.
>
> Where such a list is included, the water resource plan must set out how the impacts of each class of interception activity will be monitored. The plan must also state what action will be taken if monitoring shows that the impacts of the activities have a significant impact on an environmental watering requirement, or there is an increase in the quantity of water being intercepted by an activity.[63]

2.64 The committee heard evidence that the Basin Plan also appears to fail to account for interceptions from biodiversity planting projects. Professor Mike Young provided information to the committee that stated:

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60 Dr Rhondda Dickson, Chief Executive, MDBA, *Committee Hansard*, 23 April 2012, p. 2.

61 Dr Rhondda Dickson, Chief Executive, MDBA, *Committee Hansard*, 23 April 2012, p. 11. In this quote Dr Dickson is recorded in Hansard as saying ' If there is going to be a huge expansion of plantation forestry that is going to *decrease* interceptions...' (emphasis added), however the committee understands Dr Dickson to mean that increasing plantation forestry would *increase* interceptions.

62 MDBA, *Answer to question taken on notice*, 23 April 2012 (received 7 July 2012).

63 MDBA, *Plain English summary of the proposed Basin Plan – including explanatory notes*, November 2011, p. 49.

> Under the [Basin Plan (November 2011)], States will be required to adjust for the adverse effects on water availability of increased forestry, increases in farm-dam interception and increases in the capture of overland flows...
>
> Missing from the [Basin Plan (November 2011)] is a requirement for the adverse interception effects of biodiversity plantings to be fully accounted for.[64]

2.65 The MDBA's response to this issue was that although the Basin Plan (November 2011) listed some types of interception activities, like commercial plantations or runoff dams, this was not intended to be an 'exclusive list'.[65] The MDBA explained that the Basin Plan had an 'assessment of how much interception is going on at the moment'[66] and that if the level of interception increases in the future, that it must be monitored by states and that this process was contained in the Basin Plan. Specifically, Mr Russell James, Executive Director, Policy and Planning, MDBA advised the committee:

> [I]n the future there needs to be monitoring arrangements put in place and in future the interception increases regardless of what is causing that—whether it is biodiversity plantings or other things. Those are things that will have to be taken into account in the way in which water is kept within the diversion limit.[67]

2.66 In the final Basin Plan, there is the obligation for water resource plans to:

> specify whether there are any types of interception activity in the water resource plan area which have the potential to have a significant impact on:
>
> (a) the water resources of the water resource plan area; or
>
> (b) water resources which are hydrologically connected to the water resources of the water resource plan area…[68]

2.67 However, the following note for guidance is also added to the relevant section, with biodiversity planting not specifically listed:

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64 Professor Mike Young, "Droplet No. 20: Which is better – The Existing or Proposed Administrative Arrangements for the MDB Basin?", April 2012, p. 3. This quote above was also read into the Hansard by Senator Nick Xenophon on 24 April 2012. See *Committee Hansard,* 24 April 2012, p. 8.

65 Mr Russell James, Executive Director, Policy and Planning Division, MDBA, *Committee Hansard,* 23 April 2012, p. 10. Note, the MDBA's response was based on a similar questions raised by the committee the day prior to the reading of Professor Young's quote into the Hansard.

66 Mr Russell James, Executive Director, Policy and Planning Division, MDBA, *Committee Hansard,* 23 April 2012, p. 11.

67 Mr Russell James, Executive Director, Policy and Planning Division, MDBA, *Committee Hansard,* 23 April 2012, p. 11.

68 Basin Plan, Part 5, section 10.23(1), p. 99.

> The following are types of interception activity which may have the potential to have a significant impact on the water resources of a water resource plan area:
>
> (a) interception by runoff dams;
>
> (b) interception by commercial plantations;
>
> (c) interception by mining activities, including coal seam gas mining;
>
> (d) interception by floodplain harvesting.[69]

Committee view

2.68 The committee understands and accepts that future intercepts will need to fall within each state's water resource plan. In the committee's view this must include all forms of interceptions (such as runoff dams, commercial plantations and biodiversity planting, mining activities (including coal seam gas mining) and floodplain harvesting) so that the overall water diversion cap is not compromised. The committee notes that although biodiversity planting has not been specifically listed, the final Basin Plan refers to 'any types of interception activity...which have the potential to have a significant impact'[70] which appears sufficiently broad to capture biodiversity plantings.

2.69 Nevertheless, the committee has concerns regarding the modelling of historical change in rain water run-off and the lack of appropriate modelling of interceptions. In taking this approach, the MDBA continues to ignore calls from stakeholders, including from parliamentary committees, to consider all factors in its modelling, particularly the interception activities.

Recommendation 4

2.70 The committee recommends that the MDBA model a range of possible future intercept scenarios and publish the results so that each state can better plan for the impacts of the interception on its overall consumptive water allocation.

Recommendation 5

2.71 The committee recommends that, in undertaking its adaptive management approach to the Basin Plan, the Murray Darling Basin Authority clearly considers, assesses and incorporates all elements that could impact environmental watering requirements. This includes climate change, interception activities, coal seam gas mining, surface-groundwater connectivity and possible negative effects such as over watering caused by increased river flows. This information should be clearly set out in non-technical language and be made publicly available in a timely manner.

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69 Basin Plan, note to Part 5, section 10.23, p. 100.

70 Basin Plan, Part 5, section 10.23.

Chapter 3

Groundwater

3.1 In order to manage the entire water resource in the Murray-Darling Basin, the Basin Plan also sets Sustainable Diversion Limits (SDLs) and Baseline Diversion Limits (BDLs) for groundwater. The groundwater SDLs and BDLs have been developed in a manner similar to surface water SDLs and BDLs as discussed in the previous chapter. The definition of the SDL and BDL apply to groundwater in the same way as to surface water (see chapter two).

3.2 This chapter discusses how the Murray-Darling Basin Authority (MDBA) has set groundwater SDLs and BDLs and how they have changed significantly over the various iterations of the Basin Plan. It also discusses the key criticisms of the modelling of groundwater for the Basin Plan. Finally the chapter details the concerns with the treatment of the connectivity of surface water and groundwater resources in the Basin Plan.

Groundwater SDLs and BDLs

3.3 In the final version of the Basin Plan, the MDBA set the Basin-wide SDL for groundwater at 3334 GL/y. The BDL for groundwater is set at 2386 GL/y.[1]

3.4 The SDLs and BDLs for groundwater proposed by the MDBA have varied significantly across the different versions of the Basin Plan. Table 3.1 lists the groundwater SDLs and BDLs from the MDBA's Guide to the Proposed Basin Plan (the Guide) through to the final Basin Plan.

3.5 As Table 3.1 indicates, the Guide provided for a relatively small increase (309 GL/y) between the total Basin SDL (2095 GL/y) than the total Basin BDL (1786 GL/y). The total allowable extraction of groundwater increased greatly under Basin Plan (November 2011) with a SDL/BDL difference of 1988 GL/y. Under the final Basin Plan this SDL/BDL difference was reduced to an increase of 948 GL/y but still represents a much larger increase in ground water extraction than proposed in the Guide.

1 MDBA, *Basin Plan attachment G– Synthesis of analysis associated with the determination of an environmentally sustainable level of take (ESLT) for surface water and groundwater in the Basin Plan*, November 2012, p. 6, www.mdba.gov.au/basin-plan, (accessed 4 March 2013).

Table 3.1—Groundwater SDLs and BDLs from the Guide to the Basin Plan

	The Guide (October 2010)	Basin Plan (November 2011)	Basin Plan (May 2012)	Basin Plan (August 2012)	Final Basin Plan (November 2012)
BDL GL/y	1786[2]	2352[3]	2373[4]	2378[5]	2386[6]
SDL GL/y	2095[7]	4340[8]	3184[9]	3324[10]	3334[11]

3.6 Unlike surface water which had extractions limited by the 1995 cap agreed to by Basin states, no equivalent constraint has been applied to groundwater use. As a result, the MDBA developed the BDLs for the Basin in reference to current groundwater extraction levels and water entitlements. The Basin Plan divides the Basin up into 66 groundwater SDL resource units (based on state planning boundaries and hydrogeological regions) and sets a BDL and a SDL for each.[12] The number of SDL resource units has change across the various iterations of the Basin Plan – for example, there were 79 resource units in the May 2012 version, and

2 MDBA, *Guide to the proposed Basin Plan*, Volume 1, Overview, 8 October 2010, p. 55.

3 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012, p. 21.

4 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012, p. 21.

5 MDBA, *Altered Proposed Basin Plan*, Schedule 4, August 2012, pp 192–205.

6 MDBA, *Basin Plan attachment G– Synthesis of analysis associated with the determination of an environmentally sustainable level of take (ESLT) for surface water and groundwater in the Basin Plan*, November 2012, p. 6, www.mdba.gov.au/basin-plan, (accessed 4 March 2013).

7 Note this figure is quoted in the MDBA, *Proposed Basin Plan consultation report*, May 2012, p. 46 and includes a component for unassigned groundwater. The figure of 1601 GL/y for the Basin wide groundwater SDL which was listed in the Guide excludes unassigned groundwater; see MDBA, *Guide to the proposed Basin Plan*, Volume 1, Overview, 8 October 2010, p. 143.

8 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012, p. 21.

9 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012, p. 21.

10 MDBA, *Proposed Basin Plan: Authority's views and consultation on the matters raised by the Murray-Darling Basin Ministerial Council – Volume 1*, August 2012, p. 35.

11 MDBA, *Basin Plan attachment G– Synthesis of analysis associated with the determination of an environmentally sustainable level of take (ESLT) for surface water and groundwater in the Basin Plan*, November 2012, p. 6, http://www.mdba.gov.au/basin-plan, (accessed 4 March 2013).

12 *Basin Plan*, Schedule 4, August 2012, pp 201–213.

70 SDL resource units in the August 2012 version.[13] The Basin-wide groundwater BDL and SDL is the sum of individual BDLs and SDLs across all the groundwater resource units, respectively.

Determination of groundwater baseline diversion limits

3.7 As a reference point, the MDBA determined the BDL for each SDL resource unit on the following basis:

> 1. where a water management plan or proposed plan exists, the BDL is the plan limit unless the plan limit is greater than the level of entitlement, in which case the BDL is the entitlement;
>
> 2. where there is no plan, the BDL is the entitlement along with the effect of any rules managing extraction; and
>
> 3. where there is a cross-border agreement for groundwater management, the extraction limit under the agreement is the BDL.[14]

3.8 The MDBA has indicated that this policy is the most 'accurate reflection of the limits of use imposed on current groundwater planning arrangements.'[15] The Basin states provided the MDBA with estimates of average use of groundwater resources for the period 2003-04 to 2007-08. The MDBA stated that 'small changes to some BDL estimates' had to be made following receipt of this information.[16]

Modelling for groundwater sustainable diversion limits

3.9 According the MDBA, the proposed groundwater SDLs were informed by numerical groundwater models or an analytical risk assessment which provided the 'potential volume of water available for consumptive use' or the preliminary extraction limit (PEL).[17]

3.10 The MDBA undertook numerical modelling for 13 of the 79 groundwater resource units where numerical models were already available. The MDBA also needed to supplement this analysis with a Recharge Risk Assessment Method (RRAM) for the remaining 66 groundwater resources units, as numerical models were not available in all areas. The MDBA explained this approach:

> Numerical modelling was carried out in 13 SDL resource units where there were fit for purpose numerical models available. Where numerical models

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13 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012, p. 4 and MDBA, *Basin Plan: Authority's views on the Minister's suggestions on the altered proposed Basin Plan*, November 2012, p. 9.

14 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 22.

15 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 23.

16 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 23.

17 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012, p. 10.

> were not available the [MDBA] has used a recharge risk assessment method (RRAM), developed for the MDBA (CSIRO and SKM 2010), to inform the proposed SDLs. Both the numerical groundwater modelling and the RRAM provide the potential volume of water available for consumptive use.[18]

3.11 The MDBA stated that the numerical models used 'represented systems that covered 73% of the groundwater [extracted] in the Murray-Darling Basin in 2007/08.'[19]

3.12 The MDBA explained that for the development of SDLs for resource units where numerical model were not available (i.e. through RRAM) that:

> …the first step in determining the PEL using RRAM was to determine recharge across the Basin using the Water Vegetation Energy and Solute (WAVES) model and upscaling techniques developed for the Murray-Darling Basin Sustainable Yields project and subsequently refined for the Basin Plan (Zhang and Dawes 1998 and CSIRO 2010). Additional recharge information was also used where it was made available by the states.[20]

3.13 Modelling of groundwater SDLs included the MDBA developing a 'groundwater assessment framework' which involved two stages:

> The first stage considered the characteristics of the individual groundwater resource units. Each groundwater SDL unit was characterised as either:
>
> - Deep groundwater;
> - Non-renewable groundwater;
> - Connected groundwater; or
> - Non-connected groundwater.
>
> The second stage assessed the Authority's determination of the BDL and assessment of the PEL in conjunction with the current or proposed groundwater management arrangements to determine the SDL for each groundwater SDL resource unit. The assessments within each of the characterisation groups considered:
>
> - is there an existing reduction program in place;
> - is the BDL greater than the PEL;

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18 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012, p. 12. Note the number of resource units changed over the various iterations of the Basin Plan. The final Basin Plan has 66 groundwater resource units. However, in answer to question on notice 23 November 2012, the MDBA directed the committee to this report for information about how groundwater SDLs (especially in terms of connectivity) were determined. MDBA, answer to question on notice, 23 November 2012, (received 28 November 2012).

19 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, April 2012, p. 11.

20 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, April 2012, p. 12.

- is the BDL equal to the PEL;
- is the BDL less than the PEL; and
- is there more up to date science or knowledge, or existing or proposed water management arrangements in place and how do they relate to the BDL and PEL considerations.[21]

Addendum Report on Groundwater modelling

3.14 In July 2012, the MDBA released the *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report* (Addendum).[22] This report provides updated information regarding the modelling for groundwater BDLs and SDLs. This included a review of the groundwater assessments by the MDBA and other groundwater experts and led to a decrease in the Basin-wide groundwater SDL from 4340 to 3184 GL/y in Basin Plan (May 2012).[23] The review included:

- an explanation of how the potential impacts of groundwater take on surface water were accounted for when setting the groundwater SDLs;
- a discussion on data quality and how it was considered in the review; [and]
- changes to deep groundwater SDL resource units.[24]

3.15 The MDBA acknowledged there was limited science available for setting groundwater SDLs and stated a 'conservative approach' should be adopted. According to the MDBA, this approach provided the justification for *some* SDLs being reduced in the Basin Plan from the initial estimates that were outlined in the Guide.[25] This is despite the significant *overall* increase in the Basin-wide SDL from the Guide to the first iteration of the Basin Plan.

3.16 The MDBA reassessed the information and data used to inform the SDLs in the Basin Plan (November 2011) and determined that the most appropriate method of revising the groundwater SDLs was to alter the 'unassigned groundwater assessment' in three broad groundwater systems, the: Lachlan Ford Belt System; Highland System; and the Western System. The revisions in these groundwater SDLs focussed mainly on unassigned groundwater and deep aquifers. Unassigned

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21 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, April 2012, p. 13.

22 This report was an addendum to the MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, April 2012,

23 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 2.

24 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 2.

25 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 3.

groundwater is the groundwater that can be 'made available for consumptive use above the BDL'.[26]

3.17 The MDBA's major reports that publicly detail groundwater SDLs, BDLs, and SDL resource units pre-date some changes to the groundwater SDLs, BDLs and SDL resource units that are listed in the final Basin Plan. Some of the evidence discussed below refers to SDL, BDL and SDL resource unit figures from earlier versions of the plan and therefore may differ from the figures included in the final Basin Plan. However, despite the changes in numerical values, the committee considers that the general thrust of the criticisms raised below have not been altered by the final version of the Basin Plan.

Key criticisms of groundwater modelling

3.18 In April 2012, the Wentworth Group of Concerned Scientists (Wentworth Group) stated in its analysis of the groundwater in Basin Plan (November 2011) that the BDLs have 'changed considerably' since the Guide (from 1786 to 2352 GL/y) and that no evidence had been provided to justify these increases:

> Across the Basin as a whole there have been some baselines that have increased and some that have decreased.
>
> However the accumulated decrease in baselines across the Basin is less than 20 Gl. On the other hand, the accumulated increase in baselines across the Basin is in excess of 600 Gl. This dramatic increase in claimed baseline water use matters. Since the Baseline Diversion Limit is used to establish the Sustainable Diversion Limit this large creep in baseline use in just 13 months has the effect of increasing the Sustainable Diversion Limits available for consumptive use and decreasing the available environmental water.[27]
>
> The Murray-Darling Basin Authority provides no evidence to justify the 600 Gl increase in baselines over the 13 month period since the publication of the Guide.[28]

3.19 The Wentworth Group claimed there was no new modelling undertaken since the Guide and which would explain the groundwater SDLs as per the Basin Plan (November 2011):

> In the 12 months since then, there has not been any new science done—let us make that clear—but there has been a change of 2,600 gigalitres. We

26 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 28.

27 Wentworth Group of Concerned Scientists, *Analysis of Groundwater in the 2011 Draft Murray Darling Basin Plan*, April 2012, p. 7.

28 Wentworth Group of Concerned Scientists, *Analysis of Groundwater in the 2011 Draft Murray Darling Basin Plan*, April 2012, p. 7.

> have increased the amount of groundwater we can take by 2,600 gigalitres. I am a little bit shocked at that without new science to back that up.[29]

3.20 The RRAM approach was criticised by stakeholders for the lack of scientific review. Environment Victoria's Healthy Rivers Campaigner, Ms Juliet Le Feuvre explained this criticism stating the groundwater SDLs:

> [are] based on the recharge risk assessment model, which estimates on a very broad basis what recharge to groundwater is. They [the MDBA] say that they have taken a precautionary approach and halved it and halved it again, but there is no scientific review of the model that they have used, so it would not be a precautionary approach at all.[30]

3.21 The Wentworth Group also challenged the validity of the modelling undertaken for groundwater SDLs stating there were key limitations and flawed assumptions made with this approach:

> The draft Basin Plan divides the Murray-Darling Basin aquifers up into 79 groundwater units [Basin Plan (November 2011)]. Numerical groundwater models currently cover 13 of these 79 resource units. The areas covered by the models are generally the most heavily used alluvial systems…
>
> The Recharge Risk Assessment Method was used as a prioritisation tool for the Guide to the Basin Plan. Its results were never intended to be used to provide quantitative recharge estimates…
>
> Given the great uncertainties in the calculation of the recharge rates, the need to retain groundwater resources for future generations, and the limited information available about reliance of ecosystems on groundwater discharges, using risk factors of 50% and 70% of the recharge is very concerning.[31]

3.22 Given the information gaps regarding groundwater in the Basin, many stakeholders have argued for a precautionary approach to be taken. For example, the National Water Commission (NWC) has stated that the potential impacts regarding extraction of water from groundwater systems will take a long time to emerge so an adaptive and precautionary approach is essential.[32]

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29 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, p. 17. The MDBA stated that the 'figure of 2,600 GL/year represents the difference between the total groundwater baseline diversion limits (BDLs) in the Guide to the total groundwater SDLs in the draft Basin Plan and is hence not an accurate representation of the change'. MDBA, answer to question on notice, Senate Standing Committee on Environment and Communications Legislation Committee, additional budget estimates, February 2012, question no 184.

30 Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 31.

31 Wentworth Group of Concerned Scientists, *Analysis of Groundwater in the 2011 Draft Murray-Darling Basin Plan*, April 2012, pp 5–6.

32 National Water Commission, *Coal Seam Gas and Water Position Statement*, December 2010, p. 1.

3.23 The Basin State Ministers also supported a precautionary approach for all aquifers consistent with the NWC position and also noted that extraction limits for groundwater resources may shift over time depending on new information and the best available science in relation to these resources.[33]

3.24 Despite the prospect for future review some stakeholders claimed the proposed amount of extraction is too high. For instance Dr Paul Sinclair from the Australian Conservation Foundation stated:

> The increase in groundwater extraction contemplated by the proposed basin plan is reckless. The draft plan proposes to increase the extraction of groundwater by 2600 gigalitres, about the same amount it once returned to the rivers. Enormous amounts of public money and effort are being dedicated to addressing the problems that have arisen from past decisions to over-allocate surface water based on poor understanding and political self-interest. The authority should be prevented from repeating the mistakes of the past.[34]

3.25 The Wentworth Group was also critical of the modifications made to groundwater extractions after Basin Plan (November 2011), arguing that the Basin-wide groundwater SDL in subsequent version of the Basin Plan were not based on strong scientific evidence. As Mr Tim Stubbs explained:

> We have had a pretty comprehensive look at that huge increase [in Groundwater Methods Report] and we released a submission asking a lot of questions about the science justifying that increase. We could not see that science. The authority put out a subsequent document [Addendum] but again it really lacked the details and proved to have some very dubious assumptions in it—assumptions that were made to get to those final numbers. It was very interesting that a number of weeks after that version a subsequent version of the plan [Basin Plan (August 2012)] came out and we saw a drop of around 1,000 gigalitres in those groundwater numbers. Craig Knowles said at a media conference, I think, that he got the boffins in a room and looked at the numbers. That translated to a one-day workshop with a handful of groundwater experts and others. The big concern is that we are making decisions about the future of the Murray-Darling basin through a one-day workshop. It is an interesting way of going about public policy, particularly when we are spending huge amounts of money and time modelling the surface water and saying how much water needs to go back in there, and then completely separately having a one-day workshop to adjust the volumes of groundwater by around 1,000 gigalitres. And the two are connected.[35]

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33 Ministerial Council, *Murray-Darling Ministers' comments on the proposed basin plan*, 9 July 2012, p. 9.

34 Dr Paul Sinclair, Australian Conservation Foundation, *Committee Hansard*, 24 April 2012, p.35.

35 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 10 September 2012, pp 14–15.

Connectivity between surface and groundwater resources in the modelling

3.26 Groundwater and surface water connectivity was perhaps the single most contentious issue regarding the treatment of groundwater in the Basin Plan. The committee heard extensive evidence that the two resources should be treated as closely linked and that Basin Plan did not adequately address this issue.

3.27 The National Water Commission has stated that although it is not always apparent, these resources are 'intimately linked' and should be managed as a single resource, unless proven otherwise.[36]

3.28 Conservation Councils in particular have stated that the water resources in the Basin need to be considered as connected when considering how much groundwater is sustainable to extract. For example Mr Tim Kelly, Chief Executive of the Conservation Council of South Australia stated that 'by default, these systems should be treated as connected' and that the MDBA 'should not be allocating further water from them.'[37]

3.29 This position was echoed by the Wentworth Group that stated the Basin Plan's failure to include the impact of increasing groundwater extractions in the surface water modelling means the surface water SDLs are unlikely to deliver the claimed outcomes. The Wentworth Group analysis of the Basin Plan (November 2011) stated:

> The failure to adequately analyse the impacts of increasing groundwater extractions on surface water means the draft basin Plan will not adequately protect environmental assets, particularly those dependent on low flows.[38]

3.30 Dr Bill Young from the CSIRO advised the committee that, as with the surface water SDLs, the adaptive management approach that the MDBA have stated it will use will allow for further consideration of new science and information in relation to groundwater and surface water connectivity:

> The surface water impacts from the groundwater...will take a long time to emerge. There is a review process that has been put in place. There may be no demand for that increase in groundwater use to happen in a hurry, but that does not necessarily mean it is scientifically defensible. But it does not mean it is necessarily risky either. There is an opportunity to review this. If the authority follows through with its commitment to adaptive management, we will be monitoring the increases in use, we will be monitoring the

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36 National Water Commission, *Groundwater-Surface Water Connectivity*, 13 December 2011, http://nwc.gov.au/groundwater/connectivity, (accessed 5 September 2012).

37 Mr Tim Kelly, Chief Executive, Conservation Council of South Australia, *Committee Hansard*, 24 April 2012, p. 24.

38 Wentworth Group of Concerned Scientists, *Analysis of Groundwater in the 2011 Draft Murray-Darling Basin Plan*, April 2012, p. 3.

> impacts on stream flows and we will be monitoring the consequences and outcomes for environments across the basin.[39]

3.31 The CSIRO was also critical about the level of rigor that MDBA applied to this issue:

> …the evidence base that has been presented by the authority to date to support the [Basin Plan (November 2011)] has not demonstrated that it has undertaken a rigorous assessment of the surface water impacts of the proposed levels of groundwater take.[40]

3.32 Other Basin stakeholders also voiced concerns regarding the limited knowledge and scientific understanding of the impact of the proposed groundwater extractions. Professor Mike Young noted that he did not believe the appropriate amount of information was available for the approach the MDBA was taking with groundwater under the Basin Plan (November 2011) and that he supported the NWC approach to connectivity.[41] Another witness, Ms Beverly Smiles from the Inland Rivers Network explained:

> One of the concerns is that where this new groundwater extraction is being proposed overlays the Great Artesian Basin in recharge areas, and there is a whole range of concerns around this proposal. Those of us who have been following water for a long time know that the knowledge and science around groundwater is relatively new compared to what we know about what is in front of our faces on a regular basis with surface flow.[42]

3.33 Some stakeholders have suggested any increases to groundwater extraction should be delayed until detailed evaluations are completed:

> Any consideration of increased extraction should be delayed until a thorough assessment of characteristics, surface groundwater connectivity, groundwater dependent ecosystems and resource sustainability can be carried out.[43]

3.34 The Wentworth Group have strongly criticised the assumptions used to calculate the diversion limits and have stated the assumptions used 'ignore the long-term connectivity of surface and groundwater' resources:

> …in documentation supporting the draft Basin Plan [November 2011] the [MDBA] states that for the purpose of determining Sustainable Diversion Limits, rivers that are classified as losing streams (i.e. ones where there is a

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39 Dr Bill Young, CSIRO, *Committee Hansard*, 23 April 2012, p. 62.

40 Dr Young, Director, Water for a Healthy Country Flagship, CSIRO, *Committee Hansard*, 23 April 2012, p. 61

41 Professor Michael Young, Professor of Environmental and Water Policy, University of Adelaide (Private Capacity), *Committee Hansard*, 23 April 2012, p. 79

42 Ms Beverly Smiles, President, Inland Rivers Network, *Committee Hansard*, 24 April 2012, p. 20.

43 Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 25.

> flux of water from the rivers to the underlying aquifers) can be treated as unconnected systems. This is then used to justify the assumption that drawing these aquifers down further will not increase the loss of water from the overlying rivers.
>
> However, this assumption is incorrect. The aquifers that receive water from losing river reaches will provide water to these rivers further upstream or downstream; i.e. there are gaining reaches elsewhere. Allowing additional extractions from these aquifers simply means that the level of the watertable will drop, and the extent of the losing stream will increase into areas that are currently gaining streams. Reducing the length of these gaining streams will affect river flows, including important base flows.[44]

3.35 Dr John Williams summarised the Wentworth Group's concerns about the Basin Plan (November 2011) introducing uncertainty by not considering the water resources as connected:

> …we need to realise that groundwater and surface waters are connected, in most instances. At the moment, until you establish where the groundwater systems are and without recognising the implications of taking water out of the groundwater system on the surface water—and that being done properly, which the Basin Plan does not do—you have no understanding of the impact of the groundwater allocations on the subsequent surface water allocations, which makes them most uncertain.[45]

3.36 The issue of groundwater connectivity remained a key concern of the Wentworth Group as the final Basin Plan was presented to Parliament in November 2012. On this basis, one representative of the Wentworth Group raised doubts about the reliability of the 3200 GL/y relaxed constraints surface water modelling:

> We accept that the 3,200 modelling, with the eight constraints removed, would produce a substantive improvement in the health of the river system, subject to two significant and important caveats. The first is: that would require an assumption that increases in groundwater extraction would not have a negative impact on stream flow, which is an enormous assumption that we do not believe is valid…[46]

3.37 This was detailed further by the Wentworth Group as the following exchange shows:

> **Mr Cosier:**…the plan proposes an increase in surface water flow of 2,750 gigalitres. It also proposes an increase in extraction of groundwater by 1,700 gigalitres. The modelling for the environmental outcomes for both the 2,750 gigalitres and the 3,200 gigalitres with the constraints removed assumes that groundwater will have no impact on streamflow.

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44 Wentworth Group of Concerned Scientists, *Analysis of Groundwater in the 2011 Draft Murray-Darling Basin Plan*, April 2012, p. 6.

45 Dr John Williams, Founding Member, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, p. 16.

46 Mr Peter Cosier, Convenor and Member, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 November 2012, p. 27.

Senator NASH: Assuming there is no connectivity.

Mr Cosier: Assuming there is no connectivity. The National Water Commission advice to government is the absolute opposite. If you cannot demonstrate no connectivity, you should assume 100 per cent connectivity. As it stands, we are looking at a scenario of 2,750 gigalitres being added to the river [through increased surface water flows] and potentially 1,700 gigalitres being taken from the river [through increased groundwater extractions].[47]

3.38 As a result of the MDBA's treatment of ground-surface water connectivity, the Wentworth Group claimed the environmental outcomes achieved by the 2750 GL/y reduced surface water extractions could not be properly evaluated because of the lack of information about the impacts of increased groundwater extractions. As Mr Cosier and Mr Stubbs explained:

Mr Cosier: …The plan as it has been presented to parliament is for a 2,750 gigalitre SDL target. The public documentation we have from the [MDBA] is that that will achieve a certain number of environmental outcomes based on 113 indicators that have been referred to recently. All of those comments, all of those statements…ignores groundwater extraction. So parliament is being presented with a basin plan that pretends to produce certain environmental outcomes for the volumes that parliament believes it is being asked to sign up to, when in fact none of those outcome targets have incorporated anything to do with groundwater extraction.

Senator XENOPHON: And that is the question you think ought to be put to the [MDBA]…?

Mr Cosier: Yes. And, our view is that, if it is not satisfactorily answered by the [MDBA]…the parliament should reject this plan.

Mr Stubbs: I think the question to be asked is: can the [MDBA] quantify the volumetric impact of that groundwater extraction on the river system? If the [MDBA] cannot provide you with a number which you can then subtract from the 2,750 to understand what volume will actually be flowing down the river and then go and look at the outcome targets or rerun the model to find out what that volume will actually achieve—if the [MDBA] cannot reply to you with a number—then clearly you cannot understand what we are actually getting, because you can never subtract that number from the 2,750 and you can never rerun the model to find out whatever that number is and what environmental outcomes you will actually be signing up to. Until you can do that, you do not know what you are signing up to as far as environmental outcomes.[48]

47 Mr Peter Cosier, Convenor and Member, and Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 November 2012, p. 29.

48 Mr Peter Cosier, Convenor and Member, and Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 November 2012, p. 30.

3.39 The Australian Conservation Foundation also noted the new modelling for 3200 GL/y did not take into account any future impacts from additional groundwater extraction.[49]

3.40 The MDBA responded to this issue and challenged the groundwater extraction figures used by the Wentworth Group:

> The [MDBA] strongly refutes the statements by Mr Cosier at the public hearing on 23 November 2012 that the Basin Plan "proposes an increase in extraction of groundwater by 1,700 gigalitres" and "potentially 1,700 gigalitres being taken from the river". The Basin Plan sets the Basin wide groundwater baseline diversion limit (BDL) at 2,386 GL/y, which reflects a more accurate determination of the potential extraction under current planning arrangements than the estimate of the BDL as at late 2010 which appears to inform Mr Cosier's remarks. The Basin wide groundwater SDL of 3,334 GL/y allows for an additional 984 GL/y of overall groundwater use above the groundwater baseline.[50]

3.41 The MDBA also challenged the idea of assuming 100 per cent connectivity of surface and groundwater resources. As Dr Rhondda Dickson told the committee:

> ...The Wentworth Group have characterised groundwater as if it were one whole combined pool that was all directly linked to surface water. That is very simplistic and wrong—that is not how the system works…
>
> There are 66 different aquifers that have been assessed… [F]or most of the aquifers that are highly connected to surface water—a lot of the alluvial aquifers—there is no increase in the diversion limit. The baseline diversion limit is determined and then the sustainable diversion limit is the same as that—there are a couple where it is a little bit lower; there is one up in Queensland.
>
> There are a lot of other aquifers that have very little connection, or no connection in the case of some fossil aquifers, with surface water, so there are different issues to consider. The issue of recharge is a key consideration in determining the sustainable limits of those. The simplistic point that is being made is just not correct and does not have any grounding in science. It is just a simplistic expression of how the system works…[51]

3.42 The MDBA further stated that:

> As part of the determination of groundwater SDLs the [MDBA] has categorized the level of connectivity between surface and groundwater resources as high, medium or low. There are 30 of 66 groundwater SDL areas where the connectivity level has been classified as low.[52]

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49 Mr Jonathan La Nauze, Healthy rivers Campaigner, Australian Conservation Foundation, *Committee Hansard*, 23 November 2012 p. 22.

50 MDBA, answer to question on notice, 23 November 2012, (received 28 November 2012).

51 Dr Rhondda Dickson, Chief Executive, MDBA, *Committee Hansard*, 23 November 2012, p. 45.

52 MDBA, answer to question on notice, 23 November 2012, (received 28 November 2012).

3.43 The MDBA also explained:

> In relation to the potential impact on surface water of the increase in groundwater use permitted under the Basin Plan, the Authority's July 2012 Addendum to Groundwater Methods Report (p10) relevantly states:
>
> "In regards to the issue of the potential impact of groundwater extraction on surface water resources the MDBA has calculated that the unassigned groundwater assessment for the revised draft Basin Plan (28 May 2012) has a potential reduction in surface water resources from unassigned groundwater extraction in the Lachlan Fold Belt and Highland unassigned systems of between 29 and 58 GL/y. It is essential to note the time span of the potential impacts can vary from a few years to hundreds of years and in some cases may never be realised. Mindful of this context, the MDBA is of the view that this is an acceptable risk".
>
> The groundwater SDL revisions since May 2012 do not change the scale of the Authority's assessment undertaken for the revised draft Basin Plan.[53]

Committee view

3.44 The committee considered the issue of surface-groundwater connectivity in its interim reports for this inquiry and is disappointed that this issue continues to be only partially addressed by the MDBA through separate groundwater modelling. The committee supports the Wentworth Group's statement that the Basin Plan fails to fully assess the impacts of increasing groundwater extraction in the surface water modelling which undermines the effectiveness of the MDBA's SDLs to deliver a healthy basin.

3.45 The committee also supports the recommendation of the Windsor report which states that 'the Murray Darling Basin Authority improve data of groundwater availability, use and connectivity with surface water prior to proposing sustainable diversion limits for groundwater.'[54] The committee notes with concern that the MDBA has not done more to address this important recommendation.

3.46 The MDBA has acknowledged that groundwater SDLs may be adjusted according to new information presented through current research projects.[55] The committee welcomes and acknowledges that the MDBA has taken steps to improve groundwater information. While it is accepted that certain groundwater information will take time to develop and that SDLs should be adapted accordingly, the MDBA needs to make the rationale for future changes as clear as possible to the public and the Parliament.

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53 MDBA, answer to question on notice, 23 November 2012, (received 28 November 2012).

54 House of Representatives Standing Committee on Regional Australia, *Of drought and flooding rain*, 2 June 2011, p. 71, www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=ra/murraydarling/report.htm.

55 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 11.

3.47 The committee supports the suggestion by the workshop of groundwater experts for an ongoing Groundwater Advisory Group[56] to provide technical advice to the MDBA on groundwater matters. The committee strongly encourages that any such group include experts in relevant fields, such as climate change and coal seam gas mining to inform changes to groundwater SDLs. The committee considers that formal and public updates from such a group would help Basin stakeholders and communities further understand groundwater issues and improve the public accountability of the MDBA regarding this issue.

Recommendation 6

3.48 The committee recommends that before 2016 the MDBA undertake a thorough review of the groundwater aspects of the Basin Plan including:

- **the methodology and the assumptions underpinning the groundwater BDLs and SDLs; and**
- **the connectivity of all groundwater and surface water resources to ensure that the modelling used in the Basin Plan is scientifically sound.**

Recommendation 7

3.49 The committee also recommends that in conducting this review the MDBA should consult with a range of scientific experts. To ensure reliability, the final review findings should be peer reviewed by the CSIRO. To ensure transparency, the results of the review should be published by the MDBA.

56 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, pp 27–30. The workshop of groundwater experts was held on 17 May 2012 to provide advice to the MDBA on certain groundwater issues.

Chapter 4

Infrastructure Investment, Environmental Works and Measures, and Constraints Management and Removal

Introduction

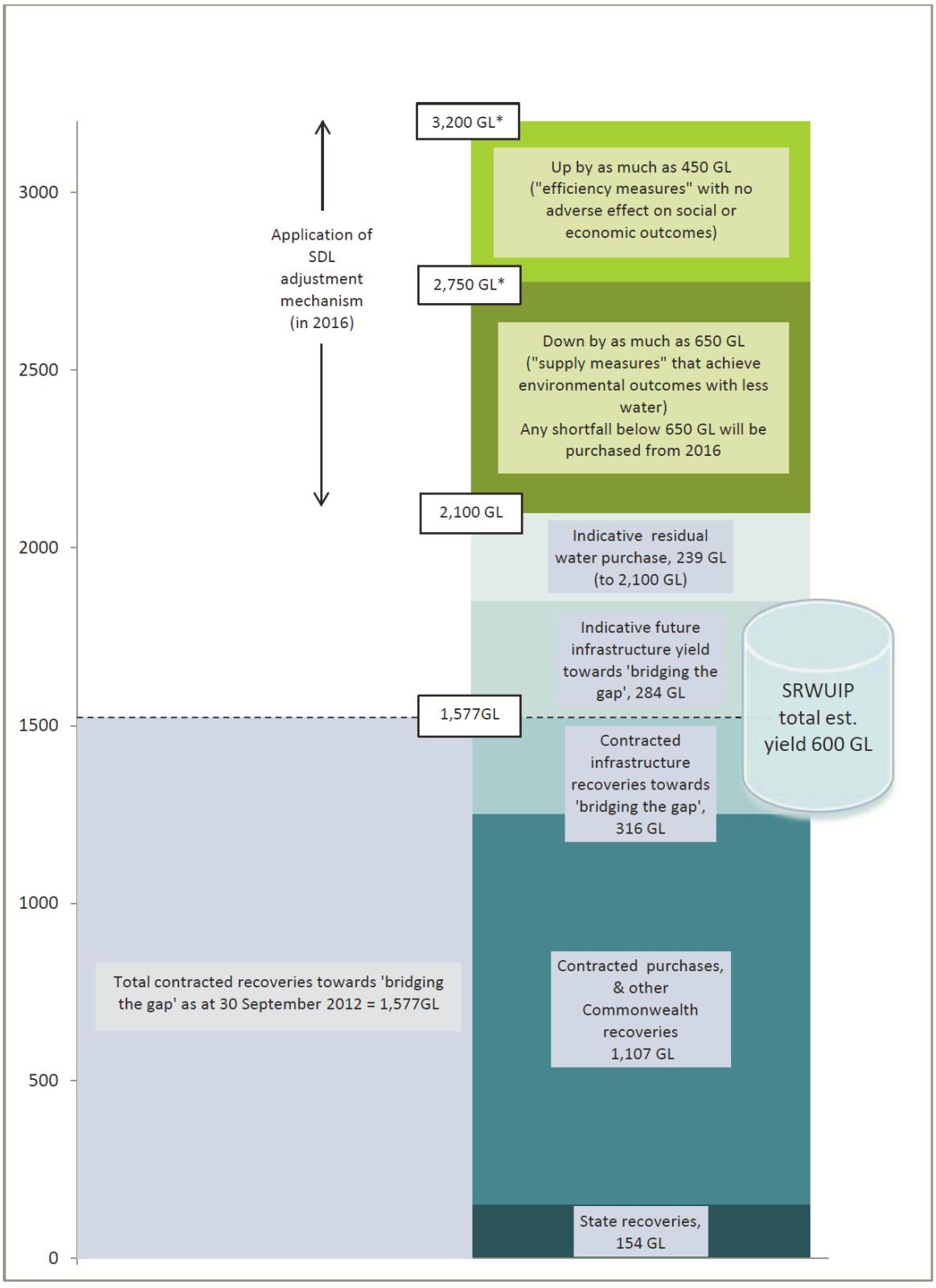
4.1 This chapter examines the use of infrastructure investment and environmental works and measures as part of the government's strategy to return water to the Basin system.

4.2 In particular, it focuses on recent evidence received about the contribution of up to 650 GL/y of the 2750 GL/y reduction in take to be achieved through environmental works and measures. In doing so, the chapter presents evidence about the uncertainty created by this strategy at the present time, but also the general preference for environmental works and measures of some Basin stakeholders over further government buybacks of water entitlements.

4.3 In addition, the chapter examines the government's announcement to return 450 GL/y to the Basin through new on-farm efficiency works, in addition to the 2750 GL/y reduction in take. The chapter does this by providing a brief outline of the recent amendments to the *Water Act 2007* (Water Act) which gave effect to the return of additional water. The chapter then notes the potential consequences of this policy and how it will be managed into the future under the constraints management strategy.

4.4 Figure 4.1, reproduced from the Department of Sustainability, Environment, Water, Population and Communities' (SEWPaC) *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, shows how these two features (the 650 GL/y and the 450 GL/y) of the Basin Plan form part of the government's overall plan to return water to the Basin.

Figure 4.1—Environmental Water Recovery and SDL Adjustment Mechanism[1]



* The amount of held environmental water will reflect the outcome of the operation of the SDL adjustment mechanism.

1 Reproduced from SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 23.

Environmental Works and Measures

4.5 SEWPaC describes environmental works and measures as:

> ...examples of 'supply measures' that can help deliver water more efficiently and effectively to meet environmental objectives. Some of these projects have the potential to provide SDL offsets by achieving equivalent environmental outcomes using less water.[2]

4.6 Previous environmental works and measures programs have been funded by Basin governments, including the works delivering and managing environmental water to five Living Murray 'icon sites' under the Living Murray program.

4.7 Currently, there is a $10 million Commonwealth funded program to:

> ...assist Basin states and communities to investigate new environmental works and measures projects. The types of projects being investigated include the removal of impediments to environmental flows, building regulators to deliver environmental water more efficiently to wetlands, and purchasing flood easements.[3]

4.8 A key implication of the adjustment mechanism in the final Basin Plan is for environmental works and measures to provide for up to 650 GL/y of the final 2750 GL/y reduction in take.[4] Any potential shortfall in reaching the 650 GL/y with works and measures will be met by water purchases from 2016.[5]

4.9 The MDBA further explained what the 2016 deadline means in practice in the following exchange:

> **Senator NASH:** Do the savings have to have been completed by 2016, or what is the arrangement?
>
> **Dr Dickson:** No. Those projects have to be completed and deliver the savings up until 2024.
>
> **Senator NASH:** As long as they are identified by 2016? Is that what we are talking about?

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2 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 15. For a definition of supply measures see chapter two, paragraph 2.13 of this report.

3 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, pp 15–17.

4 The MDBA agreed that 'the [final] Basin Plan should further clarify that the 5 per cent limit on operating the [adjustment] mechanism represents the 'net' SDL adjustment. That is, the mechanism can provide up to a 650 GL offset from supply measures provided there is a corresponding increase in the SDL reduction amount resulting from efficiency measures to maintain the 5 per cent net limit.' See: MDBA, *Basin Plan: Authority's views on the Minister's suggestions on the altered proposed Basin Plan*, November 2012, p. 2.

5 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 23.

> **Dr Dickson:** They are identified, there is investment against them and they have agreed that they are going to deliver those savings. They need to be well and truly in prospect, but they do not need to have been built and delivered at that time.[6]

4.10 Environmental works and measures were criticised by some stakeholders because, under the adjustment mechanism, environmental works and measures may return water to irrigators rather than the environment. Mr La Nauze of the Australian Conservation Foundation stated that this was not an appropriate way of spending public money under the Basin Plan:

> Firstly, the proposed SDL adjustment mechanism needs reworking. The parliament should be aware that, as it is currently drafted, this mechanism will result in the Commonwealth spending hundreds of millions if not billions of dollars returning water to irrigators instead of to the environment. It turns the water reform process on its head. New investments in certain categories of water-saving measures—the [MDBA] calls them 'supply measures'—will be used to increase the amount of water available for consumptive use rather than for the environment. This includes the reconfiguration of water storages such as the Menindee Lakes and investment in environmental works and measures. So even where the environmental outcome is manifestly inadequate, as it would be under the current 2,750-gigalitre plan, public money would be spent increasing water for irrigation instead of making more water available for the environment.[7]

4.11 Another witness, Mr Ted Hatty, Chairman, Southern Riverina Irrigators, argued that environmental works and measures would lose effect if there was a return to drought:

> …with reference to the river's health in the last few years, …we have to recognise that the river was in the midst of the worst drought in 100 years. That is something that seems to be lost on a lot of folks in the city. The fact is that we also had programs such as The Living Murray which were agreed to prior to the drought but were never actually given an opportunity to run. So there is a whole host of works and measures that are currently on the table and that were already agreed to prior to all of this Basin Plan. Prior to the drought they were ready to go, but it stopped raining. River health is always going to be an issue if it stops raining.[8]

4.12 The NSW Irrigators' Council argued that the process for proceeding with environmental works and measures projects actually provides a disincentive for the completion of such projects. As Mr Andrew Gregson explained:

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6 Dr Rhondda Dickson, Chief Executive, Murray-Darling Basin Authority, *Committee Hansard*, 23 November 2012, p. 37.

7 Mr Jonathan La Nauze, Healthy Rivers Campaigner, Australian Conservation Foundation, *Committee Hansard*, 10 September 2012, p. 20.

8 Mr Ted Hatty, Chairman, Southern Riverina Irrigators, *Committee Hansard*, 23 November 2012, p. 9.

> When it comes down to it, the basis of the 650 [GL/y for environmental works and measures] is this: if it is not obtained through environmental works and measures then it will be obtained through buyback. Minister Burke argues that the resolve to get it done lies in the hands of the states. What we would ask is that that 650 be subject to apportionment in the same way that every other purchase is subject to apportionment. Unfortunately, Minister Burke and the [MDBA] have not seen fit to implement that in the plan.
>
> What happens as we understand it is that the proposals come from the states to the ministerial council. The ministerial council, which is all of the states' ministers, must agree on each and every project. In the event that there is not unanimous agreement then that project will not proceed and potentially the 650 will not be met. Because of that unanimity requirement there is an effective veto handed to every state. Not only does that mean that there is no incentive for them to bring projects to the table but also there is no incentive for them to accept projects from other states. It is our opinion, therefore, that achieving the full 650 is, at best, difficult. As a result, that is why, again, we are calling for a cap on buybacks. At the very least, that 650 should be apportioned to give every state an incentive to be involved. If I could be parochial for just one moment...if that 650 were apportioned there would be an incentive for South Australia to look at environmental works and measures in respect of the Lower Lakes and Coorong, and we think that that is absolutely vital as part of this process.[9]

4.13 A SEWPaC official was asked about whether the potential 650 GL/y return of take from environmental works and measures would be apportioned between the Basin states:

> **...**starting from the 2,750, there is apportionment of the downstream component to provide, in a sense, a starting point, and that is done now under the planning processes. The apportionment of, to coin a phrase, the benefit of whatever the 650 has got will depend—there are some locational dimensions to this—on what the projects are and where they are. We do not know precisely what the projects are and where they are. There is a process going on right now with some prefeasibility studies and so forth being done, but the decisions on what those projects will actually be will occur in 2016. The locational apportionment of the benefit of those projects will depend upon the decisions which are taken at that point in time.[10]

4.14 Further to this point the MDBA added:

> **Dr Dickson:** The default arrangements for the apportionment is if states do not get to agreement, they are done on the baseline diversion limits—the apportionment of the 2009 baseline. There is a default if states do not get to

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9 Mr Andrew Gregson, Chief Executive Officer, New South Wales Irrigators' Council, *Committee Hansard*, 23 November 2012, p. 17.

10 Mr David Parker, Deputy Secretary, Water Group, Department of Sustainability, Environment, Water, Population and Communities, *Committee Hansard*, 23 November 2012, p. 35.

agreement, but there is enough time in there for states to come to an agreement.

Senator NASH: Does that calculation take into account any savings through the works and measures from a particular state?

Dr Dickson: As Mr Parker said, you cannot be absolutely definitive on that, because those works and measures could come from different tributaries or different parts, and one state may put the lion's share of an investment in and there may be some need for them to get agreement with another state on how they are going to share those benefits. It is up to the state governments to work out how best they want to have this managed.[11]

4.15 The MDBA and SEWPaC were also asked about what options were available if the environmental works and measures programs had not met its target by 2024:

Mr Parker: By 2024 we expect to have bridged the gap one way or another.

Senator NASH: But what is the other way? That is what I want an answer to.

Mr Parker: As I said earlier in response to your question, if the project is not completed substantially in accordance with specifications and so there is a shortfall in the recovery, then there would be a gap which needs to be recovered by other means.

Senator NASH: That is exactly what I am after. What are the other means?

Mr Parker: As I said, purchase or investment. It will depend on where they are, what the type of project is and so forth.

Senator NASH: So there is potentially further buyback if they do not meet the targets.

...

Dr Dickson: Yes, but that is why there is the point at 2016 and why we need a long period in developing the projects in that period so that we can be very confident in the savings identified and very confident there is investment and those projects will be built. That is why it needs that proper assessment, so it can minimise risk by forces that no-one could be aware of that might make a project no longer able to be conducted. Those are the sorts of things that you have to manage for, but most of the effort is in making sure that we have good projects at that time and that they are well and truly agreed on and bedded down to minimise that risk.[12]

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11 Dr Rhondda Dickson, Chief Executive, Murray-Darling Basin Authority, *Committee Hansard*, 23 November 2012, p. 38.

12 Mr David Parker, Deputy Secretary, Water Group, Department of Sustainability, Environment, Water, Population and Communities, and Dr Rhondda Dickson, Chief Executive, Murray-Darling Basin Authority, *Committee Hansard*, 23 November 2012, p. 39.

4.16 The National Irrigators' Council stated that the process risked being overly complicated which in turn could impact on reaching the desired outcomes of the environmental works and measures strategy:

> What we are concerned about with the 650 is not that it is not there; it is not that we do not believe that we can get the same outcomes that you would have got if you had bought that water or got it back through on-farm investments or whatever; it is that governments—certainly not this one—in the past had a marvellous way of overcomplicating what should not be that complicated. At the moment, we do seem to be heading down that path. As Andrew [Gregson, CEO, NSWIC] said, there are some issues within the process itself of various states perhaps being able to veto it, but even getting those projects to the ministers and then getting them through the MDBA's modelling—there are plenty of hand grenades that can be built into that that do not need to be there, and that is what we are a little bit worried about. If it becomes too complicated, everyone chucks their hands in the air at a government level and says, 'Just buy back.'[13]

4.17 Finally, the Wentworth Group noted that there was no particular scientific preference for any of the three forms of water recovery, however, it also expressed the need for policies to identify the cost effectiveness of such water recovery programs, including environmental works and measures:

> From a scientific perspective no [it doesn't make any difference how the water is recovered]. In 2007, we put a statement out which looked at the environmental needs, the economic opportunities for achieving those and the social impacts and how to address those issues. ... In simple terms, there are a range of alternatives for delivering water. Buyback is one alternative, on-farm infrastructure improvements is another and public infrastructure works is a third—there are a range of them. Our view was that once you have established the needs of the river system, based on the science, you then use whatever tools are available and you work with local communities to identify the most cost-effective way, both in economic and socioeconomic terms, to deliver those environmental outcomes.[14]

Committee view

4.18 The committee supports the use of environmental works and measures to contribute towards the reduction in take. The committee considers such measures to be an essential part of an appropriate water recovery strategy.

4.19 However, from the evidence received, the committee is concerned that the current provisions relating to environmental works and measures for the reductions of 650 GL/y of water results in some uncertainty for Basin stakeholders. In particular, the committee is concerned that the extent to which buybacks may be required to meet a shortfall from environmental works and measures (should one occur) will not be

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13 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard*, 23 November 2012, p. 18.

14 Mr Peter Cosier, Convenor and Member, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 November 2012, p. 28

known until 2016 and potentially much later. The committee is also concerned that should a shortfall occur, the decisions about the apportionment of such a shortfall among the Basin states have been delayed and that this creates further uncertainty.

4.20 Finally, while supporting the program for environmental works and measures, the committee is mindful that the return of water to the Basin should be both cost-effective and mindful of the socio-economic impacts on Basin communities.

Recommendation 8

4.21 The committee recommends the MDBA conduct further research into how effective the works and measures programs are for delivering environmental outcomes and the cost effectiveness of such projects in comparison to other forms of water recovery. This research should also include the socio-economic impacts to irrigation communities of increased levels of 'buyback'.

Recommendation 9

4.22 The committee recommends that the MDBA and SEWPaC provide ongoing public updates to Basin stakeholders on progress in securing water savings from environmental works and measures.

An additional 450 GL

4.23 On 26 October 2012, the government announced that it would:

> …provide $1.77 billion over ten years from 2014 to relax key operating constraints and allow an additional 450GL of environmental water to be obtained through projects to ensure there is no social and economic downside for communities.[15]

4.24 The 450 GL/y is in addition to the 2750 GL/y reduction in take that is targeted in the Basin Plan. The announcement came in response to the MDBA's release of the 3200 GL/y relaxed constraints modelling scenario (see chapter two).[16] The relationship of the 450 GL/y to the other aspects of environmental water recovery is illustrated in Figure 4.1 above.

4.25 To achieve this expanded target, the government committed to investing 'primarily in on-farm efficiency works that generate water savings for the environment

15 Prime Minister, the Hon. Julia Gillard MP and Minister for Sustainability, Environment, Water, Population and Communities, the Hon. Tony Burke MP, Press Release, 'Returning the Murray-Darling Basin To Health, 26 October 2012, www.pm.gov.au/press-office/returning-murray-darling-basin-health.

16 Prime Minister, the Hon. Julia Gillard MP and Minister for Sustainability, Environment, Water, Population and Communities, the Hon. Tony Burke MP, Press Release, 'Returning the Murray-Darling Basin To Health, 26 October 2012.

and other projects as agreed by states', to 'ensure there is no social and economic downside for communities.'[17]

4.26 On 19 November 2012, the Senate Environment and Communications Legislation committee presented its report into the Water Amendment (Water for the Environment Special Account) Bill 2012 (the Special Account Bill). The Special Account Bill received assent (with amendments) on 15 February 2013. Its aim was to amend the Water Act to give effect to the Prime Minister's announcement of 26 October 2012.[18]

4.27 There are several key aspects of the Special Account Bill that were relevant to the committee's inquiry such as the additional return of an additional 450GL, the removal of physical constraints, and enhanced environmental benefits. Specifically, the Special Account Bill:

> ...provides funding for the acquisition of an additional 450GL of water and the removal of physical constraints. The Bill identifies key enhanced environmental benefits which could be achieved. Further reducing levels of salinity in the Coorong and Lower Lakes so that improved water quality contributes to the health of insects, fish and plants that form important parts of the food chain. Increasing the water levels in the Lower Lakes to provide additional flows to the Coorong and to prevent acidification, acid drainage and river bank collapse below Lock 1. Ensuring the [Mouth] of the Murray is open without the need for dredging. Discharging 2 million tonnes of salt per year from the Murray-Darling Basin as a long term average. Increasing flows through the Murray Mouth barrages and supporting fish migrations. In conjunction with removing or easing constraints providing opportunities for environmental watering of floodplains of the Murray-Darling Basin to improve the health of forests and fish and bird habitat, improve connections to the river system, and replenish groundwater. Increase the flow of rivers and streams and provide water to low and middle level floodplains that are adjacent to rivers and streams.[19]

4.28 Importantly, the Special Account Bill also sets out that the government anticipates it will:

> ...acquire the additional water primarily through investment in on-farm irrigation efficiency projects and also through off-farm efficiency projects, the purchase of water access entitlements (but not through open tender rounds available to all entitlement holders in a water resource plan area)

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17 Prime Minister, the Hon. Julia Gillard MP and Minister for Sustainability, Environment, Water, Population and Communities, the Hon. Tony Burke MP, Press Release, 'Returning the Murray-Darling Basin To Health, 26 October 2012.

18 Senate Environment and Communications Legislation Committee, Water Amendment (Long-term Average Sustainable Diversion Limit Adjustment) Bill 2012 [Provisions] and the Water Amendment (Water for the Environment Special Account) Bill 2012 [Provisions], November 2012, p. 7.

19 Revised Explanatory Memorandum, Water Amendment (Water for the Environment Special Account) Bill 2012, p. 3.

> and other agreed mechanism *where the social and economic outcomes can be maintained or improved*. This would achieve enhanced environmental outcomes by increasing the volume of water available for environmental use, without adversely impacting on the productive capacity of the Basin.[20]

4.29 The Special Account Bill also dealt with the issue of constraints removal and provides funding:

> ...to allow the constraints removal to facilitate delivery of the additional environmental water recovery and achieve improved environmental outcomes from those water holdings. This could be done through a range of projects including acquisition of flood easements, provision of access works (for example, bridges, culverts), changed watering regimes and increased outlet capacity on major dams and storages.[21]

4.30 The committee did not consider the specific details of the Special Account Bill as it was a matter before the Environment and Communications Legislation Committee. However, the committee did discuss some related issues during its public hearing on 23 November 2012. In addition, the committee considers that some of the general issues raised in the Environment and Communications committee report to be of direct relevance to this committee's inquiry. The key views of stakeholders before this inquiry are discussed in turn.

4.31 The Murray Group of Concerned Communities, for example, considered that the effects of the Bill were potentially premature given the uncertainty about how other aspects of the Basin Plan may operate:

> …We feel that the 450 bill is premature. We have not yet achieved the basin plan. We have not yet seen how the adjustment mechanism will work in practice. We have not yet seen how getting 2,750 in the first instance will work in practice. We do not see the need to scramble for further water recovery before you can be sure that you can achieve outcomes and delivery this.[22]

4.32 The National Irrigators' Council (NIC) expressed dissatisfaction with the plan to return additional water through the Special Account Bill. As NIC CEO, Mr Tom Chesson, told the committee:

> We get frustrated because both the Prime Minister and the minister went down to Goolwa [in October 2012] and announced the 450-gigalitres and the upward movement. They both made the point very strongly that the reason that they wanted to invest in irrigation was because there were downsides for our communities. They have not explained what those downsides are, but we have got organisations that have done microlevel

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20 Revised Explanatory Memorandum, Water Amendment (Water for the Environment Special Account) Bill 2012, p. 4. Emphasis added.

21 Revised Explanatory Memorandum, Water Amendment (Water for the Environment Special Account) Bill 2012, p. 4.

22 Mr Bruce Simpson, Chairman, and Ms Perin Davey, Executive Officer, Murray Group of Concerned Communities, *Committee Hansard*, 23 November 2012, p. 12.

> work on what it costs in terms of what these reforms will cost communities, and it is not pretty. If there are downsides, if the government believes that there are not more large-scale water tender buybacks, then why are we even having this discussion?
>
> Surely, it should just be put into the legislation. Two bills have gone through—one has gone through the Senate and another one is currently in the Senate. We could amend the Water Act tomorrow—or next week—to make sure that there are no downsides for communities in this, and then I think you will see communities and irrigators come on board. They will be much more comfortable, because what we are being asked to do is to trust governments, not just today—I have no issue with the sentiments and the intention of government today—but this process is probably going to be five, six or seven elections long. What is discussed behind closed doors or what is discussed in these committees today is not necessarily going to be government in 2016, 2017, 2018. They are not necessarily going to go back and read this committee's report and understand exactly what the intention was.
>
> I just implore this committee: don't damage our communities further by simply taking water out of them and simply buying back. There is a win-win, and we should follow that path.[23]

Constraints Management Strategy

4.33 In addition to the some of the specific concerns relating to the Special Account Bill, it was the associated issues of the return of the additional 450 GL/y and the need to relax constraints in the Basin system to manage the additional flow that was most contested. The alternative views of irrigators' representatives and environmental groups are reflective of this.

4.34 The NIC expressed serious concern with how the Constraints Management Strategy would be implemented. In outlining this concern, the NIC's Mr Tom Chesson noted the significant impacts that removing constraints could have on certain communities and rural properties:

> …We are concerned that the constraints management strategy which is now to take place over the next 12 months could become just a tick-a-box exercise because there is so much pressure on the government to allow the 450 gigs of upward movement—that is that [$]1.8 billion that was announced the other day. The Murray-Darling Basin Authority has made it very clear in the modelling that was used as the basis for that upward movement that, if the constraints that are relaxed in that model are not actually implemented, there is no real environmental benefit of just putting another 450 gigs and sloshing it down the river.

23 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard*, 23 November 2012, pp 13–14.

> It says the only way you will hit those extra environmental targets is if you relax those constraints. The Victorian government, for example, has done a lot of work on hydrological modelling for flood risks. I know the Insurance Council has done a lot of work as well.
>
> On 9 October 2010 and again on 10 October 2010, the water minister in Victoria told the Victorian parliament that with 40,000 megalitres, the constraint that was relaxed at McCoy's Bridge, you would have 100 buildings flooded, you would have 250 kilometres of roads go under, over 8,000 hectares of dryland and about 1,000 hectares of irrigated country. That is just with that one constraint relaxed. They would argue that it is not a minor flood; it is a serious flood. You heard before from Ian Lobban and the Murray group—Louise Burge and others—that if you then have a rainfall event, you can have a serious issue on your hands.
>
> I think it needs to be understood that constraints are not a simple thing and that, if you flood someone's home, there is a very big difference between a rainfall event doing it and your own government doing it. You need to understand that the [Commonwealth Environmental Water Holder] is hiding behind the state governments, who are the river operators. If the states flood someone's home, from what I understand, legally...the states are liable. We are concerned that if the constraints are not managed properly, it could all go pear-shaped in a horrible way for a lot of people.[24]

4.35 Mrs Jan Beer also told the committee that the impact on the Goulburn river region could be significant and potentially result in moderate flooding. Mrs Beer also argued that non-natural flooding events provided for under the additional release of water could have significant impacts on farmers.[25]

4.36 These concerns were combined with evidence that predicting flows and flooding was extremely difficult in the area. According to Mrs Beer, this could also have significant consequences:

> I am therefore very concerned how unpredictable tributary flows, combined with totally insufficient real time data and the time lag factor for streamflows combined with large environmental releases from Eildon Weir, will impact on floodplain landowners and the many towns along the river system such as Yea, Seymour, Shepparton.[26]

4.37 Mr Andrew Gregson of the New South Wales Irrigators' Council also noted the complexity of the Basin system and expressed reservations about how the removal of constraints could be managed:

> One thing I am absolutely certain of is that there is not sufficient understanding of what those constraints are or what the implications are of

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24 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard*, 23 November 2012, p. 16.

25 Mrs Jan Beer, Private Capacity, *Committee Hansard*, 23 November 2012, pp 1–2 and Mrs Jan Beer, *Submission 381*, pp 2–3.

26 Mrs Jan Beer, *Submission 381*, p. 4.

> removing them. 'Constraints' makes it sound unrealistically simple. We are talking about an extremely complex system without a comprehensive understanding of how, where and why water moves through it. One of the constraints they are looking at is the capacity to release more water faster from the Menindee Lakes system. That sounds pretty simple until you realise that that water then has got to go somewhere. One of the volumes that we have seen quoted as to what they want to release would be such that the Lower Darling River channel could not carry it. It would spill into the anabranch and effectively be lost. So I think we have got to be extremely careful of oversimplifying exactly what the system constraints are and what the impacts will be of changing or moving one thing. This system is like a balloon: if you poke it in one area, you are going to have an implication somewhere else.[27]

4.38 Mr Gregson also stated that it 'is fair to say that the time frame made available to consider this constraints removal strategy is going to prove vastly insufficient to understand what the implications will be.'[28]

4.39 The MDBA responded to concerns raised about the unintended consequences of the relaxing of constraints to achieve at total of 3200 GL/y return of take by stating that it will work through the issues in consultation with local farmers and through the development of the constraints management strategy. As Dr Rhondda Dickson, Chief Executive, MDBA told the committee:

> In terms of what has been done already, there is a lot of experience in the Murray-Darling Basin Authority on this issue through many years working on the river operations with local landholders through the system. So there is a lot of knowledge there about the implications of changes to river flows. So we have background information there, but the key piece of work that the authority is going to be doing over the next 12 months—we are already getting ready to do that—is the sort of analysis that you are talking about, where there would be a lot of detailed work done on the implications of what the priorities for the constraints are first, and then the implications of changing one, having a look at what those implications are for changes to the flow regimes on private properties and what the risks might be, and looking at where the most effective relaxation might occur. There has been quite a lot of work done already this year with basin states identifying all the constraints. We have done quite a few studies on that.
>
> So base work is being done, but there will be a very active and intense program in the first year of getting a strategy together. That is the constraints management strategy which is in the plan and which we are required to do in very close consultation with states. We will be talking also with landholders on what we should be looking at then. But, once there is an initial strategy identified after a year—the program of how you would

27 Mr Andrew Gregson, Chief Executive Officer, New South Wales Irrigators' Council, *Committee Hansard*, 23 November 2012, p. 16.

28 Mr Andrew Gregson, Chief Executive Officer, New South Wales Irrigators' Council, *Committee Hansard*, 23 November 2012, p. 16.

> proceed once the ministerial council and the basin governments agree on a strategy—there is a long program of working closely with landholders, in a way that has been done in the previous exercises, with looking at changes to constraints.[29]

4.40 The committee notes that the consultation process has already commenced. Furthermore, the committee notes that Mrs Jan Beer, a stakeholder that appeared at a public hearing on 23 November 2012 who was concerned about the consultation process has subsequently been contacted by the MDBA to discuss issues and arrange further meetings.[30]

4.41 Mr Jonathan La Nauze from the Australian Conservation Foundation (ACF) expressed support for the constraints management strategy but sought some changes to how it was treated under the Basin Plan:

> I think the constraints management strategy is absolutely essential. I am not as worried about the delay [of the constraint strategy being released 12 months after parliament is expected to sign off on the plan]; what I am worried about is the way that it is written into the plan—it does not actually drive the systematic assessment of those constraints, an assessment of the feasibility of overcoming them and then actually ensuring that they will be overcome where that is physically possible. It leaves that option open but it does not drive it. But I think some simple wording changes to the constraints management strategy in the plan would enable that, as well as realigning the adjustment mechanism to work in the way that I said. So it actually requires the overcoming of constraints and achieving a better environmental outcome before you start to return any water for consumptive use.[31]

4.42 Environment Victoria urged that the MDBA work through the possible water infrastructure achievements that could assist in the removal of system constraints which it noted was a major reason for establishing the 2750 GL/y reduction in take. As Environment Victoria's Ms Juliet Le Feuvre told the committee:

> …The MDBA has stated that system constraints are very important limiting factors in setting SDLs and that they hinder the availability of environmental water, particularly to the upper levels of the [subplain]. Constraints have been cited as a key reason for selecting the 2,750 gigalitre figure. If that is the case, and the MDBA has to be prepared to do something about them, it should conduct a systematic assessment of the feasibility, costs and benefits of redesigning river management operations and infrastructure to deliver ecological outcomes, followed by a prioritisation of works and measures. Once an impediment to the delivery

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29 Dr Rhondda Dickson, Chief Executive, Murray-Darling Basin Authority, *Committee Hansard*, 23 November 2012, p. 41.

30 *Committee Hansard*, 23 November 2012, pp 4,41, and 42 and correspondence between the MDBA and the committee, 11 December 2012.

31 Mr Jonathan La Nauze, Healthy Rivers Campaigner, Australian Conservation Foundation, *Committee Hansard*, 10 September 2012, p.23.

> of environmental water has been removed, the MDBA should review the ability to achieve improved environmental objectives and adjust the SDL accordingly.[32]

Committee view

4.43 The committee supports the improved environmental outcomes for the Basin system that will be achieved by returning an additional 450 GL/y primarily through on-farm infrastructure investment.

4.44 However, the committee recognises that the additional return of 450 GL/y of water to the Basin system which also involves constraints removal is a contentious issue and the feasibility is yet to be proven.

4.45 The committee is concerned about the significant impact the additional return of water for environmental purposes and the removal of system constraints may have on many landholders and rural communities in certain parts of the Basin system. It is clear from the evidence received that the proposals for constraints removal may cause significant flooding and damage to rural properties and also have adverse impacts on a number of farmers and related businesses. The committee is also concerned that there may be unintended socio-economic consequences of the policy as it currently stands. The committee notes from recent press reports that this is an ongoing concern for a number of rural and regional communities (see Appendix 4).

4.46 Finally, the committee acknowledges the concerns raised about the lack of consultation that has occurred in the lead up to the relevant changes being introduced into the Basin Plan. At the same time, the committee notes the future consultation that was outlined by SEWPaC and the MDBA on this issue. The committee also commends the commitment and the consultation undertaken by relevant government officials regarding a specific request from a stakeholder and committee members arising from the committee's public hearing 23 November 2012.

Recommendation 10

4.47 The committee recommends that greater detail on the socio-economic costs and benefits of any proposed constraints removal be presented to affected communities and the public in general. Such information should be publicly updated in a timely manner when changes occur or new information is obtained by the MDBA and SEWPaC.

Recommendation 11

4.48 The committee recommends that further consultation regarding constraints management and the additional 450 GL/y should remain a high priority for the MDBA and SEWPaC. To ensure consultation is adequately undertaken, the committee recommends that the MDBA and SEWPaC develop and publish a strategy that identifies and provides solutions for previous

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32 Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 25.

shortcomings (see chapter seven) in the government's consultation process for developing the Basin Plan.

Chapter 5

Water buybacks and water trading

5.1 This chapter discusses water buyback and water trading in the Murray-Darling Basin. In particular it discusses the conduct of and problems with the government's program for purchasing water entitlements to return to the Basin for environmental purposes. Following a short outline of the government's water buyback scheme, the chapter discusses several key problems with the process that were raised by witnesses throughout the inquiry.

5.2 First, the chapter discusses the 'Swiss-cheese' effect that has occurred through the buyback process whereby government purchases have created excessive cost pressures on remaining water holders because of gaps in water delivery in the surrounding regions.

5.3 Second, the chapter considers the issue of distressed sellers in situations where water sales, while technically voluntary, are undertaken by farmers (the sellers) who are facing significant financial pressures which have unwillingly pushed them towards selling water entitlements.

5.4 Finally, the chapter considers the issue of sleeper and dozer licenses and the potential problems that the initial over-allocation of water entitlements of previous decades has for the government's aim of purchasing water for environmental purposes.

5.5 The related issue of the water buyback process and types of water entitlements in terms the reliability of water, such as high security, general security and supplementary water (including for the cases of Twynam, and Nimmie-Caira) is discussed in chapter six.

Background of the water buyback

5.6 The Commonwealth government committed to water recovery for the environment in 2008 as part of the $12 billion Water for the Future program. This was followed in 2010 with the government's commitment to 'bridge the remaining gap between what [water] has been returned for the environment and what is required to be returned by the Basin Plan.'[1] The two main ways that the government recovers water for the environment are through its programs to improve water efficiency and infrastructure, and its $3.1 billion Restoring the Balance in the Murray-Darling Basin program (RTB) which purchases water entitlements from water holders.[2] The total target for all programs (i.e. RTB and other programs) seeking to return water to the

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1 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 7.

2 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 7. See also SEWPaC, *Restoring the Balance in the Murray-Darling Basin*, www.environment.gov.au/water/policy-programs/entitlement-purchasing/index.html, (accessed 4 March 2013).

environment is the 2750 GL/y reduction in take of surface water (see chapter two). Water recovery undertaken since 2009 is attributed towards the 2750 GL/y reduction in take. As at 30 September 2012, the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) states that 1577 GL/y had been recovered through the following:

- 1094 GL of secured water purchases
- 316 GL received or scheduled for transfer under infrastructure works contracts
- 154 GL recovered through state government actions
- 11 GL gifted by the Queensland Government and 2 GL of other recovery.[3]

5.7 The RTB is also referred to as the government buyback scheme. The buyback scheme is managed by the Commonwealth Environmental Water Holder (CEWH) as set out in the *Water Act 2007*. The water that is obtained through the water entitlements purchased under the buyback scheme is used for environmental purposes.[4]

5.8 As of 31 January 2013, the government had secured water purchases of about 1119 GL in terms of long-term average annual yield as part of the buyback process (an increase from 1094 GL as at 30 September 2012).[5] The Government's water strategy notes that until 2016, trajectory of water recovery will be:

> ...to set the pace of environmental water recovery so that 2100 GL of environmental water would be acquired by 2019 if that pace of recovery were to continue to 2019. Water entitlement purchasing will be used only as a residual where the water returns expected from SRWUIP [Sustainable Rural Water Use and Infrastructure program] investments and other sources are not sufficient to reach this target.[6]

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3 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, pp 8-9.

4 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 7.

5 SEWPaC, Progress of water recovery under the Restoring the Balance in the Murray-Darling Basin Program, www.environment.gov.au/water/policy-programs/entitlement-purchasing/progress.html (accessed 24 February 2013).

6 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 11.

5.9 A result of this approach is that subject to the 2016 review of the sustainable diversion limit (SDL) adjustments, the government aims to secure a further 239 GL (of the total 2750 GL/y figure) through water entitlement purchases.[7]

5.10 The government has stated that its approach to water purchasing is to:

- purchase water entitlements only from those who wish to sell (no compulsory acquisition)
- purchase a portfolio of water entitlements that can be efficiently and effectively used to meet environmental needs identified in the Basin Plan
- ensure value for money from the use of public funds is consistent with government procurement requirements
- integrate water purchasing with opportunities to rationalise or reconfigure irrigation infrastructure wherever possible
- operate in the water market with the same rights and obligations as other market participants
- deliver a fair, equitable, transparent and accountable process for sellers
- consult with states over the approach to purchasing in each Basin jurisdiction.[8]

Concerns about the buyback program

5.11 Over the course of the inquiry, the committee heard concerns from numerous witnesses about the buyback process. The committee notes that the bulk of water purchases under the buyback process have been completed. However, it is worth highlighting the concerns identified as part of this inquiry to help ensure that the remaining purchases are conducted in the most efficient and effective manner possible.

Impact of buybacks on irrigators

The 'Swiss cheese' effect

5.12 The committee heard significant evidence about the 'Swiss cheese' effect as part of the water buyback process. The House of Representatives Standing Committee

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7 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 11. Note: the Draft Water Recovery Strategy states that the 'role of water purchasing is to complement the projected water recovery from infrastructure, SDL offsets and any other sources, thus enabling the task of bridging the gap to be completed by 2019' and further adds 'the pace and location of water purchasing will be regularly adjusted to take into account the latest information on water recoveries from the various sources. This includes adjusting the pace and location of water purchasing if the volume of SDL offsets from supply measures is less than 650 GL.' SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 17.

8 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, pp 17–18.

on Regional Australia's report *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan* refers to the 'Swiss cheese' effect as:

> ...what happens when some entitlement holders along an irrigation channel sell their entitlements and stop irrigating. The effect of this is to create 'holes' in irrigation areas, reducing the efficiency of delivering water down that channel, stranding assets and increasing the maintenance costs and delivery fees for the entitlement holders who remain.[9]

5.13 The Wentworth Group of Concerned Scientists (the Wentworth Group) stated a preference for buybacks as a tool of water recovery in the Basin but also noted that the buybacks needed to be strategic. In response to a question about how this may help prevent the 'Swiss cheese' effect, Mr Tim Stubbs from the Wentworth Group noted:

> …First we need a plan that clearly articulates how much water we need for a healthy Murray Darling Basin. This plan does not do that, so we need a plan that sets that number down as the science is based. We need to understand where that water needs to come from, which share comes out of each catchment and what contributions to the downstream flows are needed. Then you have a process that puts all that on the table and uses the money that is available to get the best outcome with a mix of strategic buybacks and spending on [infrastructure]...[10]

5.14 The potential differences across the Basin states were also noted in the inquiry given the different histories of State governments in managing water resources. For example, the National Irrigators' Council (NIC) was asked to comment on how it dealt with its role as a national body and the interests of different states, especially in regard to the 'Swiss cheese' effect and the government's buyback program. The NIC's CEO, Mr Tom Chesson, outlined his approach to this issue:

> All along we have been very mindful as representatives of irrigation groups or irrigation supply schemes that we did not want to see that Swiss cheese effect taking place. What was originally proposed with the basin plan was spending money on infrastructure and efficiencies first and foremost, before you ventured into water buybacks—non-strategic buybacks.[11]

5.15 A number of representatives of rural communities and industries expressed concerns about the 'Swiss cheese' effect, the pressure it was placing on the costs for irrigators, and the even the failure of irrigation schemes (such as the Romani scheme

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9 House of Representatives Standing Committee on Regional Australia's report *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan*, May 2011, p. 104.

10 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 10 September 2012, p. 12.

11 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard*, 23 April 2012, p. 53.

in Hay, New South Wales).[12] Indeed, Mr Terence Hogan AM, Chairman, Riverina and Murray Regional Organisation of Councils (RAMROC) suggested that this issue was an early, central and constant problem with the Basin Plan and its development:

> …The draft Murray-Darling Basin plan [November 2011] still proposes very substantial removal of irrigation water currently used for food and fibre production. When the pre-2009 acquisitions are taken into account, well over 3,500 gigalitres will have been diverted to meet the demands being made for regular watering of environmental assets. The whole process to date has been not good, as you have already alluded to, starting with ad hoc water purchases that never even had a strategic plan, foundation or basis. This caused the often referred to 'swiss cheese' effect, leaving stranded assets and disruptions, loss of agricultural production and adverse impacts on families, business and communities. The subsequent processes have been nearly as bad.[13]

5.16 The practical implications of the 'Swiss cheese' effect were vividly described by one witness in particular. A local farmer, Mr Duncan Fraser, told the committee:

> …I have a property about 50 kilometres south-west of Hay. I am secretary of the Romani joint water supply, which is a private joint water authority, which was set up in approximately 1964 to pump out of the Murrumbidgee southwards. All the members of the scheme are off the river. There were 17 base licences held in the scheme until recently; I had three licences myself. Obviously, because of the changes that were forecast a few years ago regarding the Water Act and whatever, there were concerns about the viability of our scheme with the reduction of water, given that we have transmission losses from the river to the delivery points for members of the scheme. We were faced with a situation where we considered that we were probably at the end of the line and that we could not continue as we were. In the end, in 2008, we decided to allow members to permanently sell water off the scheme. Everyone, except me, basically bailed out. I still retain two licences, but I am the only person left holding water on the scheme. I decided to hold onto two licences because I was concerned about the effect the exodus of water would have on the local community. I wanted to see that we could retain some water. Given that everyone else sold out, I am in a situation where I am a stranded irrigator and not a willing seller. I am in a situation where the water is of no use to the local community, because I cannot do anything with it—I cannot irrigate because I cannot justify turning the pumps on with the water loss that would occur between the river

12 See for example Cr Margaret Thomson, Mayor, Shire of Wentworth, *Committee Hansard*, 3 April 2012, p. 32; Mr Ian Murdoch, Chairman, and Ms Cheryl Rix, General Manager, Western Murray Irrigation Ltd, *Committee Hansard*, 3 April 2012, p. 12; Mr Mark McKenzie, Chief Executive, Murray Valley Winegrowers Inc., and Mrs Tania Chapman, Chair, Citrus Australia Ltd, *Committee Hansard*, 3 April 2012, p. 28; and for the Romani scheme see Councillor Roger (Bill) Sheaffe, Mayor, Hay Shire Council, *Committee Hansard*, 10 September 2012, p. 25; and Mr Duncan Fraser, Private Capacity, *Committee Hansard*, 2 April 2012, p. 66.

13 Mr Terence Hogan AM, Riverina and Murray Regional Organisation of Councils, *Committee Hansard*, 2 April 2012, p. 58.

> and the delivery points. That is the situation that I am personally facing. This is magnified right along the Murrumbidgee for a lot of private irrigators on the river.[14]

Distressed sellers

5.17 A number of representatives of rural communities also noted that the government buyback process did not take into account the financial difficulties faced by many farmers selling water entitlements.[15] Indeed, one witness, Mr Terence Hogan, AM, Chairman of RAMROC, told the committee that the problem was widespread:

> …In most cases, it is believed that irrigators who have sold their water were not willing sellers...but more likely sold out because of financial pressure or family necessity, with the sale income often used to retire debt or exit the agricultural industry altogether.[16]

5.18 The committee also heard how this situation may have come about for certain farmers. As a rural financial counsellor, Mr Darren Macartney told the committee:

> After so many years of drought there has been a lot of talk about the water sellers being willing sellers. Yes, they might have put their hands up to sell the water, but it was because they were under so much financial pressure after 10 years of drought that that was the only way to get any of their debt down. Livestock numbers are really low. The only way of getting some quick dollars to get some equity in the farms—because their equities were really squeezed and the banks were putting pressure on them—was to sell that licence, get some money and pay off some debt to try to continue. Otherwise where do they go? They are at a stage where their equity is very minimal and they are getting forced out. No-one wants to buy the farm anyway, so where do they go? The only avenue was to sell some of that water.[17]

5.19 Witnesses from Hay, NSW, argued that the sale of water entitlements (either by distressed sellers or willing sellers) had flow-on effects for the community as it was difficult to transfer properties from irrigation to dry-land farming. As the following exchange shows:

> **Mr Hill:** ...Once a water licence leaves a property, unless it is a temporary transfer and there is still a licence and they can purchase water back

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14 Mr Duncan Fraser, Private Capacity, *Committee Hansard*, 2 April 2012, p.66.

15 In addition to that noted below, other witnesses also expressed concerns about this issue. See for example, Mr John Culleton, Chief Executive Officer, Coleambally Irrigation Cooperative Ltd, *Committee Hansard*, 2 April 2012, p. 29 and Mrs Betty Lloyd, Grower Representative Board Director, South Australian Citrus Industry Development Board, *Committee Hansard*, 3 April 2012, p. 38.

16 Mr Terence Hogan AM, Chairman, Riverina and Murray Regional Organisation of Councils, *Committee Hansard*, 2 April 2012, p. 58

17 Mr Darren Macartney, Rural Financial Counsellor, Rural Financial Counselling Service, New South Wales Southern Region, *Committee Hansard*, 2 April 2012, p. 13.

> in…that property, because of the soil type, has been converted to an irrigation farm. Once that water is taken away, that soil does not suit dryland pasture. It is too heavy a soil and it just becomes no longer a usable asset.
>
> **Senator RHIANNON:** Nothing can be done about that?
>
> **Mr Hill:** Over the long term, I am sure. It would be very expensive. You could put native species back into that system. But it would be very expensive to do it.
>
> **Mr Schipp:** With the investment that has gone into some of that irrigation infrastructure, a lot of money and capital expense, a lot of land forms and a lot of ground have gone to waste. People have sold off their water. We have an abundance of land suitable for irrigation and not for water, now. It has been a big cost to the community in general, in that development that has gone on in land that will be underutilised.[18]

5.20 In June 2012, SEWPaC released a report it commissioned into the experience of water holders participating in the buyback process, which presented a more positive view of buybacks from water holders. The report detailed the results of a survey of over 500 irrigators who had sold (or applied to sell) water entitlements between 2008/09 and late 2011. The key findings of the report included:

- Almost 80 per cent of those interviewed said that selling water to the Commonwealth was a positive decision for them.
- The principal reason for selling water was to generate cashflow with the intention of either retiring debt (30 per cent), supplementing farm income (22 per cent), or funding on-farm improvements (8 per cent).
- The majority of proceeds from water sales are spent within the local region.
- Almost all of those who sold their entitlement to the government and exited farming found alternative local employment, or retired in their local community.
- Around 60 per cent of those interviewed sold part of their entitlement to the government. Around half of these sellers said the water sale had not affected farm production in a significant way.
- The survey results suggest that many irrigators who sell some of their water to the government have found ways to change their farming operations to maintain production levels.

18 Mr James Hill, private capacity, and Mr Andrew Schipp, District Agronomist, New South Wales Department of Primary Industries, *Committee Hansard*, 2 April 2012, pp 13–14.

- Overall, there was strong support among surveyed sellers for the resumption of general tenders in 2013. Those who supported the resumption outweighed those opposed to it by two-to-one.[19]

The future of buybacks

5.21 The committee is aware that a large proportion of the water entitlement buyback process has been completed. The recently published *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation* states that the remaining target for buyback purchases is 239 GL.[20] However, as discussed in chapter four on environmental works and measures, there is also scope for further water entitlement buybacks if there is a shortfall from environmental works and measure not meeting a target of 650 GL/y (as part of the 2750 GL/y reduction in take).

5.22 Some concerns were raised about the uncertainty of this approach regarding the volume of remaining buybacks. As the NIC CEO, Mr Tom Chesson, stated:

> Within the water recovery strategy documents...we have all heard the three tranches of water: the 2,100, the 650, the 450—to get to the 2,100, there is roughly 239 gigalitres of buybacks left and about 600 gigalitres will be recovered through infrastructure work. What we are saying is that the 239 gigalitres of buybacks will take you up to 1,500 gigalitres of buybacks all up and then another 600 take you to the 2,100. Let's just cap it at that 1,500. That allows buybacks to continue, but it gives certainty to communities that there are not going to be large-scale buybacks if the 650 gigalitres of environmental works and measures do not materialise. We believe they are there—I want to put that up-front—but there ways and means that governments can make it so complicated that it simply will not occur. If that happens, as Minister Burke said yesterday, there will be buybacks to bridge that gap.[21]

5.23 The New South Wales Irrigators' Council expressed a strong preference for infrastructure investment over buybacks:

> …There are three means of acquiring water in the plan as it sits at the moment. One is environmental works and measures, one is buyback, and the other is infrastructure investment. So obviously it would be our conclusion that those volumes not found through environmental works and measures should be found through infrastructure rather than the economic vandalism of straight buyback.[22]

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19 Marsden Jacob Associates prepared for SEWPaC, Survey of water entitlement sellers under the Restoring the Balance in the Murray-Darling Basin Program, June 2012, www.environment.gov.au/water/publications/mdb/survey-seller-rtb-program.html (accessed 1 March 2012).

20 SEWPaC, *Environmental Water Recovery Strategy for the Murray-Darling Basin: Draft for Consultation*, November 2012, p. 23.

21 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard*, 23 November 2012, p. 14.

22 Mr Andrew Gregson, Chief Executive Officer, New South Wales Irrigators' Council, *Committee Hansard*, 23 November 2012, pp 17-18.

Committee view

5.24 The committee is concerned that in a number of areas, the non-strategic purchase of water entitlements by the government has led to the 'Swiss cheese' effect that adversely affects the remaining irrigators in the area. The committee notes that the government has recently sought to address this issue through the Strategic Sub-System Reconfiguration Program[23] that provides 'financial support for projects which integrate water access entitlement purchases with the decommissioning and reconfiguration of shared water delivery infrastructure'.[24] The committee is of the view that avoiding the creation of the 'Swiss cheese' effect in irrigation communities should be a high priority when the government conducts the remaining water purchases under the Basin Plan.

5.25 The committee is also concerned that there may have been some farmers who sold water entitlements in the past due to financial pressures. Whilst the committee notes that the sale of water entitlements was positive for many sellers, more than 20 per cent of farmers surveyed reported an experience which was other than positive. The committee considers that some future entitlements may be purchased by water holders facing financial distress.

5.26 The committee notes the concerns raised regarding the uncertainty about the volume of future buybacks is caused by the possibility of buybacks being used to meet a shortfall from environmental works and measures (should such a shortfall occur).

5.27 The committee urges the government to take steps, when making any future water buybacks, to inform potential water entitlement sellers of the full implications of the sale of their entitlements, particularly if they are facing financial stress related to their water holdings.

Recommendation 12

5.28 The committee recommends that the government develop a water trading information and support program aimed at helping possible "distressed sellers" understand their financial options and risks relating to water trading.

Sleeper and dozer licences

5.29 As part of this inquiry the committee examined the issue of sleeper and dozer licences in the Murray-Darling Basin. New South Wales State Water defines a sleeper licence as 'one which uses none of its Allocation over the course of the Water Year'

23 The Hon. Tony Burke, MP, Minister for Sustainability, Environment, Water, Population and Communities, Media Release, 'Gillard Government supports irrigators', 13 February 2013.

24 SEWPaC, Restoring the Balance in the Murray-Darling Basin, www.environment.gov.au/water/policy-programs/entitlement-purchasing/index.html (accessed 24 February 2013).

and a dozer licence as 'one that uses very little of its Allocation over the course of the Water Year'.[25]

5.30 The problems arising from sleeper and dozer licences were associated with the significant increases in water allocation and extraction in the 1970s and 1980s. As noted by researchers Hugh Turral, Daniel Connell and Jennifer McKay regarding the NSW experience in particular:

> Water use had been growing in the basin throughout the 1970s and 1980s, with continued development, mostly in NSW... Fearing that this would lead to overabstraction, no new licences were issued after 1986, but existing unused licences were not rescinded. In NSW, it is common for licence-holders, particularly stock farms, to keep water rights in reserve for drought periods (known as 'dozers') or not use them at all ('sleepers'). As time went on, more of the sleeper and dozer volume was activated, through property transfers and enterprise diversification, and, more recently, through water trading.[26]

5.31 The National Water Commission (NWC) also considered sleeper and dozer licences as part of a review of water trading in the Murray-Darling Basin. In a survey of existing literature about the extent of these licences the report noted:

> The activation of so-called 'sleeper' and 'dozer' licences may have been a result of the development of the water market and the value water markets place on such entitlements.
>
> Previous studies have provided some evidence of activation and trade in sleeper and dozer licences. In the interstate trade pilot project, 99% of the 9.5 GL of water traded was previously not being used by sellers (Young et al. 2000). In an assessment from 2004, sleeper and dozer licences represented 50% of sales in northern Victoria (Alankarage 2004). Similar results were reported by Bjornlund and McKay (2000).[27]

5.32 The NWC report also noted that activating sleeper and dozer licences could have the following impacts:

> - In a system in which overall diversions are capped, increased use of water allocations to these rights can lead to a reduction in the reliability of future allocations to other entitlements, thus affecting individual water entitlement holders.

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25 NSW State Water, Glossary of water terms, www.statewater.com.au/Customer+service/iWAS/Glossary+of+Water+terms (accessed 1 March 2013).

26 Hugh Turral, Daniel Connell and Jennifer McKay, "Much Ado About the Murray: the Drama of Restraining Water Use" in Francois Molle and Philippus Wester (eds.). *River basin trajectories: societies, environments and development,* Wallingford, UK, CABI, Colombo, Sri Lanka, International Water Management Institute (IWMI), 2009, p. 278.

27 NWC, *The impacts of water trading in the southern Murray–Darling Basin: an economic, social and environmental assessment,* 2010, p. 38.

> - In a system in which overall diversions are not capped (or not capped in a completely effective manner), increased use water allocations to these rights are likely to lead to a reduction in water available to meet environmental water requirements.[28]

Sleeper licences and the Basin Plan

5.33 The committee heard a mix of evidence about sleeper and dozer licences and the relationship of these licences to the Basin Plan. The evidence before the committee did not add much to detail about the extent of sleeper and dozer licences in the water market beyond the reports above. However, there were views expressed that sleeper and dozer licences were undesirable. For example, the Wentworth Group lamented the transfer of sleeper and dozer licences to private ownership:

> The water was held by the public through licence. That was transferred to the private sector. That is a lot of dollars. The fact that the sleeper and dozer licences were also transferred in that process is something too. I know that John Anderson said to me it was his greatest mistake...
>
> The fact is...we have traded water from the public sector to the private sector on the basis of a social contract that the water would be brought back into the river system sufficient for sustainable river health—and that is what the Basin Plan is about.[29]

5.34 Some witnesses also expressed the view that over-allocation of water entitlements associated with sleeper licences was a main cause of current problems facing water resources in the Basin system.[30] Indeed, Ms Debbie Buller, President of the Murrumbidgee Valley Food and Fibre Association, argued it was a central problem facing the Basin system:

> …If you look at what the stated problem is [for the Murray-Darling Basin], they are talking about things like the system being overallocated and there having been too much extraction for irrigation. They are the sorts of things that we hear all the time—they are the assumptions—and therefore the government needs to step in and right this wrong.
>
> There is some rationale behind that overallocation argument and I am not arguing against that—water has been overallocated. But it was not purpose-built irrigation areas that caused the overallocation problem. That is not where it came from, was it? Yet somehow or other, those areas are being very heavily targeted and the storage systems that were clearly built as human resources to build those areas are the areas that are being targeted at the moment. They were not the areas that caused this problem.
>
> The overallocation problem came, in particular, from when water got separated from the land—and we all know how that process occurred…

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28 NWC, *The impacts of water trading in the southern Murray–Darling Basin: an economic, social and environmental assessment*, 2010, p. 38.

29 Dr John Williams, Founding Member, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 240412, pp 15–16.

30 For example, Mr David Davies, Private Capacity, *Committee Hansard*, 2 April 2012, p. 1.

> We have all the states knowing that that was coming and legislating and doing that and not paying attention to all the sleeper licences that were sitting there that could not be used because they were attached to land. That is where our overallocation problem came from. So why are we not actually focusing on the real problem? It is your unregulated river flow, the creek streets—actually, some of our streets did look like creeks recently, I have to say. That is where the problem has come from. If we are not prepared to attack the problem and notice what the real problem is, then we cannot fix it, and if you are using the wrong resources to try to fix it, what is going to happen down the track?[31]

5.35 However, the committee also heard evidence that the development of diversion limits in the Basin Plan, reduced the likely impact of sleeper and dozer licences on the management of water resources in the Basin. For example, the Murray-Darling Basin Authority (MDBA) noted that even if sleeper licences came to be used, the overall cap on allocations should not be affected. As the following exchange shows:

> **CHAIR:** One of the mistakes we have made is to allow the trading of supplementary licences. Victoria started that. We also allowed sleeper licences to be tradeable. A lot of river systems worked well until they woke up the sleepers. The day they woke up the sleepers and made them a financial instrument, they over allocated the river system straightaway.
>
> **Ms Swirepik:** In relation to the states and states' allocation of water, what is important for us is that the diversion stays the same and there is a cap on diversion. So, even if sleeper licences are woken up, in theory there are no further diversions.[32]

5.36 The NIC made a similar statement regarding the reduced effect of sleeper and licences in response to a question about the extent of such licences in the water market. Their CEO, Mr Tom Chesson, explained:

> …One of the things the drought did is that people now are trading a lot more water. If people can make money out of trading, they will, instead of putting in a crop. That has happened as well. But, as you know, a lot of those sleeper licences got hammered during the National Water Initiative and the state water-sharing plans, particularly in New South Wales. I remember the Mungundi to Menindee water-sharing plan area. A sleeper licence with no history of use lost 89 per cent of their water; with a full history of use it was around 60 per cent. I would also say that the sleeper licences are taken into account in the baseline diversions, so, whether they are being used or not, they have apparently been taken into consideration.[33]

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31 Ms Debbie Buller, President, Murrumbidgee Valley Food and Fibre Association, *Committee Hansard* , 2 April 2012, pp 20–21.

32 Ms Jody Swirepik, Executive Director, Environmental Management Division, *Committee Hansard*, 23 August 2012, p. 23.

33 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard*, 23 April 2012, p. 50.

Committee view

5.37 The committee acknowledges that original decision to allow sleeper and dozer licences to be tradeable financial instruments was problematic and contributed significantly to the current over-allocation of the resource. The committee is concerned that more information about the extent of sleeper and dozer licences in the Murray-Darling Basin system is not available. Furthermore, based on the evidence received, the committee was not fully convinced that sleeper and dozer licences no longer impact on the management of water resources in the Basin system. The committee considers that the extent of the problem arising from the activation of sleeper licences is not fully known.

5.38 The committee does not consider that rescinding such licences is an appropriate and desirable solution. In this respect the committee concurs with the view of the Senate Environment and Communications References committee that 'the important National Water Initiative principle of secure property rights in water should be respected.'[34]

5.39 The committee considers that further consideration of the extent of and potential impact of sleeper and dozer licences on the Murray-Darling Basin system needs to be developed. The committee urges the government to monitor this issue more closely as part of the implementation of the Basin Plan.

Recommendation 13

5.40 The committee recommends that the government undertakes explicit auditing and reporting of the extent and impact of sleeper and dozer licences on the Basin Plan.

Recommendation 14

5.41 The committee recommends this audit be publicly released and that updated audit information is incorporated into the MDBA's reporting on the Basin Plan at regular intervals.

34 Senate Environment and Communications References Committee, *Sustainable management by the Commonwealth of water resources*, October 2010, p. 18.

Chapter 6

Types of Water Entitlements

6.1 A significant issue that arose during this inquiry was the different types of water entitlements and the potential impact each could have on the development and implementation of the Basin Plan.

6.2 Water entitlement types are regulated by relevant state laws and the types of licences vary across states. This means that water entitlement types across the Murray-Darling Basin are not always directly comparable. However, a number of similarities exist and the states generally provide for the prioritisation of water allocations depending on the availability of water.

6.3 The water entitlement types can be identified as high, general, and low reliability types. When referring to the trade in the southern Basin, the National Water Commission (NWC) in its 2011 biennial assessment of water trading divided the state water entitlements into these categories as:

> Higher reliability entitlements include Victorian high-reliability water shares, New South Wales high-security water access licences (WALs) and South Australian high-security water entitlements. Lower reliability entitlements include Victorian low-reliability water shares and New South Wales supplementary WALs. General reliability entitlements are New South Wales general security WALs.[1]

6.4 In Queensland, the reliability types are called high security, medium security and low security.[2]

6.5 In terms of a broad comparison across states, the Productivity Commission has noted that:

> ...high reliability entitlements had, in the past, been expected to yield 100 per cent of their nominal volume in seasonal allocations 90 per cent of the time or more. Further, they receive seasonal allocations before any water is delivered against lower reliability entitlements… At the Basin level, the majority of water entitlements (and the greatest quantity of entitlements by megalitre (ML)) are general or low reliability entitlements.[3]

6.6 In addition, the trade in water entitlements is affected by the connectivity of water in the Basin system. That is, the 'ability to trade is limited by the hydrological

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1 National Water Commission, 2011, *The National Water Initiative–securing Australia's water future: 2011 assessment,* NWC, Canberra, p. 66 (figure 2.5).

2 Productivity Commission, 2010, *Market Mechanisms for Recovering Water in the Murray-Darling Basin*, Final Report, March, p. 42.

3 Productivity Commission, 2010, *Market Mechanisms for Recovering Water in the Murray-Darling Basin*, Final Report, March, p. 42

connectivity between the buyer and the seller.'[4] For the purposes of this report, water that is not connected to the Basin system is referred to as terminal water.

6.7 The use and value of different water types can have a significant effect on how water resources can be managed in the Murray-Darling Basin. The committee heard significant evidence about this issue and this chapter examines it in-depth. The evidence received about the possible effects of different water types on the development of the Basin Plan (through the hydrological and socio-economic modelling) and the implementation of the buyback program, including significant cases such as Twynam and Nimmie-Caira will be discussed in turn.

Long-term Cap equivalent

6.8 A process for managing the differences in water types in the Murray-Darling Basin was developed prior to the Basin Plan and agreed to by Basin States and the Commonwealth as part of the Living Murray Program in 2004. The differences between the water types is calculated as a volume called the 'long-term Cap equivalent' (LTCE) – also referred to as the 'Cap factor'. An LTCE is an average that is calculated from a hydrological model based on climate data from 1891 to 2003. The LTCE is developed to:

> [take] into account the different characteristics of water entitlements in New South Wales, Victoria and South Australia, and their reliability… [creating] a common unit of measure, thus allowing equitable comparison of a broad range of water recovery measures.[5]

6.9 The Murray Darling Basin Authority's (MDBA) website notes, for example, 'to recover a [LTCE] volume of 1,000 ML in the NSW Murray region, you could purchase either a 1,053 ML High Security Water Access Licence or a 1,237 ML General Security Water Access Licence.'[6]

6.10 Mr Tim Stubbs, environmental engineer, from the Wentworth Group of Concerned Scientists (Wentworth Group) also explained how this works in terms of the modelling for different types of water:

> It comes back to that issue of entitlement, its level of security or cap factor, as they call it. If you have a supplementary entitlement it might have a cap factor of 0.4. So if you buy a gigalitre of supplementary water then when you put that in the model it will only count as 0.4 of a gig.[7]

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4 Productivity Commission, 2010, *Market Mechanisms for Recovering Water in the Murray-Darling Basin*, Final Report, March, p. 45.

5 MDBA, 'How is water recovery measured? (What is a 'long-term Cap equivalent' volume?)', www.mdba.gov.au/programs/tlm/faqs#How_is_water_recovery_measured_ (accessed 31 January 2013).

6 MDBA, 'How is water recovery measured? (What is a 'long-term Cap equivalent' volume?)'.

7 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 10 September 2012, p. 12.

Types of water entitlements and the modelling

The MDBA modelling

6.11 The committee heard evidence that differences in water entitlement types could have an impact on the output of the hydrological modelling of the Basin. Therefore, the committee questioned MDBA officials about how different water types were taken into account in the MDBA's modelling. The MDBA told the committee how the model deals with different types of water entitlements:

> There are some places in the basin where we can define an entitlement class, but because all of the buyback is modelled under the basin planning process we have to use the models that are available. What that actually means is that in a lot of catchments we have to look at the long-term average yield of entitlements. You cannot actually in a lot of the models determine up-front as an input to the model how much off allocation will be declared, for instance. So what we have to do is suppress the long-term average yield in the catchment and that flows through into the model to determine what the components are of general security, off allocation or supplementary...[8]

6.12 However, while the MDBA acknowledged that the different types of water would have a significant impact on the modelling, it stated that the modelling does not detail different water types. As the following exchange shows:

> **CHAIR:** …[Do] you agree that if you modelled [2750 GL/y] of buyback water that happened to be all supplementary water you would get a completely different outcome than if you modelled [2750 GL/y] of high-security water?
>
> **Dr McLeod:** Yes, that is correct.
>
> **CHAIR:** The same thing applies to general allocation and terminal water. Where is the model that says, 'We can only take that much terminal water, that much supplementary water and we need that much general'? How did you model that[?]…
>
> **Mr James:** The Basin Plan is really based on volumes of water, it does not necessarily go to what mix of entitlements needs to be recovered to achieve that volume. The volume is a long-term average amount, and the entitlement mix to achieve that recovery could be a range of product mixes.[9]

6.13 The oral testimony by MDBA officials goes on to indicate that terminal water was not used in the modelling but that like other water types it could impact on the management of water resources through water trading:

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8 Ms Jody Swirepik, Executive Director, Environmental Management Division, Murray-Darling Basin Authority, *Committee Hansard*, 23 August 2012, p. 11.

9 Dr Tony McLeod, General Manager, Water Planning, and Mr Russell James, Executive Director, Policy and Planning, Murray-Darling Basin Authority, *Committee Hansard*, 23 August 2012, p. 15.

> **CHAIR:** But in the [2750 GL/y]…what was the modelling [in terms of the different entitlement classes]?…
>
> **Dr McLeod:** We assumed a pro rata reduction across all the entitlement classes in each of the—
>
> **CHAIR:** …So you had an equal 25 per cent terminal, 25 per cent [supplementary], 25 per cent general purpose [water entitlements]?
>
> **Dr McLeod:** That is right. Terminal is not actually a class. In the terminal system—
>
> **CHAIR:** I can assure you, though, the impact of buying water out of a terminal river is a lot different to the impact of buying out of—
>
> **Dr McLeod:** I totally accept that. In the typical New South Wales system, there is high security, general security and supplementary [water entitlements]. We assumed a pro rata share across each of them.
>
> **CHAIR:** But is it not a bureaucratic, or a technical, flaw to say that general-purpose water in a terminal river can deliver the same outcome as general-purpose water in a continuous system?
>
> **Dr McLeod:** No. It can deliver it at different locations, so buying general—
>
> **CHAIR:** Yes, but there has to be a restriction on the amount of terminal water you buy—correct?
>
> **Dr McLeod:** Yes.[10]

6.14 The MDBA official, Dr Tony McLeod, also explained how wet and dry years were taken into account in this respect:

> …the modelling we did assumed a pro rata purchase across a range of entitlements. Not every model actually captures that in detail and the models are calibrated against the way water is used, both in wet and dry years. In dry years water use is generally limited by the amount of water that is available under those entitlements. In wet years, even if the entitlements have a high level of annual allocation they have tended not to be used. That is factored into the way the model operates. We look at the yield that would come from a portfolio that would deliver [2750 GL/y] on average across the basin.[11]

6.15 The MDBA indicated that there was potentially a very large fluctuation in the environmental water available each year. The MDBA stated that in its modelling:

> …the variation in environmental water availability between years is influenced by modelling assumptions which include the nature and location of water recovery and the variability in water availability over the historic climate sequence. In the context of such assumptions, modelling results

10 Dr Tony McLeod, General Manager, Water Planning, Murray-Darling Basin Authority, *Committee Hansard*, 23 August 2012, pp 15–16.

11 Dr Tony McLeod, General Manager, Water Planning, Murray-Darling Basin Authority, *Committee Hansard*, 23 August 2012, p. 22.

> indicate that, in providing the long term average amount of water recovery to meet the requirements of the Basin Plan, the annual amount of water available could vary from around 300 to around 3,800 GL/yr.[12]

6.16 Mr Tim Stubbs from the Wentworth Group explained how the modelling available to the MDBA could help it decide how to use the different water types and achieve environmental outcomes:

> …When they do the modelling, the model does not want to flow an average volume down the river all the time. That is not what it is about. It is very sophisticated. It looks at adding peaks to get overland flow and looks at adding tails to inundate areas for longer periods. Once you have your breakdown of how you want to get those outcomes and what is the best way, you will then have some clear picture of what sort of water you would need. You might be able to say: well, to achieve all these events, we only need to achieve them when it is flooding already because we want to put a top on a peak or a tail on a flood. We may be able to use general security water for that or, potentially, even supplementary if it was in the right place at the right time. However, for other events you might have to say: well, we probably need high-security water to make sure we can be confident of achieving that event, because there will not be any supplementary water around at that time, potentially, and we will need a certain amount of high security in the bank to make sure we can hit those events, because they are drier time events. I am not sure how the authority has done it, but I imagine you would have to have a spread of entitlements to be able to hit all your targets.[13]

The ABARES modelling

6.17 The committee also heard evidence that the water entitlement types had limited consideration as part of the socio-economic modelling used to develop the Basin Plan. In this regard, the committee took evidence from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) about its approach for different categories of water entitlements in the socio-economic models of the 2750 GL/y reduction of take for the Basin.

6.18 When asked about whether the MDBA had specified the different water types to ABARES for use in its modelling of buybacks, an ABARES official stated that there was 'no differentiation between the types' and later added that for 'all intents and purposes the difference between low and high security water is reflected in the average yield'.[14] When pressed further about differences in availability of water types, the ABARES official conceded that 'we do not have that information'.[15]

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12 MDBA, answer to question on notice, 23 August 2012, (received 25 September 2012).

13 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 10 September 2012, p. 16.

14 Mr Orion Sanders, Economist, ABARES, *Committee Hansard*, 24 April 2012, p. 13.

15 Mr Orion Sanders, Economist, ABARES, *Committee Hansard*, 24 April 2012, p. 14.

6.19 ABARES provided some further explanation of how water types are considered as part of its modelling of the impacts of the 2750 GL/y figure. In an answer to a question on notice, ABARES outlined that a pro rata approach was used:

> The ABARES water trade model is a 'water use' model that models how irrigators use available irrigation water during the year. The model does not explicitly model entitlement classes, but rather aggregate allocations across regions and industries.
>
> For the Basin Plan modelling a long-term average year of water availability was modelled, with water allocations based on observed long-term average allocations. For this modelling, differences in entitlement types are reflected through differences in their long-term Cap equivalents.
>
> ABARES modelling is broadly consistent with the Commonwealth purchasing an equal proportion of high and low security entitlements. That is, if it was assumed 25 per cent of entitlements within a region were to be purchased, then this would involve purchasing 25 per cent of the high security entitlements in the region and 25 per cent of the low security entitlements.
>
> In order to mimic the effect of purchasing a higher proportion of high security water entitlements, ABARES modelled a scenario where it is assumed the SDLs lead to a 20 per cent reduction in perennial land use (fruit, nuts and grapes). As expected, the results for this scenario indicate that the reduction in the gross value of irrigated agriculture increases as higher proportions of high security water are purchased (16.8% reduction compared to a 13.5% reduction).[16]

6.20 During the inquiry, the ABARES modellers also had difficulty explaining how terminal water was treated in the modelling and constantly referred to the published technical reports:

> **CHAIR**: In the 2,700 gigs of removal, is any of that water terminal?
>
> **Dr Nguyen**: I do not think we have information on that.
>
> **CHAIR**: Do you know what I am talking about?
>
> **Mr Sanders**: No; what do you mean by terminal? Do you mean that it reaches the end of the system?…
>
> **CHAIR**: You do not know what I am talking about; that is the problem. Is it in the Lachlan? Is it in the Macquarie? These are terminal waters. Do you know the difference?...
>
> **Mr Sanders**: Some of our systems are terminal and disconnected from the whole system.
>
> **CHAIR**: But you are not trying to tell me that you consider the Lachlan or the Macquarie to be a connected system?
>
> **Mr Sanders**: No; the Lachlan is disconnected. I believe the Macquarie might be connected, but all that information is contained within our reports.

16 ABARES, answer to question on notice, 24 April 2012 (received 5 June 2012).

CHAIR: It would have to be a bloody big flood to get connected.

Mr Sanders: All that information is contained in our reports.

CHAIR: But how much of the water, for your modelling purposes, is terminal?

Mr Sanders: Once again, all that information is contained in these reports.

CHAIR: But, mate, tell me. You wrote the thing; tell me what the answer is.

Mr Morris: We will have to take that on notice, I think.

CHAIR: You do not know the damn answer. The whole thing is flawed.[17]

6.21 ABARES explained on notice that regions that were deemed to be connected or disconnected for the purposes of water trade were based on the direction of the MDBA. The answer noted that:

> The ABARES Water Trade Model is a model of water use that allows water to move between irrigation activities and regions depending on relative economic returns and constraints on water trade.
>
> Regions were deemed connected or disconnected for the purposes of water trade based on direction from the MDBA. The main requirement for trade was sufficient hydrological connectivity between regions. Specifically, the analysis assumed:
>
> - the northern and southern parts of the Basin are not connected for the purposes of water trade;
> - there is interconnectivity within the southern connected system of the Basin and there is also interconnectivity between some of the northern regions;
> - some regions are entirely disconnected from the rest of the system for the purposes of water trade (Paroo, Warrego, Gwydir, Lachlan, Ovens, Wimmera, and the Eastern Mount Lofty Ranges);
> - water trade is also constrained by the Barmah Choke and by within catchment environmental requirements as directed by the MDBA.[18]

Committee view

6.22 The committee was concerned with the limited consideration of different water entitlement types as part of the MDBA and ABARES modelling for the Basin's water resources and the associated socio-economic impacts. The committee acknowledges that the LTCE and assumptions of pro-rata purchases across different entitlement types helps address the issue in the modelling.

6.23 However, the committee is of the view that these considerations do not fully account for the possible impacts that different water entitlement types can have on the

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17 Mr Orion Sanders, Economist, Dr Nga Nguyen, Economist and Mr Paul Morris, Executive Director, ABARES, DAFF, *Committee Hansard*, 24 April 2012, pp 15-16.

18 ABARES, DAFF, answer to question on notice, 24 April 2012 (received 5 June 2012).

desired environmental outcomes for the Basin. The committee considers that the MDBA and ABARES should have examined the impact of different water types for modelling and environmental outcomes more explicitly and in greater detail.

6.24 The committee remains concerned about the accuracy of models regarding the socio-economic impacts of the 2750 GL/y figure on the Basin when such models do not consider full details about how different water types are used in practice.

6.25 Furthermore, the committee remains concerned that terminal or unconnected water was not appropriately represented in the modelling. This is part of a broader concern the committee has with the socio-economic modelling of the impacts of the Basin Plan (see chapter seven) and has the potential to undermine public confidence the social, economic and environmental outcomes that may be achieved under the Basin Plan.

Recommendation 15

6.26 The committee recommends that the MDBA commission an independent review of the possible effects of using a range of assumptions of water entitlements types (e.g. high and low reliability) in the hydrological and socio-economic modelling of the Basin Plan. In the case where the results for certain water entitlement assumptions show that the objectives of the plan will be compromised, the MDBA should develop a policy which will ensure that this arrangement of water entitlements will not be realised.

Types of water entitlements and the buyback process

6.27 In addition to the modelling of water entitlement types, water entitlement types are an important feature of the water buyback process under the government's *Restoring the Balance Program*. The committee received evidence about water entitlement types across many Basin catchments and also examined the Nimmie-Caira buyback case in detail (and to a lesser extent the case of Twynam Agricultural Group). The general issues, Twynam and the Nimmie-Caira case are discussed in turn.

6.28 The committee heard evidence about the problems that could arise in the buyback process due to the differences in water entitlements types. For example, the practical limitations of how water entitlement types (and their legalistic classifications) have for managing water resources in the Basin were noted by the Wentworth Group. As the following explanation by Dr Williams, Member, Wentworth Group shows:

> **CHAIR:** …Why did we allow supplementary water to be tradeable?
>
> **Dr Williams:** …I think the issue of rules based water that is built in and supplementary water—and the way that is managed for the environment and converted across to tradeable entities—is one that we just did not get right. This plan was an opportunity to do that.
>
> **CHAIR:** I agree with that. When you get four inches of rain at Gundagai and you get a [supplementary] flow and if you get four inches the next night

> it become a flood flow, and when it gets down to the Redbank Weir somehow they can define one from the other!
>
> **Dr Williams:** It illustrates, to my mind, the nonsense we have. When we have the legal people take what this current plan has in place and put it into legal language, which it will be, we will have a muddle-time tangle, because of the issues you raise. I think we need a plan that recognises the flood plain and recognises how you use supplementary water, rules based water and water for entitlements, and build that sensibly into the plan. It currently [as of September 2012] does not.[19]

6.29 The committee also asked questions about how terminal water was treated in terms of water purchasing. As the following exchange shows, SEWPaC officials considered that the supplementary water, even in a terminal system, was able to be used for its identified purposes and removed from the consumptive take if needed:

> **CHAIR:** …How do you value [in terms of purchasing] that water in a terminal system versus in a non-terminal system—supplementary?…
>
> **Ms Harwood:** We assess the water on offer to us against market benchmarks. We ask: 'What does that type of water trade for in that catchment?' We are also looking at the key factors of whether the entitlement can be used for the environment, whether it can be delivered to the environment and whether it represents value for money against other water offers.
>
> **CHAIR:** My difficulty is that in a terminal system...this water is the water that you are buying when the water is in flood in most terminal systems. So why would you buy it?
>
> **Mr Robinson:** I think it is not always when it is in flood; it is certainly when there is a significant flow-on. Part of the purchase program assessment is whether the water be directed to the key environmental sites. In the case of the Macquarie, supplementary water can be called to the weir at the top of the Macquarie marshes and can supplement flows—
>
> **CHAIR:** The event of supplementary water is when it is the system, not when it is in the storage.
>
> **Mr Robinson:** Yes…If there is a supplementary event and we decide to call our supplementary water, it is not then available for consumptive use in the supplementary event, and it arrives at the environmental sites.[20]

6.30 The committee was given an example in how the water entitlement types were determined for the buyback program. The case of the purchase of supplementary water from Tandou was instructive. In this case, the purchase of approximately 250 GL of supplementary water only resulted in a long-term average yield of 11 GL of

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19 Dr John Williams, Member, Wentworth Group of Concerned Scientists, *Committee Hansard*, 10 September 2012, p. 12.

20 Mr Ian Robinson, Water Holder, Commonwealth Environmental Water Office, *Committee Hansard*, 24 April 2012, pp 57–58.

water being returned to the Basin system. As an MDBA official explained to the committee:

> **Ms Swirepik:** I used to work in New South Wales. I am drawing a bit on my historic knowledge there. Our supplementary water used to be water gifted, if you like, to irrigators—
>
> **CHAIR:** Off allocation. Turn your pump on tomorrow morning—
>
> **Ms Swirepik:** That is right—during the high flow events. So it is not part of the normal allocation announcements of water that is generally held in the dam if you like. What happens with the supplementary water is that, in terms of someone like the Commonwealth Environmental Water Holder purchasing that water, they will look at the long-term average yield against that license. You were talking yesterday I think about the Tandou licence which has been issued, and it is 250 gigalitres but the long-term average yield is only 11 or something.
>
> **CHAIR:** At the conjunction of the river.
>
> **Ms Swirepik:** That is right. So what that basically means is that you do not get that 250 gigalitres very often. You might get it once every ten or 15 years. You will get a bit of a bonanza, basically, by accessing a flood.
>
> **CHAIR:** But my difficulty is this. In an environment sense, that it was great for Tandou. 'We've won the lottery!' the CEO said. 'We will buy the water on the spot market because it is only available when there is a spot market.' I mean, it was a gift.
>
> **Ms Swirepik:** Yes.[21]

6.31 The MDBA representative went on to acknowledge a concern raised in committee questions that the reliability of supplementary water had significant restrictions in how it could be used in the system – while at the same time noting a benefit was that it mimicked natural flooding events:

> **CHAIR:** But my difficulty is: for the Commonwealth Water Holder, it is only available when it is in the system.
>
> **Ms Swirepik:** I understand exactly what you are saying. I think, from an environmental point of view, that is actually a bonus, because what we are often trying to do is to recreate some of those flood events. So instead of us having to purchase an average yield and think about how we might bank that up to deliver a pulse down the river, it is coming naturally.
>
> **CHAIR:** That could happen in an ideal event, but there is often two inches of rain in the district and they do not take up the water and it becomes supplementary. You cannot necessarily put that water to the best use with 24 hours notice. That is my problem.

21 Ms Jody Swirepik, Executive Director, Environmental Management Division, Murray-Darling Basin Authority, *Committee Hansard*, 24 April 2012, p. 73.

> **Ms Swirepik:** That is right. My experience is mostly in the Murray system. Those smaller access events tend to be a very small portion of the access by those users. A lot of it is actually in the bigger events.[22]

Twynam water purchase

6.32 The Twynam purchase was made in the 2008-09 tender process, and was the largest single purchase of water entitlements that year. The total paid by the government for the Twynam water entitlements was $303.3 million and was made up of 240 GL of water entitlements which converted to a long-term annual average yield of 107 GL.[23]

6.33 The committee questioned Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) officials about how the purchases for the Twynam process were considered by the Department, as the purchase initially began as a tender process but subsequently moved to direct negotiations.[24] In an answer to question on notice the Department stated that the water sales were considered as a package:

> Twynam submitted 34 applications through the Northern and Southern Basin water entitlement tenders in 2008-09. Each application was for a single entitlement, but they were offered as a combined package with a single asking price. The Evaluation Committee assessed the 34 applications as a combined bid in accordance with the tender evaluation plan. This involved assessing the combined bid against the following criteria:
>
> • Ability to provide more water in a catchment where scientific evidence indicates that water needs to be recovered for the environment;
>
> • Capacity to deliver the water for an environmental benefit; and
>
> • Price including offer prices, transaction costs, and management costs.[25]

6.34 The committee questioned SEWPaC officials about several issues contained in the Australian National Audit Office's (ANAO) report into the Twynam purchase. The committee considers that the ANAO report provides a comprehensive examination of the government's buyback process in this case and notes the following issues raised in the report.

6.35 First, the purchase process should have been more completely documented by the department especially regarding the move from the tender to the negotiation process of the purchase. As the ANAO report notes:

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22 Ms Jody Swirepik, Executive Director, Environmental Management Division, Murray-Darling Basin Authority, *Committee Hansard*, 24 April 2012, p. 73.

23 SEWPaC, answer to question on notice, 24 April 2012, (received 2 July 2012, QoN 22 and 23).

24 Ms Mary Harwood, First Assistant Secretary, Water Efficiency Division, SEWPaC, *Committee Hansard*, 24 April 2012, p. 70.

25 SEWPaC, answer to question on notice, 24 April 2012, (received 2 July 2012, QoN 25).

> …some aspects of the department's processes and practices for securing Twynam's entitlements should be given greater attention in any future negotiations, to better demonstrate compliance with procurement principles and established tender procedures. In particular, there was no letter on file to show that Twynam's original application had been rejected. Rejection of unsuccessful offers was effectively a pre-condition of the then Minister's approval to enter into direct negotiations with applicants; and a letter is the department's normal practice for notifying unsuccessful applicants. In seeking the then Minister's approval to enter into direct negotiation with vendors, the department also undertook to develop 'operational guidelines' in consultation with its probity advisor, the Australian Government Solicitor (AGS). No such guidelines were in place prior to the meeting with Twynam's representative. Also, the department did not seek probity advice from AGS on its dealings with Twynam until after the meeting took place on 16 February [which included direct negotiations between senior departmental officers and Twynam's representatives]. The probity advisor concluded that the department had a defensible response to any complaint about 'unfair treatment', but recommended that the department update its program documentation, including tender guidelines and evaluation plans, to provide greater clarity around the management and documentation of meetings with applicants. The ANAO endorses this approach.[26]

6.36 Second, and more importantly for this committee, there were concerns that the purchase of water entitlements that were of low reliability did not reflect value for money – particular as the department chose to pay a premium for the water entitlements from Twynam. The ANAO report notes:

> … that the project board's rationale for paying a premium for large parcels of water did not explicitly take into account the reliability of the entitlements being purchased—and therefore the capacity of these entitlements to meet more urgent environmental needs in the catchments. All of the entitlements purchased from Twynam were general security or supplementary licences, rather than high reliability entitlements. While supplementary licences have provided water for use on the environment, the allocations against the general security entitlements have been modest (or zero) [see footnote], in line with prevailing climatic conditions in the relevant parts of the Basin. Contrary to the project board's original rationale for paying a premium, the general security allocations have not enabled 'immediate' benefits for the environment. Moreover, their capacity to provide 'substantial' benefits will, as elsewhere, depend on rainfall and inflows to storages.[27]

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26 ANAO, *Restoring the Balance in the Murray-Darling Basin*, Audit Report no. 27 2010-11, 2011, p. 93.

27 ANAO, *Restoring the Balance in the Murray-Darling Basin*, Audit Report no. 27 2010-11, 2011, p. 95. The report also notes in footnote 76, p. 95: 'The ANAO assessed allocations against the Twynam entitlements, which ranged from zero for Macquarie and Lachlan general security and 27 per cent for the Murrumbidgee general entitlements; whereas the supplementary entitlements received 100 per cent of the allocations, due to the floods in early 2009.'

6.37 Furthermore the report states:

> The ANAO acknowledges that it is the prerogative of the project board to determine the appropriate pricing strategy for each tender, including the basis on which price premiums can be paid. Nevertheless, the ANAO suggests that the justification for price premiums should include explicit consideration of the reliability of the entitlements and the compatibility with priority environmental needs that are not able to be serviced through other entitlements already held. The expected administrative costs savings resulting from large purchases should also be documented.[28]

Nimmie-Caira buyback proposal

6.38 The committee examined some of the general issues regarding water entitlement types through the case of the Nimmie-Caira buyback proposal in New South Wales. The case also raised questions about how the different types of water were defined and the distinction between supplementary water and floodwater.

6.39 At the time of writing, the Nimmie-Caira buyback proposal was for the government purchase of 381 000 megalitres of supplementary water from the Nimmie-Caira irrigation project in south-west New South Wales. The 381 000 megalitres of supplementary water converts to a long-term average annual yield of 173 000 megalitres.[29] As the Nimmie-Caira proposal relates specifically to supplementary water, Mr David Harriss, Commissioner, NSW Office of Water, informed the committee of the licensing structures in place for supplementary water in New South Wales. Mr Harris described supplementary water as:

> …water which is over and above regulated flow and which can be diverted through licensed infrastructure. It is not flood flows. It is not overland flows. It is water which exceeds regulated flows and cannot be reregulated or diverted. It can be used to offset another regulated flow downstream. That water can be diverted through licensed infrastructure. In the future—and in many areas already—it will incur a cost which is determined by the Independent Pricing and Regulatory Tribunal in New South Wales.[30]

6.40 The committee asked questions about how the supplementary water in the Nimmie-Caira proposal could be separated from flood water or overland flows. Evidence received by the Wentworth Group suggested that the management of floodwater was a problem across the Basin:

> ...I think this [the Nimmie-Caira proposal] is a very good illustration of a very important matter that in the current plan has not been properly

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28 ANAO, *Restoring the Balance in the Murray-Darling Basin*, Audit Report no. 27 2010-11, 2011, p. 95.

29 Mr David Harriss, Commissioner, New South Wales Office of Water, *Committee Hansard*, 10 September 2012, p. 42.

30 Mr David Harriss, Commissioner, New South Wales Office of Water, *Committee Hansard*, 10 September 2012, p. 35.

> resolved—that is, the diversions of floodplain water is an issue right across the plain. In the original guide to the basin, that matter was right up front. That matter has not been dealt with properly and now we have got a whole lot of nonsense exercises, in my judgement, being done to accommodate a process that the current plan does not address properly—that is, if you have floods and you are trying to return the river to flood and retain its ecological function again then you must have floods. It appears to me that what we are doing, if these are the facts of the matter, is actually buying back our flood water to flood. I think that is an issue that is more general than this particular one right across the floodplain. A really good Murray-Darling Basin plan should deal with that matter thoroughly and properly, and it does not.[31]

6.41 Furthermore, the committee heard that local communities were not being fully informed how the floodwater in the region and the supplementary water targeted in the Nimmie-Caira proposal and, as a result, the land in the region would be managed:

> **CHAIR:** The mean average of 173 gigs and a peak of 390 gigs [under the Nimmie-Caira proposal] we are firmly told on three stacks of Bibles does not include any floodwater. I will be interested to see how they define supplementary water converting from a flood. The proposition is that you will then take water off the floodplain? Your dad would remember when this floodplain was covered in lignum et cetera. And I have seen what happened down at places at the bottom there when Twynam converted it from what Tysons used it for, and it became a poverty bush wilderness. Does the council have concerns about the unavailability of information on the re-formation, the redefining, of the irrigation, what is now overland flow, supplementary water, floodwater, whatever? Farming it into some sort of shepherding proposition where allegedly it is going to perhaps get back to the river?
>
> **Councillor Sheaffe:** If there is a plan for what they are going to do with this country, we certainly do not know what it is.[32]

6.42 However, the NSW Office of Water stated that overland flows and floodwater would not form part of the purchase of supplementary water:

> **Mr Harriss:** On the Nimmie-Caira, they diverted during the peak year 381,000 megalitres in any particular year.
>
> **CHAIR:** In those peak years that included—I was just wondering how—
>
> **Mr Harriss:** No, that did not include any overland flows. This is the water that is backed up—
>
> **CHAIR:** But how did you differentiate the water because there was overland flow.

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31 Dr John Williams, Member, Wentworth Group of Concerned Scientists, *Committee Hansard*, 10 September 2012, p. 11.

32 Cr Roger (Bill) Sheaffe, Mayor, Hay Shire Council, *Committee Hansard*, 10 September 2012, p. 26.

> **Mr Harriss:** No, it was not overland flows. This is the water that has backed up beyond the regulators and is diverted through the offtakes into the Nimmie-Caira area.
>
> **CHAIR:** But some of this was over-bank water in the average—
>
> **Mr Harriss:** No, Senator, we have not factored in the over-bank flows. In fact, we cannot—
>
> **CHAIR:** What became of the floodwater that got mixed in with the supplementary water?
>
> **Mr Harriss:** The floodwater did not go into it. This was specifically diverted through the Nimmie-Caira regulators and pumped through channels and then the appropriate floodway, but it does not include the over-bank flow.[33]

6.43 Other witnesses suggested the LTCE helps manage the issues regarding the Nimmie-Caira buyback proposal. As the following exchange with representatives from the National Irrigators' Council and the NSW Irrigators' Council shows:

> **CHAIR:** The 'supplementary flow' is an artificial diversion of in-river water—right? It is not a supplementary flow; it is in-river water diverted with the weir. Agreed?
>
> **Mr Culleton:** It is a diversion of a regulated flow.
>
> **CHAIR:** Yes, so it is not supplementary water.
>
> **Mr Culleton:** Correct.
>
> **CHAIR:** It is regulated water which, for the purposes of this licence, is defined as supplementary. What I am trying to find out is this: in 1992, when did supplementary water become flood water?
>
> …
>
> **Mr Gregson:** The reason that there is an average annual reliability associated with entitlements is to get past exactly this confusion [between different water entitlement types] and to be able to talk to them on a one-on-one exchange rate basis. So whether this is supplementary, or whether it is regulated, or whether it is Victorian sales water, is, as my erstwhile colleague puts it, irrelevant. We are able to judge what the average annual volume of water will be from those entitlements.[34]

6.44 The committee notes that the NSW Legislative Council passed an order to produce documents relating to the proposed Nimmie-Caira project. On 20 September 2012, the response was tabled in the NSW Parliament. The index of documents that was made publicly available shows that, at the time, many of the relevant documents

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33 Mr David Harriss, Commissioner, New South Wales Office of Water, *Committee Hansard*, 10 September 2012, p. 36.

34 Mr John Culleton, Director, National Irrigators Council, and Mr Andrew Gregson, Chief Executive Officer, New South Wales Irrigators Council, *Committee Hansard*, 10 September 2012, pp 3–4.

remained confidential because of claims of privilege.[35] Following a review of the claims of privilege, the Nimmie-Caira business case and certain related documents were tabled in the NSW Parliament on 20 November 2012. Therefore, further information is now publicly available that was not available when the committee held hearings on the Nimmie-Caira issue.[36] The business case presented by the NSW Office of Water to SEWPaC lists a total cost for the project of over $168 million. Of this, $120 million is for the purchase of water entitlement, land and infrastructure covering the 19 properties from 11 farm businesses. About $25.5 million is proposed to be spent on 'land transition arrangements' including the establishment of easements, decommissioning fencelines and establishing boundary fences, pipelined water supply, utilities, environmental water management services and a cultural heritage survey.[37]

6.45 The committee also notes that in NSW in 2012 'water historically diverted for flood irrigation to the Lowbidgee under a legislative power was recognised as a new licence subcategory, supplementary water (Lowbidgee) access licences.'[38] The issuing of 381 000 unit shares for the Nimmie-Caira area landholders and the subsequent purchase of these new water entitlements by the government from the landlholders are key parts of the Nimmie-Caira proposal.[39]

Committee view

6.46 The committee remains concerned about how the government examines and purchases different water types through the water buyback scheme. The examples of Tanduo and Twynam highlighted that the purchase of large amounts of supplementary water can have only a minimal impact on the return of water to the Basin system. The

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35 See: NSW Legislative Council, Return to Order - Nimmie-Caira System Enhanced Environmental Water Delivery Project – Clerk tabled documents received on Thursday 20 September 2012 from the Director General of the Department of Premier and Cabinet, together with an indexed list of documents, www.parliament.nsw.gov.au/prod/lc/lctabdoc.nsf/cccc870c6126b1b6ca2571ee000318a4/8a60bb511edeacd8ca257a7f00209cd5/$FILE/Index%20-%20Nimmie-Caira%20System%20Enhanced%20Environmental%20Water%20Delivery%20Project.pdf (accessed 28 September 2012).

36 NSW Legislative Council, Disputed Claim of Privilege – Nimmie-Caira System Enhanced Environmental Water Delivery Project – Tabling of Privileged Documents – Clerk tabled documents identified as not privileged in the report of the Independent Legal Arbiter, dated 20 November 2012, www.parliament.nsw.gov.au/prod/lc/lctabdoc.nsf/cccc870c6126b1b6ca2571ee000318a4/8045418e0d4cf112ca257abe00067476?OpenDocument&Highlight=0,nimmie* (accessed 12 March 2013).

37 The covering letter for the business case from the NSW Office of Water to SEWPaC and a summary of the Nimmie-Caira project costs (which contain this information) is included as Appendix 5.

38 NSW Office of Water, Summary of amendments to the Murrumbidgee Regulated Water Sharing Plan, October 2012, p. 3.

39 See Appendix 5.

committee is unconvinced that this provides the government with the best options available to manage environmental follows given the low level of reliability of the water.

6.47 The committee heard evidence that led to similar concerns about the Nimmie-Caira buyback proposal. In this case too, the lack of reliability of flows undermines the value for money that the proposal provides for tax payers and leads to uncertain environmental outcomes. The committee is also concerned that there has been limited public transparency about the Nimmie-Caira buyback proposal. In this regard the committee welcomes the tabling of the Nimmie-Caira business case in the NSW Parliament following the review of an independent arbiter. However, the committee considers that there still has not been the opportunity to fully scrutinise the potential problems arising from the use of different water types in this case.

6.48 The committee also has concerns that the proposed purchase of water entitlements as part of the Nimmie-Caira project stems from the creation of a new licence entitlement recently granted to the landholders. This, combined with the concerns about different types of water entitlements and the $168 million total cost of the proposal, raises further questions about the value for money the Nimmie-Caira proposal represents for Australian taxpayers.

Recommendation 16

6.49 The committee recommends that the Australian National Audit Office (ANAO) review the Nimmie-Caira proposal. To the extent possible and in collaboration with the NSW Audit Office if necessary, the review should amongst other things examine the process undertaken by relevant parties for determining the value of all aspects of the Nimmie-Caira proposal. The review should also examine any factors that may impact on the value for money for the government and the tax-payer of the proposal should it proceed. The ANAO should report on this review prior to the approval of the Nimmie-Caira proposal by the Department of Sustainability, Environment, Water, Population and Communities.

Chapter 7

Impact of the Basin Plan on Rural Communities, Localism and Stakeholder Engagement

7.1 The social and economic implications of the Basin Plan formed a major part of the evidence received during this inquiry. Also prominent was the broader public debate about the future of the Murray-Darling Basin itself.

7.2 This chapter deals with the socio-economic impacts of the Basin Plan and the related issue of the Murray-Darling Basin Authority's (MDBA) and the Department of Sustainability, Environment, Water, Population and Communities' (SEWPaC) engagement with rural communities and stakeholders. First, the chapter discusses the impacts of the Basin Plan on rural communities. In particular, it focusses on the following areas:

- external pressures affecting rural communities that are unrelated to the Basin Plan including, the millennium drought, commodity prices and the general economic climate;
- modelling of the future social and economic impacts of the Basin Plan by the MDBA, the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), and independent groups; and
- community perceptions of the potential social and economic impacts of the Basin Plan on communities reliant on irrigation in the Basin.[1]

7.3 Second, the chapter discusses the issues of localism and stakeholder engagement in the development of the Basin Plan. It examines how the concept of localism has been developed and used by the MDBA since the release of the House of Representatives Standing Committee on Regional Australia's May 2011 report entitled, *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Pla*n (Windsor Report). It also examines the process and criticisms of the MBDA and the government's approach to stakeholder consultation in the Basin region.

Impact on Rural Communities

External pressures unrelated to the Basin Plan

7.4 The socio-economic pressures faced by regional and rural communities from severe drought, fluctuating commodity prices and the post-GFC economic climate were made apparent when the committee held public hearings in Hay and Mildura in early April 2012.

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1 The socio-economic impacts of the additional 450 GL/y return of take to the environment announced by the government on 26 October 2012 are discussed in chapter 4.

7.5 The General Manager of Hay Shire Council outlined the impact that the Basin-wide 2750 GL/y reduction could have on Hay in addition to the difficulties caused by the millennium drought:

> That will decimate the lifeblood of this area. From Hay Shire's point of view, it is a very resilient community but it has had a pretty hard time with 12 years of extreme drought, and to lose this amount of irrigated agriculture from the area is a terrible blow to the economy of the community.[2]

7.6 Two local Hay witnesses also explained how the drought and other factors had a strong impact on the Hay local economy resulting in skills shortages, but that the Basin Plan process was creating additional uncertainty for the region:

> **Mr Hill:** … it is hard to find that semi-skilled employee for general driving of tractors. It is all high-tech equipment. It is all GPS. It is hard to find people that are reliable et cetera. So many people have left for the mining industry. Families have left the area because of the uncertainty moving forward. We have had the drought, which created a lot of uncertainty, obviously. Because local farms have sold water, locals have seen it happen. Families are thinking: 'Well, my kids are about to go to high school. I think we might move now and just not take that chance.' Even local shops find it hard to find people. It is an ongoing problem.
>
> **Senator URQUHART:** So it is across the broad spectrum of all different industries?
>
> **Mr Hill:** True. We cannot all blame the [Basin Plan], either, for people leaving town. It is a country town. Kids often do leave. They go to uni et cetera. Once they are at uni they possibly do not always come back. But the plan has created uncertainty.
>
> **Mr Schipp**: The other thing is that production has ramped down because of drought and zero [water] allocation, and to suddenly ramp it back up one season later or two seasons later is another compounding factor. It clouds this whole issue. The [Basin Plan], probably, has some impact. But there is also the drought compounding the story as well.[3]

7.7 Mr Bennett from the Sunraysia Irrigators Council, also noted the effect of poor commodity prices followed by the drought on irrigated horticulture in Mildura:

> The recent history of Mildura is that, mainly due to commodity prices before the drought, some people were starting to get out of irrigated horticulture. That was rapidly advanced during the drought, and I think the district is now pumping only half the amount of water it was pumping prior to the drought. As [Mr Daniel Lee, Chairman, Sunraysia Irrigators Council] said, even though there had been irrigation efficiency up until that time, it accelerated through the drought and most people have got some form of

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2 Mr Allen Dwyer, General Manager, Hay Shire Council, *Committee Hansard*, 2 April 2012, p. 57.

3 Mr James Hill, Private Capacity, and Mr Andrew Schipp, District Agronomist, New South Wales Department of Primary Industries, *Committee Hansard*, 2 April 2012, p. 14.

> pressurised irrigation on their properties. We hope that that drying off in the pumped irrigation districts has bottomed out and from now on, depending mainly on commodity prices—and the Australian dollar, which is sort of connected—we are hoping to see in the next few years not necessarily a resurgence but some form of getting back to where we were prior to the drought.[4]

7.8 The MDBA also outlined a number of the impacts of the millennium drought on the agricultural sector in the region in its report on the socio-economic impacts of the Basin Plan:

> The severe and prolonged millennium drought has resulted in many farmers in the Basin being under significant financial stress.
>
> - Many farmers survived the drought on a combination of exceptional circumstances payments and off-farm income, and by running down farm equity.
> - Some irrigators sold permanent water entitlements to keep debt levels down, and bought annual water allocations to continue irrigated farming.
> - The average gross margin return on farm assets over five years to 2010 for horticulture, broadacre, livestock, dairy, and mixed farms was in the range of 2 to 3 per cent. When debt and interest costs are included, the average annual return on assets during that period was negative for the majority of farms surveyed.
> - Since 1996, levels of farm average cash income have fallen significantly, and levels of average farm debt have increased substantially in most areas of the Basin.[5]

7.9 In noting the future economic outlook of the Murray-Darling Basin, the MDBA stated that the general economic climate will have the most significant effect:

> In the longer-term, the greatest influence on social and economic outcomes in the Basin will be conditions in the wider economy. The main drivers will include long-term changes in commodity prices, driven largely by growth in emerging Asian economies, exchange rates and anticipated continuing growth in Australia's GDP and productivity.[6]

Committee view

7.10 The committee is mindful that many of the pressures facing communities and irrigators in the Murray-Darling Basin are not caused by the Basin Plan. The committee also considers it important that the public debate about the future of the Murray-Darling Basin clearly delineates the likely impacts of the Basin Plan from these other external factors.

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4 Mr Malcolm Bennett, Vice Chairman, Sunraysia Irrigators Council, *Committee Hansard*, 3 April 2012, p. 4.

5 MDBA, *The Socio-economic implications of the proposed Basin Plan*, May 2012, p. v.

6 MDBA, *The Socio-economic implications of the proposed Basin Plan*, May 2012, p. 12.

7.11 However, the committee is also mindful that the Basin Plan may have effects that tend to exacerbate the existing social and economic challenges in the Basin. The committee considers that it is very important that the Basin Plan takes into account existing socio-economic issues in the Basin.

Social and economic modelling

7.12 The potential social and economic impacts of the Basin Plan formed a major part of the inquiry's evidence. The MDBA and other groups undertook various studies to model these impacts. While acknowledging that there would be social and economic costs, the MDBA also presented modelling that the costs would be limited.

7.13 The broad, Basin-wide findings of the MDBA can be summarised as follows:

- The reduction in irrigated agricultural output as a result of the Basin Plan is expected to be 5–10 per cent from 2007 to 2019 (less than 1 per cent per annum).
- That overall agricultural output is expected to grow by more than this reduction in irrigated agricultural output until 2019 – meaning net growth for the region despite the Basin Plan.
- Government investment in infrastructure and water management is expected to create 2 000 to 3 000 more jobs to 2019.
- Without the Basin Plan the region (excluding the ACT) is expected to have a general increase in fulltime jobs of 13 000 per annum by 2019.
- Under the Basin Plan (without buybacks re-invested), there is expected to be a total reduction of 1 600 jobs by 2019, equating to a reduction in the annual increase of approximately 200 jobs.[7]

7.14 These broad outcomes were part of MDBA's socio-economic analysis that assessed the impact of the Basin Plan at four levels: national, regional, industry and local. The MDBA described how it developed this analysis:

> Firstly, regional socio-economic profiles were collated. Economic models were used to assess likely impacts on agricultural production and communities at Basin-wide, regional and industry levels. Socio-economic impact assessment was used to complement this analysis and describe in more detail the potential impacts at the industry and local level.[8]

7.15 The MDBA stated that it undertook the economic and hydrological modelling on only the 2800 GL/y figure and noted that many of the 'benefits and costs are not of sufficiently high precision to be able to discern a significant difference' between 2750 GL/y the 2800 GL/y scenarios.[9] Although socio-economic impacts of other reduction in take scenarios were modelled for socio-economic effects, less detail of

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7 MDBA, *The Socio-economic implications of the proposed Basin Plan*, May 2012, p. ii.

8 MDBA, *Plain English summary of the proposed Basin Plan – including explanatory notes, Appendix B*, November 2011, p. 119.

9 MDBA, *The Socio-economic implications of the proposed Basin Plan*, May 2012, p. 2.

the results were made available in public reports. As noted in the MDBA's report *Socioeconomic analysis and the draft Basin Plan: Part A – Overview and analysis*: '[e]conomic modelling studies have considered a range of scenarios with a focus on a 2800 GL water recovery volume, and sensitivity analyses of 2400 GL and 3200 GL scenarios.'[10]

7.16 A further criticism, by witnesses such as the Wentworth Group, was that the socio-economic modelling did not adequately explain the impacts, costs and benefits that would occur under several different scenarios for returning environmentally sustainable levels of take.[11]

7.17 The analysis across the four levels showed that while the impact of the Basin Plan when spread across the entire Murray-Darling Basin is relatively low, it is likely that disproportionate costs will be borne by specific Basin communities:

> These costs are likely to occur in areas that have small populations and high dependence on irrigated agriculture, and communities which are more geographically isolated relative to others across the Basin.[12]

7.18 The MDBA also advised that various assumptions were tested, particularly in relation to potential job losses. For example, as the following exchange demonstrates, different modelling scenarios were developed to measure the impacts of people either staying in the community or moving elsewhere following job losses:

> **Dr Dickson:** We did three different studies on the employment impacts and then did a review of all of those three. They do vary. We also tested whether people move on or whether they stay in their jobs. Effectively, there was not a lot of difference in the overall impact of whether people moved on or stayed there. But we did analyse that. That is all reported in our social and economic impact assessment…
>
> **Senator NASH:** Which one are you using for the purposes of the plan—that they move on or that they stay?
>
> **Dr Dickson:** We are basically painting the three scenarios that you could have—that they all move on, that a mixture will stay, which is probably closer to the reality, or that they all stay—and then just looking at the relative impacts. You cannot be precise about these things in identifying the particular impact.
>
> **Senator NASH:** No, I understand that. Obviously it is a very imprecise situation we are dealing with. If you are using all three but you have come to an understanding of what you think the impact is going to be on job losses, if you have three different scenarios, how can you be so certain about the job losses?

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10 MDBA, *Socioeconomic analysis and the draft Basin Plan: Part A – Overview and analysis*, November 2011, p. 55.

11 Mr Tim Stubbs, Environment Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, pp 16–18.

12 MDBA, *Plain English summary of the proposed Basin Plan – including explanatory notes*, *Appendix B*, November 2011, p. 120.

> **Dr Dickson:** We have not said we are absolutely certain about job losses. What we have identified is the order of impact... I think the worst case was around 1,600 overall over the long term, and the best case was something around 800. It all depends on the modelling that you use.[13]

7.19 Elsewhere, the MDBA also stated that the potential costs for economies and communities are 'manageable if there is a smooth transition over time to a sustainable level of water use.'[14]

7.20 ABARES also provided socio-economic modelling complementary to or as input for the information published by the MDBA.[15] Where relevant, the results and criticisms of this modelling are also discussed below.

Concerns with the MDBA's modelling

7.21 Despite the studies put forward by the MDBA about the socio-economic impacts of the Basin, a number of witnesses claimed that there was either significant uncertainty regarding the socio-economic impacts or significant problems with the MDBA's modelling.

7.22 Some stakeholders stated that the full impact on communities is not yet completely known. Mr Jock Laurie, President of the National Farmers' Federation summarised these concerns:

> The variation of seasonal allocations, variations of rainfall and all those things do have an impact. So how do you get an understanding? They do know that, if you work on averages, you can extract money out of a community—like Griffith, for instance—and you should be able to put a dollar figure to it. We are not convinced, at this stage, that they [the MDBA] have enough knowledge about the actual impact. I do not believe that they understand exactly what the impact on each of those individual communities will be. So whenever you are taking water out of productive use you will be removing income. What we are saying is that we need to get all of those things together: the infrastructure spend, the environmental works and measures, the [research and development] component, maintaining economic capacity and other things.[16]

Assumptions behind the socio-economic modelling

7.23 Given the broad nature of the assessments made by the MDBA, there is a sense of uncertainty regarding the extent of the negative socio-economic impact on the

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13 Dr Rhondda Dickson, Chief Executive, MDBA, *Committee Hansard*, 24 April 2012, p. 7. See also Mr Paul Morris, Executive Director, ABARES, DAFF, *Committee Hansard*, 24 April 2012, p. 11.

14 MDBA, *Plain English summary of the proposed Basin Plan – including explanatory notes, Appendix B*, November 2011, p. 119.

15 For example, ABARES, *Modelling the economic effects of the Murray-Darling Basin Plan*. Report prepared for the Murray-Darling Basin Authority, November 2011.

16 Mr Jock Laurie, President, National Farmers' Federation, *Committee Hansard*, 23 April 2012, p. 33.

Basin as a whole and how individual communities would be affected. As such, some organisations commissioned their own assessments to gain an understanding the impacts to local areas. One report, by Independent Economics, presented quite different findings at the local level compared to the MDBA's overall assessment:

> The Independent study found that a 29 per cent reduction in productive water use in the South West Murrumbidgee (Griffith, Leeton, Narrandera, Carrathool and Murrumbidgee local government areas) is likely to permanently reduce employment by 2100 jobs, comprising 700 jobs from farming and processing businesses and 1400 jobs from urban based service industries. The study also estimates GDP in this region will reduce by about 9 per cent and income by about $200 million.[17]

7.24 Given the significantly different findings, the committee explored some of the Independent Economics report's finding with ABARES officials at a committee hearing. When questioned about the impact on smaller communities as reflected in the Independent Economics research, which indicated that people will leave smaller communities and the social and economic impact would be quite negative, Mr Morris, Executive Director, ABARES explained their different modelling approach:

> **Mr Morris:** In our water modelling—so this is agricultural areas—we look at about between 22 and 24 different regions. In our general equilibrium modelling, which is more of the basin wide, it is a slightly smaller set of regions; I think it is about seven regions. The smaller you can get those regions—obviously, to some degree the more information would be available to you and others in terms of decision makers—unfortunately, the less reliable the data and information is at that regional level, so it becomes very difficult to depend on the reliability of information. We map it on areas that we believe we have reliable data and information on which to make decisions on. So that is why we use the seven regions across the basin for this type of modelling.
>
> **Senator NASH:** Are you saying that the Independent Economics analysis is not reliable?
>
> **Mr Morris:** We value inputs from all sources. The work done by Independent Economics is very different from all of the other economic work that has been done on the basin. If I were asking them questions, I would ask them why their results are so different—and I do not think it is because of the assumptions that they have said that they have changed because we have modified those assumptions.[18]

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17 Murrumbidgee Irrigators Ltd, *Murray-Darling Basin Plan*, www.mirrigation.com.au/Policy-and-Reform/Murray-Darling-Basin-Plan/Murray-Darling-Basin-Plan, (accessed 6 September 2012). The full report was prepared for The Murrumbidgee Valley Funding Partners: Independent Economic, *Modelling the Economic Impact of the Draft Basin Plan*, April 2012, www.independenteconomics.com.au/information/Reports/Independent_Basin_Plan_second_stage_final3.pdf (accessed 4 March 2013).

18 Mr Paul Morris, Executive Director, ABARES, DAFF, *Committee Hansard*, 24 April 2012, p. 24.

7.25 ABARES also explained that the different models took different approaches and the variance in results could be a result of the size of areas assessed. As Mr Morris told the committee:

> There are a number of reasons why that might be the case, and I do not fully understand their model. It has some quite unusual results that we do not quite understand. The smaller the region, potentially the higher the likelihood of people moving out of the region. They have defined quite a small region—it is the south-west Murrumbidgee—whereas our regions are a bit bigger than that. We looked at the Riverina, which would be our comparable region for our regional impact modelling, and so part of the reason is that they have got a smaller region.[19]

7.26 The MDBA also stated in its report that the main reason for different results regarding the socio-economic impacts is that different assumptions have been used for different modelling. The MDBA explained there would be larger impacts with the following assumptions:

- 100 per cent of water required to meet SDLs is recovered by buy-back (when in fact, a considerable portion is being recovered through infrastructure improvements);
- all water recovery is yet to occur (when in fact, the target has been half achieved already);
- water continues to be used in fixed proportions with other inputs (with no substitution between water, land, labour, capital, materials and services);
- there is no trading of water between industries or between the water resource planning regions (which might include farmers in one area selling temporary water allocations to farmers in the same area or other areas as a source of income in low allocation years);
- when farmers sell their water entitlements to the government, they sell all of their entitlements and exit the industry altogether; and
- a proportional impact on irrigated agriculture flows through to an equivalent proportional effect on the size of the Basin economy and employment.[20]

Limited consideration of connectivity

7.27 In the hydrological modelling of various SDLs, there was limited consideration of connectivity between the groundwater and surface resources in the Basin (see chapters three and eight). This had implications for how the socio-economic modelling of the Basin Plan was undertaken. ABARES explained how this connectivity was represented in its socio-economic modelling:

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19 Mr Paul Morris, Executive Director, ABARES, DAFF, *Committee Hansard*, 24 April 2012, p. 11.

20 MDBA, *The Socio-economic implications of the proposed Basin Plan*, May 2012, pp 3–4.

> **Mr Morris:** In terms of groundwater versus surface water, clearly, if there is more groundwater available or there are changes in the relationship between the amount of groundwater and the amount of surface water, that will affect the overall water available to the basin and that could have quite a significant impact on the results. But we have built into our scenarios the scenarios given to us on the basis of availability of surface water and groundwater from the Murray-Darling Basin Authority.
>
> **CHAIR:** Have you included in that the connectivity? The more groundwater you take in some places, the less river water there is.
>
> **Mr Morris:** It is not a detailed scientific model, but there is some representation of differences between surface water and groundwater in the modelling.[21]

7.28 However further questioning by the committee of an ABARES official suggested there remained a limited understanding about the connectivity between surface water and ground water by those involved in different aspects of the modelling:

> **Mr Sanders:** …You have to remember that our models of regions are at a sort of aggregate scale. While we have some hydrological component, we do not necessarily model the relationships between surface water and groundwater, but we treat—
>
> …
>
> **CHAIR:** Do you understand the connectivity of the Murrumbidgee and the aquifer?
>
> **Mr Sanders:** No, I do not understand it. The—
>
> **CHAIR:** How the hell can you model if you do not understand it?[22]

Committee view

7.29 The committee is of the view that, given the MDBA has indicated it has attempted to strike an appropriate balance between environmental, social and economic outcomes, it is reasonable to expect that more detailed analysis would be undertaken in relation to the impacts of the Basin Plan at a local community level across the Basin.

7.30 Independent modelling undertaken by others, which found significant social and economic impacts compared to the MDBA's own assessments, generates valid concern within the communities about the Basin Plan, particularly in the absence of thorough data to refute these claims. The MDBA's response that it 'does not agree with the assumptions' made by other research is not acceptable where the assumptions made by the MDBA are not clear to the public.

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21 Mr Paul Morris, Executive Director, Australian Bureau of Agricultural and Resource Economics and Sciences, DAFF, *Committee Hansard*, 24 April 2012, pp 4–5.

22 Mr Orion Sanders, Economist, Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 24 April 2012, p. 5.

7.31 The committee is concerned by ABARES apparent lack of understanding about the surface and groundwater connectivity in undertaking its socio-economic modelling of the Basin Plan.

7.32 The committee believes, consistent with the recommendation below, that the assumptions that underpin the socio-economic modelling need to be more clearly explained to the public. Although the committee is aware that modelling of socio-economic impacts of other reduction in take scenarios was undertaken, the committee is concerned that the level of detail made publicly available was limited especially in comparison to the 2750 GL/y scenario.

Perspective of rural communities

7.33 The committee heard evidence from a number of regional Basin community groups, councils, and industry representatives that also diverged from results of the MDBA and ABARES' socio-economic modelling. These perspectives were put to the committee, most forcefully during its visit to the rural communities of Hay, NSW and Mildura, Victoria.

7.34 Mr Crighton, a local engineer from Hay, summarised the position of rural communities well:

> Water is going to go; we understand that. We all want the river to be managed; we all want it to be maintained. We understand that a volume of water has to go but the communities that are there are going to be the people who are truly going to suffer from that change and they are the people who most need assistance. These regional towns need any assistance they can get to broaden their sector, to get out and grab other work and other income and to start working with other industries, such as our predominant industry which is dryland farming. The transition is not easy.[23]

7.35 Concerns were strongly evident in other Basin communities as well. For example, Mayor Margaret Thomson of Wentworth Shire outlined the Basin Plan's impact on the Wentworth community given its reliance on irrigated farming:

> We do have very grave concerns about the effect on our communities in the future and how we can remain a prosperous community. The shire is an agricultural economy that is almost entirely dependent on production from irrigated horticulture. Up to 80 per cent of the gross value of our agricultural production is generated by only 0.5 per cent of the landmass of the Wentworth shire.[24]

7.36 The Mildura Rural City Council Mayor, Councillor John Arnold, also pointed to the flow-on effects of the Basin Plan and the associated water buyback process:

> ...it will take out of those areas massive production, and it is going to make it very difficult for the councils to continue with a rate level as it is

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23 Mr Jasen Crighton, Director, Crightons Rural Engineering, *Committee Hansard*, 2 April 2012, p. 5.

24 Councillor Margaret Thomson, Mayor, Shire of Wentworth, *Committee Hansard*, 3 April 2012, p. 30.

> currently, because as the land values in those areas decrease other people are going to pay more. Mildura is also a member of Regional Cities Victoria, and both the previous Labor government and the current coalition government in Victoria have a policy of people moving to the regional cities. You cannot do that with a lower rate base unless there is some significant capital put in to ensure that they are able to survive.[25]

7.37 The local impacts were also highlighted by Mrs Tania Chapman of Citrus Australia. Mrs Chapman argued that the appropriate balance between the environmental, social, and economic impacts were not reached under the Basin Plan (November 2011):

> A recent report released last month on the socioeconomic impacts of the proposed plan by Regional Development Victoria is another example of the impact it will have in our communities. Even the best-case scenario, minimum buybacks, points to an increase in abandoned blocks in Red Cliffs, Merbein and Mildura. How will all the extra environmental water be managed? We are yet to see best practice water management by governments during extreme weather events. The draft Murray Darling Basin Plan continues to fail to deliver the balanced social, economic and environmental outcomes that we do need.[26]

Committee view

7.38 The committee was concerned throughout this inquiry that the various iterations of the Basin Plan did not fully address the socio-economic impacts that the return of 2750 GL/y would have on Basin communities.

7.39 Although the committee acknowledges the progress made by the MBDA in addressing socio-economic impacts during the development of the Basin Plan, some of the original concerns remain. Although the committee is aware of the research conducted and commissioned by the MDBA about local socio-economic impacts of the Basin Plan,[27] the evidence received by the committee shows that rural communities face a degree of uncertainty about their social and economic future.

Recommendation 17

7.40 The committee recommends that the MDBA update the socio-economic modelling of the local impacts of the Basin Plan. There should be a strong focus on the communities likely to be most affected by the Basin Plan and strategies should be developed to address the impacts. All such information should be publicly released and presented in a form that is accessible to stakeholders, local community members, and parliamentarians. This modelling should also include

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25 Councillor John Arnold, Mayor, Mildura Rural City Council, *Committee Hansard*, 3 April 2012, p. 31.

26 Mrs Tania Chapman, Chair, Citrus Australia, *Committee Hansard*, 3 April 2012, p. 18.

27 See, for example, MDBA, *Socioeconomic analysis and the draft Basin Plan: Part A – Overview and analysis*, November 2011, pp 85–111.

tabular or graphical data depicting the location and volumes of buyback on an irrigation district basis.

Stakeholder engagement and localism

Stakeholder engagement

7.41 The issue of stakeholder engagement was a significant concern among many of the witnesses who appeared before the committee. While developing the Basin Plan, the MDBA undertook a significant process of consultation with interested parties. The Basin Plan Explanatory Statement (explanatory statement) outlined the MDBA's consultation as follows:

> During the 20 weeks of formal consultation, the Authority held a total of 24 public meetings, 56 round table and technical meetings, 18 social and economic briefings for representatives from rural financial organisations, 5 regional briefings on water trading issues, and 31 bilateral and working group meetings with Basin States. Further, a tailored Indigenous consultation process took place in more than 30 towns in the Basin.[28]

7.42 The explanatory statement also noted that:

> By the end of the formal consultation period on 16 April 2012, the Authority had received nearly 12,000 submissions from individuals, organisations and governments across Australia, as well as some from overseas. As a result of this further feedback, more than 300 changes were made to the proposed Basin Plan.[29]

7.43 Under the *Water Act 2007* the MDBA is required to 'consider' any submissions received as part of the formal consultation period.[30]

7.44 Despite the extensive public consultations that took place, a number of stakeholders expressed significant concerns about flaws they saw in the MDBA consultation process and its effectiveness in helping stakeholders understand the Basin Plan. For example, the Mayor of Mildura Rural City Council stated that although there were significant meetings with the government over the plan, information on certain issues could be hard to obtain:

> You may be aware that we have consulted closely in Canberra, Leeton and a number of other places with the Murray-Darling Basin Authority. Like Mark McKenzie [Chief Executive, Murray Valley Winegrowers Inc], who we were at the meeting in Canberra with, we discussed the technical details about how they came up with decisions about use of environmental water, flows and what they were going to be able to do with regard to that. There are certainly some genuine concerns with regard to the information which

28 Basin Plan explanatory statement p. 10.

29 Basin Plan explanatory statement p. 11.

30 *Water Act 2007*, section 43(10)(a).

> has been made available. Often when questions are asked there has not been a definitive answer.[31]

7.45 A witness from the Riverland Winegrape Growers Association was also critical of the general approach to stakeholder engagement taken by the government and other officials:

> **Mr Byrne:** We have also witnessed a lot of what I can only call prevarication on the part of those who have been charged with responsibility for engagement with us as stakeholders and those who have been charged with responsibility for further developing the draft into a final plan. I can only imagine that the intransigence and the prevarication, which I would define as 'acting or speaking evasively or misleadingly', is going to continue because there have been no signs in recent times that we are suddenly going to have a more open, cohesive and interactive opportunity with those who have primary responsibility for developing this plan.
>
> **Senator NASH:** … for clarification, when you are talking about the people you are engaged with and the few responses and the prevarication, are you talking about the Murray-Darling Basin Authority officials?
>
> **Mr Byrne:** I am talking about the politicians with whom we have had engagement. I am talking about the bureaucrats who work for those politicians and I am talking about some of those within the authority; though I would have to say that our engagement with the higher level in the authority has generally been met with some satisfaction but not a lot of detail.[32]

7.46 Despite the extensive meetings held by the MDBA in the formal consultation process in the first half of 2012, the National Irrigators' Council (NIC) criticised the MDBA for providing little information afterwards. As the NIC told the committee, the MDBA's efforts in early 2012 were followed by an absence of information in the time leading up to the tabling of the Basin Plan in parliament:

> On the issue of consultation: we got consulted to death. We have had millions of reports and God knows what else handed down. But it has suddenly gone silent. We have the Basin Plan out there and there have been a lot of closed-door meetings going on for the last two or three months. But our communities are crying out for information about what the plan means for them. They have no idea. I know we are trying to get our heads around it and trying to be the conduits, but—and I am going to verbal Andrew [Mr Andrew Gregson, CEO, NSW Irrigators Council] again—both Andrew and I would say that we do not have the resources to do that. Only governments have those resources. We would implore you: after Christmas [2012]—now is not a good time; people are trying to harvest and get summer crops in and those sorts of thing and communities are busy—there has to be a very

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31 Councillor John Arnold, Mayor, Mildura Rural City Council and representative of the Murray River Group of Councils, *Committee Hansard*, 3 April 2012, p. 31.

32 Mr Christopher Byrne, Executive Officer, Riverland Winegrape Growers Association, *Committee Hansard*, 3 April 2012, p. 41.

> concerted effort to get out there and explain what this is all about and what it means for people.[33]

7.47 The Wentworth Group was also critical of the manner in which its comments regarding the proposed Basin Plans were treated by the MDBA. In particular, the Wentworth Group was concerned that one of its statements was not engaged with constructively but placed on the MDBA's 'Mythbusting' website. As Mr Stubbs explained:

> We have said, 'You don't tell us the number [of the Basin wide SDL]; you need to tell not just Wentworth but tell the public, tell every stakeholder in the basin, and the parliament.' I know the environmental groups have written to the authority specifically asking them to model volumes of 4,000. I cannot respond on exactly what response they got. We have not got any specific response to our statements. Our statement got put on the myth-busting section of the authority's website. In this public consultation process, a statement that we have put out is put up as myth busting and ridiculed on their site. We have not got a comprehensive response.[34]

7.48 A number of environmental groups were also critical about the manner in which public consultation meetings took place. In particular, these groups stated that the very short notice of the time and location of meetings made it difficult to properly present their views. As the committee was told by representatives of the Conservation Council of South Australia, Nature Conservation Council of New South Wales, Environment Victoria, respectively:

> **Senator HANSON-YOUNG:** What type of consultation have the three organisations had with the Murray-Darling Basin Authority in relation to the draft plan?'
>
> **Mr Kelly:** We have been invited to attend a number of information sessions and had discussions with the authority over last year and this year [2011 and 2012]. My feeling was that at many of those meetings there were a number of questions continuously asked about modelling the 4,000 gigalitres, why certain things were done and when reports were going to be released as such. It was always a little bit constrained in the answers that were provided, so we have felt that there has not been a hugely strong amount of listening to the concerns of the environmental movement. If there were, we would have seen the 4,000 gigalitres and other values modelled already, and then there would be better knowledge and information out in the community and with policymakers to make an informed decision.
>
> **Ms Smiles:** Just to answer that question as well, as far as the information sessions that the MDBA has been running are concerned, I think we were given 10 days notice of the last-minute decision to hold an information

33 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard*, 23 November 2012, pp 16–17.

34 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, p. 24.

> session in Sydney, and the 10 days included Easter, so it was very short notice for anyone that was interested in the issue in Sydney to be able to organise themselves to get along to that information session. So we do not feel that there has been enough notice to enable community access to the sessions that have been run…
>
> **Ms Le Feuvre:** For some of the community consultations out in regional Victoria, they would ring up a couple of days before and say, 'Do you know of any environmental people we should invite?' That kind of notice is really very short. In terms of the [NGO] consultation, we have had a number of briefings with them. Finally, in Sydney, probably a couple of weeks ago, we had the sort of conversation we wished we had had about a year before, while the plan was still under development.[35]

7.49 Other groups have been more equivocal about the MDBA's consultation and stakeholder engagement process. For example, regarding the consultation with indigenous Australians in the Basin, the Murray Lower Darling Rivers Indigenous Nations told the committee about the draft Basin Plan that although significant consultation had taken place and was encouraged, further work needed to be done:

> I must say, Rhondda Dickson CEO of MDBA and Craig Knowles [MDBA Chairman], have been very supportive in the development of our processes within the basin planning itself. I do give them acknowledgement of that, but in saying that, me and my confederated nation groups, see this as a bit of a cop out. It is a very tokenistic measure, where the Commonwealth area actually not taking the responsibilities on as they should be doing and handballing everything across to the basin states and saying that it is their responsibility to do that. We require a lot more clarity around that space. We really do need the Commonwealth to start instigating processes through the basin states where it is compulsory where they actually integrate, negotiate and consult with the Indigenous nation groups. But the MDBA, I must say, have been very supportive in a lot of spaces with Indigenous nations, but in saying that there need to be a lot more work done in those areas too.[36]

7.50 The Wentworth Group also raised concerns that some supporting documentation relevant to the Basin Plan was not adequately available for review for the formal consultation process. As Mr Stubbs explained:

> **Mr Stubbs:** … The authority has been releasing material over the whole 20 weeks of the consultation. As I said before, this volume here is one of four volumes that was released about two weeks before the end of the consultation. They are making it very difficult for anyone to actually fully—

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35 Mr Tim Kelly, Chief Executive, Conservation Council of South Australia, Ms Beverley Smiles, Executive Member, Nature Conservation Council of New South Wales, and Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 31.

36 Mr Grant Rigney, Chairperson, Murray Lower Darling Rivers Indigenous Nations, *Committee Hansard*, 23 April 2012, pp 40–41.

> **Senator XENOPHON**: For the benefit of Hansard, that is about 300 pages?
>
> **Mr Stubbs**: A whole range of small reports have been brought together here, and there are apparently four more of those. I know that there is groundwater information which was released after the end of the consultation period. [37]

Committee view

7.51 The committee acknowledges the effort undertaken by the MDBA to engage with numerous community groups and stakeholders regarding the Basin Plan. The committee also acknowledges the extent of the information that is now available from the MDBA regarding the Basin Plan.

7.52 However, the committee also considers that there have been a number of significant problems with the way that the MDBA has communicated with the public and engaged with stakeholders. The committee is concerned that a number of stakeholders expressed that their views were not appropriately considered or simply dismissed.

7.53 Finally, the committee is of the view that information of greater clarity should have been provided through the development of the Basin Plan and it is particularly concerned that the information about the consequences of the Basin Plan as introduced into Parliament has not been adequately explained to relevant stakeholders and communities.

Recommendation 18

7.54 The committee recommends that the government develop a formal process for long-term and integrated engagement with key stakeholders on the implementation of the final Basin Plan.

Localism

7.55 The concept of localism as applied to the Basin Plan evolved out of the Windsor report (the House of Representatives Standing Committee on Regional Australia's report, *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan)*. The Windsor Report emphasised this issue as a key concern with the release of the Guide in late 2010 and noted the need to use local knowledge and reflect local conditions in the development and implementation of the Basin Plain:

> It is essential that the final Basin Plan and any related implementation plans (including state water sharing plans) reflect the local conditions in each Basin valley. This includes reflecting the knowledge of the local land and

37 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, p. 21. Dr Young from the CSIRO as noted a similar experience with the groundwater information, see Dr Bill Young, Director, Water for a Healthy Country Flagship, *Committee Hansard*, 23 April 2012, p. 61

> catchment managers in how to best manage environmental flows and savings and recognising the work done to date by communities in developing state water sharing plans.[38]

7.56 Subsequently, the MDBA has taken steps to address the issue of community level engagement through the concept of 'localism'. When asked by the committee how 'localism' was defined and how it would operate in the context of the Basin Plan, the MDBA responded:

> …You do need to operate [localism] at a number of scales. The whole purpose of having a basin wide plan is the connectedness of the system, so we do need to plan for the connections, and people operate at local scales. We believe that the localism concept can operate in pretty much all of the aspects of the basin plan…
>
> In water recovery, we have already been having some discussions with some of the stakeholders in the northern basin, the Lower Balonne working group, about different ways to do recovery and watering in that region that would end up with a more efficient outcome. These are ideas at the moment, but the process which we are wanting to work through is to set up arrangements—as yet undefined, I agree—so that we can work very closely with the communities involved there and with the Queensland department. Hopefully we can work closely with the New South Wales government as well, if they become party to it, to look at better ways of managing the system. That is in the northern basin most particularly, because there is still a lot of unknowns up there. That is a localism approach in looking at how you can work with people on different ways of recovery.
>
> We have also flagged in this document *Delivering a Healthy Working Basin* the idea of setting up a community committee that would advise us on some of the SDL adjustment proposals coming forward from either local communities or the states, so that we can make sure we get the full local perspective on those. Some of those may need to be parcelled up together with each other to enable us to get a full sense of what some of those innovations are going to deliver across the whole system, but we want to set up the arrangements so that can happen...[39]

7.57 The MDBA continued the explanation of localism by highlighting some examples of how it was working in practice in terms of environmental watering. As one MDBA official, Ms Jody Swirepik put it:

> The model example at the moment is in Victoria, where they are already work with the Murray-Darling Basin Authority on a hierarchy of identifying at a very local level what they believe their environmental watering priorities are. They do that at a [Catchment Management Authority (CMA)] level. The CMA feeds their priorities into the Victoria

38 House of Representatives Standing Committee on Regional Australia, *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan*, Canberra, May 2011, p. 73.

39 Dr Rhondda Dickson, Chief Executive, MDBA, *Committee Hansard*, 24 April 2012, p. 75.

> Department of Sustainability and Environment, who then looks at their own water portfolio in Victoria, the Commonwealth's portfolio and the Living Murray's portfolio. The CMA basically filters out all the requests to go to different water holders to try and get a co-ordinated view of how they meet their state's watering priorities. There is a process by which the CMA relies on local individuals and their own expert staff to gather up priorities. It comes all the way through to being discussed in the [MDBA] in terms of how we implement different watering priorities.
>
> In our processes, which we run at the moment, pretty well, and which we are obliged to run under the basin plan, there are avenues for people to put in their own ideas directly to us. An example of that that has occurred in the last two years was that the Murray Wetlands Working Group put forward a proposal for watering in the Darling Anabranch during the floods initiated in 2010. That was taken up and a combination of New South Wales water, Living Murray water and Commonwealth environmental water-holding water was used to divert water down into the anabranch. It provided the first watering there. It was a small amount—47 gigalitres—but was quite significant in breaking that dry period. And it was significant because of the combination of water-holders who were co-ordinating to bring that event to fruition.[40]

7.58 Overall, the MDBA described localism as a principle by which it would operate in the future.[41]

Criticisms of localism

7.59 The way that the MBDA had developed the principle of localism to better implement the objectives of the Environmental Watering Plan (EWP) also came under criticism in the committee's hearings. For example, as the NIC put it:

> ...We have certainly got some mixed messages from the Murray-Darling Basin Authority around the localism issue. It certainly has been promoted that localism would be a huge part of the answer in developing the environmental watering [plan] from here on. Then we have had the chair of the MDBA saying that localism may just further exacerbate the current problems that we have in running a basin-wide system.[42]

7.60 The NIC expanded on its views on localism. In particular, as Mr Chesson explained, the NIC was concerned with how localism was being employed by the MDBA, how it fitted with the other Government strategies for the Basin including the Basin Plan and the tension between centralised and local decision making in this regard:

> There was a story floating around just after the plan consultation finished up. It quoted the MDBA CEO Rhondda Dickson as saying if you made a

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40 Ms Jody Swirepik, Executive Director, Environment Management Division, MDBA, *Committee Hansard*, 24 April 2012, p. 75.

41 Dr Rhondda Dickson, Chief Executive, MDBA, *Committee Hansard*, 24 April 2012, p. 76.

42 Mr Stewart Ellis, Chair, National Irrigators' Council, *Committee Hansard*, 23 April 2012, p. 49.

> local decision in the Riverland at Berri, it would have an impact somewhere else in the basin, so it is very hard to have localism when the entire plan is about centralising the decision making back to a federal body. I looked at it and thought, hang on, for the last four months we have been told about localism and about the need for local communities to make decisions but then in one hit they seem to be saying that localism could not work because we need to make a federal overarching sort of decision for the whole river, not just a parochial decision. So I was a little bit confused by this, but it is one of those mixed messages that we do seem to get back sometimes.[43]

7.61 Mr Chesson continued to articulate the 'mixed message' concerns:

> …We think localism is really important because no-one understands how the whole system works. A lot of people know the rhythm of the river in their own patch but then they are quite ignorant of what happens upstream of them or downstream of them. That is pretty obvious. So it is a mixed message: on one hand 'we want to centralise everything' and on the other hand 'we want localism'. We would love to know whether it is about CMAs or natural management NRMs. Some people suggest it is about Regional Development Australia. I do not know who would deliver on a local basis. It is a conundrum.[44]

7.62 The tension between the centralised decision making and localism was also expressed by Dr Paul Sinclair of the Australian Conservation Foundation:

> …[The Murray-Darling Basin] is a system made up of bits that create a whole. Like the saying about finding God in a grain of sand, the smallest bit contributes to the wellbeing of the whole.
>
> Our challenge has always been how we coordinate the Goulburn, the Murrumbidgee or the Kiewa across those state boundaries…in a way that manages it as an integrated system. Localism on its own will not work for the system. It might work for bits of the local environment, but we have to find ways of connecting the local to the regional and to the valley and to the basin. That is the thing that is really hard but also really exciting. I think one of the previous witnesses was involved with the Murray Wetlands Working Group, and community institutions like that are a pivotal link between the overarching basin vision and the actual delivery of water and relationships with people locally in getting that water into the environment.[45]

7.63 Dr Sinclair also highlighted the difficulty in drawing the right balance between localism and central decision making for the Basin. When asked whether he

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43 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard,* 23 April 2012, p. 56.

44 Mr Tom Chesson, Chief Executive Officer, National Irrigators' Council, *Committee Hansard,* 23 April 2012, p. 56.

45 Dr Paul Sinclair, Healthy Ecosystems Program Manager, Australian Conservation Foundation, *Committee Hansard*, 24 April 2012, p. 41.

thought that the MDBA properly understood the connection between localism and central decision making, he responded:

> No. But I do not think many people have, because it is bloody hard and we have not done it before. The thing that gives me great hope is that the investment of successive Australian governments in the regional delivery model of natural resource management has created a framework. We are not at zero. There is an institutional framework out there for doing this stuff that we have to build on, not say, 'Right, get rid of it; start again with some newfangled local thing.' We already have these regional institutions out there. Increasingly, they are involved in the management of carbon in the soils and the landscape, and, increasingly, in the management of water. We need to build their strength and the vertical connection with our overarching plans for the basin.[46]

7.64 However, Dr Sinclair also remained optimistic about how localism could continue to make improvements for the Basin:

> …part of the theme of my intro was that we have to recognise that we are not at zero, that we have actually progressed a significant distance. I was at a natural resource management sharing knowledge thing last week. It is amazing the things people are doing in their local patches, but most of them also have a pretty sharp eye to the way that their local action can be amplified to provide a much better model for a bigger area...[47]

7.65 At a community level there was also criticism about how localism (and other stakeholder engagement) would engage communities in meaningful decision making regarding the Basin Plan. As one community member in Hay, NSW stated:

> A lot of that need to take water had been decided on long before people were consulted on it, long before the thoughts of localism and adaptive management came into play. A lot of that decision-making process, I feel, has been made at an earlier point. All we can do now as stakeholders is try and influence better outcomes for us in the wake of it.[48]

Committee view

7.66 In general, the committee supports the concept of 'localism' and agrees that it should be adopted as a systematic part of the implementation of the Basin Plan. It also acknowledges the work completed by the MDBA to date in using it as a principle for developing key aspects of the Basin Plan. While the committee is generally supportive of the concept of localism, the evidence received in the inquiry suggests that much

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46 Dr Paul Sinclair, Healthy Ecosystems Program Manager, Australian Conservation Foundation, *Committee Hansard*, 24 April 2012, p. 41.

47 Dr Paul Sinclair, Healthy Ecosystems Program Manager, Australian Conservation Foundation, *Committee Hansard*, 24 April 2012, p. 41.

48 Mr Jasen Crighton, Director, Crightons Rural Engineering, *Committee Hansard*, 2 April 2012, p. 6.

more work remained to have it used effectively as part of the EWP and the Basin Plan more broadly.

7.67 However, as with so many aspects of the Basin Plan, the MDBA needs to work harder to clearly articulate how localism will continue to be used in future. The committee is concerned that this is an area where key stakeholders feel they have received mixed messages on the issue.

7.68 In particular, the MDBA needs to delineate how localism applies in certain cases or issue areas from the features of the Basin Plan that will appropriately remain under central control. Localism should remain a flexible option to solve problems regarding the Basin Plan as needed. However, the committee is of the view that the use of the localism concept should not confuse or muddle the process of implementing the Basin Plan.

Recommendation 19

7.69 The committee recommends that the MDBA provide a clear explanation of how 'localism' is to be implemented under the Basin Plan.

Chapter 8

Future Research and Solutions

8.1 This chapter discusses ways forward for a number of key problems identified in previous chapters regarding the management of the Murray-Darling Basin. Although it does not prescribe specific solutions to these problems, the committee considers that the evidence it received shows that further research in the areas identified is likely to make a substantial contribution to the improving social, economic, and environmental outcomes for the Basin.

8.2 The committee considers that there are five key areas of further research that have the potential to provide significant benefit for the Basin or where current research needs to be more fully integrated into the implementation of the Basin Plan. First, improved water efficiency is essential to sustaining the Basin system and research into and the development of crops that can produce better yields with less water offers promising medium to long-term benefits for the Basin.

8.3 Second, the management of water in the Basin could be improved by more research into the rainwater interception and run-off effects due to changing farming practices. Further use of existing research in this area in the modelling the water flows in the Basin should also be considered.

8.4 Third, the level of scientific understanding of surface water and groundwater connectivity in the Murray-Darling Basin needs to be urgently and substantially improved. As the Basin Plan is moving ahead with increased groundwater extractions and the 2750 GL/y proposed reduction in take in surface water, the committee considers it essential that greater knowledge of this issue is developed so that ongoing management groundwater and surface water resources is based on better information than is currently available.[1]

8.5 Fourth, the committee received evidence about potential benefits for the Murray-Darling Basin through the use of better practices for managing agricultural soils. The committee considers that further government-funded research in this area would be beneficial to the Basin and elsewhere. The committee is mindful that the management of the Murray-Darling Basin needs to cover all areas of sustainable agriculture and not solely water resources.

8.6 Fifth, the committee heard evidence that further research and development (R&D) was required so that water infrastructure projects would improve water efficiency in the Murray-Darling Basin. Furthermore, the committee heard evidence of the cost of such projects and the need to consider how such money should be best spent to achieve optimal outcomes for the Basin.

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1 'Increased groundwater extractions' refers to increases in the Basin Plan from those identified in the Guide to the proposed Basin Plan (the Guide). See chapter 3 table 3.1.

8.7 Overall, the committee is of the view that further R&D funding is essential to implementing a robust and workable Basin Plan. The committee has already noted in chapter two that further research into the possible effects of climate change on water run-off is needed. The committee was disappointed that even where significant knowledge gaps were identified by the Murray-Darling Basin Authority (MDBA) and government departments, more was not or is not being done to address the gaps and improve the information available to policy makers, stakeholders and the public. While the committee's view on the key knowledge gaps is listed below, the committee is also of the view that the government should give greater priority to research that can improve agricultural productivity, environmental outcomes and efficient use of water resources across the Basin. The committee is of the view that government should develop a clear and detailed research strategy for the Basin that incorporates the specific areas of concern listed below.

Recommendation 20

8.8 The committee recommends that the government develop and publish a detailed policy for agricultural productivity, environmental and water resource R&D in the Murray-Darling Basin. This policy should reflect a greater priority in this area and incorporate the specific research areas identified in recommendations throughout this report.

Key areas for future research and solutions

Water efficiency

8.9 Given the competing social, economic and environmental interests inherent in managing water resources in the Murray-Darling Basin, the committee took evidence about possibilities for future improvements in the efficiency of water use by the Basin agricultural sector. To examine this issue, the committee looked into the farming of non-paddy rice as a case study.

8.10 In particular, the committee heard evidence from Dr Peter Snell, a Rice Breeder, at the New South Wales Department of Primary Industries. Dr Snell explained that currently the direct water productivity of paddy versus non-paddy (aerobic) rice was similar. However, he also noted that other factors needed to be considered:

> **CHAIR:** … if I was to grow a paddy rice crop and it was, say, 10 tonnes, it would require 10 megalitres of water, roughly.
>
> **Dr Snell:** Yes.
>
> **CHAIR:** If I was to grow an aerobic variety and it went eight tonne, how much water would I need?
>
> **Dr Snell:** You would probably be looking at seven or so. It depends on the delivery system and evaporation and transpiration.
>
> **CHAIR:** So you are saying there is no real water saving?
>
> **Dr Snell:** There is, in a way, to marry the production potential. There is if you shorten the duration. A lot of the work they have done is on full-season

> varieties, and I stress those full-season varieties—and this is again adaption—will lengthen them. Even though you are saving on water but still reaching parity on the production to consumption—
>
> **CHAIR:** Per hectare.
>
> **Dr Snell:** Yes, per hectare. You are probably making rice still untenable in the farming system. The big thing we sell on water productivity of rice is that it is not just the water for the rice; it is the following crops. For aerobics that is another thing: you can use centre pivots or things. You will grow corn or vegetables et cetera and have the flexibility of not having to pull up banks.[2]

8.11 The committee was told that although further work was required, the potential for greater water efficiency in rice growing was significant and that the development of water-efficient varieties would give rice farmers greater confidence in planting their crops:

> **...**[a move to non-paddy rice] is a little way off. Having said that, I think I am closer than anyone has been before. My colleague has just moved on from breeding. In our paradigm rice was at the centre like the big cash crops—cane, cotton et cetera. To me rice has to be a bit more flexible because it is not dollar per hectare, it is dollar per drop at the moment. You need to adjust the breeding program accordingly—whether it is aerobic adaption, so you can use rice on ground where you grow corn or soya beans, or shortening the seasons of commercial varieties to allow the farmer to get his winter cereals off and then plant rice with more certainty. I assume with the scheme, regardless of how it is rolled out, farmers will be a lot more confident about the allocation of what water they have—and a lot of the rice is being grown on saved water later on in season, so they can make that decision later on. We do not tell them to grow rice; it is up to them to do their gross margins and see if it is worth it.[3]

8.12 Dr Snell also told the committee that the potential long-term success of the development of programs such as commercially viable non-paddy rice could benefit from changes to the way that research funding was provided:

> **Senator NASH:** …It comes back to the point about research that we have been talking about for the last two days: that there is not enough of the research dollar being applied out there so that in the future we can actually be sustainable and get to those opportunities we want to. Would you agree with that?
>
> **Dr Snell:** I would agree… As to researchers…publication is important but publications generally do not encompass the big picture. You have to be a really loyal researcher to do that. And when you have academic 'publish or perish' on your mind, you are more on short-term things: 'I can show I am

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2 Dr Peter Snell, Rice Breeder (Professional Officer), New South Wales Department of Primary Industries, *Committee Hansard,* 24 April 2012, p. 49.

3 Dr Peter Snell, Rice Breeder (Professional Officer), New South Wales Department of Primary Industries, *Committee Hansard,* 24 April 2012, p. 52.

> unique in the literature,' et cetera. Breeders, and even marketers, want us to respond to market fluctuations over a six-month period with a seven- to 10-year breeding program. So we are used to saying: 'See the big picture: that stuff on the horizon that we need to do we need to start on now. We will get you the grain and let you taste it, and then you will see if there is a market,' because the funny thing about the rice that we produce—and it is of a high quality—is that it is generally saleable. So you need that practicality.[4]

8.13 In this regard, Dr Snell indicated the importance of allocating funding between practical research and more theoretical research:

> …there is research for research's sake out there. I am not running it down; that is key scientific learning. But you have to get the balance right. You have to employ the right researchers. [For example, the Australian Centre for International Agricultural Research]…in 2008 came to us because they knew departments were better with the grey publications in terms of doing work that can be taken on by farmers... I would warn that, yes, more money needs to be applied to research but you have to be mindful of where that research dollar is going.[5]

8.14 Representatives of the Wentworth Group also noted the need to develop better long-term water efficiency for farming in the Murray-Darling Basin and that research into non-paddy rice could be an important feature of this. As the following exchange shows:

> **CHAIR:** …What would be the cost benefit analysis of converting the rice industry to non-paddy rice?
>
> **Mr Stubbs:** One of the key things the CRC [Cooperative Research Centres] for Irrigation Futures and before that the rice CRC tried to get the temperature…in the plant. What you are trying to do is get the plant to be able to cope with the low temperatures without having to use the water as a thermal blanket. There was quite a lot of progress on that. To me, clearly, that is the area to remove the actual need to pond the rice. That has made some progress but it has not got to the stage—
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> **CHAIR:** They are the things I presume we need to do because regardless of whether we put 4,000 or 2,700 [Gl/y] back, the scientists are saying by 2050 we are going to lose more than that anyhow so we are going to be back to where we started.
>
> **Mr Stubbs:** That is right. We certainly need to do those sorts of things. I was on the board of the CRC and argued very strongly for that research program but it has basically become stationary.

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4 Dr Peter Snell, Rice Breeder (Professional Officer), New South Wales Department of Primary Industries, *Committee Hansard,* 24 April 2012, p. 51.

5 Dr Peter Snell, Rice Breeder (Professional Officer), New South Wales Department of Primary Industries, *Committee Hansard,* 24 April 2012, p. 51.

CHAIR: Well, that is where we ought to put some dough.[6]

Committee view

8.15 The committee is encouraged by the evidence it received about the possible future developments for non-paddy rice farming in the Murray-Darling Basin. However, the committee is concerned that research funding structures as well as the levels of funding available for research are creating impediments to innovation in this and other areas of agricultural research.

8.16 The committee also notes the finding of the Senate Education, Employment and Workplace Relations (EEWR) References Committee's inquiry into *Higher education and skills training to support agriculture and agribusiness in Australia* that the extension of research to agricultural practices are in decline.[7] This committee supports the EEWR References committee view 'that extension services play [an] important role in both improving productivity and also creating closer links between the farming industry and researchers and should be encouraged.'[8] The committee considers that a comprehensive approach towards R&D to benefit the Murray-Darling Basin needs to cover both the conduct of research and the take-up of research by the agriculture industry.

8.17 The committee considers that the government should give greater priority to agricultural research that can improve agricultural productivity through more water efficient crops while at the same time improve the long-term sustainability of the Basin's water resources.

Recommendation 21

8.18 That the Government commission the Australian Bureau of Agricultural and Resource Economics and Sciences to undertake a cost-benefit analysis of potential water-efficient crops (including non-paddy rice) in the Murray-Darling Basin.

Water interception

8.19 Determining the extent of water interception, and the possible historical changes in water interception, from different land use practices such as forestry plantations was another key area where the committee heard evidence that further

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6 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 10 September 2012, p. 19.

7 According to the EEWR report extension 'refers to the practice of researchers presenting their findings to businesses and operators currently working in the field.' See Senate Education, Employment and Workplace Relations References Committee, *Higher education and skills training to support agriculture and agribusiness in Australia*, June 2012, p. 43.

8 Senate Education, Employment and Workplace Relations References Committee, *Higher education and skills training to support agriculture and agribusiness in Australia*, June 2012, p. 44.

research was required to properly inform the management of water resources in the Murray-Darling Basin.

8.20 The MDBA indicated to the committee that the volume of water from interception due to farm dams and commercial plantations was significant. In an answer to question on notice the MDBA stated that its:

> …current best estimate of the impact of commercial plantations and runoff dams on surface water yield (runoff) is 2720 GL/y. This is comprised of 2384 GL/y for runoff dams and 336 GL/y for commercial plantations.[9]

8.21 The committee heard evidence from a variety of organisations about this issue. For example, the CSIRO, while acknowledging that significant water interception assessments had taken place, expressed reservations about the level of the knowledge that the MDBA had for interception activities when developing the Basin Plan. As Dr Bill Young from the CSIRO told the committee in reference to the Basin Plan (November 2011):

> The proposed plan, as part of the supporting documentation, provides an audit, if you like, of the current take, the current use, of water in the basin. I forget the exact numbers; there are about 13,000 gigs a year, I think, and of that about 11,000 or so is irrigation diversions, and about 2,000 is really interception take. In our submission we have some concerns about the methods, about how [the MDBA] have come at some of those interception numbers, and the consistency with the modelled water, but that is a side issue. But [the MDBA] have assessed, therefore, the current farm dam interception, and current commercial forestry interception. So [the MDBA] are trying to put a baseline on the total amount of take. How state governments manage take into the future under an SDL is up to them under their water resource plans. Ideally, under the National Water Initiative, you would get to all of those interception takes being entitlement based and allow trade between different forms of take.[10]

8.22 The MDBA's representatives, while stating that the Basin Plan was based on the best available information at the time, acknowledged that there is significant room for improvement in the knowledge of future interceptions in the Basin. As Dr Rhondda Dickson, the MDBA's Chief Executive conceded:

> ...the plan itself was based on the historical climate and the best available estimate of interceptions that we have at the moment. We would be the first to acknowledge that the estimate of interceptions can be improved, and there are large areas of uncertainty about future interceptions, about the interplay of climate change and losses to the ground, between temperature as well as the interception changes. However, what we have done in the plan is, as the chairman said, used as the starting point the best available

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9 MDBA, answer to question on notice 23April 2012, (received 7 June 2012). The MDBA also noted here that 'runoff dams include farms dam used for irrigation purposes and farms dams under basic rights (e.g. farm dams used for stock and domestic purposes).'

10 Dr Bill Young, Director, Water for a Healthy Country Flagship, Commonwealth Scientific and Industrial Research Organisation, *Committee Hansard*, 23 April 2012, p. 59

> information where we do have confidence, which is the historical record. Because it is a 10-year planning framework, that gives us the opportunity to get a lot more certainty about some of those estimates.[11]

Committee view

8.23 The committee is concerned with the gaps in detailed scientific information of interception in the Basin. The committee acknowledges that interceptions (including from runoff dams and commercial plantations) have been considered in the development of baseline diversion limits. However, the committee is not convinced that the reliance on historical data of interceptions in the Basin takes into account the future changes that may occur in the rates of water interception due to evolving land management practices.

8.24 Furthermore, the committee notes that there were occasions where scientific evidence has not been included in the development of the Basin Plan when it reasonably should have been. This issue is also discussed in Chapter 2 where the committee recommends that further research is warranted into future water interception scenarios.

Surface water and ground water connectivity

8.25 As discussed in chapter three, the committee heard evidence that the scientific knowledge of surface water and groundwater connectivity in the Murray-Darling Basin has some significant limitations. The MDBA defended the level of knowledge on which it based its decisions regarding surface water and groundwater connectivity. As noted in chapter three, the MDBA released two major reports detailing its approach to groundwater extraction including the issue of surface water and groundwater connectivity.[12] The MDBA also told the committee that in developing its sustainable diversion limits for groundwater, the MDBA categorised the level of connectivity with surface water resources.[13]

8.26 However, the evidence of other witness highlighted some significant gaps in the knowledge of surface water and groundwater connectivity. For example, Dr Bill Young from the CSIRO stated that the understanding of the impacts of surface and ground water connectivity was incomplete and that future review would improve knowledge of the issue:

> …The surface water impacts from the groundwater take, as I said, will take a long time to emerge. There is a review process that has been put in place. There may be no demand for that increase in groundwater use to happen in

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11 Dr Rhondda Dickson, Chief Executive, Murray-Darling Basin Authority, *Committee Hansard*, 23 April 2012, p. 2.

12 The two reports are: Murray-Darling Basin Authority, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012 and Murray-Darling Basin Authority, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012

13 MDBA, answer to question on notice, 23 November 2012, (received 28 November 2012).

> a hurry, but that does not necessarily mean it is scientifically defensible. But it does not mean it is necessarily risky either. There is an opportunity to review this. If the authority follows through with its commitment to adaptive management, we will be monitoring the increases in use, we will be monitoring the impacts on stream flows and we will be monitoring the consequences and outcomes for environments across the basin.[14]

8.27 Dr Young also noted that there were a number of areas where the connectivity between surface water and groundwater resources remained unknown and that, furthermore, the MDBA was moving away from precautionary approaches to managing these resources. As Dr Young put it:

> …there are many different levels of connectivity between the alluvial systems, the fractured rock systems and other things. The authorities made different types of assumptions on connectivity. Compared to what [the MDBA] presented in the guide, [the MDBA] have moved to perhaps less conservative assumptions around connectivity. There are many areas where the connectivity is quite poorly known, and our view is that in those cases a precautionary principle would be appropriate, particularly if there is not the evidence at the moment of a strong demand for extra use.[15]

8.28 Similarly, the Wentworth Group told that committee that while there was good knowledge about some aspects of groundwater and surface water connectivity some important gaps remain and that the MDBA's approach relied on 'some very big assumptions': As Mr Stubbs noted:

> I think we know enough about some aquifers. We definitely know enough to know that it is very dangerous to make the massive increase in groundwater extraction without really serious and clear understanding of all those aquifers and of how they interact with the river. One thing that we need to raise is that there are quite accurate and robust models for about 13 of the 76 groundwater units that the [MDBA] has looked at. There are models there. The [MDBA's] approach has gone against earlier identifications of what needed to happen even in those areas. In the other areas the [MBDA] has used a modelling tool which was only ever meant to prioritise aquifers. It was never developed as a tool to accurately predict volumes and recharges and, hence, levels of extraction. There are some very big assumptions that have been made that are based on models that were not intended for the use that they have been used for.[16]

8.29 With the release of the final Basin Plan in November 2012, the Wentworth Group reiterated the scientific uncertainties regarding the MDBA's approach to groundwater and surface water connectivity. As the following exchange suggests:

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14 Dr Bill Young, Director, Water for a Healthy Country Flagship, Commonwealth Scientific and Industrial Research Organisation, *Committee Hansard*, 23 April 2012, p. 62.

15 Dr Bill Young, Director, Water for a Healthy Country Flagship, Commonwealth Scientific and Industrial Research Organisation, *Committee Hansard*, 23 April 2012, pp 60–61.

16 Mr Tim Stubbs, Environmental Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 April 2012, p. 19.

> **Senator NASH:** With that 1,700 [Gl/yr groundwater extraction under the Basin Plan], what is your understanding of why the groundwater increase was included?
>
> **Mr Stubbs:** It is a bit unclear. It is like: why was 2,750 the starting number [for reduced surface water take] when that first draft of the Basin Plan came out? There was a 2,600 gigalitre increase [groundwater extractions].
>
> **Senator NASH:** ...So what is your best guess about why that has happened?
>
> **Mr Stubbs:** I would love to know. There are a lot of grey areas that do not have science to support them. Why did it start at 2,750? Why did the groundwater extraction initially in the first draft of the Basin Plan increase by 2,600 gigalitres? Why was there a one-day workshop that shaved 900 gigalitres off that, back to 1,700 gigalitres? And where is the science and information to justify any of this and make it clear the level of impact that increase is going to have on surface water flows?[17]

8.30 A number of other witnesses expressed similar concerns about this issues. Mr Grant Rigney, Chairperson, Murray Lower Darling Rivers Indigenous Nations stated that there 'really needs to be a lot more research done into what is the connectivity of ground and surface water in the artesian basins and [in reference to mining and aquifers] what types of poisonous materials we are putting into these spaces…'[18] Ms Beverley Smiles, President, Inland Rivers Networks, referred to the knowledge about groundwater and its connectivity with surface water as being 'new' especially in comparison to understandings about surface water.[19] A third example was Ms Juliet Le Feuvre from Environment Victoria who stated that:

> Any consideration of increased [groundwater] extraction should be delayed until a thorough assessment of characteristics, surface groundwater connectivity, groundwater dependent ecosystems and resource sustainability can be carried out.[20]

8.31 Ms Le Feuvre also expressed concerns with the way that the MDBA developed groundwater extraction figures using its recharge risk models:

> [The MDBA's figure for the groundwater extraction] is based on the recharge risk assessment model, which estimates on a very broad basis what recharge to groundwater is. [The MDBA] say that they have taken a precautionary approach and halved it and halved it again, but there is no

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17 Mr Tim Stubbs, Environment Engineer, Wentworth Group of Concerned Scientists, *Committee Hansard*, 23 November 2012, p. 29.

18 Mr Grant Rigney, Chairperson, Murray Lower Darling Rivers Indigenous Nations, *Committee Hansard*, 23 April 2012, p. 44.

19 Ms Beverley Smiles, President, Inland Rivers Network, *Committee Hansard*, 24 April 2012, p. 20.

20 Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 25.

> scientific review of the model that they have used, so it would not be a precautionary approach at all.[21]

Committee view

8.32 While there is significant information about groundwater and surface water connectivity in certain parts of the Murray-Darling Basin, there are many areas where it is not comprehensive. The committee considers that the conservative approach that should have been adopted until further information was available has not been taken by the MDBA.

8.33 The committee considers that the limitations of the scientific knowledge regarding surface water and groundwater connectivity to be one of the key risks in delivering an effective Basin Plan. While the committee acknowledges that the MDBA is further developing its knowledge in this area and some positive steps have been taken, the committee remains of the view that the information gaps that still exist has the potential to undermine the effective management of the overall water resource across the Basin.

8.34 Therefore, the committee is of the view that increasing the scientific knowledge of surface water and groundwater connectivity should be a major priority for the government and the MDBA. Furthermore, the application of any new knowledge on this issue should be given the strongest priority by the MDBA in its adaptive management of the Basin. The committee has made a recommendation regarding this issue in Chapter 3 of this report.

Soil use

8.35 The committee heard evidence that some innovative soil use practices offered significant opportunities to increase agricultural production while using less water. The primary example provided was from Mr Richard Hazelton who had more than 20 years' experience in a fertiliser-spreading business. His general argument was:

> …about how healthy soils go hand in hand with a limited supply of water. What I believe has been overlooked in the Murray-Darling area discussions is the importance of healthy soils. If we put somewhere between 10 and 15 per cent of water back into the environment without affecting the productivity of the irrigation areas, what a result for our food bowl, rural Australia and every Australian![22]

8.36 To support this argument, Mr Hazelton focussed particularly on the strategic use of lime for improving soils, which would, in turn, have a water benefit:

> The areas I am familiar with are the Macquarie, Lachlan, Murrumbidgee and Murray river systems. The reason for our rapid expansion was innovation. We built purpose-built conveyors and added eight per cent

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21 Ms Juliet Le Feuvre, Healthy Rivers Campaigner, Environment Victoria, *Committee Hansard*, 24 April 2012, p. 31.

22 Mr Richard Hazelton, Private Capacity, *Committee Hansard*, 23 April 2012, p. 46.

> moisture to the lime and this eliminated the dust problem and stopped the fine lime from blowing away and allowed us to spread a wider pattern. After much trial and error with reversing spinners, we built special spinners and frames for spreading moist lime. I cannot stress enough the importance of spreading lime evenly to show big results. We spread hundreds of thousands of tonnes using this method. Although lime is important to the soil, today I will be primarily discussing calcium and magnesium percentages and the setting up of a truly independent agronomy trial. I first became aware of water efficiencies when we limed half of [a client's] centre-pivot irrigation area on his property south of Dubbo. The pivot at the time was the third largest in Australia and was on a consistent soil type. We limed half the area of the pivot. When we returned the following year to lime the other half of the pivot, [the client] informed me that the corn on the lime section had a 10 per cent increase in yield and everything else had remained the same. I knew then that there were a lot of soils that would show a bigger increase as [the client's] soils were of a high standard. For those who are not familiar with soil science, magnesium controls photosynthesis and in high percentages makes the soil tighter. Calcium causes structure, improves water infiltration and generally leaves soil in a more friable condition. [23]

8.37 Mr Hazelton also noted that irrigation areas have higher pH levels than other farming types and that if this issue can be managed, there are opportunities to improve the effectiveness of fertilisers for increasing agricultural output. As Mr Hazelton explained:

> Our soils in Australia are among the oldest in the world. We have a huge variation of soil types, from the Great Dividing Range, where there is a calcium-magnesium deficiency, to the predominantly high-magnesium, low-calcium soils of the irrigation areas of the Murray-Darling. Soils in the irrigation areas often have an artificially high pH because they are high in magnesium, potassium and sodium. Magnesium has about 1.5 times the neutralising value than that of calcium.
>
> The good book states you cannot lime a high pH soil, because you make nutrients and trace elements unavailable. I started to question this information because of the results we were getting. On the dump sites where we tipped the lime, if you cleaned them up properly, the concentration of lime on the ground would be 10 to 20 times what was spread on the field. The crop on the dump site sometimes was actually better than on the rest of the field. This is where the controversy starts. When you lime these soils you displace the magnesium, potassium and sodium, which have a high neutralising value. There is a pie chart which is used in agronomy. If you put, say, calcium into the pie chart you have to take something out. In this case, calcium and magnesium have two positives. You push out magnesium and, if in excess, you will take out potassium and sodium. This is how we manage to keep the pH in check, and because the soils usually have a heavy exchange capacity this also

23 Mr Richard Hazelton, Private Capacity, *Committee Hansard*, 23 April 2012, p. 46.

> helps to keep the pH in check. The heavier soils require a heavier rate to correct the imbalance, and the lighter soils require a lighter rate to correct the imbalance.[24]

8.38 Mr Hazelton further noted that having the correct chemical balance in the soil improves fertiliser efficiencies. He recommended that an independent agronomy trial take place that could demonstrate the benefits for the Basin system:

> When in balance, the fertiliser efficiencies improve. One unit of nitrogen will grow one bushel of corn. When out of balance, it takes one-and-a-half units of nitrogen to grow one bushel of corn. Drip irrigation has a big role to play in the irrigation areas. Having the correct calcium-magnesium balance improves the ability of water to disperse through the soil profile. Biological farming may well have a big role to play. They also heavily depend on calcium. The cost of a truly independent agronomy trial throughout the Murray-Darling that would show the correct balance on how to gain greater water efficiencies, I estimate, would be around $6 million. With the productivity increase created, a return on investment would be in a five-year period. If someone can improve on what we have achieved—I might add, with the help of many others—I will welcome this. The Murray-Darling is so important for the growing of food and fibre in our nation.[25]

Committee view

8.39 The committee does not consider that it is appropriate to express a view on the merits of particular practices that improve agricultural productivity from soil management techniques. However, the committee considers that further R&D into innovative soil practices and the potential improvements in agricultural productivity and water efficiencies should form a significant part of the overall government strategy to managing the Murray-Darling Basin.

Recommendation 22

8.40 The committee recommends that the government commission research into innovative agricultural soil use and farming practices that will improve agricultural productivity and water efficiency in the Murray-Darling Basin.

Effectiveness of water infrastructure

8.41 The committee heard evidence that water infrastructure improvements formed a major part of the government's plans to implement the Basin Plan.

8.42 The National Farmers' Federation (NFF), in particular, made strong and compelling arguments about the importance of R&D into water efficiency in the Basin and its relationship to the overall strategy of water infrastructure. As Mr Jock Laurie, President, NFF told the committee:

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24 Mr Richard Hazelton, Private Capacity, *Committee Hansard*, 23 April 2012, p. 46.

25 Mr Richard Hazelton, Private Capacity, *Committee Hansard*, 23 April 2012, p. 46.

> Our view has been that we need to make sure that, as the Basin Plan goes ahead, it delivers a balanced outcome. In many ways we think that can be achieved maintaining the economic capacity in those communities, providing that the government go down the path of delivering good infrastructure spend, continuing with R&D to make sure that they actually deliver water efficiencies back in through that system, identifying environmental works and measures and getting water to those efficiently, and putting a lot of those systems in place and then making changes as time goes along.[26]

8.43 Furthermore, Mr Laurie told the committee that R&D funding was central to the long-term solutions for the Murray-Darling Basin:

> If you go through everything I have said on the Murray-Darling Basin over the last 12 months you will see me mentioning R&D and its importance in this whole thing. As far as I am concerned we can get to where we want to get to by looking in the mirror and seeing the changes we have made and the water savings and water efficiencies we have made and having a look to see what we can do in the next 10 to 15 years. But that is going to be based on a commitment with R&D. There is no doubt about that.[27]

8.44 On a similar note, Mr Laurie explained that any reduction in R&D spending at this time would be to the detriment of Basin communities:

> …The R&D is going to be a really critical component to be able to deliver the water that the system wants. What we have been saying regularly is that, with the infrastructure spend, the environmental works and measures and the R&D component, by lining those all up time-wise I think you can make sure that you are saving communities and at the same time delivering that water outcome. That is absolutely crucial. To reduce R&D spend now, when you are asking communities to deliver more with less, I think would be extremely damaging to the communities.[28]

8.45 The strong advocacy from the NFF for R&D in the Murray-Darling Basin stemmed, in part, from the current way that water flows throughout the Basin are managed. In this respect, Mr Laurie argued for R&D alongside the need to update the Basin's water infrastructure:

> Obviously, efficiencies in delivering water are absolutely crucial. I think everyone understands that there are far better ways of delivering water than the open channel system. We have been saying pretty regularly that we should be looking at it valley by valley, and getting locals to be part of the decision-making process is also a very important part of it. I think we could end up having a lot of stranded assets on the end of some of these channels,

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26 Mr Jock Laurie, President, National Farmers' Federation, *Committee Hansard,* 23 April 2012, p. 27.

27 Mr Jock Laurie, President, National Farmers' Federation, *Committee Hansard,* 23 April 2012, p. 36.

28 Mr Jock Laurie, President, National Farmers' Federation, *Committee Hansard,* 23 April 2012, p. 29.

> which could be a real problem. We are talking about delivering infrastructure into well planned regions, which I think would help the whole process... It is about delivering infrastructure which delivers better water efficiencies per farm—less seepage, less evaporation and all of those things. When we talk about environmental works and measures, obviously identifying and understanding how we should be watering some of those environmental assets is crucial. If we are talking about delivering efficient watering systems throughout, that also means delivering efficient environmental systems. So it is not just about delivering efficiency to irrigation systems; it is about delivering efficiencies to the whole thing. That also means going into towns' water supplies. There are a whole range of areas that we need to be covering off on.[29]

8.46 The committee also took evidence directly about the Northern Victoria Irrigation Renewal Project (NVIRP), which is one of the major water infrastructure projects in the Basin. In response to a question about the scope for future R&D in water management, Mr George Warne, the CEO of NVIRP noted the progress made in recent years for water infrastructure while acknowledge the significant scope for future improvements:

> Since these schemes were built in south-eastern Australia, typically between 1910 and 1940, a lot has happened but not much in the irrigation infrastructure. The irrigation infrastructure in the 1990s throughout the Murray-Darling Basin in these big, expansive group schemes resembled the technology that the Egyptians would have been very familiar with—that is, drop-boards in concrete panels and people putting letters in boxes about water orders eight days in advance. So there was a lot of room to move using technology that was available, say, in the oil industry in the 1950s and 1960s about real-time monitoring of water levels and that sort of thing.
>
> To that extent, Goulburn-Murray Water has led in its adoption, although, for a fully completed system, Coleambally Irrigation probably leads in terms of having the automated remote sensing and control. We have now completed what we have defined as the backbone of the system—that is, the 3½ thousand kilometres of channel we want to keep, with gates and remote systems and sensing—and we are progressively working through the farm outlets and turning them into remote sensing; better, more accurate metering; and real-time control for farmers to actually control the water supply from their own office, so we are moving a long way towards that. We have not completed that yet, and not until we get the last farmer in a connection of 30 farms together can we decommission the old channel, so we still have some way to go.
>
> But the potential for improved performance of the system is enormous—and something we are seeing repeated, really, across the Murray-Darling Basin. In New South Wales there is a thing called the Computer Aided River Management system on the Murrumbidgee River being implemented right now. That project will lead to modest but significant savings in river

29 Mr Jock Laurie, President, and Ms Deborah Kerr, Manager, Natural Resource Management, National Farmers' Federation, *Committee Hansard*, 23 April 2012, p. 29.

> operations year in, year out, and lead to a lot better understanding of floodwater, inflows from tributaries and how much water is being taken out at any time. We are seeing improvements occurring in leaps and bounds, largely as a response to investment by the federal and state governments.[30]

8.47 Mr Warne also noted that the improvements to water infrastructure delivery were coupled with some improvements in farmers' water management practices. However, he also acknowledged that there was a need to widen the scope of water efficiency in this area:

> What we are seeing in some cases is that the new connection acts as a catalyst for the farmer to change the whole way he thinks about his farm. In some examples they say: 'Well, if you're going to knock the old spur channel out and you're going to take five of my Dethridge outlets, why don't I supply the water to my farm with a low-pressure poly pipe across my neighbour's paddock and put it straight into a centre pivot? I might use a third of the water to get the same or increased farm production.' We are seeing examples of that. It is not as widespread as we would like.
>
> Some of that has been subject to on-farm investment partnerships with catchment management authorities and others. Where you get the benefit of the two—that is, the new farm connection, the new real-time sensing, properly metered, high-volume or high-pressure outlet, along with on-farm investment—the performance of the combination of the new irrigation scheme and the on-farm efficiency can save many megalitres. We are seeing that adopted and we are holding field days now at some of these properties. You have to say that the best farmer is getting further and further ahead of the worst. We really have a responsibility to try and pull them all up.[31]

Committee view

8.48 The committee is of the view that significant opportunities exist for improving water efficiencies in the Basin through the development of improved water infrastructure. The committee supports the development of water infrastructure under the government's Sustainable Rural Water Use and Infrastructure program (SRWUIP). The committee also considers that R&D is a key aspect of maintaining effective water infrastructure in the Basin in the future.

Recommendation 23

8.49 The committee recommends that the government prioritise R&D into water infrastructure to meet the needs of farming communities, agricultural production, and the environmental health of the Murray-Darling Basin.

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30 Mr George Warne, Chief Executive Officer, Northern Victoria Irrigation Renewal Project, *Committee Hansard*, 24 April 2012, p. 34.

31 Mr George Warne, Chief Executive Officer, Northern Victoria Irrigation Renewal Project, *Committee Hansard*, 24 April 2012, p. 34.

Senator the Hon. Bill Heffernan

Chair

Additional Comments by Senator Nick Xenophon

1.1 The Murray-Darling Basin is one of Australia's most important ecosystems. It is a vital part of our nation's food production and the source of employment for hundreds of thousands of Australians. There is no doubt this valuable resource needs to be managed in such a way as to optimise its output and ensure the Basin's future health.

1.2 However, I am concerned the Murray-Darling Basin Plan as passed by the Federal Parliament will fall short of achieving such outcomes. The committee's majority report makes a number of sensible – and desperately needed – recommendations as to how the Basin Plan could be improved.

1.3 Importantly the committee has identified that the Murray-Darling Basin Authority (MDBA) is yet to produce a non-technical explanation of the hydrological modelling and assumptions used to develop the 2750 GL/y environmental water recovery. The MDBA should also undertake urgent modelling of a number of different environmental water recovery scenarios (including up to 4000 GL/y) given the weight of evidence that suggested the 2750 GL/y figure is insufficient to flush 2 million tonnes of salt from the system each year.

Recommendation 1

1.4 The MDBA conduct urgent modelling of a number of figures above the 2750 GL/y figure, up to 4000 GL/y. This modelling must be publicly released with both a technical and non-technical explanation and conducted in a timely manner.

1.5 On 26 October 2012 the Prime Minister announced that the Government would:

> …provide $1.77 billion over ten years from 2014 to relax key operating constraints and allow an additional 450GL of environmental water to be obtained through projects to ensure there is no social and economic downside for communities.[1]

1.6 While the $1.77 billion fund and additional water flows could bring about significant improvements to the health of the River Murray, a number of stakeholders have raised concerns about whether the aims of such measures will be achieved.

1.7 Professor John Williams, Dean of Adelaide Law School and vice-president of the Australian Association of Constitutional Law summarised some of the concerns in an article in the Adelaide Advertiser:

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1 Prime Minister, the Hon. Julia Gillard MP and Minister for Sustainability, Environment, Water, Population and Communities, the Hon. Tony Burke MP, Press Release, 'Returning the Murray-Darling Basin To Health', 26 October 2012, www.pm.gov.au/press-office/returning-murray-darling-basin-health.

> There are obvious activities that would be required to deliver the additional water for the Murray. However, the Bill does not prioritise these activities. The temptation to focus on infrastructure rather than reducing the over-allocation of the river may prove irresistible. Further, the link between the expenditure of the fund and measurable outcomes for the health of the River is poorly made.[2]

1.8 Mr Tim Kelly, Chief Executive Officer of the Conservation Council of South Australia echoed these concerns:

> The additional 450 gigalitres of water from a special account may never be achieved, even if up to $1.77 billion is spent on additional infrastructure. There is no absolute requirement in the special account bill for these funds to be spent to achieve the additional water.[3]

1.9 I believe that when allocating funding, priority must be given to projects with maximum guaranteed water returns to the system within the shortest timeframe, taking into account social and economic factors, as well as early adopters of water efficiency measures.

1.10 I have repeatedly raised concerns about the glib attitude taken by both the Federal Government and the MDBA in respect of recognising and rewarding irrigators for past efficiencies and investigating the comparative efficiencies of different irrigation regions. This attitude was clearly displayed during my interchange with the MDBA's Chief Executive, Dr Rhondda Dickson, during Senate Estimates in May 2012:

> **Senator XENOPHON:** …but can you establish how efficient an area is and when it became efficient, can't you? This is a matter of fact, isn't it?
>
> **Dr Dickson:** You could presumably do that. But I guess, as to how you might rank efficiencies, that is not really our job. It is more to look at what is a sustainable level of extraction rather than who is the most efficient.[4]

Recommendation 2

1.11 Urgent modelling be undertaken to establish the comparative efficiencies or irrigation communities in the Murray-Darling Basin to ensure fair treatment of irrigators, particularly with respect to allocating funds for water efficiency projects.

1.12 South Australian irrigators have applied for funding under a number of Federal Government programs, including the $5.8 billion Sustainable Rural Water Use and Infrastructure Program. However, due to irrigators' already high levels of efficiency, many of them have been deemed too efficient to qualify. For this reason

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2 Professor John Williams, "River Murray agreement to waterproof SA may turn out to be a castle built on sand", Adelaide Advertiser, 12 November 2012.

3 Mr Tim Kelly, CEO of the Conservation Council of South Australia, Senate Environment and Communications Legislation Committee, *Committee Hansard*, 12 November 2012, p. 9.

4 Dr Rhondda Dickson, Murray-Darling Basin Authority, *Committee Hansard*, Environment and Communications Legislation Committee, 23 May 2012, p. 102.

consideration must be given to providing funding for research and development as well as for emerging technologies.

Recommendation 3

1.13 Irrigators must receive recognition for their past water efficiencies. In the absence of any prior recognition for past water-saving efforts, the guidelines for the Sustainable Rural Water Use and Infrastructure Program and other similar programs should be amended to allow irrigators to apply for funding for research and development as well as for emerging technologies projects.

1.14 The impact of the lack of funding through such programs mentioned above, together with possible distortions of the water and commodity markets through the current market-based water buyback system continues to be of grave concern for me. These issues were raised with the Chair of the Murray-Darling Basin Authority in April 2012:

> **Senator XENOPHON:** Can I go then to a fundamental issue for South Australia, and that is in terms of its history of being an early adopter of water efficiency measures and that South Australia has, I think you can say, by and large abided by the cap since 1968, whereas, for instance, New South Wales, because of the activation of sleeper licences and whatever, has increased its take by about 3,000 gigalitres a year since that time. This is not a criticism of New South Wales but a matter of fact. How was that taken into account in terms of the equity of determining which state cops what in terms of cutbacks? I think one of the arguments that you put, Mr Knowles, at forums — and I appreciate that you have been available for those forums in a very open way — is that the market will sort itself out to some extent. But to what extent is the water market itself distorted by virtue of the infrastructure fund which other states can access and South Australia really cannot to any great degree?
>
> **Mr Knowles:** That is a very good question — the second half of it, certainly — and one which is almost impossible to answer. The only comments I can make are in these veins. First of all, as you know, because you have been at some of the meetings, we have recognised, if you like, the historic effort of particularly Riverland irrigators…[5]

1.15 Our interchange continued:

> **Senator XENOPHON:** …Isn't the market to some extent altered, distorted or skewed by virtue of the efficiency fund, that $5.8 billion fund, because those who can get it get to keep half the water, so that in effect affects the market?
>
> **Mr Knowles:** It may, but, equally, isn't the market distorted by the four per cent cap on trade rules? Isn't the market distorted by the—
>
> **Senator XENOPHON:** No, I was not asking about that. You acknowledge that the market could be distorted by virtue of the—

5 The Hon Craig Knowles, Chair, Murray-Darling Basin Authority, *Committee Hansard*, 23 April 2012, p.12.

> **Mr Knowles:** I think it is fair to acknowledge that we are not working in a pure market. Every state boundary creates a range of artificial barriers, one of which is access to funding because of efficiency…[6]

1.16 The discussion above illustrates the difficulties involved in having concerns about the distortion of the water and commodity markets allayed in any form.

Recommendation 4

1.17 The MDBA urgently provide evidence that the current market-based buyback approach will not distort the water and commodity market. In absence of any available evidence, the MDBA conduct urgent modelling on the impact the market-based buyback approach will have on those who have not accessed funds under the Federal Government's $5.8 billion Sustainable Rural Water Use and Infrastructure Program and other similar programs.

Senator Nick Xenophon
Independent Senator for South Australia

6 The Hon Craig Knowles, Chair, Murray-Darling Basin Authority, *Committee Hansard*, 23 April 2012, pp. 12–13.

Appendix 1

TERMS OF REFERENCE

On 28 October 2011 the Senate moved that the following matter be referred to the Rural Affairs and Transport References Committee for inquiry and report by 30 November 2011:

The management of the Murray-Darling Basin, and the development and implementation of the Basin Plan, with particular reference to:

(a) the implications for agriculture and food production and the environment;

(b) the social and economic impacts of changes proposed in the Basin;

(c) the impact on sustainable productivity and on the viability of the Basin;

(d) the opportunities for a national reconfiguration of rural and regional Australia and its agricultural resources against the background of the Basin Plan and the science of the future;

(e) the extent to which options for more efficient water use can be found and the implications of more efficient water use, mining and gas extraction on the aquifer and its contribution to run off and water flow;

(f) the opportunities for producing more food by using less water with smarter farming and plant technology;

(g) the national implications of foreign ownership, including:

(i) corporate and sovereign takeover of agriculture land and water, and

(ii) water speculators;

(h) means to achieve sustainable diversion limits in a way that recognises production efficiency;

(i) options for all water savings including use of alternative basins; and

(j) any other related matters.

IMPACT OF MINING COAL SEAM GAS

The Rural Affairs and Transport References Committee, as part of its inquiry into management of the Murray Darling Basin, is examining the impact of mining coal seam gas on the management of the basin. The committee will examine:

- The economic, social and environmental impacts of mining coal seam gas on:
- the sustainability of water aquifers and future water licensing arrangements;
- the property rights and values of landholders;
- the sustainability of prime agricultural land and Australia's food task;
- the social and economic benefits or otherwise for regional towns and the effective management of relationships between mining and other interests; and
- other related matters including health impacts.

Appendix 2

Submissions Received

Submission Number	Submitter
1	Matthew Devine
2	Debbie Buller
3	Geoff Tuckett
4	Finley Chamber of Commerce - Industry and Agriculture
5	David Leaman
6	Peter Oataway
7	Murray Valley Water Diverters Advisory Association (NSW)
8	Margot Marshall
9	Pechelba Trust
10	Donald Ward
11	Robyn Schmetzer
12	Greg Parr
13	Peter Millington
14	Michael Tonner
15	Environmental Farmers Network
16	Country Women's Association of NSW
17	Urban Taskforce Australia Ltd
18	South Australian River Communities
19	Les Hill
20	Pentreaths Lockington
21	Grand Junction Pty Ltd
22	Barrie Dexter and Donald Macleod
23	Brian Kelaher
24	Bill Murray
25	Murrumbidgee Valley Food and Fibre Association (MVFFA)
26	Virginia Tropeano
27	Les Worland
28	Robert Shaw
29	Yenda Producers Co-operative Society Ltd
30	John Fensom
31	Ken Jury
32	NSW Irrigators' Council
33	Wakool Shire Council
34	Meredith Whykes
35	Grampians Regional Development Australia Committee
36	Josephine Kelly
37	Australian Plantation Products and Paper Industry Council (A3P)

38 Leeton Shire Council
39 National Irrigator's Council
40 Citizens Electoral Council of Australia
41 Loddon Shire Council
42 Murray Irrigation Ltd
43 John Martin Total Property Services
44 Bruce Lang
45 Christine O'Callaghan
46 Tobacco and Associated Farmers Co-operative Ltd Rural Supplies (TAFCO)
47 Myrtleford Chamber of Commerce and Industry (MCCI)
48 East End Mine Action Group Inc. (EEMAG)
49 South Pacific Seed PL
50 Ian Rowan
51 Bill Hetherington
52 Mark Cameron
53 Jessica Stanford
54 Australian Floodplain Association
55 Max Winders
56 Kristy Bartrop
57 University of New England (UNE)
58 National Association of Retail Grocers of Australia PL (NARGA)
59 Mildura Rural City Council
60 Western Murray Irrigation Limited
61 Griffith Business Chamber
62 B and W Rural
63 Namoi Councils Water Working Group
64 Inland Rivers Network
65 Wentworth Shire Council
66 High Security Irrigators - Murrumbidgee
67 Victorian Farmers Federation (Corryong Branch)
68 The Hon. Tony Catanzariti MLC
69 Peter Calabria
70 Jason Richardson
71 Citrus Australia Ltd
72 Wine Grapes Marketing Board (WGMB)
73 Julie Andreazza
74 Ben Witham and Family
75 Young Irrigation Network
76 NSW Business Chamber
77 Bourke Shire Council
78 Loddon Mallee RDA Committee
79 Stephen Tynan
80 NSW Murray Darling Basin Catchment Authorities
81 Kitty Schiansky
82 Victorian Farmers Federation (Kiewa Branch)
83 Jason Reid

84 Murrumbidgee Irrigation
85 David Reid
86 Des Morgan
87 Barossa Infrastructure Ltd
88 Bart Brighenti
89 National Association of Forest Industries (NAFI)
90 Gannawarra Shire Council
91 Terry Court
92 Borders Rivers Food and Fibre
93 Murrumbidgee Private Irrigators Inc
94 Casimiro Damiani
95 Bill Johnston
96 Don Ciavarella
97 FutureFlow
98 RDA Committees (Hume, Grampians and Loddon Mallee)
99 Rural City of Wangaratta
100 Namoi Water
101 West Corurgan Private Irrigation District
102 Conservation Council of South Australia
103 Roger Shemilt
104 Walter Mitchell AM
105 North East Victorian Catchment Councils
106 AgForce Queensland
107 Anthony Roddy
108 University of Newcastle, Centre for Rural and Remote Mental Health
109 Tanya Clarke
110 Sally Dye
111 Booth Associates - Agribusiness and Environmental Solutions
112 Michael Ryan
113 Tom Condon
114 Riverina Citrus
115 Hay Shire Council
116 CSIRO
117 Municipal Association of Victoria (MAV)
118 National Farmers' Federation (NFF)
119 Indigo Shire Council
120 Tandou Ltd
121 Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)
122 Running Stream Water Users Association Inc
123 National Program for Sustainable Irrigation
124 Bogan Shire Council (Nyngan)
125 Murrumbidgee Groundwater Inc
126 Riverina Eastern Regional Organisation of Councils (REROC)
127 Department of Agriculture, Fisheries and Forestry (DAFF)
128 Annette Commins

129 Tim Commins
130 Australian Centre for Agriculture and Law, UNE
131 Australian Dairy Farmers Ltd
132 Shire of Campaspe
133 Hydrology Research Laboratory, University of Sydney
134 Mildura Development Corporation
135 Balonne Shire Council
136 Australian Wetlands and Rivers Centre, UNSW
137 Towong Shire Council
138 South Australian Murray Irrigators
139 Uniting Church of Australia
140 Rubicon Water
141 Regional Development Australia - Hume Committee
142 Australian Network of Environmental Defender's Office (ANEDO VIC)
143 Gwydir Valley Irrigators Association Inc
144 RDA-Riverina
145 Strengthening Riverina Irrigation Communities
146 John Chant
147 National Water Governance Initiative
148 Moira Shire Council
149 Australian Conservation Foundation
150 Border Rivers - Gwydir Catchment Management Authority
151 Victorian Farmers Federation
152 Tumbarumba Shire Council
153 Michael Erny
154 Peter Smith OAM
155 Macquarie River Food and Fibre
156 SA Citrus Board
157 Queensland Farmers' Federation (QFF)
158 NSW Farmers' Association
159 SA Minister for Environment and Conservation; the River Murray; and Water
160 Caroona Coal Action Group
161 Dean Brown AO
162 Department of Regional Australia, Regional Development and Local Government
163 Kim Hann
164 Murray Group of Concerned Communities (MGCC)
165 Louise Burge
166 Glen Andreazza
167 Laura Andreazza
168 Brendan Andreazza
169 Teneeka Andreazza
170 Ian Bowditch
171 Upper Catchment Water Committee
172 Larry and Narelle Willams
173 Murray Shire Council

174 Murray Williams
175 Joan Pickersgill
176 NSW State Member for Barwon
177 John Cox
178 Bob Culhane
179 RDA Grampians Committee
180 Ace Regional Marketing
181 Jean Gall
182 David Gall
183 Trevor Loxton
184 Robert Caldwell
185 National Water Commission
186 Ricegrowers' Association of Australia
187 GetSet Inc
188 Fonterra
189 Holm Trading
190 Sophie Mirabella, MP, Federal Member for Indi
191 Gilbert and Tobin Centre of Public Law, UNSW
192 Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)
193 City of Wodonga
194 Irrigation Australia Ltd
195 DHI Water and Environment
196 Brian Mills
197 Jeanine McRae
198 Fifth Estate
199 Alison Walpole
200 Henry Schneebeli
201 Shadow Minister for Natural Resource Management, Member for Burrinjuck
202 J Cunningham
203 Trevor Randall
204 Alice Fiumara
205 Campbell Partnership
206 Ron Miller
207 Tony Pickard
208 David Allen
209 Australian National University (ANU)
210 NSW Government
211 Southern Riverina Irrigators
212 Max Talbot
213 T Bowring and Associates Pty Ltd
214 David McCabe
215 Jim Leggate
216 Central Downs Irrigators Limited
217 Australian Lot Feeders' Association (ALFA)
218 Natalie Tydd

219 Ben Rees
220 Doctors for the Environment Australia
221 Federal Member for Parkes
222 Dart Energy Ltd (Australia)
223 Victoria Hamilton
224 Joesph, Jennie and Ben Hill
225 Lock The Gate Alliance Inc
226 Queensland Conservation Council (QCC)
227 National Toxics Network (NTN)
228 Ruth Armstrong
229 Southern Highlands Coal Action Group
230 United Myall Residents Against Gas Extraction
231 Daniel Reardon
232 Australian Network of Environmental Defender's Offices (ANEDO NSW)
233 Cotton Australia
234 Claudia Cortizo
235 Basin Sustainability Alliance (BSA)
236 George Carrard
237 Australian Petroleum Production and Exploration Association (APPEA)
238 Penny Blatchford
239 Australian Water Campaigners Inc
240 Pamela Stoves Sefton
241 Annette Lovecek
242 Bart Ristuccia
243 Brian Cotgrove
244 Sue Wilmott
245 W. J Bryan
246 T. C Hall
247 Bev Pattenden
248 Xavier Marton
249 Moree Community Consultative Community (Coal Seam Gas)
250 Caroona Coal Action Group (Coal Seam Gas Committee)
251 John and Kate Scott
252 Drillham Action Group
253 Steve and Robyn White
254 John and Penny Taylor
255 Simon and Katrina Body
256 Alan Ellis
257 Queensland Beekeepers Association Inc.
258 Queensland Resources Council (QRC)
259 QGC Pty Ltd
260 Scott Collins
261 Alistair and Jenny Donaldson
262 James Kerr and Ms Judy Whistler
263 Mullaley Gas and Pipeline Accord
264 Kate Ausburn

265 Lynda Windsor
266 Robert Barry
267 Debbi Orr and Mr Rod Matthews
268 State Social Justice Committee of St Vincent De Paul Society of Queensland
269 Stuart Setzer
270 Kate Lloyd
271 Allen and Barbara Clark
272 Darling Downs Cotton Growers Inc
273 Peter Shannon
274 Angela Smith
275 Save Bunnan Inc
276 Ian Falconer
277 Susan Gourley
278 Friends of Felton
279 Stephanie Weaver-Wong
280 Eric Heidecker
281 Craig and Iris Kelehear
282 Gail Evlerstain
283 Bill Hastings
284 Darryl and Julie Bishop
285 Nerida Mills
286 Putty Community Association Inc - CSG subcommittee
287 Ronald and Dawn Childs
288 Denis and Anthea Itzstein
289 James Murphy
290 Marilyn Bidstrup
291 Brian Sinnamon
292 Fiona Paul
293 Katie Ledingham
294 Maules Creek Community Council Inc
295 Janet Cox
296 Beverly Smith
297 Jackie Reardon
298 Jill Wiltshire
299 DJ and MP Wall
300 Marko Klemen
301 Matt Wiseman
302 Friends of Pilliga
303 Michelle Shaw
304 Craig and Michele Radford
305 North West Ecological Services (NWES)
306 Beth Williams
307 AGL Energy Ltd
308 Michael and Margaret Chamberlain
309 Judy Bloomfield
310 Mullaley Gas Pipeline Accord

311 Jane Vickery
312 Northern Inland Council for the Environment, Friends of the Earth Melbourne, Nature Conservation Council of NSW, The Wilderness Society, the Colong Foundation for Wilderness, Coonabarabran Local Environment Group and the Armidale National Parks Association
313 Richard Golden
314 Janet Robertson
315 Scott Cooper
316 Kerrie Eather
317 Sonya Marshall
318 Paul Brieotto
319 Northern Grampians Shire Council
320 David Hubbard
321 Omega Labels
322 Peter Faulkner
323 Bill Crawford
324 L K Wray
325 Barambah Organics
326 Queensland Murray-Darling Committee Inc.
327 Boudicca Cerese
328 Anne Bridle
329 Gilgandra Shire Council
330 Megan Donnelley
331 Len Martin
332 Alicia Harrison
333 Sarah Ball
334 Gordon Gilder
335 Trevor Crouch
336 Tracey and Clive Parker
337 Coast and Wetlands Society Inc
338 Rivers SOS Alliance
339 Sue Odgers
340 John and Peggy Hann
341 Narrabri Shire Council
342 Glen Zimmerle
343 Sandra Fasullo
344 Cotton Catchment Communities CRC
345 Moree Plains Shire Council
346 OzEnvironmental Pty Ltd
347 Bellata Gold
348 Martin Molesworth
349 Anne Cameron
350 John Bridle
351 J. L. Rohde
352 Judith Deucker
353 Santos Ltd

354 Bob McFarland
355 Arrow Energy Pty Ltd
356 Peter Gillbank
357 Elfian Schieren
358 Queensland Government
359 Northern River Guardians
360 Dayne Pratzky
361 Deedre Kabel
362 Murray Scott
363 Geo-Processors Pty Limited
364 Wayne Somerville
365 University of Sydney
366 Australia Pacific LNG
367 Noondoo Partnership
368 Tom Lyons
369 Carol Jones-Lummis
370 Gympie Water, Air and Soil Protection Group
371 Rabobank Australia and New Zealand Group
372 Hunter Valley Protection Alliance (HVPA)
373 Charlie Shuetrim
374 Denise Ewin
375 Fodder King Ltd
376 Carol Donvito
377 Estelle Ross
378 Anne Layton-Bennett
379 Tom Loffler
380 Jason Beet
381 Jan Beer

Additional Information Received

- Received on 12 August 2011, from Australian Petroleum Production and Exploration Association (APPEA). Answers to Questions taken on Notice on 20 July 2011 in Brisbane, QLD;
- Received on 22 August 2011, from Basin Sustainability Alliance (BSA). Answers to Questions taken on Notice on 19 July 2011 in Dalby, QLD;
- Received on 26 August 2011 & 28 September 2011, from Eastern Star Gas (ESG). Answers to Questions taken on Notice on 2 August 2011 in Narrabri, NSW;
- Received on 29 August 2011, from National Farmers' Federation (NFF). Answers to Questions taken on Notice on 9 August 2011 in Canberra, ACT;
- Received on 30 August 2011, from Commonwealth Scientific and Industrial Research Organisation (CSIRO). Answers to Questions taken on Notice on 9 August 2011 in Canberra, ACT;

- Received on 31 August 2011, from Arrow Energy. Answers to Questions taken on Notice on 9 August 2011 in Canberra, ACT;
- Received on 31 August 2011 & 9 September 2011, from Queensland Gas Company (QGC). Answers to Questions taken on Notice on 9 August 2011 in Canberra, ACT;
- Received on 8 September 2011, from the National Water Commission (NWC). Answers to Questions taken on Notice on 9 August 2011 in Canberra, ACT;
- Received on 9 September 2011, from AGL Energy Lt. Answers to Questions taken on Notice on 9 August 2011 in Canberra, ACT;
- Received on 12 September 2011 & 30 November 2011, from Mr Bruce Brown, General Manager, Namoi Catchment Management Authority. Letter regarding the document (Namoi Catchment Management Authority, *Report on the flooding and soil degradation impacts of the use of Public and Crown roads that dissect Lot 1 DP1093884 'Inering' Mullaley*, 2009) tabled in Narrabri on 2 August 2011 by Mr David Quince, Secretary, Mullaley Gas Pipeline Accord;
- Received on 19 September 2011 & 25 October 2011, from Dart Energy Ltd. Answers to Questions taken on Notice on 9 September 2011 in Canberra, ACT;
- Received on 19 September 2011, from the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). Answers to Questions taken on Notice on 9 August 2011 in Canberra, ACT;
- Received on 27 September 2011, from the Queensland Department of Energy & Resource Management (QLD DERM). Answers to Questions taken on Notice on 9 August 2011 in Canberra, ACT;
- Received on 7 October 2011, from Doctors for the Environment. Answers to Questions taken on Notice on 9 September 2011 in Canberra, ACT;
- Received on 18 October 2011, from NSW Farmers' Federation. Answers to Questions taken on Notice on 2 August 2011 in Narrabri, NSW;
- Received on 24 October 2011, from Australia Pacific LNG/Origin Energy. Answers to Questions taken on Notice on 9 September 2011 in Canberra, ACT;
- Received on 30 November 2011, from Senator Heffernan. Report prepared for the Queensland Department of Mines & Energy by Mr Geoff Edwards: Is there a drop to drink? An issues paper on the management of water, co-produced with coal seam gas;
- Received on 19 April 2012, from the Hon. Craig Knowles, Chair of the Murray-Darling Basin Authority (MDBA). Answers to written Questions taken on Notice on 5 April 2012;
- Received on 17 May 2012, from the CSIRO. Answers to Questions taken on Notice on 23 April 2012 in Canberra, ACT;
- Received on 5 June 2012, from the Department of Agriculture, Fisheries and Forestry (DAFF). Answers to Questions taken on Notice on 24 April 2012 in Canberra, ACT;
- Received on 7 June 2012 & 12 June 2012, from the Murray-Darling Basin Authority (MDBA). Answers to Questions taken on Notice on 24 April 2012 in Canberra, ACT;

- Received on 7 June 2012 & 12 July 2012, from the Murray-Darling Basin Authority (MDBA). Answers to Questions taken on Notice on 23 April 2012 in Canberra, ACT;
- Received on 2 July & 25 September 2012, from the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). Answers to Questions taken on Notice on 24 April 2012 in Canberra, ACT;
- Received on 24 August 2012, from Wakool Shire Council. Answers to Questions taken on Notice on 23 August 2012 in Canberra, ACT;
- Received on 18 September 2012 & 2 October 2012, from NSW Office of Water. Answers to Questions taken on Notice on 10 September 2012 in Canberra, ACT;
- Received on 25 September 2012, from Murray-Darling Basin Authority (MDBA). Answers to Questions taken on Notice on 23 August 2012 in Canberra, ACT;
- Received on 25 September 2012, from NSW Irrigators' Council. Answers to Questions taken on Notice on 10 September 2012 in Canberra, ACT;
- Received on 27 September 2012, from Murray-Darling Basin Authority (MDBA). Answers to written Questions taken on Notice on 23 August 2012 in Canberra, ACT;
- Received on 15 October 2012, from Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). Answers to Questions taken on Notice on 23 August 2012 in Canberra, ACT;
- Received on 15 October 2012, from Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). Answers to written Questions taken on Notice on 23 August 2012 in Canberra, ACT;
- Received on 24 October 2012, from South Australian Citrus Industry Development Board. Answers to Questions taken on Notice on 3 April 2012 in Mildura, VIC;
- Received on 26 October 2012, from Murray Valley Winegrowers INC. Answers to Questions taken on Notice on 3 April 2012 in Mildura, VIC;
- Received on 28 October 2012, from Murray-Darling Basin Authority (MDBA). Answers to Questions taken on Notice on 23 November 2012 in Canberra, ACT;
- Received on 30 October 2012, from Macquarie University. Answers to Questions taken on Notice on 23 October 2012 in Canberra, ACT;
- Received on 30 October 2012, from Macquarie University. Additional information;
- Received on 6 December 2012, from NSW Irrigators' Council. Answer to Question on Notice on 23 November 2012 in Canberra, ACT;
- Received on 11 December 2012, from Wentworth Group of Concerned Scientists. Answer to Question on Notice on 23 November 2012 in Canberra, ACT;
- Received on 5 February 2013, from Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). Answers to written Questions taken on Notice on 23 November 2012 in Canberra, ACT;

- Received on 5 March 2013, from Southern Riverina Irrigators' Council. Answers to Questions on Notice on 23 November 2012 in Canberra, ACT;

TABLED DOCUMENTS

18 July 2011, Roma, QLD:

- Tabled by Mayor Robert Loughnan, Maranoa Regional Council. *Briefing Paper*, 18 July 2011, Ed Sims, Manager, Organisational Performance, Maranoa Regional Council;
- Tabled by Ms Kate Scott. Opening statement.

19 July 2011, Dalby, QLD:

- Tabled by Mr Ian Hayllor, Chairman & Mr David Hamilton, Committee member, Basin Sustainability Alliance (BSA).
  - Opening Statement;
  - BSA, *Not at any cost – Blueprint for Sustainable CSG operations* report;
  - *Surat Basin Groundwater Management Plan – Preliminary Concept* Chart;
  - *Issues of Concern* document;
  - *Example of a well designed and managed floodplain farming system* photo;
  - Overview of CSG activity in grazing country (Kogan/Grassdale);
- Tabled by Ms Ruth Armstrong, Yanco Farms.
  - *Additional Documents*, 4 photos & 3 maps;
  - Copy of the Queensland Government Department of Natural Resources and Water, *Great Artesian Basin - resource operations plan (*See attached link) www.derm.qld.gov.au/wrp/pdf/gab/gab_rop.pdf;
- Tabled by Mr Graham Clapham, Central Downs Irrigators.
  - 3 Maps;
  - Copy of the Queensland Government Department of Environment and Resource Management (DERM), *Central Condamine Alluvium Groundwater Management Area* Report, 23 June 2010;
  - *Schedule of Fixed Charge Component Yearly payment options and costs* table;
  - QLD Government DERM Public Notice, Water Regulation 2002 (Section 66);
  - Letter to Mr Clapham from QLD Government DERM, regarding Application for Review of original decisions relation environmental authority PEN100449509;
  - Letter from, QLD Government Department of Infrastructure and Planning to the Hon. Tony Burke MP, Minister for Sustainability, Environment,

Water, Population and Communities, 18 October 2010, regarding Coal Seam Gas extraction near Gladstone;

- Tabled by AgForce Queensland. *Coal Seam Gas Policy* document;
- Tabled by Ms Anne Bridle.
  - Copy of the Queensland Government Department of Natural Resources and Water, *Great Artesian Basin - resource operations plan 2007* Report. *(*See attached link) www.derm.qld.gov.au/wrp/pdf/gab/gab_rop.pdf;
  - Copy of the Queensland Government Department of Infrastructure, *Liquefied Natural Gas Whole of State Environmental Impacts Study*, 2007 Report. (See attached link) www.deedi.qld.gov.au/cg/resources/project/liquefied-natural-gas/matrix-lng-industry-report-full.pdf;
  - Copy of the Queensland Government Department of Natural Resources and Mines, *Hydrogeological Framework Report for the Great Artesian Basin Water Resource Plan Area*, 2005 Report. (See attached link) www.derm.qld.gov.au/wrp/pdf/gab/gab-hydrogeological-framework-report.pdf;
  - Copy of the Program Proposal, *Water, Agriculture and Mining: Regional Development Outcomes for Groundwater in the Condamine Alluvial and Surat Basin Aquifers* prepared for Regional Development Australia, by University of Southern Queensland;
  - Condamine Alliance, *Environmental Values – Consultation Pack, February 2011*;
  - *Ground water concerns from Coal Seam Gas Extraction* paper, Anne Bridle, 2010;
  - *A risk to Ground water from Coal Seam Gas Extraction in the Surat Basin*, Bridle, A and Harris, C, 2010;
  - *ESG and the Energy Sector – Water Concerns: QLD Coal Seam Gas Developments* Report, J.P. Morgan, © 2010;
  - *Typical Queensland CSG Gas field and CSG Gas field Infrastructure* photos;
  - Copy of an article from *International Journal of Coal Geology 70 (2007), p.209-222*, "Coal petrology and coal seam contents of Walloon Subgroup – Surat Basin, Queensland, Australia", Scott, Anderson, Crosdale, Dingwall and Leblang. (See attached link) http://www.sciencedirect.com/science/article/pii/S016651620600111X;
  - Copy of the *Advice in relation to the Potential impacts of Coal Seam Gas Extraction in the Surat and Bowen Basins, Queensland* report prepared for the Department of the Environment, Water, Heritage and the Arts by Geoscience Australia and Dr M A Habermehl;

- Copy of Department of Sustainability, Environment, Water Population and Communities, Proposed Approval for Queensland Gas Company Ltd (QGC) And BG International Limited (BG) for coal seam gas field component of the Queensland Curtis LNG Project;
- Letter from, QLD Government Department of Infrastructure and Planning to the Hon. Tony Burke MP, Minister for Sustainability, Environment, Water, Population and Communities, 18 October 2010, regarding Coal Seam Gas extraction near Gladstone;
- Copy of *Environmental Authority Applications* QGC areas map and information;
- Letter to Ms Bridle from QGC, 12 July 2011, regarding notice of application for internal review;
- Copy of the Oil & Gas Accountability Project (a project of Earthworks), *Our drinking water at risk* report. (See attached link) http://www.earthworksaction.org/pubs/DrinkingWaterAtRisk.pdf;
- Copies of Queensland Government Department of Employment, Economic Development and Innovation maps of Dalby district ©.

20 July 2011, Brisbane, QLD:

- Tabled by Mr Ross Dunn, QLD Director, Australian Petroleum Production and Exploration Association (APPEA). Email from Ms Stacey Milner, Producer, 612 ABC Brisbane Mornings, ABC Radio to Mr Dunn regarding questions about statement Mr Dunn made on QLD Country Hour, ABC Radio.

2 August 2011, Narrabri, NSW:

- Tabled by Mayor Katrina Humphries & Councillor John Tramby, Moree Plains Council.
  - Copy of a letter of introduction and request for an Access Agreement to conduct well program from Leichardt Resources;
  - *Fracking chemicals, their uses and hazards* document;
  - Caltex: *Material Safety Data Sheet – Delo Extended Life Coolant Premixed* document;
  - Copy of the NSW *State Environment Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*. (See attached link) www.legislation.nsw.gov.au/fullhtml/inforce/epi+65+2007+cd+0+N;
- Tabled by Ms Natalie Tydd. 17 photos of property;
- Tabled by Ms Rosemary Nankivell, Chairman Caroona Coal Action Group.
  - Letter from Ms Nankivell, Caroona Coal Action Group to the NSW Department of Primary Industries, regarding Santos' report on the Review of Environmental Factors at Glasserton pilot wells;

- Copy of the *Environmental Hazards of Oil and Gas Exploration* report;

- Tabled by Mr David Quince, Secretary, Mullaley Gas Pipeline Accord.
  - Proposal for Narrabri to Wellington gas transmission pipeline, 11 April 2011;
  - Namoi Catchment Management Authority, *Report on the flooding and soil degradation impacts of the use of Public and Crown roads that dissect Lot 1 DP1093884 'Inering' Mullaley*, 2009 and photos;
  - Copy of the NSW Government Department of Natural Resources, *Upper Coxs Creek Floodplain Management Plan* report, 2005. (See attached link) http://www.environment.nsw.gov.au/resources/floodplains/UpperCoxscreekFMP.pdf;
- Tabled by Ms Carmel Flint, Northern Inland Council for the Environment. Copy of the *Under the Radar – How Coals Seam Gas Mining in the Pilliga is impacting matters of national environment significance* report. (See attached link) http://www.wilderness.org.au/files/Under%20the%20Radar%20Eastern%20Star%20Gas%20EPBC%20Report%20email.pdf;
- Tabled by Mr Peter Fox, Executive General Manager – Stakeholder Division, Eastern Star Gas Ltd.
  - Eastern Star Gas, *Narrabri Project – June 2011* Presentation;
  - Eastern Star Gas, *About Eastern Star Gas* information.

9 August 2011, Canberra, ACT:

- Tabled by Mr James Baulderstone, Vice President, Eastern Australia, Santos/GLNG. Opening Statement;
- Tabled by Ms Catherine Tanna, Managing Director, Queensland Gas Company (QGC) Pty Ltd. Opening Statement;
- Tabled by CSIRO. Coal Seam Gas fact sheets 1-9.

9 September 2011, Canberra, ACT:

- Tabled by Doctors for the Environment. Additional information;
- Tabled by National Toxics Network.
  - Additional information;
  - National Toxics Network, *Hydraulic Fracturing in Coals Seam Gas Mining: The Risks to Our Health, Communities, Environment and Climate r*eport, 2011. (See attached link) http://ntn.org.au/wp-content/uploads/2011/07/NTN-CSG-Report-July-2011.pdf;
- Tabled by National Industrial Chemicals Notification & Assessment Scheme (NICNAS). *Outline of industrial regulatory framework* chart;

- Tabled by NSW Government Department of Trade & Investment, Regional Infrastructure & Services. *NSW Government Statement*.

2 April 2012, Hay, NSW:

- Tabled by Mr David Davies. Opening statement;
- Tabled by Coleambally Irrigation Co-operative Limited. Opening statement;
- Tabled by Murray Irrigation Limited. Opening statement;
- Tabled by Mr Lance Howley. Opening statement;
- Tabled by Mr Jock Robertson. Opening statement and attachment;
- Tabled by Hay Business Chamber. Additional information: Correspondence between Hay Business Chamber and the Department of Sustainability, Environment, Water, Population and Communities.

3 April 2012, Mildura, Vic:

- Tabled by Sunraysia Irrigators Council. Opening statement and attached correspondence;
- Tabled by Western Murray Irrigation Limited. Opening statement;
- Tabled by Mildura Development Corporation. Additional information: Updated Submission;
- Tabled by Central Irrigation Trust.
  - Additional Information: Graph of SA river communities;
  - Additional Information: SA River Communities Meeting with MDBA.

23 April 2012, Canberra, ACT:

- Tabled by National Farmers' Federation. Submission to the MDBA for the Proposed Basin Plan;
- Tabled by Murray Lower Darling Rivers Indigenous Nations. Statement to the Proposed Basin Plan;
- Tabled by National Irrigators' Council. A balanced plan for the Murray-Darling Basin: A submission to the MDBA;
- Tabled by CSIRO.
  - Submission on the Proposed Murray-Darling Basin Plan;
  - Science review of the estimation of an environmentally sustainable level of take for the Murray-Darling Basin.

24 April 2012, Canberra, ACT:

- Tabled by Senator Nick Xenophon. Correspondence by Professor Mike Young to the Committee regarding biodiversity plantings and interception arrangements in the Proposed Basin Plan;

- Tabled by Inland Rivers Network. Submission to the MDBA in response to the Proposed Basin Plan;
- Tabled by NSW Murray Wetlands Working Group. NSW Murray Wetlands Working Group Projects;
- Tabled by Conservation Council of South Australia.
  - Correspondence to the MDBA regarding Conservation Councils of Australia Joint Submission on the Proposed Basin Plan;
  - Submission on the Proposed Murray-Darling Basin Plan;
- Tabled by Nature Conservation Council of NSW. Submission to Proposed Basin Plan;
- Tabled by Environment Victoria. Submission to the MDBA's Proposed Basin Plan;
- Tabled by Friends of the Earth.
  - Modelled Ecological Outcomes of the Proposed Basin Plan Surface Water Sustainable Diversion Limits;
  - Basin Plan Groundwater Diversion Limits: Comparing the "Guide" and the Proposed Basin Plan.

23 August 2012, Canberra, ACT:

- Tabled by Wakool Shire Council.
  - Wakool Shire Council discussion notes;
  - NSW Office of Water – *The Lowbidgee Water Licence – including Nimmie-Caira*.

10 September 2012, Canberra, ACT:

- Tabled by the Wentworth Group of Concerned Scientists. Centre of Policy Studies and the Impact Project paper: *Upgrading Irrigation Infrastructure in the Murray Darling Basin: is it worth it?*
- Tabled by Australian Conservation Foundation. Modelled Ecological Outcomes of the Proposed Basin Plan 2750GL SDL scenario.

23 November 2012, Canberra, ACT:

- Tabled by Murray River Action Group.
  - Speaking notes for RRAT References Committee Hearing- 23 November 2012;
- Tabled by Mr Tom Chesson, National Irrigators Council.
  - National Irrigators' Council submission to Senate Environment and Communications Committee inquiry into the Water Amendment (Water for the Environment Special Account) Bill 2012, November 2012.

Appendix 3

Public Hearings and Witnesses

Monday, 18 July 2011 – Roma, QLD

- FOOTE, Mr David Michael, Chief Executive Officer,
  Australian Country Choice
- LOUGHNAN, Mayor Robert, Mayor,
  Maranoa Regional Council
- SCOTT, Mr John Robertson
- SCOTT, Mrs Katherine Lucy (Kate)
- SCOTT, The Hon. Bruce,
  Member for Maranoa
- SIMS, Mr Edward Thomas, Manager Organisational Performance,
  Maranoa Regional Council
- THOMPSON, Mr Peter Laidlaw
- WALKER, Mr Jack James, Agribusiness Coordinator,
  Australian Country Choice
- WASON, Mr Scott, Councillor,
  Maranoa Regional Council

Tuesday, 19 July 2011 – Dalby, QLD

- ARMITAGE, Mr Stuart, Director,
  Central Downs Irrigators Limited
- ARMSTRONG, Mrs Ruth Ann Grace
- BREMNER, Mr Kim, South-East Water Spokesman,
  AgForce Queensland
- BRIDLE, Mr Robert Newton
- BRIDLE, Mrs Anne, Committee Member,
  Basin Sustainability Alliance
- BRIDLE, Mrs Anne,
  Private capacity
- CLAPHAM, Mr Graham, Chair,
  Central Downs Irrigators Limited

- HAMILTON, Mr William David, Committee Member,
  Basin Sustainability Alliance
- HAYLLOR, Mr Ian, Chairman,
  Basin Sustainability Alliance
- JOHNSTON, Ms Genevieve, Policy Adviser,
  AgForce Queensland
- LLOYD, Mrs Kate Burgoyne, Committee Member,
  Basin Sustainability Alliance
- NEWTON, Mr Wayne, Mining Spokesman,
  AgForce Queensland
- SHANNON, Mr Peter Charles, Solicitor,
  Basin Sustainability Alliance

Wednesday, 20 July 2011 – Brisbane, QLD

- BOYLAND, Mr Des, Policies and Campaigns Manager, Wildlife Preservation Society of Queensland; Member, Queensland Conservation Council
- DUNN, Mr Ross, Director, Coal Seam Gas,
  Australian Petroleum Production and Exploration Association
- GALLIGAN, Mr Dan, Chief Executive Officer,
  Queensland Farmers Federation
- HUTTON, Mr Drew, President,
  Lock the Gate Alliance
- JOHNSON, Mr Ian, Water Adviser,
  Queensland Farmers Federation
- MURRAY, Mr Michael Bernard, National Water Policy Manager and Queensland Policy Manager, Cotton Australia
- PARRATT, Mr Nigel, Rivers Project Officer,
  Queensland Conservation Council
- PAULL, Mr Matthew Andrew Mather, Director, Policy, Queensland and New South Wales, Australian Petroleum Production and Exploration Association
- WILKINSON, Mr Richard John, Chief Operating Officer, Eastern Australia, Australian Petroleum Production and Exploration Association

Tuesday, 2 August 2011 – Narrabri, NSW

- ADAMS, Mr James, Member,
  Mullaley Gas Pipeline Accord

- BAKER, Mrs Jon-Maree, Executive Officer,
  Namoi Water
- CASEY, Ms Brianna, Senior Policy Manager,
  New South Wales Farmers Association
- CLEMENTS, Mr John Ewen, Narrabri Shire Delegate,
  Namoi Water
- COOK, Mrs Charmaine, Member,
  Mullaley Gas Pipeline Accord
- DONNAN, Mr Timothy Patrick, Government Approvals and Environmental Supervisor, Eastern Star Gas Ltd
- DUDDY, Mr Timothy, Public Officer and Director,
  Namoi Water
- FLINT, Ms Carmel Therese, Member,
  Northern Inland Council for the Environment
- FOX, Mr Peter, Executive General Manager, Stakeholder Relations,
  Eastern Star Gas Ltd
- HAMILTON, Ms Victoria Ann
- HUMPHRIES, Mrs Katrina, Mayor,
  Moree Plains Shire Council
- KELLY, Mr Michael John, General Manager, Health, Safety and Environment,
  Eastern Star Gas Ltd
- MACFARLANE, Ms Jane Lindsay, Catchment Program Leader,
  Cotton Catchment Communities CRC
- NANKIVELL, Ms Rosemary Margaret, Chairman,
  Caroona Coal Action Group
- PARISH, Mr Donald, Member,
  Mullaley Gas Pipeline Accord
- PICKARD, Mr Anthony John
- QUINCE, Mr David Michael, Secretary,
  Mullaley Gas Pipeline Accord
- REARDON, Mr Daniel Walter
- ROTH, Dr Guy Weeden, Strategy Adviser,
  Cotton Catchment Communities CRC
- SIMSON, Ms Fiona, President,
  New South Wales Farmers Association
- SLEEMAN, Mr Roland Kingsbury, Chief Commercial Officer,
  Eastern Star Gas Ltd

- SPARK, Mr Philip Harold, Member,
  Northern Inland Council for the Environment
- TRAMBY, Mr John, Councillor,
  Moree Plains Shire Council
- TYDD, Mr James
- TYDD, Ms Natalie

Tuesday, 9 August 2011 – Canberra, ACT

- BAKER, Mr Peter, Principal Science Advisor,
  Department of Sustainability, Environment, Water, Population and Communities
- BAULDERSTONE, Mr James Leslie, Vice President, Eastern Australia, Santos
- BIRCHLEY, Mr Michael Francis, Assistant Director-General, Regional Service Delivery, Department of Environment and Resource Management, Queensland
- BRIER, Mr Andrew Stuart, General Manager, Coal and Coal Seam Gas Operations, Department of Environment and Resource Management, Queensland
- CAMERON, Mr James David Alan, Acting Chief Executive Officer, National Water Commission
- COLREAVY, Ms Mary, First Assistant Secretary, Environment Assessment and Compliance Division, Department of Sustainability, Environment, Water, Population and Communities
- DRIPPS, Ms Kimberley, Deputy Secretary,
  Department of Sustainability, Environment, Water, Population and Communities
- ELDER, Miss Leisa, Vice President, Community and Corporate Affairs, Arrow Energy Pty Ltd
- FAULKNER, Mr Andrew, Chief Executive Officer,
  Arrow Energy Pty Ltd
- FRASER, Mr Duncan, Chair, Mining and Coal Seam Gas Taskforce, Vice President, National Farmers Federation
- GOSSMAN, Mr Simon Markus, Groundwater Management Coordinator, Arrow Energy Pty Ltd
- JURINAK, Dr Jeff, Vice President, Developments,
  QGC Pty Ltd

- KENDALL, Mr Matthew, General Manager, Sustainable Water Management, National Water Commission
- KERR, Ms Deb, Manager, Natural Resource Management, National Farmers Federation
- KNIGHT, Mr Tony, Vice President, Exploration, Arrow Energy Pty Ltd
- MACFARLANE, Mr Mark Stuart, President, Santos GLNG
- McNAMARA, Ms Sarah, Head of Government and Community Engagement, AGL Energy Ltd
- MILLHOUSE, Mr Rob, General Manager, Government Affairs, QGC Pty Ltd
- MORAZA, Mr Mike, Group General Manager, Upstream Gas, AGL Energy Ltd
- NUNAN, Mr Tony, General Manager, Land and Community Management, QGC Pty Ltd
- PARKER, Mr David, Deputy Secretary, Department of Sustainability, Environment, Water, Population and Communities
- PURTILL, Mr James Anthony, General Manager, Sustainability, Santos
- ROSS, Mr John, Manager, Hydrogeology, AGL Energy Ltd
- SLATYER, Mr Tony, First Assistant Secretary, Water Reform Division, Department of Sustainability, Environment, Water, Population and Communities
- STONE, Dr Peter, Deputy Chief, Ecosystem Sciences, CSIRO
- TANNA, Ms Catherine, Executive Vice President, BG Group Australia, and Managing Director, QGC Pty Ltd
- TODD, Mr Michael, Government Relations Manager, Arrow Energy Pty Ltd
- UNDERSCHULTZ, Dr James (Jim) Ross, Theme Leader, Petroleum and Geothermal Portfolio, CSIRO
- WALKER, Dr Glen, Theme Leader, Water for a Healthy Country Flagship, CSIRO

Friday, 9 September 2011 – Canberra, ACT

- CAREY, Dr Marion, Victorian Committee Member,
  Doctors for the Environment Australia
- CRISP, Dr George, Management Committee Member,
  Doctors for the Environment Australia
- DE WEIJER, Mr Robbert, Chief Executive Officer,
  Australia, Dart Energy Ltd
- GREGSON, Mr Andrew David, Chief Executive Officer,
  New South Wales Irrigators Council
- HEALY, Dr Marion Joy, Director,
  National Industrial Chemicals Notification and Assessment Scheme
- HORTON, Mr Ken, Group Manager, Corporate Affairs,
  Upstream Queensland and CSG to LNG, Australia Pacific LNG
- LINDSAY, Mr Alan Robert, Member,
  Southern Highlands Coal Action Group
- LLOYD-SMITH, Dr Mariann, Senior Adviser,
  National Toxics Network
- MAXSON, Mr Page, Chief Executive Officer,
  Australia Pacific LNG
- McKINNON, Mrs Angela Mary, Head of Existing Chemicals Program,
  National Industrial Chemicals Notification and Assessment Scheme
- MOORE, Mr Mark Andrew, Policy Analyst,
  New South Wales Irrigators Council
- MULLARD, Mr Brad William, Executive Director, Mineral Resources,
  New South Wales Department of Trade and Investment, Regional Infrastructure and Services
- NEEDHAM, Mr Jason, Exploration Operations Manager,
  Dart Energy Ltd
- O'NEILL, Mr Rob, Director, Water Policy and Planning,
  New South Wales Office of Water
- PATERSON, Mr Mark Ian, AO, Director General, New South Wales Department of Trade and Investment, Regional Infrastructure and Services
- REDMOND, Dr Helen, New South Wales Committee Member,
  Doctors for the Environment Australia
- SATYA, Dr Sneha, Head of Science Strategy and International Program,
  National Industrial Chemicals Notification and Assessment Scheme
- SHORT, Mr John, General Manager, Government Relations,
  Australia Pacific LNG

- WICKENS, Mr John,
  National Toxics Network
- WINDEYER, Mr Gordon Phillip, Member,
  Southern Highlands Coal Action Group

Monday, 2 April 2012 – Hay, NSW

- BULLER, Ms Debbie, President,
  Murrumbidgee Valley Food and Fibre Association
- COUROUPIS, Mr Anthony, General Manager,
  Murray Irrigation Ltd
- CRIGHTON, Mr Jasen, Director,
  Crightons Rural Engineering
- CULLETON, Mr John, Chief Executive Officer,
  Coleambally Irrigation Cooperative Ltd
- DAVIES, Mr David Llewelyn,
  Private capacity
- DWYER, Mr Allen, General Manager,
  Hay Shire Council
- ELLIS, Mr Stewart, Chairman,
  Murray Irrigation Ltd
- FRASER, Duncan,
  Private capacity
- HEADON, Mr Neil Ronald, Chairman,
  Hay Private Irrigation District
- HEADON, Mr Ross Stuart, Irrigator, Former Chairman,
  Hay Private Irrigation District
- HILL, Mr James,
  Private capacity
- HOGAN, Mr Terence Noel, AM, Chairman,
  Riverina and Murray Regional Organisation of Councils
- HOWLEY, Mr Lance Edward,
  Private capacity
- JONES, Mr Howard, Chairperson,
  Murray Wetlands Working Group Inc.
- LUGSDIN, Mr Ian, Vice Chairman,
  Hay Water Users Association

- MACARTNEY, Mr Darren, Rural Financial Counsellor,
  Rural Financial Counselling Service, New South Wales Southern Region
- MAYNARD, Mr Nick, Chairman,
  Hay Water Users Association
- McNAMARA, Mr Anthony James, Chairman,
  Hay Business Chamber
- MORPHETT, Graham,
  Private capacity
- OATAWAY, Mr Peter John,
  Private capacity
- PIEROTTI, Mr Paul Gregory, President,
  Griffith Business Chamber
- ROBERTSON, Mr John William Yeatman (Jock),
  Private capacity
- RUTLEDGE, Councillor Michael, Deputy Mayor,
  Hay Shire Council
- SCHIPP, Mr Andrew, District Agronomist,
  New South Wales Department of Primary Industries
- SHEAFFE, Councillor Roger William (Bill), Mayor,
  Hay Shire Council
- STUBBS, Mr Raymond Oscar, Executive Officer,
  Riverina and Murray Regional Organisation of Councils

Tuesday, 3 April 2012 – Mildura, VIC

- ARNOLD, Councillor John, Mayor,
  Mildura Rural City Council
- BENNETT, Mr Malcolm Raymond, Vice Chairman,
  Sunraysia Irrigators Council
- BROWN, The Hon. Dean, AO, Chair,
  Lower River Murray Reference Group
- BYRNE, Mr Christopher John, Executive Officer,
  Riverland Winegrape Growers Association
- CHAPMAN, Mrs Tania, Chair,
  Citrus Australia Ltd
- GRAY, Mr Ron,
  Private capacity

- KING, Mr Mark, Chairman,
  Dried Fruits Australia Inc.
- LEE, Mr Daniel Thomas, Chairman,
  Sunraysia Irrigators Council
- LLOYD, Mrs Betty Lyniece, Grower Representative Board Director,
  South Australian Citrus Industry Development Board
- MANSELL, Mrs Anne, Chief Executive Officer,
  Mildura Development Corporation
- McKENZIE, Mr Mark de Lacy, Chief Executive,
  Murray Valley Winegrowers Inc.
- McMAHON, Mr Gavin Geoffrey, Chairman,
  South Australian River Communities
- MURDOCH, Mr Ian, Chairman,
  Western Murray Irrigation Ltd
- PEDERSEN, Mr Barry, Chair,
  Murray Valley Table Grape Growers Council
- RIX, Ms Cheryl Kathleen, General Manager,
  Western Murray Irrigation Ltd
- THOMSON, Councillor Margaret Elizabeth, Mayor,
  Shire of Wentworth

Monday, 23 April 2012 – Canberra, ACT

- CHARLTON, Mr Terry, Managing Director and Chief Executive Officer,
  Snowy Hydro Ltd
- CHESSON, Mr Thomas Scott, Chief Executive Officer,
  National Irrigators Council
- COSIER, Mr Peter Aubrey, Director,
  Wentworth Group of Concerned Scientists
- DICKSON, Dr Rhondda, Chief Executive,
  Murray-Darling Basin Authority
- ELLIS, Mr Stewart Gordon, Chair,
  National Irrigators Council
- HARRIS, Mr David, Executive Officer, Production, Water and Environment,
  Snowy Hydro Ltd
- HAZELTON, Mr Richard George,
  Private capacity

- JAMES, Mr Russell, Executive Director, Policy and Planning Division, Murray-Darling Basin Authority
- KERR, Ms Deborah, Manager, Natural Resource Management, National Farmers Federation
- KNOWLES, The Hon. Craig, Chair, Murray-Darling Basin Authority
- LAURIE, Mr Jock, President, National Farmers Federation
- McLEOD, Dr Tony, General Manager, Water Resource Planning, Murray-Darling Basin Authority
- PROSSER, Dr Ian, Science Director, Water for a Healthy Country Flagship, Commonwealth Scientific and Industrial Research Organisation
- RIGNEY, Mr Grant John, Chairperson, Murray Lower Darling Rivers Indigenous Nations
- STUBBS, Mr Timothy Paul, Environmental Engineer, Wentworth Group of Concerned Scientists
- SWIREPIK, Ms Jody, Executive Director, Environmental Management Division, Murray-Darling Basin Authority
- WILLIAMS, Dr John, Founding Member, Wentworth Group of Concerned Scientists
- YOUNG, Dr Bill, Director, Water for a Healthy Country Flagship, Commonwealth Scientific and Industrial Research Organisation
- YOUNG, Professor Michael, Professor of Environmental and Water Policy, University of Adelaide

Monday, 24 April 2012 – Canberra, ACT

- DICKSON, Dr Rhondda, Chief Executive, Murray-Darling Basin Authority
- GOOD, Mr Roger Bishop, Executive Member, Murray Wetlands Working Group
- GRANT, Mr Allen, First Assistant Secretary, Agricultural Productivity Division, Department of Agriculture, Fisheries and Forestry
- GRAY, Dr John, Acting Assistant Secretary, Productivity, Water and Social Sciences Branch, Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture, Fisheries and Forestry

- HARWOOD, Ms Mary Beatrice, First Assistant Secretary, Water Efficiency Division, Department of Sustainability, Environment, Water, Population and Communities
- KELLY, Mr Tim, Chief Executive,
  Conservation Council of South Australia
- LA NAUZE, Mr Jonathan, Murray-Darling Campaigner,
  Friends of the Earth Australia
- LE FEUVRE, Ms Juliet, Healthy Rivers Campaigner,
  Environment Victoria
- MORRIS, Mr Paul, Executive Director, Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture, Fisheries and Forestry
- NGUYEN, Dr Nga, Economist, Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture, Fisheries and Forestry
- OTTESEN, Mr Peter, Assistant Secretary, Crops, Horticulture and Wine Branch, Agricultural Productivity Division, Department of Agriculture, Fisheries and Forestry
- OWEN, Mr Peter, Campaign Manager,
  Wilderness Society, South Australia
- PARKER, Mr David, Deputy Secretary, Water Group,
  Department of Sustainability, Environment, Water, Population and Communities
- ROBINSON, Mr Ian, Water Holder,
  Commonwealth Environmental Water
- RUSCOE, Mr Ian, Acting Assistant Secretary, Forestry Branch, Climate Change Division, Department of Agriculture, Fisheries and Forestry
- SANDERS, Mr Orion, Economist, Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture, Fisheries and Forestry
- SINCLAIR, Dr Paul, Healthy Ecosystems Program Manager,
  Australian Conservation Foundation
- SLATYER, Mr Tony, First Assistant Secretary,
  Department of Sustainability, Environment, Water, Population and Communities
- SMILES, Ms Beverley, Executive Member,
  Nature Conservation Council of New South Wales
- SMILES, Ms Beverley, President,
  Inland Rivers Network

- SNELL, Dr Peter James, Rice Breeder (Professional Officer),
  New South Wales Department of Primary Industries
- SWIREPIK, Ms Jody, Executive Director, Environmental Management
  Division, Murray-Darling Basin Authority
- WARNE, Mr George, Chief Executive Officer,
  Northern Victoria Irrigation Renewal Project

Thursday, 23 August 2012 – Canberra, ACT

- DOUGLAS, Councillor Andrew John, Mayor,
  Wakool Shire Council
- GRAHAM, Mr Bruce David, General Manager,
  Wakool Shire Council
- HARWOOD, Ms Mary, First Assistant Secretary, Department of
  Sustainability, Environment, Water, Population and Communities
- JAMES, Mr Russell, Executive Director, Policy and Planning,
  Murray-Darling Basin Authority
- McLEOD, Dr Tony, General Manager, Water Planning,
  Murray-Darling Basin Authority
- PARKER, Mr David, Deputy Secretary, Department of Sustainability,
  Environment, Water, Population and Communities
- SLATYER, Mr Tony, First Assistant Secretary, Department of Sustainability,
  Environment, Water, Population and Communities
- SWIREPIK, Ms Jody, Executive Director, Environmental Management
  Division, Murray-Darling Basin Authority

Monday, 10 September 2012 – Canberra, ACT

- CHESSON, Mr Thomas Scott, Chief Executive Officer,
  National Irrigators Council
- COSIER, Mr Peter, Director,
  Wentworth Group
- CULLETON, Mr, John, Director,
  National Irrigators Council
- DWYER, Mr Allen, General Manager,
  Hay Shire Council
- GREGSON, Mr Andrew, Chief Executive Officer,
  New South Wales Irrigators Council

- HARRISS, Mr David, Commissioner,
  New South Wales Office of Water
- LA NAUZE, Mr Jonathan, Healthy Rivers Campaigner,
  Australian Conservation Foundation
- LITTLEMORE, Mr Christopher David, General Manager,
  Balranald Shire Council
- McMAHON, Mr Gavin Geoffrey, Chairman,
  National Irrigators Council
- PURTILL, Mr Alan Geoffrey, Mayor,
  Balranald Shire Council
- RAFT, Mr Stephen, Coordinator, State Priority Projects,
  New South Wales Office of Water
- SHEAFFE, Cr Roger (Bill), Mayor,
  Hay Shire Council
- STUBBS, Mr Tim, Environmental Engineer,
  Wentworth Group
- TALUKDAR, Miss Ruchira, Healthy Rivers Campaigner,
  Australian Conservation Foundation
- WILLIAMS, Dr John, Member,
  Wentworth Group

Tuesday, 23 October 2012 – Canberra, ACT

- ARAKEL, Dr Aharon, Adjunct Professor,
  Macquarie University
- GEORGE, Associate Professor Simon, Director,
  Produced Water Research Centre, Macquarie University
- GORE, Associate Professor Damian, Director,
  Produced Water Research Centre, Macquarie University
- HOSE, Dr Grant, Director,
  Produced Water Research Centre, Macquarie University
- RUSSELL, Dr Bill,
  Produced Water Research Centre, Macquarie University

Friday, 23 November 2012 – Canberra, ACT

- BEER, Mrs Jan,
  Private capacity

- BURGE, Mrs Louise, Executive Officer,
  Southern Riverina Irrigators

- CHESSON, Mr Tom, Chief Executive Officer,
  National Irrigators Council

- COZIER, Mr Peter, Convenor and Member,
  Wentworth Group of Concerned Scientists

- DAVEY, Ms Perin, Executive Officer,
  Murray Group of Concerned Communities

- DICKSON, Dr Rhondda, Chief Executive,
  Murray-Darling Basin Authority

- DUNN, Ms Marie Jeanette, Honorary Secretary,
  Murray River Action Group Inc.

- GREGSON, Mr Andrew, Chief Executive Officer,
  NSW Irrigators Council

- HARWOOD, Ms Mary, First Assistant Secretary, Water Efficiency Division,
  Department of Sustainability, Environment, Water, Population and Communities

- HATTY, Mr Ted, Chairman,
  Southern Riverina Irrigators

- JAMES, Mr Russell, Executive Director, Policy and Planning,
  Murray-Darling Basin Authority

- KELLY, Mr Timothy Michael Welch, Chief Executive,
  Conservation Council of South Australia

- LA NAUZE, Mr Jonathan, Healthy Rivers Campaigner,
  Australian Conservation Foundation

- LE FEUVRE, Ms Juliet, Healthy Rivers Campaign Manager,
  Environment Victoria

- LOBBAN, Mr Ian Harold, Chair,
  Murray River Action Group Inc.

- McLEOD, Dr Tony, General Manager, Water Resource Planning, Murray-Darling Basin Authority
- OWEN, Mr Peter, South Australian Campaign Manager, Wilderness Society South Australia
- PARKER, Mr David, Deputy Secretary, Water Group, Department of Sustainability, Environment, Water, Population and Communities
- PATTISON, Mr Kenneth William, Private capacity
- SCHULTE, Ms Stefanie, Economic Policy Analyst, NSW Irrigators Council
- SIMPSON, Mr Bruce Priestley, Chairman, Murray Group of Concerned Communities
- SLATYER, Mr Anthony, First Assistant Secretary, Water Reform Division, Department of Sustainability, Environment, Water, Population and Communities
- STUBBS, Mr Tim, Environmental Engineer, Wentworth Group of Concerned Scientists
- SWIREPIK, Ms Jody, Executive Director, Environmental Management, Murray-Darling Basin Authority

Appendix 4

Recent press articles and NSW Office of Environment and Heritage documentation regarding proposed relaxed flow constraints at Mundarlo Bridge on the Murrumbidgee River

NSW GOVERNMENT | Office of Environment & Heritage

Fact sheet

February 2013

Upper Murrumbidgee Environmental Flows Enhancement Project

What is the project about?

The project is examining the potential benefits and impacts of relaxing the flow constraint at Mundarlo Bridge on the Murrumbidgee River (30km downstream of Gundagai). Potentially higher flow thresholds are being considered that would allow environmental flow releases to be delivered more efficiently to the downstream environment, and in particular the mid-Murrumbidgee wetlands.

What stage is the project at?

Detailed modelling and consultation with key stakeholders is being undertaken to understand and identify potential opportunities, impacts, constraints and benefits associated with a higher flow threshold at Mundarlo Bridge. The project team is now seeking feedback on the modelling results from local community members to inform the options assessment phase of the project.

What are the benefits of this project?

- improve water quality and flows in the lower Murrumbidgee
- improve connectivity of wetlands between Wagga Wagga and Hay
- enhance fishing opportunities in the lower Murrumbidgee near Hay and Balranald
- boost recreational and tourism benefits stemming from improved wetland health and additional bird breeding
- require a higher bridge at Mundarlo which will reduce disruption to local traffic during flood events
- provide greater flexibility in managing water releases as part of flood mitigation.

What are the expected inundation levels?

- the floodplain modelling indicates some increases in inundation of riparian land
- all potential higher flows being examined are below the minor flood level (6.1m at Gundagai, 7.3m at Wagga Wagga, 6.7m at Narrandera, 5.5m at Darlington Point)
- the maximum flow threshold is likely to be similar to the peak flow experienced during the September 2010 event, which was considered a successful environmental watering event for mid-Murrumbidgee wetlands.

When and how often would higher flows occur?

- the release of environment flows depends on the condition and needs of the wetlands to be watered
- this could range from once every two to five years depending on water availability
- opportunities to release managed environmental flows are likely to occur in spring/early summer.
- the community would be notified well in advance of any planned water releases.

To provide feedback on or obtain further information call 1800 991 305 or email murrumbidgeeflows@globalskm.com

Point farmers seeing red

Objection to river flooding plan

▶MURRUMBIDGEE RIVER

DARLINGTON Point farmers and regional leaders have reacted with horror at a plan to force thousands of extra megalitres of water down the Murrumbidgee River.

The NSW Office of Environment and Heritage has unveiled a proposal to remove constraints, including the Mandarlo Bridge upstream of Gundagai, to increase environmental flows in the river.

The department held a meeting in Darlington Point last month to gauge reaction to the proposal and was told it could spark wholesale flooding of local farms and impact tourism in river red gum parks.

Murrumbidgee mayor Phil Wells said the implications of up to 13,000 extra megalitres being pumped under the Mandarlo Bridge daily could be "devastating" for his shire.

"They call them (the river red gum areas at the Point) wetlands, but they're actually lagoons and they are meant to be flooded in a natural flood event, which might only be every four or five years," Councillor Wells said.

"These sort of high flows would give us no beaches and give tourists no access to river red gum parks."

He said there were also fears the extra water would inundate local farming properties.

"All through the basin plan process, we were told farmers would have to be smarter and start using new technologies," Cr Wells said.

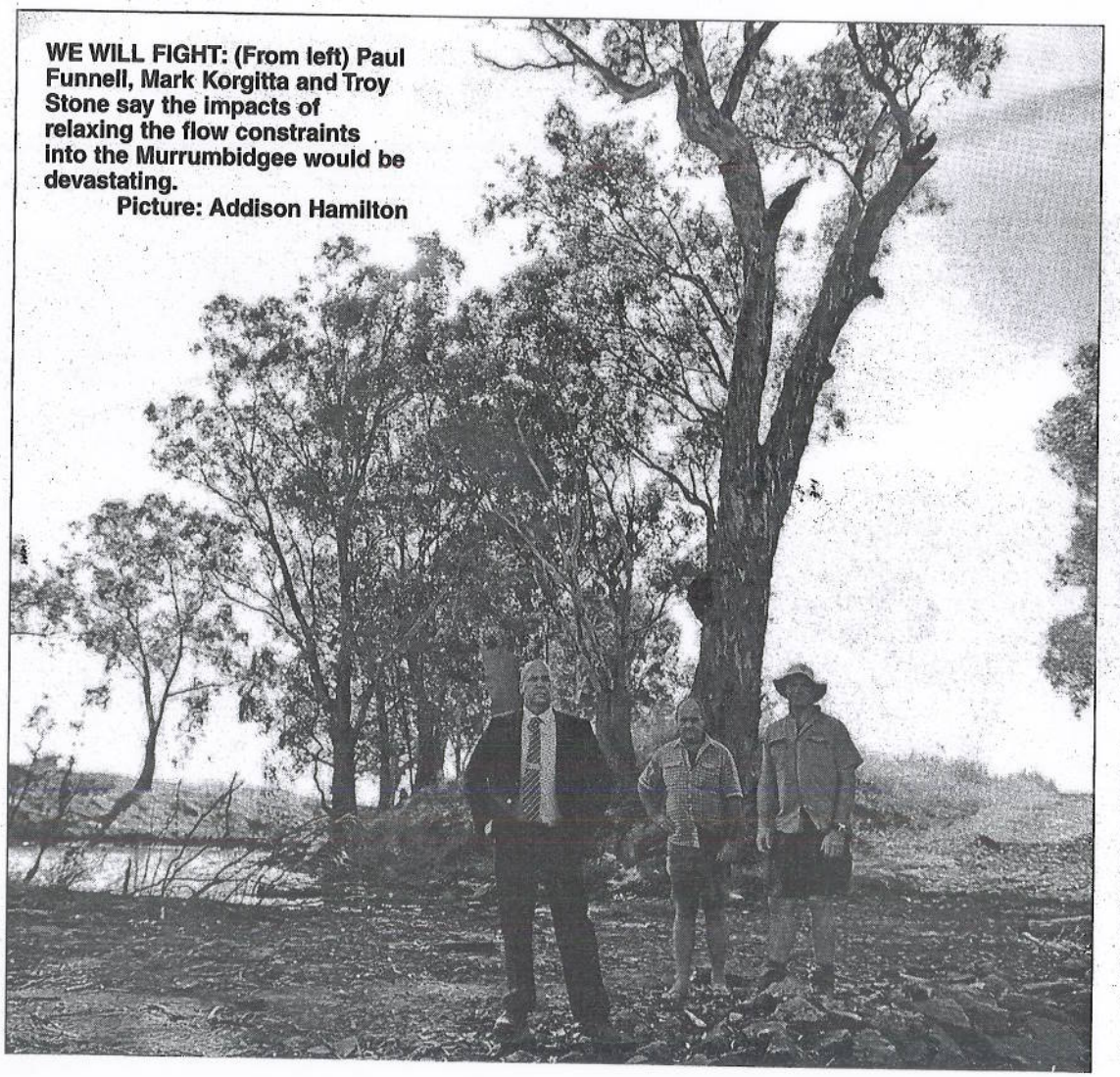
"Why can't the Office of Environment and Water do the same?

"We don't need over-bank flooding to flood these local sites, they can pump and channel it in."

Murrumbidgee council has made a formal objection to the proposal.

– The Area News

Plan would 'finish farmers'



WE WILL FIGHT: (From left) Paul Funnell, Mark Korgitta and Troy Stone say the impacts of relaxing the flow constraints into the Murrumbidgee would be devastating.
Picture: Addison Hamilton

By Ashleigh Gleeson

THE impact will be much more serious than a few pumps going under – it will put lives at risk, cost millions of dollars and damage the environment.

That was the message angry farmers took with them to an Office of Environment and Heritage (OEH) public consultation meeting held in Collingullie yesterday.

OEH is tasked with submitting a report in two months on the feasibility of increasing releases into the Murrumbidgee at Mundarlo Bridge, near Gundagai.

The higher flows would be 6.1 metres at Gundagai, 7.3 metres at Wagga and 6.7 metres at Narrandera.

One of the main questions raised at the meeting yesterday was why Wagga's Floodplain Risk Management Advisory Committee and the chairman of Riverina Water knew little about the proposals.

Farmers also raised concerns for the red gum forest with no apparent research done into what negative impacts the changing conditions would have, as well as erosion to the river banks.

"Can you play God and say it is not going to rain for two weeks?" was a question asked by Collingullie farmer Troy Stone. "Who actually rings up and says I want 7.3 metres to come through?" he asked.

"When someone puts all this together they say we're connected to the river but have no figures to show that, I'm looking for science behind it." Leading Wagga solicitor and landowner at Euberta, Tim Abbott, said he would sue if the proposals went ahead.

"The damage they would create would be in the millions of dollars," he said.

"If they want to do it I will sue their a—e off.

"I'm happy to take on claims for everybody on the river."

Democratic Labor Party branch president and Wagga City Councillor Paul Funnell is on Wagga's Floodplain Committee and spoke at great length at yesterday's meeting. An owner of land near Collingullie, he labelled what was happening as "environmental terrorism".

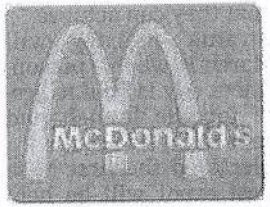
"You are destroying the lives of thousands of people all supposedly under the guise of the environment," he said.

"If you push six metres of water down the river you will flood to a major extent the Berry Jerry State Forest. The economic ramifications of this are a finality, we're finished.

"We want real consultation – the people are fed up. We are not going away."

OEH says increasing the water flows would improve water quality and connectivity to wetlands, enhance fishing opportunities and "provide greater flexbility in managing water releases as part of flood mitigation".

Macca's rumour denied



▶WAGGA

PERSISTENT rumours another McDonald's store will open in the city soon are just rumours according to Wagga franchisee Tony Aichinger.

But a fifth store hasn't been entirely ruled out.

It is understood the business may be looking into establishing a new store on the corner of Kooringal Road and the Sturt Highway, [illegible]site the soon-to-be [illegible] million

Potential flood victims meeting to fight plan

Tim Abbott

▶WAGGA

By Ken Grimson

A PUBLIC meeting will be held in Wagga on Monday to gauge concerns about environmental flows down the Murrumbidgee River which some rural landholders fear will wreak massive flood damage on their properties.

Anger about the flows is so high that some landholders are threatening to sue whichever government they work out is responsible for the inundation.

The focus of their worries is what is known as the Upper Murrumbidgee Environmental Flows Enhancement Project.

It could result in the Murrumbidgee River reaching heights of up to 7.3 metres, a level which Euberta landholder and Wagga lawyer Tim Abbott claims would cause immense damage not only to his property and others, but also financial losses for Murrumbidgee valley businesses and councils.

Mr Abbott said a meeting would be held at the Wagga Commercial Club at 7.30pm on Monday and everyone – not just affected rural producers – were welcome to attend so their concerns could be passed on to government.

"These fools (in government) might then become aware of the number of people affected, the cost and the effect of the flooding and think it is not such a good idea," Mr Abbott said.

Wagga City Councillor Paul Funnell has a property between Collingullie and Currawarna that he believes will go under from a "man-made" flood. He is organising Monday's meeting with Mr Abbott.

"At that level (7.3m) Wagga goes into flood mode," Councillor Funnell said. "It has the potential to destroy people's livelihoods and land."

Mr Abbott has fired off a letter to member for Wagga, Daryl Maguire, warning that government will be held accountable for any flood losses.

He has made application for documents through Government Information Public Access to try to find which level of government is responsible for the plans.

"You don't know whether it is federal or state, who is making the decisions," Mr Abbott said.

Mr Maguire defended the state government, saying it did not create the environmental flow problems and was trying to deal with them the best it could.

The Daily Advertiser FRIDAY 25.1.2013

Thoughts sought on greater water release

▶MURRUMBIDGEE

THE NSW government wants to know what you think about releasing more water into the Murrumbidgee River.

The Office of Environment and Heritage (OEH) will be holding public information sessions next month to discuss allowing a higher water-flow threshold into the Murrumbidgee, near Gundagai.

The proposed increase comes at a time when the amount of water flowing from Blowering and Burrinjuck dams is the highest seen in more than a decade.

OEH is investigating the potential impacts and benefits a higher flow threshold would have on floodplain landholders, waters users and the environment.

Because the height of Mundarlo Bridge limits the volume of regulated water that can pass through the river, OEH is considering raising or replacing the bridge to cater for the increases.

"The height of Mundarlo Bridge currently limits the volume of regulated water that can be passed through the Murrumbidgee River and this is a key constraint to both environmental water management and general river options," OEH director waters, wetlands and coast Derek Rutherford said.

"The project team has undertaken detailed floodplain modelling and consulted with landholder groups, irrigation groups, traditional owners, government agencies and other key stakeholders to introduce the project and identify potential impacts, constraints and benefits."

Mr Rutherford said the potential higher flow thresholds being considered by the study remained below the minor flood level.

The maximum flow that can be passed in the Murrumbidgee before water overtops the Mundarlo Bridge at the moment is 32,000 megalitres a day.

For details on the dates and times of information sessions, or for general information, the project team can be contacted on 1800 991 305 or at *murrumbidgeeflows@globalskm.com*.

Information sessions

Tuesday, February 12

8am to 10am
Gundagai District Services Club, 254 Sheridan Street, Gundagai

4pm to 6pm
Oura Community Centre, Oura Road, Oura

Wednesday, February 13

8am to 10am
Collingullie Memorial Hall, Sturt Highway, Collingullie

4pm to 6pm
Narrandera Bowls Club, corner of Jonsen and Bolton streets, Narrandera

Thursday, February 14

8am to 10am
Darlington Point Club, DeMamiel Street, Darlington Point

4pm to 6pm
Hay War Memorial Hall, 202 Lachlan Street, Hay

Friday, February 15

8am to 10am
Balranald Royal Theatre 88 to 92 Market Street, Balranald

The Daily Advertiser 5/3/13

Tempers flare at meeting

▶WAGGA

By Alex McConachie

OUTRAGE at a proposal by the NSW Office of Environment and Heritage (OEH) to send increased environmental flows down the Murrumbidgee was on full show at a meeting of Wagga landholders last night.

The increased flows could see some landholders around the region facing inundation on large sections of their properties and many are furious at the OEH's proposal.

But the serious ramifications of the proposal aren't limited to just rural property owners, with Wagga also set to face serious consequences if the Murrumbidgee were raised to 7.3 metres, according to Wagga councillor Paul Funnell, who chaired last night's meeting.

"If we get a 7.3-metre river, eight floodgates close in Wagga," he said.

"That puts our stormwater infrastructure in a questionable position.

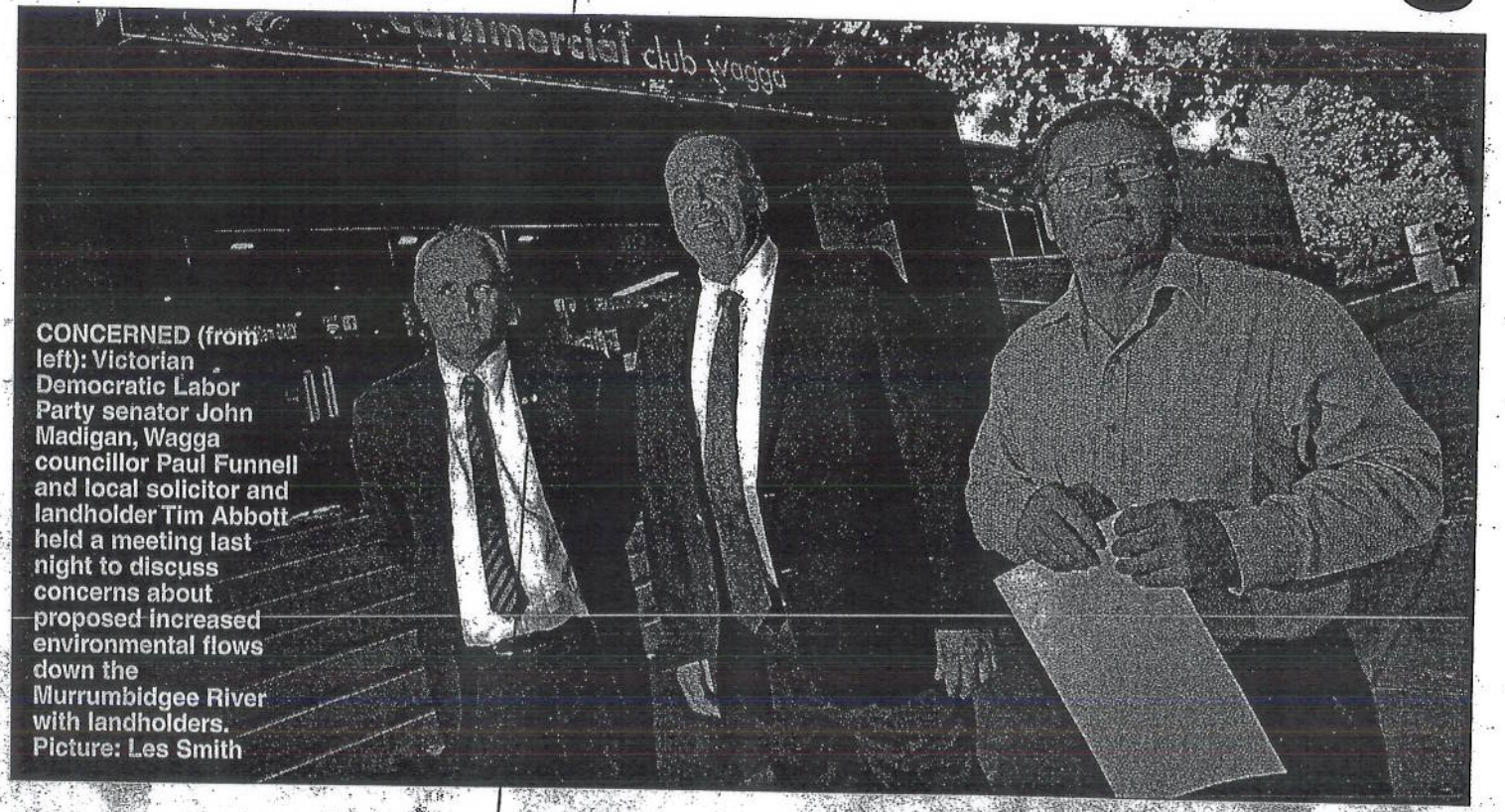
"If we get a rain event in our catchment area – which is thousands of square kilometres – Wagga becomes a bucket that will fill up."

Helping to spearhead the opposition to the OEH's proposal along with Cr Funnell is local solicitor and landholder Tim Abbott, who would see close to 80 per cent of his property go underwater at the river heights the OEH is proposing.

Mr Abbott lashed out at the incompetence of the OEH over the proposal, claiming the department was in the dark on how they planned to implement the proposal, or of its consequences.

"I can tell you now that you can pay an expert anything to tell you anything," he said.

"Even when they're being honest and independent they get it wrong."



CONCERNED (from left): Victorian Democratic Labor Party senator John Madigan, Wagga councillor Paul Funnell and local solicitor and landholder Tim Abbott held a meeting last night to discuss concerns about proposed increased environmental flows down the Murrumbidgee River with landholders. Picture: Les Smith

Last night's meeting resolved to form a committee of concerned landholders to present a united voice to the Murray-Darling Basin Authority, who will consider a report from the OEH over the issue in April.

Victorian Democratic Labor Party senator John Madigan, who is concerned about what ramifications this proposal may have for Victorian communities, also addressed the meeting last night, telling landholders that the proposal was "ludicrous".

"If these people were paid on performance they'd bloody well starve," he said.

Appendix 5

Feasibility study and business case for the proposed Nimmie-Caira project

(Source: documents tabled in the NSW Parliament on 20 November 2012)

Department of Primary Industries
Office of Water

File ref: WS12 / 264

Mr David Parker
Deputy Secretary
Department of the Sustainability, Environment, Water, Population and Communities
GPO Box 787
Canberra ACT 2601

Dear Mr Parker

Nimmie-Caira System Enhanced Environmental Water Delivery Project

I have pleasure in submitting the feasibility study and business case for the Nimmie-Caira System Enhanced Environmental Water Delivery Project.

The Nimmie-Caira Project involves the purchase of 19 properties on the Nimmie-Caira floodplain, owned by 11 farming businesses, together with 381,000 unit shares of supplementary water (Lowbidgee) access entitlement (hereinafter referred to as Lowbidgee supplementary entitlement), and associated water supply infrastructure and improvements.

The project includes the transition of the area from working irrigated agricultural farms to actively managed conservation areas with provision for dryland farming in those areas that are not of high environmental value and includes the costs of an alternative stock and domestic water supply to provide for this. Included in the future land management options to be determined in consultation with the regional community and NSW Government agencies, is the potential for the significant involvement of regional Aboriginal communities in land management activities.

The project includes reconfiguration of water delivery infrastructure to more efficiently and effectively deliver environmental flows onto the Nimmie-Caira area and other parts of the Lowbidgee floodplain, as well as deliver increased flows through the Lowbidgee system to the Murrumbidgee River. This has the potential to significantly increase the capacity to deliver regulated flows from the Murrumbidgee into the Murray River downstream of Balranald.

The total project cost is $185 million, which will enable the transfer of 381,000 unit shares of Lowbidgee supplementary entitlement to the Commonwealth Environmental Water Holder. This entitlement will permit the diversion of up to 381,000 megalitres (ML) each year and equates to a long term average annual yield of 173,000ML. This is expected to

.../2

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reduce the remaining volume required to be recovered to meet the within-valley target in the Murrumbidgee Valley under the Draft Basin Plan.

The location of the Nimmie-Caira area within the Lowbidgee floodplain in the lower reaches of the Murrumbidgee River, together with the reconfiguration of the water supply system will, at times, enable the recovered volume to be excluded form diversion to the Nimmie-Caira area to meet the hydrological requirements of downstream environmental assets in the Lower Murray River.

The project may enable further SDL offsets to be realised by using the Nimmie-Caira infrastructure to more efficiently deliver environmental flows within the floodplain and to downstream environmental assets.

This offer is consistent with the draft National Partnership Agreement (NPA) on Water for the Future: A Healthy Working Murray-Darling Basin. The project achieves a market multiple of 2.25 times the market price of water (Lowbidgee supplementary entitlement) based on the sale price of $246/unit share.

The sale price of $246/unit share for Lowbidgee supplementary entitlement reflects the market price for Murrumbidgee supplementary entitlement adjusted for the quarantining it from impacts from growth in use through out the Murrumbidgee Valley, provision for which is to be included in the water sharing plan. Further, the price reflects that a Lowbidgee supplementary entitlement will provide for far greater environmental outcomes in the Lower Murrumbidgee and Murray valleys than could be achieved through the acquisition of NSW high or general security entitlements.

The total project cost includes a 10 per cent contingency to offset any potential financial risk to the NSW Government in the implementation of this project. Consistent with the draft NPA, any cost savings achieved will accrue to NSW and will be used for other environmental projects within the NSW Murray-Darling Basin that may further contribute to the within-valley or downstream shared component of water recovered to meet the Sustainable Diversion Limits in the Proposed Basin Plan.

The NSW Office of Water is proposing that the project be implemented in two stages.

Stage 1, will include the purchase of the land, water entitlements and associated water supply and management infrastructure, the administrative and legal costs involved in the transfer of the assets and project management costs. Stage 1 will include the transfer of the 381,000 unit shares of Lowbidgee Supplementary Entitlement that has a Long-Term Average Annual Yield of 173,000ML.

The cost of Stage 1 is $121,000,000, and is payable on the agreement by the Australian Government for the NSW Office of Water to proceed with implementation of the project, consistent with the business case.

Stage 2 of the project provides for the implementation of the outstanding components of the project as defined in the business case, including:

- Water delivery and infrastructure reconfiguration
- Land management transition arrangements
- Water planning and modelling
- Local community offset projects
- Project management and governance.

The cost of Stage 2 is $64,000,000, and implementation activity would commence as soon as a detailed implementation plan is submitted to the Commonwealth, as outlined in the business case.

NSW proposes the following payment milestones to allow for the efficient delivery of the project:-

i.	On project approval	$121 million
ii.	On exchange of contracts and delivery of the implementation plan	$20 million
iii.	On settlement of purchase and transfer of entitlement	$44 million

The Nimmie-Caira System – Enhanced Environmental Water Delivery Project represents a unique opportunity to recover a large volume of water currently used for consumptive purposes at a strategic location in the Murrumbidgee Valley that will contribute to the volume of water needed to be recovered to meet the sustainable diversion limits (SDLs) within the proposed Basin Plan.

The Nimmie-Caira landowners are a collective of willing participants in the project and have entered into a joint landholder agreement to facilitate the implementation of the project. The project has support of the NSW Government and the broader Murrumbidgee community.

Most importantly, the project delivers water for the environment and the opportunity to secure one of the significant environmental assets in the Basin, while maintaining or enhancing the social and economic benefits in the region.

The Nimmie-Caira Project is a combination of infrastructure works, social and economic offsets, and includes the strategic purchase of land and water entitlements. The NSW Office of Water would recommend that funding for the project be apportioned between the 'Restoring the Balance Program' and the remaining allocation available to NSW under the 'Sustainable Rural Water Use and Infrastructure Program'.

As we have previously discussed there is an imperative that Stage 1 of the project be implemented as soon as possible.

File ref: WS12 / 264

I therefore seek the agreement of the Australian Government for the project based on the business case submitted, plus the additional 10 per cent contingency and subject to agreement, to proceed as soon as possible with Stage 1 of the project as described.

I look forward to your favourable consideration of this offer and early response.

Yours sincerely

4. 7. 2012

David Harriss
Commissioner, NSW Office of Water

Cc: NSW Minister for Primary Industries

Table 3.1 Summary of Nimmie-Caira Project

Nimmie-Caira Project Summary		
Project Component	**Description**	**Cost ($)**
Purchase of Nimmie-Caira land and water package	Purchase of 381,000 shares of Lowbidgee Supplementary Water Entitlement. Purchase of 84,000ha of Nimmie-Caira land across 19 properties. Purchase of Nimmie-Caira landholder water delivery infrastructure.	120,000,000
	Legal Services associated with the purchase.	100,000
Water Delivery Infrastructure Reconfiguration	Upgrade of system capacity to deliver up to 3000ML/day through the system.	
	System upgrade to optimise delivery efficiency.	
	Automation and moderisation of system operation.	16,259,823
	Rationalisation of infrasturcture to facilitate movement of water through the floodplain and minimise operation and maintenance costs.	
Land Transition Arrangements	Establishment of easements.	
	Decommissioing of fencelines, establish of boundary fences.	
	Pipelined water supply	
	Provision of utilities	25,550,000
	Environmental water management services.	
	Cultural heritage survey.	
Water Planning and Modelling	Environmental water plan	
	Verification and modelling of system losses	
	System operational Plan	500,000
	Hydrological modelling and verification of off-sets	
Local Community Offset Projects	Road upgrade for Waugorah and Loorica Roads to maintain access.	
	Community Development Coordinator for Hay Shire.	
	Community Interpretive Centre Nimmie-Caira Module in Balranald.	4,547,000
	National/regional tourism marketing.	
Project Management and Governance	Project Manager	
	Project Steering Committee	1,300,000
	Monitoring and Reporting	
Total		**168,256,823**